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brief 14

The Transformation of the Defense Industry in Hungary

july 99

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The Transformation of the Defense Industry in Hungary

by
Yudit Kiss

july 99

Zusammenfassung

German Summary

Die Rüstungsindustrie in Ungarn wurde seit dem Ende der 80er Jahre radikal verändert. Nachdem noch 1987/88 ein Höchststand der Produktion mit 30.000 Beschäftigten erreicht worden war, sank die Industrie in den 90er Jahren in eine tiefe Krise.

In den ersten Jahren nach dem politischen Umbruch von 1990, der eine rechts-bürgerliche Regierung an die Macht brachte, mußte die immer noch weitgehend staatliche Rüstungsindustrie fast ohne staatliche Unterstützung in einer völlig veränderten Umwelt um ihr Überleben kämpfen. Die Regierung stellte sich auf den Standpunkt, daß die Rüstungsfirmen sich anpassen und den zivilen Märkten stellen mußten. Für die dafür notwendige Konversion von Produktionsanlagen waren keine nennenswerten Hilfen vorgesehen.

1993 war die Produktion auf 10 Prozent des Niveaus von 1988 gesunken, die Beschäftigung betrug noch etwa 20 Prozent der Zahl von 1988. Viele Firmen hatten sich mit mehr oder weniger mäßigem Erfolg an der Konversion ihrer Produkte und Produktionsanlagen versucht. Relativ erfolgreich waren vor allem solche Firmen, die, zum Teil auf der Grundlage von Konkursen, radikale Umstrukturierungen vornehmen konnten. Musterbeispiel hierfür ist Videoton. Videoton profitierte vom vorhandenen Know-how im Bereich von Elektronik und Telekommunikation, einer traditionellen Stärke der ungarischen Rüstungsindustrie. In vielen anderen Fällen aber blieb die, in der Regel nur teilweise, Umstellung der Rüstungsproduktion auf Fertigung für zivile Märkte Stückwerk.

Ab 1992 begann die Regierung ihre Politik zu ändern. Pläne für den staatlich gesteuerten Aufbau einer starken Rüstungsindustrie erwiesen sich jedoch bald als unrealistisch. Die politische Steuerung wurde dem Ministerium für Industrie und Handel übertragen, das eine pragmatische Haltung gegenüber Konversion und Stützung der Rüstungsindustrie einnahm. Die Regierung war bereit, Firmen zu unterstützen, zum Beispiel durch Entschuldung, ohne eine umfassende Steuerung anzustreben. Die Reste der ungarischen Rüstungsindustrie begannen sich zu konsolidieren. Grundlage hierfür waren vor allem Exportaufträge. Auch wurde die Privatisierung, die in den frühen 90er Jahren kaum vorangekommen war, nun auf der Grundlage klarer Regeln beschleunigt.

Die Hauptlast und -verantwortung für die Anpassung an geschrumpfte militärische Märkte und den Auf- oder Ausbau ziviler Produktion blieb jedoch bei den verschiedenen Firmen.

Veränderungen zeigen sich vor allem in drei Dimensionen: Eigentum, Produktionsprofil und Organisationsstruktur.

Bis 1998 war die ehemalige ungarische Rüstungsindustrie bis auf wenige Betriebe privatisiert. Eine wichtige Rolle spielte dabei ausländisches Kapital. Allerdings erwies sich Privatisierung nicht als Allheilmittel. Das Beispiel dreier Firmen (MFS, Gamma Muvek, Siemens-Telefongyar) zeigt die Bandbreite der Effekte der Privatisierung.

Alle Firmen waren gezwungen, ihr Produktionsprofil zu ändern. Etwa ein Drittel der noch Ende der 80er Jahren wichtigsten Firmen konvertierten ihre Produktionsanlagen vollständig auf zivile Produkte. Entgegen anfänglicher

Hoffnungen brachte die Konversion nicht die Rettung vom zurückgehenden Militärgeschäft, blieb aber auch nicht ohne Erfolge. Dies zeigen Kurzanalysen von drei Firmen (Bakony Movek, Danuvia Gepipari, BHG). Der große Rest betrieb Diversifizierungsstrategien. Anstrengungen wurden unternommen, die zivile Produktion auszubauen, ohne daß die militärische Produktion aufgegeben wurde. Beispiele, die kurz beschrieben werden, sind FMV und Nitrokemia-Nike-Fiocchi. Nur wenige Firmen, wie PVG, DIGEP-AG und Mechlabor, setzten überwiegend auf Rüstungsproduktion.

Die betroffenen Firmen unternahmen eine Vielzahl von Reorganisationen, Aufteilungen und Veränderungen der Rechtsform. Nur einigen gelang eine vollständige Reform der Organisationsstruktur. Zahlreiche Arbeitsplätze gingen verloren, wobei Beschäftigte außerhalb des wirtschaftlichen Zentrums Budapest stärker betroffen waren. Produktionsanlagen und Netzwerke wurden nur in einigen Fällen übernommen. Der Verkauf von Flächen war oft eine wichtige Quelle zur Finanzierung der Umstellung.

Im Ergebnis hatte Ungarn 1998 eine stark geschrumpfte Rüstungsindustrie, mit noch ca. 5.000 Beschäftigten. Die Industrie hatte sich außerdem gegenüber der Zeit des Staatssozialismus deutlich verändert. Um den Preis signifikanter Verluste an Arbeitskräften und Kapital sind die verbliebenen Rüstungsfirmen effizienter, flexibler und stärker in die ungarische und Weltwirtschaft integriert. 1997/98 begannen sich die Zeichen zu mehren, daß nationale Beschaffung und internationale Kooperation deutlich zunehmen werden. Die allgemeine wirtschaftliche Erholung und die Aussicht auf die Mitgliedschaft in der NATO verstärkten den Trend der Wiederbelebung der ungarischen Rüstungsindustrie.

Summary

The Hungarian defense industry has undergone a radical transformation since the end of the 1980s.

After reaching a production peak in 1987/88 it then sank into a major crisis. As of 1993 the sector was only producing approximately 10 percent of its record output and employed 20 percent of its previous workforce.

From 1994 the first signs of consolidation appeared. Defense industry production resumed, some important export deals were concluded, and some crucial questions regarding privatization and official support for the sector were decided. The consolidation of the Hungarian defense industry was principally industry-led. State authorities exerted a conspicuously minor influence on the sector compared to that of the past.

The most important sectoral transformations took place in three dimensions: ownership changes, profile changes and organizational changes.

By mid-1998 the bulk of Hungarian defense industry enterprises were privatized. As the Hungarian armed forces were left with very restricted possibilities for ordering new equipment from the defense industry, the sector was principally dependent on foreign orders and financing. As a result, foreign capital became an important new actor and played a significant role in shaping the sector.

About one-third of the principal weapon producers of the late 1980s converted their production to civilian use. The remainder diversified their activities, preserving an important defense-related division while extending the scope of civilian production. Some companies opted to become predominantly military-oriented. As far as organizational changes were concerned, defense industry enterprises went through

reorganizations, decentralizations and legal transformations. Some accomplished genuine restructuring by transforming the entire functioning of the enterprise.

As a result of all these changes, by mid-1998 the Hungarian defense industry was significantly reduced. It had a different structure and internal hierarchy than that which had prevailed under state socialism. At the price of significant human and material losses, the surviving defense-related companies became more efficient, more flexible and more integrated in both the Hungarian and world economies. As of 1997/98 there were signs that local orders and foreign cooperation would significantly increase. The general economic recovery and imminent NATO membership have also increased the prospects for a strengthened Hungarian defense industry in the foreseeable future.

Historical Background

The origins of the Hungarian defense industry date back to the Austro-Hungarian Empire, when some of the major arms factories were established in the framework of a large-scale, state-backed industrialization program. The most important defense-related branches were the electrotechnical industry, with companies like Tungsram, Telefongyar, Ganz Gepgyar and Lang Gepgyar; the vehicle and agricultural machinery industry—the most important company being Weiss Manfred Works, later known as Csepel Steelworks—and the aircraft industry. These companies were all based in Budapest.

The end of the First World War significantly restricted the demand for these products. The Versailles Peace Treaty had imposed severe restrictions on the military capabilities of the defeated powers, including Hungary. The absence of both internal and external demand led to a near halt in the sector's activities. From the end of the 1920s, the defense industry was rebuilt in cooperation with the country's new allies, first Italy and later Germany. Ammunition, hand weapon and armed vehicle production, precision and optical engineering industries were added to the existing branches. In the so-called 'Program of Győr' launched in 1938, Hungary announced its decision to rearm itself in preparation for the next war. At the height of the defense industry reconstruction 70,000 people were directly employed in the sector. The most important companies in this period were the Fegyvergyar, Danuvia and Diosgyori Gepgyar (Tothszollosy, 1993, p. 5).

The Hungarian defense industry emerged from the Second World War in ruins. With the subsequent Communist takeover in 1948, and the introduction of a new, forced industrialization program in which heavy industrial branches (including metallurgy, machinery, chemical and construction) were prioritized, the defense industry became an engine of industrial growth. In 1953, 70 percent of the Hungarian armed forces' needs were met by the indigenous military industry (Gombos, 1992, p. 1). This period culminated in the establishment of the Warsaw Treaty Organization (WTO) in 1955. The country's increasing economic and political difficulties led to the 1956 popular uprising, which was followed by a slow and painful stabilization period. During this time defense industry development ground to a halt.

Reorganization began anew in 1958 according to guidelines established by the Warsaw Pact. Dual-purpose factories produced goods for both military and civilian use, working primarily on the basis of Soviet licenses. Exchanges between WTO member countries were organized in a quasi-barter system. Arms imports were paid for with arms exports and the balance was filled with both military and civilian goods. According to Gombos, by 1970 the Hungarian defense industry had reached a size and structure which corresponded to the needs of the WTO, as required under the alliance agreement (Gombos, 1992, p. 1). Hungary specialized in telecommunications, vehicle and chemical production, and field equipment for the Hungarian armed forces was also locally produced. While the country was a member of the Warsaw Pact, defense industry production had a higher rate of growth than the national industrial average.

Between 1970 and 1988 the structure of the defense sector gradually changed. The share of weapons production dropped from 15 to 8 percent, ammunition from 22 to 1 percent, and vehicles from 34 to 7 percent. Conversely, the share of telecommunication equipment increased from 25 to 80 percent (Tothszollosy, 1993, p. 5). Seventy percent of the Hungarian armed forces' needs by this time were being met through imports. In the mid-1980s a major modernization program was undertaken to extend and modernize existing production capacities.

The Peak Years

In the late 1980s, the Hungarian military industrial output consisted of 66.7 percent telecommunication electronics and precision instruments, 13.8 percent vehicles, 10.8 percent weapons, and 1.8 percent ammunition. The remaining 6.9 percent was listed as 'other products' (Csobay, 1990a). Most of this production was geared towards export markets. In the peak year of 1988, 76 percent of production was exported, of which 60 percent went to the Soviet Union. (*Heti Világgazdaság*, 5 November 1994). According to data published in 1994¹, in the 1988 peak year 40 enterprises produced 21 billion Hungarian forint (Ft) in military output, amounting to 2.5 percent of the total manufacturing sector output (*Heti Világgazdaság*, 5 November 1994). The share of defense-related activity for machine industry production reached 6 percent, and between 25 and 30 percent of electronics and instrument production was for defense purposes (Kovacs, 1994). Approximately 30,000 people were directly employed in the defense industry, comprising nearly 2 percent of the economically active population (*Figyelő*, 14 February 1991).

All defense-related companies had mixed profiles, with the exception of the Godolloi Gepyar, an armored vehicle and weapon repair factory whose entire output was military-related. 93 percent of Hungary's military output was produced by 17 enterprises, and the share of production devoted to the military sector ranged from 7.1 percent up to 82.2 percent of their total production portfolios. There were only five companies in which defense-related production represented more than half of the overall output. In addition to the companies directly involved in defense-related production, there were a further 13 companies which were

also considered as such since, although they were not producing for the military at the time, they had maintained military-related production assets (Gombos, 1994, p. 4).

Most defense industry companies were based in the capital, Budapest. Some facilities were developed in already established industrial centers, for example around Miskolc, Szekesfehervar or Veszprem. Other companies were green-field investments set up in remote areas for security reasons. There was a strategic consideration in the post-World War II regional organization of the Hungarian defense industry, which resulted in the replication of major production facilities on the western and eastern sides of the country. This constituted preventative planning, as it was believed that in the event of an attack from the West, companies in the Trans-Danubian region would be destroyed. As a result, the principal heavy metallurgy and chemical centers were developed in the northeast of the country, near the border with the Soviet Union.

¹ Data published about the Hungarian defense industry is still scarce and contradictory. Even data concerning the past changes regularly.

Political and Economic Changes

The momentous events of 1989/90 brought major political and economic changes to Hungary. Following decades of a closed one party system rule based on a centralized yet comparatively liberalized command economy, a new multiparty Parliamentary system and market economy were introduced. Successive post-Communist elections held in 1990, 1994 and 1998 resulted in shifting coalition governments, with different parties holding a majority position. The first post-Communist government which came to power after the elections in 1990 was led by the center-right Hungarian Democratic Forum (MDF). After the 1994 elections a new coalition was formed through an alliance between the Hungarian Socialist Party (MSZP), a reformed successor of the pre-1989 ruling Party, and the Alliance of Free Democrats (SZDSZ), a party created by the former opposition to the Communists. In 1988, this coalition was ousted by a new right-wing coalition consisting of the Alliance of Young Democrats-Hungarian Civic Party (FIDESZ-MPP), the Smallholders Party (FKGP) and other, minor right-wing parties.

Thanks to its earlier efforts at economic and political reform, Hungary was already in a relatively advanced social and economic position by the time the major socio-economic transformation began. Nevertheless, it proved unable to weather the transition crisis which followed the end of the Cold War. Industrial and agricultural output dwindled due to lack of demand. Faced with declining terms of trade, a mounting budget deficit, increasing external and internal debts, high and stagnant unemployment and inflation levels, and with investments at a near standstill, a dramatic process of

social and regional differentiation began to unfold. To stabilize the economy and redress macro-economic imbalances, the Socialist-Liberal coalition introduced an austere economic stabilization package in the spring of 1995. While the project had a negative impact on social welfare, it succeeded in improving the general state of the economy. In 1996 economic growth resumed, with an important increase in industrial production and investments. By the end of 1997 foreign debt had been halved, the public sector deficit had decreased and inflation was diminished (*Financial Times*, 9 December 1997).

Due to this macro-economic stabilization program and the demilitarization efforts launched after 1990, military expenditures were radically scaled down along with considerable reductions in the size of the national armed forces, with personnel dropping from 155,000 to 60,000 between 1989 and 1997.

Table 1: Hungarian military expenditure, 1990–1997

^a: In billion forint, current prices

	1990	1991	1992	1993	1994	1995	1996	1997
<i>Military expenditure^a</i>	52.4	54	60.8	64.5	66.5	76.9	87.9	96.8
<i>Real value (1989=1)</i>	0.85	0.65	0.6	0.55	0.44	0.39	0.36	0.33
<i>Share of development military expenditure</i>	19%	12%	11%	7.5%	9%	5.4%	7.2%	7.5%
<i>Share of military expenditure in GDP</i>	2.5%	2.3%	2.3%	1.9%	1.6%	1.4%	1.2%	1.2%

Crisis and consolidation

The major structural crisis of the Hungarian defense sector began to manifest itself immediately following the peak year of 1988. From 1989, defense expenditures plummeted. With the dissolution of the Warsaw Pact and the abandonment of the Council for Mutual Economic Assistance (CMEA)—the trade and economic organization of the former Eastern bloc—Hungary lost its traditional export ‘markets’. Arms producing industries found themselves hard hit by the sudden socio-economic transformation as demand fell and production ground to a near standstill. In addition they lost the substantial subsidies and protection previously offered by the state.

The crisis reached its lowest point in 1993. Most defense-related companies were insolvent and many balanced at the edge of bankruptcy. According to a Ministry survey quoted by Mr. Andras Nagy, head of a Parliamentary subcommittee in charge of the defense industry, 87 percent of defense-related companies had only average level or else obsolete production technologies in 1993. In the event of a sudden

increase in demand, 56 percent of enterprises would have had insufficient numbers of qualified workers to fill orders. 81 percent of the companies had not fabricated defense-related products at all since 1990 (*Magyar Hírlap*, 12 May 1993). By the end of 1993, the sector was only utilizing 20 percent of its remaining production capacities (Medgyesy, interview, 1994).

Beginning in 1994, however, the first signs of consolidation appeared. Certain companies had managed to stabilize their position. New export deals were concluded with Ukraine and India, among others. In November 1995 it was announced that Dunai Repulogepeggyar Rt. would cooperate in the production of the Swedish JAS 39 Gripen aircraft. This was the first case of the sought-after ‘new’ form of military cooperation involving Western defense contractors. In 1995 it was officially announced that local producers would have an opportunity to participate in contracts to modernize the communication system, the chemical and nuclear instrument

equipment, and a vehicle park of the Hungarian armed forces (*Nepszabadsag*, 18 October 1995). These developments provided new hope for Hungary’s surviving defense-related companies.

Due to a newly introduced law on secrecy, no official data was published concerning defense industry output after 1995. According to Dr. Geza Peter Kovacs, head of the Magyar Hadiipari Egyesulet (MHE, Hungarian Defense Industry Association), defense industry production in 1997 reached approximately 6–8 percent of the record level set in 1988/89 (*Napi Gazdasag*, 30 October 1997). In a 1998 interview, Dr. Kovacs quoted figures for defense industry output in the first 6 months of 1997 of approximately Ft5–10 billion, produced by 5,000 employees of 40 companies (*Napi Gazdasag*, 25 March 1998).

Table 2: Hungarian defense industry production, 1988–1995

Sources: For columns 1–4: Isaszegi interview, *Vilaggazdasag*, 28 September 1994; for columns 1–4, data marked with an *: Hegyhati interview, *Nepszabadsag*, 27 November 1993; for column 3: *Heti Vilaggazdasag*, 5 November 1994; for column 6: Takacs interview, *Nepszabadsag*, 18. October 1995; for column 7: Nagy interview, *Vilaggazdasag*, 4 August 1995.

	1988	1990	1992	1993	1994	1995
Output (in billion forint)	21	9.3	4.7*	6.7	6.3	6.7
Workforce	30,000	-	-	5,600	-	5,600
Companies	40	-	80*	66*	60	60
Share of military production in GDP	3%*	-	-	Less than 1%*	-	-
Export	75%	50%	80–90%*	Ft1.4 bn	-	20%

The official policy on defense industry

The first major institutional changes concerning the defense industry followed the political changes that took place from the early 1990s. The special institutions and tools that had legitimized the defense industry's privileged status in the past were abolished. Representatives of the new government which took office following the elections of 1990 declared that the defense industry would be expected to cope with the new economic environment as any other branch of production. Soon, however, policy guidelines changed, and in January 1992 a Military Industrial Office (MIO) was set up to coordinate and promote military production.

The MIO's large-scale projects envisaged the creation of a state-owned military industrial holding and a revamping of the Hungarian defense industry to reproduce, and even surpass, its pre-crisis levels. Following long debates and political confrontations, the MIO was dissolved in 1994 and a department of the Ministry of Industry and Trade was charged with the task of coordinating the Hungarian defense industry.

By the mid-1990s a different, pragmatic attitude concerning the sector emerged. Mr. Bela Takacs, head of the Ministry department in charge of the sector confirmed that state agencies were unable and unwilling to artificially recreate the defense sector of the pre-1989 scale. The Ministry had attempted to improve coordination and cooperation within the sector, among those companies that had succeeded in overcoming the crisis by and large of their own accord. In so far as their possibilities permitted, representatives of the Ministries of Industry and Trade, Defense, and Foreign Economic Relations provided direct and indirect assistance to defense industry companies. They mediated access to credits, promoted loan forgiveness, organized export deals and represented Hungarian firms in international negotiations.

In the spring of 1997, at the request of the Ministry of Industry and Trade, a total of Ft461 billion in bad debts accrued by eighteen defense-related companies as a result of pre-1989 investments were written off. The most important of these companies were Videoton Ipari Rt., Tavlozlesi Innovacios Rt. (TKI) and Mechlabor. There was a precedent for such action: before 1992, fourteen enterprises had been allowed to write off a total of Ft381 billion in bad debts, and the following year the Minister of Defense requested that Parliament permit forgiveness of an additional Ft230 million worth of bad debts belonging to HM Radar Rt. (*Napi Gazdasag*, 4 February 1997).

A consolidation project was launched by the state in 1993. This involved the selection of certain state-owned enterprises which, due to their macro-economic and strategic importance, qualified for intensive state aid in the form of debt-cancellations, additional loans, and other protective measures. Of the thirteen major enterprises chosen, five were military-related: Ganz Gepgyar, Raba Rt., MGM, Nitrokemia and Budapesti Híradastechnikai Gyar (BHG).

The authorities also created an institutional framework to assist the companies in establishing international contacts.² They helped enterprises obtain quality certificates, eventually even providing them with modest financial backing. At the end of 1997 the economic office of the Ministry of Defense signed a cooperation agreement with the Hungarian Organization of Standards, according to which a company could receive military quality certificates as soon as they had qualified for a civilian one (*Vilaggazdasag*, 9 September 1997; Takacs, 1997a).

Another indirect way in which the Government supported the defense sector was through the promotion of military-related R&D. In 1993 a special 'Defense Industry and Defense Technology Development Committee' was set up within the National

Technical Development Committee (OMFB), the state agency in charge of coordinating and promoting R&D. Enterprises could apply for preferential loans to develop competitive new products (Balotay, 1993; Medgyesy, interview, 1994). Despite the grave crisis in the Hungarian defense industry, the development of defense technology—financed jointly by OMFB, the Ministry of Defense and the Ministry of Industry and Trade—continued throughout the 1990s.

State policy concerning the defense industry was one, but not the only, decisive factor that reshaped the Hungarian defense sector. Market forces and the enterprises' own efforts played equally important roles.

The changes took place in three main dimensions:

- ownership changes,
- production profile changes and
- organizational changes.

These changes all comprised combinations of state- and enterprise-level decision-making. The decision of whether and when to privatize a company rested ultimately with the state, although some companies tried to influence outcomes through lobbying. Conversely, whereas production profile changes were by and large decided at enterprise level, state agencies could suggest or indirectly encourage certain directions. At the beginning of the post-Cold War transformation, the declared "neutrality" of the state regarding the defense industry prompted several companies to radically alter their production profiles. Later, the prevailing indecisiveness of the state agencies was often interpreted as a sign of the possible future rejuvenation of the defense industry. This reinforced the decision of several companies to conserve their defense-related assets.

² In 1996 Ministry-level cooperation agreements were signed with India and Sweden, for example.

Major Changes in the Defense Industry

Ownership changes

At the beginning of the transformation period all defense-related companies had been state owned and supervised by their respective Ministries (Ministry of Defense or Ministry of Industry and Trade). In the early 1990s policy guidelines concerning the privatization of defense-related companies were not clear. At first defense industry companies were supposed to be privatized quickly, as with any other enterprise. Soon afterwards, however, it was officially decided that for national security reasons no military-related firms would be privatized for the time being.

Between 1990 and 1994, privatization was a highly contested issue in the power struggle among various Ministries, state-asset managing and privatization agencies, and the companies themselves. These different organizations pushed alternatively for rapid privatization on the one hand and state ownership on the other. As a result, some companies, for example DIGEP-AG, were hastily sold, while the sale of other companies remained blocked for lengthy periods. PVG-Dunai Repulogepgyar and MFS-Magyar Loszergyarto Kft., for example, had to wait years for their privatization deals to come through.

After 1994, with the advent of a Socialist-Liberalist coalition (MSZP-SZDSZ), privatization was accelerated. With the exception of a handful of companies, the bulk of Hungarian enterprises—including those with defense-related activities—were put on the market or made available to their managers and employees. By mid-1998 most had been privatized. The few

remaining majority state-owned enterprises were under the control of various state apparatuses.

The Ministry of Defense supervised five military-related companies principally specialized in repair and services. In addition to the obligatory services they provided for the armed forces, these enterprises became increasingly involved in activities within the civilian sphere. HM Currus Rt., a tank and armored vehicle repair company which was an offspring of Godolloi Gepgyar, amassed the bulk of its profits from civilian production, mainly in the repair and transformation of trucks and tractors. Another company which specialized in radio-technological equipment succeeded in pulling itself out of the red thanks to its specialized shops which sell hunting and fishing equipment. According to Ministry of Defense planning, in the near future these companies are to be at least partially privatized (*Heti Világazdaság*, 20 April 1996; *Magyar Hírlap*, 21 April 1998).

Two research institutes, Tavlozlesi Innovacios Rt. (TKI) and Merestechikai, Informatikai Kutato es Innovacio Rt. (MIKI) were placed under the control of the Ministry of Industry and Trade. This measure was taken principally to ensure the continuity of R&D activities at these firms. TKI specialized in research and production of electronics and microwave equipment. MIKI developed and produced measuring instruments and equipment for informatics.

In the early 1990s, both TKI and MIKI underwent major restructuring. They were compelled to make drastic personnel cuts and to reduce the scope of their economic activities. Both

institutes nonetheless managed to introduce efficiency, creativity and profitability as the major guidelines for their company activities. They also succeeded in preserving dynamic and flexible working teams and continued with their own R&D. Furthermore, both pursued active marketing policies, resulting in a wide network of cooperation partners both in Hungary and abroad (Tothszollossy, interview, 1994; Erdej, interview, 1993). By 1998 both companies were reporting relative financial stability.

According to a new law on privatization passed in 1997, ten Hungarian companies were to be retained as long-term state-owned properties, among them three military-related companies (Magyar Loszergyarto Kft., Fegyver es Gazkeszulekgyar Rt. (FEG) and Mechanikai Muvek. They would be managed by the state asset privatization and managing company APVRt.³ FEG, one of Hungary's major weapon exporters, was able to maintain its strong position primarily due to its solid export markets. Magyar Loszergyarto Kft., on the other hand, struggled with serious financial difficulties, but it was hoped that in time its position would stabilize. Mechanikai Muvek failed to carry out a genuine transformation and was unable to find major orders either locally or on the export market. The enterprise was kept afloat through state financing.

Bakony Muvek, Gamma Muvek, FMV, Danuvia, Mechlabor and Videoton were all privatized with the participation of Hungarian capital. Bakony, Dunai Repulogepgyar Rt. and FMV were bought up by their own employees and managers. The problem with this type of ownership change was that it rarely provided the additional capital infusions that were necessary

³ At the beginning of the transformation process there were several agencies involved in state asset management, privatization and company transformation. By 1998 the principal actor was Allami Privatizacios es Vagyonkezeló Rt. (APVRt., State Asset Privatization and Managing company).

for a company's reconstruction. Videoton was a unique case, because unlike Bakony, Gamma Muvek and FMV Rt.—which struggled with a lack of capital and orders—its new owners were successful in mobilizing a considerable amount of external economic and political capital.

Foreign capital became a major new actor in shaping the Hungarian defense industry. However, unlike other Eastern European countries, foreign capital participated principally in privatization, the creation of joint ventures and enterprise restructuring projects, and not specifically in military development programs in Hungary. DIGEP-AG was bought up by Russian businessmen; Matravideki Femmuvek (MFS) by a Canadian-American entrepreneur; Orion Elektronikai Kft.'s majority shares were bought first by a Russian and later by a Singapore-based business group; Telefongyar and Danuvia established joint ventures with German partners; Comasec-Respirator Rt. was founded with Hungarian and French capital; Gamma Muvek's portfolio included some US participation; a deal between a division of Nitrokemia and Fiocchi led to the creation of an Italian-Hungarian joint venture; and FMV established a joint venture with Italtel and the French Alcatel.

The cases of privatization of the Hungarian defense industry enterprises reveal that wherever management succeeded in accomplishing genuine restructuring, and where the company's owners were able to mobilize capital, find markets, promote technology transfers and facilitate the firm's insertion into the national and international economies, the potential for success was far greater.

Private ownership became crucial because it could provide indispensable capital infusions needed for restructuring projects which the state was no longer able to finance. The facilitation

of access to new business contacts was also an important factor in the successful cases.

At the beginning of the transformation there were high hopes that foreign capital would invigorate the Hungarian defense industry, and the Hungarian economy as a whole. However, if the new foreign owners proved unable to push for genuine restructuring and provide the above-mentioned elements required for it, privatization with foreign participation did not bring the desired results either. The privatization attempts of DIGEP-AG and MFS-Magyar Loszergyarto Kft. failed for these reasons. In addition, FMV was forced to pull out of its joint ventures, while BHG was abandoned by its potential joint venture partners. On the other hand, Orion managed to overcome its crisis and was able to make progress due to the investments and fresh market contacts made by its new foreign owners. Foreign cooperation had also been extremely advantageous in the cases of Videoton, Comasec-Respirator Rt. and Nike-Fiocchi. Telefongyar also survived to become a successful company as a result of its strategic alliance with the German company, Siemens.

The following case studies represent three different examples of Hungarian defense enterprise privatization:

- The case of MFS-Magyar Loszergyarto Kft. demonstrates the difficulties of transforming from a state-owned to a commercial enterprise, and the damage of an unfounded privatization decision;
- Gamma Muvek was taken over by a group of Hungarian and US businessmen, but privatization alone was unable to ensure sufficient capital infusions;
- Telefongyar represents a case in which privatization with foreign capital turned out to be a success.

*Examples of privatization I:
Matravideki Femmuvek-Magyar
Loszergyarto Kft.*

Matravideki Femmuvek (MFS) was established in 1952 for the production of ammunition for handguns. At the end of the 1950s, to compensate for the fluctuation of military-related production, the company diversified its production to include industrial chains, aluminum tubes and other metal-based packing material for the civilian sector.

By 1991 both its civilian and military markets collapsed and MFS went bankrupt. Until late 1994 the company had been one of the very few remaining classical state-owned enterprises under the control of the Ministry of Industry and Trade. Institutional insecurity about MFS's status and profile blocked both a possible privatization deal and the introduction of radical internal changes for several years. In addition, the company found itself in a curious deadlock. It had no more orders for ammunition, but at the same time it was not allowed to transform or liquidate its defense-related productive capacities.

At the end of 1994 MFS was divided into three successor companies: two civilian and one military-related. The majority shares of the latter, Magyar Loszergyarto Kft., were sold to a North American private businessman, who was a major distributor of the company's products. In May 1997 the APVRt bought the company back on behalf of the Hungarian state. There were two reasons for this move. Instead of proposing new investments and markets for the enterprise, the foreign owner intended to realize quick, high profits, even against the company's long-term interests. In addition, by 1997 it was decided that certain military-related enterprises, among them Magyar Loszergyarto Kft., would remain in long-term majority state property. The minority share package would be offered for sale again.

The company's new management launched a thorough quality and profit-centered reorganization. In 1997 Magyar Loszergyarto received the ISO 9001 quality certificate. On the basis of this qualification, it also received a certificate from the Quality Control Committee of the Hungarian armed forces for military products. Magyar Loszergyarto's principal problem was a lack of capital investment. Large debts had accumulated, and it was only through a medium-term bank loan awarded on condition of state guarantee that the company was able to remain afloat.

The company management placed emphasis on an active marketing policy, trying to reestablish business contacts that had been severed during the period of the foreign ownership. In the absence of large-scale orders from the Hungarian armed forces, the company needed to find market niches abroad. In 1995 the enterprise struck a large-scale deal with the Slovak police forces, and in 1997 the management was expecting to conclude an important agreement with the Turkish government (Pasztor, interview, 1994; Paulenka, interview, 1997).

Examples of privatization II: Gamma Muvek

The original Gamma Muvek was established in Budapest in 1920. It produced precision and optical instruments for both civilian and military purposes. In the 1980s the company was producing military-related precision, electrotechnical, nuclear and geophysical instruments, and instruments used for regulating industrial processes. After 1990 Gamma Muvek's military orders fell by 80 percent. The liberalization of imports, coupled with the switch to dollar-based commerce within the former CMEA meant that the company lost the bulk of its civilian markets as well.

In 1992 a liquidation procedure was initiated against the enterprise. Gamma Muvek was on the verge of being closed down, but disagreements emerged between the ministries responsible regarding the enterprise's fixed military assets. As a result, no decision was taken. In the meantime, the company management implemented a radical streamlining and reorganization program based on the recommendations of the Budapest-based Financial Research Institute. Thus, by the time it was formally decided to privatize Gamma Muvek, its chances for survival were already favorable.

The reorganizations included drastic reductions in workforce, economic activities and assets. Half of the real estate of its Budapest headquarters was sold and all branch companies became independent. Two main profiles, the production of nuclear and process regulation instruments, were selected for further development, whereas all remaining economic activities were cancelled. Strict budgeting and efficiency-enhancing methods were introduced. Gamma Muvek's former service network was transformed into small-scale commercial and service-oriented joint ventures in the Czech Republic, Poland, Slovakia, Russia and Brazil. In 1994, the company was finally sold to a consortium of Hungarian and US businessmen.

Even during the hectic period of reorganization, the company management insisted on continued development. The enterprise developed NATO-compatible instruments for military use, and environmental monitoring instruments for civilian use. Gamma Muvek, together with the Military Technology Research Institute (HTI), developed a radiation detector which was awarded a Silver Medal at the 1997 Salon des Inventiones in Geneva. Despite these positive

developments the company still had to struggle with capital shortage and market volatility (Figyelő, 9 June 1994; Nepszabadsag, 14 April 1994; Koi, interview, 1997).

Examples of privatization III: Siemens-Telefongyar

Telefongyar was one of the oldest industrial companies in Hungary. It was founded in 1876 to produce communication technology, principally based on Hungarian inventions. Its long-standing production and R&D traditions and its importance as a supplier to both military and civilian sectors, made Telefongyar one of Hungary's most important companies. In the 1980s the enterprise was faced with the warning signals of a forthcoming production and financial crisis.

To prevent collapse, the company management chose a 'leap forward' strategy. In 1989 it created a joint venture with Siemens for the production and R&D of telecommunication equipment. A change in top-level management in 1990 resulted in a major internal reorganization of production, and the company eventually achieved financial stability. In 1990, when the Hungarian national telephone company MATAV announced its first open tender for the development of its network, Siemens and Telefongyar made a joint bid and were awarded the second position. Following this success, Siemens undertook major investments in the company and financed the costs of retraining the workforce. In 1991 the Siemens-Telefongyar joint venture became majority Siemens-owned.

Telefongyar was thus rescued from an impending crisis through its merger with Siemens. With the backing of a powerful parent company, Telefongyar did not face the problems encountered by most Hungarian enterprises: loss of markets, lack of capital, lack of experience in marketing, and obsolete

technology. In the course of a couple of years, Siemens-Telefongyar was able to adjust to the challenges of the new economic environment to become rather successful. These positive changes were not accomplished without costs, however. Significant workforce reductions and the abandonment of some of the company's established industrial traditions were the inevitable results of the process.

At the time of winning the MATAV tender, Telefongyar had no prior experience in producing telephone centers. By the end of 1997 it had become a Hungarian market leader and an important actor in the telephone network and mobile phone market as well. The company was profitable and was able to carry out further investments in order to secure its future. According to the strategic plans of the Siemens group, Siemens-Telefongyar was expected to expand in Hungary and other Eastern European countries as well (*Figyelő*, 15 August 1996 and 7 August 1997; *Világgazdaság*, 31 January 1991, 28 March 1997 and 8 May 1998; *Napi Gazdaság*, 28 March 1997 and 18 April 1998).

Profile changes

By mid-1998 only a handful of companies had become exclusively civilian-oriented. Others opted for diversification, extending their civilian production, but maintaining military production capacity. This meant that although actual production was suspended or reduced to a minimum level, military-related assets were preserved in hope of a future revival of the sector. Still other enterprises turned completely or predominantly towards military-related activities.

Conversion

In the early 1990s, conversion was being proposed to defense industry companies by their supervising authorities. This occurred, however, at a rather theoretical level, since there was no genuine official government policy to promote conversion. Consequently, conversion became a purely enterprise-level choice. Company managements which opted to convert to civilian production did so because they saw it as a matter of necessity. The few companies that accomplished complete conversion were faced with new challenges arising from the economic transformation. Coping with these proved difficult even for those companies having considerable past experience in the civilian sphere. Problems of market competition, inefficient marketing, and the lack of capital made adjustment hard for enterprises such as BHG, Danuvia and Bakony Muvek.

Among the seventeen most important defense production companies in 1988, five—Bakony, Danuvia, Telefongyar, BHG and Magyar Optikai Muvek (MOM)—had ostensibly stopped military-related activities by 1998. The halt was however incomplete. BHG and MOM had small-scale successor companies through which they preserved their military-related profiles. Danuvia was featured on the list of defense-related firms compiled by the Ministry of Industry and Trade, and was a member of the Hungarian Defense Industry Association. Eszak-Magyarországi Vegyimuvek (EMV), despite its important military-related production, was not listed among the top producers of 1988. The company has since entirely stopped its military-related production, and it therefore now genuinely belongs to this group.

Bakony, Danuvia, and EMV opted for a radical profile change right at the beginning of the transformation period, when they recognized the inevitable and impending decrease in military-related orders. As described

above, Telefongyar's merger with Siemens led to the abandonment of military-related activity in the course of redefining the company profile. After having initially resisted the change, BHG and MOM were eventually forced to renounce defense-related activity due to the lack of new military orders. Among the converted companies, only at Bakony and Telefongyar was the profile change accompanied by a thorough internal restructuring. Both companies succeeded in adjusting to the new conditions and became rather successful, although there was uncertainty surrounding Bakony's situation due to the lack of capital and unpredictable ownership changes rather than the change in profile or problems of internal restructuring.

BHG, Danuvia and MOM all failed to accomplish genuine enterprise restructuring. They tried to weather the changes by relying on their production traditions and their accumulated assets instead of adjusting in anticipation of them. The failure to develop clear new goals and business strategies meant that the companies rapidly lost their development assets, including their relatively high-level industrial and research traditions, skilled workforce and technology. By mid-1998 Danuvia managed to stabilize its position, but at a relatively low level. At the same time, MOM and BHG were divided into small-scale companies of minor importance.

The following case studies present three different examples of conversion in the Hungarian defense industry. They demonstrate that a good decision on profile change is not enough to ensure a company's survival unless it is accompanied by thorough internal restructuring.

- In the case of Bakony Muvek, both the radical profile change and the company's internal restructuring can be considered successful.
- Danuvia deliberately opted for conversion in the early 1990s, when the company's management forecast and took measures to pre-empt the defense sector's impending crisis. This decision, however, was not followed by a radical internal restructuring of the company. By the end of the 1990s, therefore, Danuvia's production had stagnated.
- The lack of new orders and financial resources forced BHG to renounce its military-related profile in the early 1990s. Neither was the company able to assert itself on the civilian market, however, and the failure to undergo internal renewal or to foster the development of new business opportunities led to BHG's disintegration.

*Examples of conversion I:
Bakony Muvek*

Bakony Muvek was established in 1938 for the production of ammunition. In 1990 the company management decided to liquidate its defense-related profile. Machinery and technology were sold to Vietnam, workshops were emptied and, where possible, transformed to meet the needs of civilian production. Alongside these production profile changes, the company went through a radical restructuring on the advice of an Austrian consultant, with financing derived from the enterprise's own resources. After a thorough analysis of the company's assets and activities, several branch enterprises were sold, workforce reductions took place and the production structure was simplified and streamlined. The company's internal hierarchy and functions were reorganized. The restructuring program envisaged a 30 percent productivity increase. Bakony was the first Hungarian company to receive the ISO 9001 quality certificate in 1994.

The company's principal new profile centered around the production of spare automobile parts. Bakony received subcontracted work from such companies as BMW, Ford and Suzuki Hungary. Despite its precarious financial situation, in 1997 the company undertook a minor investment to improve the quality of its subcontracting work for Ford. In the same year a joint venture was established with the Russian company VAZ to produce car parts.

Bakony was privatized in 1992. The majority shares were transferred to a state-owned development bank while the remainder was divided between the management and employees. In December 1997 the bank sold its shares to a Hungarian financial group. Following the deal, the management sold its shares to the new owners and the General Manager left the company. The new owners wanted to continue reducing product lines and workforce levels.

In March 1997 Bakony received another, specialized quality certificate, the QS 9000, testifying to its ability to provide the highest quality level subcontracting work for automobile producers. In May 1997 a cooperation agreement was signed with Mitsubishi of Japan. In 1998 Bakony's new owners initiated negotiations about a possible joint venture with the German ITT company, indicating positive future developments (*Napi Gazdasag*, 22 June 1992, 22 and 24 July 1995; *Vilaggazdasag*, 7 May 1988; Sin, interview, 1998).

Examples of conversion II: Danuvia Gepipari Rt.

Danuvia Gepipari Rt. was founded in 1920 for handweapon production. The company was principally defense-related, with small-scale civilian activities. Demand for Danuvia's

products was so high that at the peak of its production in the mid-1950s and in the 1970s, the enterprise ran three shifts. Danuvia had an enormous industrial estate, with a shooting ground, a laboratory, and independent water, sewage, electricity, roads and storage systems. In addition to this, it had an establishment in the countryside where, for security reasons, the whole production process could have been relocated. The company's technological base made possible the in-house manufacture of all elements needed for weapon production, including a small foundry and full-scale technology for producing mechanical parts.

Danuvia received its last order from the Hungarian army in 1988. Following negotiations with the representatives of the Ministry of Defense and Ministry of Interior, the company produced all the necessary spare parts for those of its weapons expected to be in use until 2011. By 1990 its defense-related activities has ceased altogether. Part of the unused machinery, spare parts and materials were sold, much of it as raw material. Danuvia became a producer of hydraulic supply sources, hydraulic machines and spare parts.

In August 1990 the company entered into a joint venture with one of its former principal commercial partners, the German company Rexroth. The most profitable activity—the production of hydraulic supply sources—and many of the highly qualified workforce were transferred to this new company, in which Danuvia owned a 20 percent share. Danuvia itself continued to produce hydraulic elements and spare parts. By 1994 the company was fabricating approximately 120 different types of product. Eighty percent of its income was derived from work subcontracted to it as a result of the joint venture, and it was filling minor orders for other companies and generating additional income from renting out its premises. In 1994

Danuvia was sold to three Hungarian businessmen in a leasing-privatization scheme. Even though the company managed to survive, its crucial problems of future development, lack of investments and capital, and its weak marketing strategy had not yet been resolved (Sebestyen, interview, 1994; *Napi Gazdasag*, 8 September 1994).

Examples of conversion III: Budapesti Híradástechnikai Gyar (BHG)

Budapesti Híradástechnikai Gyar—Budapest Telephone Company—was one of the largest companies in Hungary, specialized in telephone centers and military telecommunication equipment. In the late 1980s the company had renewed its production base in preparation for a major state order, but subsequent changes in the political system radically altered the conditions. In the early 1990s the company formed a strategic alliance with Northern Telecom to bid on a tender for the production of telephone centers on behalf of MATAV. Despite their undisputed professional competence, BHG-Northern Telecom lost the first tender, because the competitors proved to be financially and politically stronger. The first winner was Muszertechnika, the first private enterprise of Mr. Gabor Szeles, Videoton's general manager, in alliance with the Swedish telecom giant, Ericsson. The second winner was Siemens-Telefongyar, discussed above. In a second MATAV tender called in 1995, BHG did not even stand a chance of winning, since by that time it was evident that the company had failed to restructure, and had not managed to find a powerful Western business partner to support its bid. The loss of both tenders meant that BHG was obliged to abandon its principal profile, the production of telephone centers.

Given the company's economic importance and in light of its precarious situation, BHG was selected for the state's consolidation program, which effectively rescued it from bankruptcy by granting crucial financial assistance and some minor orders through state mediation. These interventions, however, were not able to guarantee the company's long-term future. During the 1990s BHG's country-based branch companies were individually sold. In 1997 the remaining, substantially reduced Budapest-based enterprise was divided into three limited companies, one of which had some military-related activity.

Following the loss of both its military and telephone center markets, the management of the parent company opted to develop those civilian profiles that in the past had served as auxiliary activities to its military production. By 1998 the company was producing mechanical outfits and equipment (for example telephone booths), as well as spare parts for computers. In 1997, in order to service its debts, BHG was obliged to give up its historical Budapest headquarters and move to a small, provisional office building next to it. In addition to its symbolic weight, this step demonstrated that in order to ease its financial difficulties, BHG had to begin to sell off its last capital assets (*Nepszabadsag*, 5 February 1997; *Heti Világgazdasag*, 11 May 1996; *Világgazdasag*, 12 January 1996; *Figyelő*, 29 October 1992, 25 August and 15 December 1994; Vari, interview, 1997).

Diversification

Most defense-related enterprises in Hungary decided to extend their civilian production profiles and reduce or suspend their defense-related production. The companies that suspended defense-related production did not completely liquidate their military-related productive assets. They preserved the defense-related divisions or chose to run them at low levels,

providing spare parts and services for their products still in use by the armed forces. The general managers of these companies confirmed that in the event of renewed demand (and possibly some financial incentives) they would be prepared to renew and expand their military-related activity.

Companies which chose to continue military-related production were nonetheless forced to diminish the scope of these activities. Videoton, TKI and Gamma Muvek intended to revamp and if possible expand military-related production, but they placed more emphasis on the development of their civilian profiles. Strict efficiency criteria was introduced for both the civilian and military-related profiles.

In the above-mentioned cases, diversification took place within the company. Another type of diversification was accomplished with the actual separation of the different production profiles. In the cases of Nitrokemia-Nike-Fiocchi, Godolloi Gepgyar-Currus, FEG, MFS-Magyar Loszergyarto Kft. and Pestvideki Gepgyar-Dunai Repulogepgyar Rt., production divisions became independent companies. Though they were physically and legally separated from the enterprise, they were often tied together through production contacts, the use of common infrastructure and eventual cross-ownership. Usually in these cases the new company was created out of the former military division—for example Nike-Fiocchi, FEG, Dunai Repulogepgyar Rt.—and became predominantly military-related. The civilian successor companies, on the other hand, normally became completely autonomous and were quickly sold.

The following case studies present three different types of enterprise diversification.

■ Videoton diminished the scope of its military production, but reorganized it such that it became much more efficient than in the past. The company simultaneously extended its civilian profiles. As of the late 1990s, both divisions were expected to increase their production output and profit margins.

■ FMV also preserved its military-related profile while increasing the share of civilian production. However, modification of the production structure was not accompanied by a thorough organizational restructuring. Neither civilian nor military production was able to generate enough revenues to assure the company's financial stability and future development.

■ At Nitrokemia-Nike-Fiocchi the different production divisions were separated into individual companies. Thanks to an internal reorganization of the military-related profile concentrated at Nike-Fiocchi, prospects were fairly positive. The parent company, where the rest of the defense-related and civilian production was continued, did not go through a major restructuring process. By the end of the 1990s it was facing serious adjustment problems.

Examples of diversification I: Videoton Ipari Rt.

The predecessor of Videoton Ipari Rt., located in Szekesfehervar, was established in 1938 for ammunition production. By the late 1980s Videoton was among the most important Hungarian companies. Approximately one-third of its activity was defense-related, one-third computer technology and the remainder consisted of consumer electronics. Despite several

warning signs of an approaching crisis in Warsaw Pact-based military production, the enterprise borrowed money to increase its military-related output as late as 1991. Neither did the management react to the financial and marketing problems which were already affecting civilian production by the late 1980s. As a result, Videoton declared bankruptcy in 1991.

In December of that year, a consortium of Hungarian private entrepreneurs, led by Mr. Szeles, bought the company and created a financial holding. Videoton's assets, activities and development potential were systematically analyzed and reorganized. Western management and accountancy systems and very tight financial controls were introduced. Both workers and managers were motivated to work more efficiently following the introduction of a new system of incentives.

The restructuring of Videoton proved to be a major success. The holding became profitable by 1994 and it soon expanded, creating branch companies and joint ventures throughout Hungary. By mid-1998 it had four principal profiles. The first was computer-technology, run in close cooperation with IBM. The second was vehicle—principally spare parts—production, in cooperation with Alcoa Fujikura Ltd., Michels Kabel, Texas Instruments, Volkswagen, Audi, Mercedes and Volvo. The third was consumer electronics, with subcontracted work from Matsushita-Bosch, Philips and Akai, as well as the development and production of Videoton's own products in cooperation with firms like Sanyo.

The fourth production profile was defense-related. In 1993 one of Videoton holding's branch companies, VT-Rendszertechnika, reorganized the

remnants of the former Hungarian electronics industry in a sub-contractor system for large-scale military projects destined principally for export. The workforce was recruited from the successor companies of FMV (HM Radar Rt., Mechlabor, BHG, Labor MIM, TAKI, Orion, Kismotor and Gepgyar). According to a contract signed in 1993, VT-Rendszertechnika also became a certified supplier for the Hungarian army.

In 1998 plans to establish further joint ventures in Carpathian-Ukraine, Transylvania, Latin America and the Middle East were announced. The company envisaged further expansion both in the civilian and military electronics and telecommunication industries (Megyeri, interview, 1994; *Figyelő*, 10 February 1994; 1 February 1996; *Napi Gazdasag*, 13 February 1997; *Vilaggazdasag*, 21 May 1998).

Examples of diversification II: Finommechanika Muvek (FMV)

While Videoton managed to reestablish itself as one of the leading companies in the Hungarian economy, Finommechanikai Muvek (FMV), the other former giant of the Hungarian telecommunication industry, struggled for survival. During the crisis of 1990–1993 the company lost its markets, accumulated bad debts and amassed enormous reserves of unsellable spare parts. State privatization agencies tried to sell the enterprise, but due to its precarious financial situation and uncertain prospects there were no serious buyers. The company's assets have since drastically eroded, and much of its highly qualified white- and blue-collar workforce has left.

In 1993 a FMV branch company specialized in radar technology was separated from the parent company. In the framework of a debt-swap arrangement, the Hungarian Ministry of Defense and another state agency received the company's shares. Together they founded HM Radar Rt.,

a 100 percent defense-related Limited. While this new company's share of old FMV debts were eventually written off, FMV itself was still expected to honor its share.

In 1995 the management of what remained of FMV bought the enterprise with financial assistance provided by an Austrian private businessman. Privatization saved the company from liquidation, but did not provide important new inputs for its further development. The company's uncertain economic situation and restricted financial possibilities made it impossible to carry out new developments. FMV's main profile was telecommunication equipment production, based principally on one military-related product developed before 1990. In order to survive, the company tried to find minor orders, subcontracted work or cooperation with other Hungarian and foreign firms. To manage liquidity problems, parts of the company assets, principally its enormous real estate, were sold, leased or rented out (*Napi Gazdasag*, 14 July 1992 and 27 June 1994; Nagy, interview, 1997).

*Examples of diversification III:
Nitrokemia-Nike-Fiocchi*

Nitrokemia Rt.—Nitrochemical Works, Balatonfuzfo—was established in 1921 for military chemical production. It became an outstanding producer of explosives for both civilian and military use, with its own R&D and widespread international business connections. From the 1950s it produced fertilizers and other semi-processed products. After the systemic changes, Nitrokemia lost its massive agricultural markets and also its military orders in both Hungary and the former Soviet Union. In 1993 military-related production still represented 8 percent of the company's total output, but even this was suspended in 1994.

During the 1990s the enterprise struggled with an increasingly acute lack of capital, became heavily indebted, and was unable to undertake major new investments. It also continued to be a source of serious environmental damage. In 1993 Nitrokemia became a commercial company under the ownership of the APVRt. It was among the 13 large-scale industrial companies selected for rescue by the state. Several important state interventions intended to improve the company's financial situation could not prevent it from edging towards the brink of bankruptcy. By the end of 1997 its output and workforce had significantly diminished and its accounts registered losses. The number of employees had fallen from 7,000 in 1988 to 2,000 a decade later. In June 1998 Nitrokemia was divided into two state-owned limited companies. The production profile of one of these companies included the successful pesticides and semi-processed goods previously produced by Nitrokemia. All other activities, including ammunition and explosive production, was delegated to the other company, which also inherited the former state-owned company's debts and environmental rehabilitation obligations. State authorities aimed for the rapid privatization of both companies.

In the early 1990s Nitrokemia's former production divisions were included in the creation of five independent shareholder companies or joint ventures. One of these, Nike-Fiocchi, was established with the Italian Fiocchi company for ammunition production in 1991. Nitrokemia owned 50 percent of Nike-Fiocchi's shares and the latter used the premises and services provided by the parent company. Nike-Fiocchi was a prospering enterprise with a predominantly military profile, producing principally for export. In 1996 the company presented a newly developed grenade that was expected to become a major export success (Baracska, interview, 1994; Szabo, interview, 1994; *Heti Vilaggazdasag*, 16 August 1997 and 8 May 1988; Nepszava, 8 January 1996 and 26 June, 1988).

Becoming military

A handful of company managements opted to eliminate the civilian production profiles inherited from the past and instead concentrate their efforts on military-related production. This specialization proved fruitful if the company's products could find stable markets, principally external ones, since local demand remained low. This was the case of FEG and to a lesser extent MFS-Magyar Loszergyarto Kft. and Dunai Repulogeppgyar Rt. Other companies, however, vested their future in exclusively military-related development, but did not carry through internal restructuring, preliminary feasibility studies and market research to improve their efficiency, financial possibilities and access to markets. Since the state authorities refused to bail these companies out as they had done in the past, several ended up on the edge of bankruptcy.

The following case studies comprise three examples of military specialization:

- In the case of PVG-Dunai Repulogeppgyar Rt., military specialization proved to be a viable path to survival, since it was accompanied by the efficient reorganization of the company and an effective preliminary market research strategy. At the same time, the company management realized that a simultaneous development of its civilian profiles would provide a more balanced situation in future.
- The management of DIGEP-AG (Army Co-op) clung to military production despite the fact that the company lacked financial resources and markets for its products. In addition there was no renewal in the company's structure and management. As a result of both a wrong choice in profile and bad business practices, the company had to suspend its activities.

■ Due to administrative complications as well as financial and marketing problems, Mechlabor spent years on the verge of bankruptcy. In order to survive, the company was forced to terminate all of its civilian activities. The military specialization proved feasible only thanks to its merger with the powerful Videoton company.

Examples of military specialization I: PVG - Dunai Repulogepgyar Rt.

The predecessor of PVG, Pestvideki Gepgyar, was founded in 1941 for military aircraft production. Before 1990 PVG had specialized in repair and servicing of military aircraft and helicopters. During the 1980s, foreign orders began to diminish, and despite its decreasing resources, the management tried to keep the company afloat by postponing crucial changes and through heavy borrowing.

Despite these efforts, PVG went bankrupt in June 1990 and was scheduled for liquidation. Several attempts to sell the enterprise failed, and in June 1992 the company employees created Dunai Repulogepgyar Ltd. This new enterprise leased the workforce and productive assets from the parent company until the latter was liquidated or sold. From the time of its formation, Dunai Repulogepgyar had to struggle with the lack of domestic orders from the Hungarian armed forces, vulnerable foreign markets, lack of capital, and administrative and legal complications. The enterprise nonetheless managed to survive to become a fairly successful private company.

Dunai Repulogepgyar's production profile was revamped, and measures to increase efficiency were introduced. An intense campaign was launched to find new market and cooperation opportunities, and business partners both in Western and Eastern Europe. In the hope of attracting Western cooperation, and despite its precarious

financial situation, Dunai Repulogepgyar bought a used machine which enabled it to produce spare parts for the Swedish 'Gripen' aircraft in 1994. A cooperation agreement was signed with Saab in November 1995. Dunai Repulogepgyar's contribution was relatively modest, but the Hungarian partners considered it a first and important breakthrough as it created possibilities for new investments and advanced technology transfer, while serving as a reference for the company's future market research.

In July 1996, following a six year liquidation process, Dunai Repulogepgyar bought its original mother company, Pestvideki Gepgyar. In its new business plan the company envisaged the loosening of its dependence on domestic orders and the extension of its civilian production (*Napi Gazdasag*, 4 June 1994; *Magyar Nemzet*, 8 October 1994 and 17 November 1995; *Figyelő*, 23 November 1995; *Heti Világgazdasag*, 20 August 1994 and 20 July, 1996; Kovacs, Dr. G.P., interview, 1994).

Examples of military specialization II: DIGEP-AG—Army-Coop

Diosgyori Gepgyar Altalanos Gepgyar (DIGEP-AG), Hungary's only important heavy weaponry factory, was established in 1949. In order to fully utilize its large productive capacities, compressors and machine parts for civilian use were also fabricated. In January 1989 DIGEP-AG shifted entirely to military production. However, in that same year the company did not get any new orders.

DIGEP-AG was part of a large-scale metallurgy trust, DIGEP, which had 9 separate production plants. Until 1988 DIGEP-AG was the most lucrative enterprise of the trust, practically assuring the financial survival of the otherwise loss-making trust. After 1989

the situation was reversed, and it was the rest of the enterprise that kept DIGEP-AG alive. In November 1989 a liquidation process was started against DIGEP. In 1992 the company was divided into independent enterprises offered for individual sale. DIGEP-AG was taken over by two Hungarian entrepreneurs and was renamed Army-Coop. The Military Industrial Office fought to recuperate at least 10 percent of the company's shares, but was unable to mobilize the necessary resources. The Ministry of Defense declared that it did not need the company's products, and therefore did not oppose the privatization decision.

Despite Army Coop's precarious financial state, uncertain future and evident marketing problems, the new owners insisted on further military-related development. With the help of some technological development funding in addition to its own resources, the company developed a new type of NATO-compatible grenade launcher. Officials of the Ministry of Foreign Economic Relations and the MIO facilitated the firm's entrance to the US market. The weapon was tested by the US army and received positive evaluations, but this did not translate into orders.

In the meantime, it became known that the two Hungarian businessmen were acting on behalf of a dubious Russian-American enterprise. The company's new management was unable to reorganize production, find new markets or new work opportunities. In November 1994 Army-Coop suspended its activities, and as of December 1997 the loan taken out to pay for the enterprise had not yet been serviced. In October 1997 the authorities of Borsod-Abauj-Zemplen County initiated a process against the company's Russian General Manager and owner because he had failed to pay social security contributions for his employees (Feher, interview, 1993; *Napi Gazdasag*, 2 December 1997).

Examples of military specialization III: Mechlabor

The predecessor of Mechanikai Laboratorium—Hiradastechnikai Kiserleti Vallalat—was founded in 1947 for the production of telecommunication equipment for military use. From the 1950s the company had important civilian profiles as well. Both civilian and military production were geared towards individual customers' needs. Mechlabor created the first camera for the Hungarian television company, the first Hungarian recorders and cameras for oil-drilling equipment, among other products. It had a fairly developed technological base, a highly skilled workforce, and its own R&D center.

Due to the loss of lucrative military markets and increasing financial problems, the company went bankrupt by the end of 1992. The liquidation process which was initiated became very complicated, as state authorities were unable to decide the company's future. As a result of these administrative complications Mechlabor's privatization was also blocked. In addition, it was unable to secure credits due to its financial situation, even in the rare event that it managed to get an order. By the end of 1993 the company had to reduce its assets to the level of fixed military capacities: 200 employees and the corresponding productive assets. To keep this small remaining unit alive, Mechlabor tried to find minor work subcontracted from the military, and introduced some conversion products. They intended to produce food processing machinery, garden furniture and special machines, however in the absence of capital and orders, these efforts failed.

In 1994 Videoton holding bought up 49 percent of Mechlabor's shares. The company lost its formal independence, but managed to survive within the

framework of Videoton's subcontractor system. It received a major capital infusion and was backed by the financial weight of the parent company, and was soon able to participate in large-scale export projects (Bodi, interviews, 1993 and 1994).

Profile changes at the sectoral level

The profile changes of individual companies in the Hungarian defense industry reshaped the structure of the sector at the macro-level as well. By the mid-1990s the share of telecommunication equipment and precision instruments had diminished, while the importance of weapons, vehicles and ammunition increased (*Nepszabadsag*, 18 October 1995).

No official data for total output was published after 1995, but changes in the sector's structure could be discerned from the public export figures. Between 1991 and 1996 Hungary exported annually US \$20–25 million worth of military products. Twenty-five percent were handweapons for self-defense, 15 percent consisted of telecommunication instruments and 65 percent was ammunition and explosives (*Nepszava*, 15 May 1996).

Reorganization—restructuring

The crisis of the defense industry forced companies to reorganize themselves. All military-related enterprises, irrespective of their chosen profile strategy, had to radically diminish their output and workforce. They all underwent a process of commercialization, decentralization and major internal reorganization. Larger formerly state-owned enterprises were subsequently divided into several independent companies, and previous divisions became new companies.

These important changes however did not necessarily entail a genuine restructuring of the companies. In several cases, organizational changes remained at the surface, without resulting in fundamental changes in the production process, which often remained inefficient. Genuine restructuring involved an in-depth transformation of the whole production process from military-centered to profit-directed activities. This included a reevaluation of production goals, modification of the company's internal hierarchy, reassessment of decision-making patterns, and establishing relationships with the outside economic environment. Only a handful of companies—such as Videoton, Orion, Comasec-Respirator and TKI—pursued such in-depth restructuring.

Restructuring could take place with or without a change in production profile. In principle, genuine conversion would imply both profile changes and thorough restructuring of the company. Such changes only took place at Bakony and Siemens-Telefongyar.

An example of genuine restructuring: Orion

Orion Elektronikai Kft.—Orion Electronics Limited, Budapest—was founded in 1913 for the production of electrotechnical and telecommunication equipment. In the 1930s it was one of the most famous Hungarian companies, having a worldwide reputation. After World War II the company's main profile was radio and television production, and later included microwave radio systems. Military-related profiles were introduced after 1956. In the early 1990s the company was hit by the abrupt liberalization of imports, the demise of the CMEA and the loss of military orders both for export and local use.

At the end of 1991 the company's liquidation was initiated. During the liquidation process Orion's management pushed through a radical profile cleaning and internal restructuring program. Output, economic activities and workforce were dramatically cut, but productivity and efficiency had considerably increased, and in 1995 the company was awarded the ISO 9001 quality certificate.

Orion used its existing sales infrastructure to introduce new civilian products, predominantly television sets. Principally geared towards the Russian market, Orion carried out a strict selection of business partners before launching a new promotion campaign. In late 1993 the Russian Yuganskneftegaz Company, the world's sixth largest oil company and one of Orion's long-time trading partners, bought up the majority of Orion's shares. The joint venture became 83 percent Russian property and was renamed Yuganskorionneftegaz. The new majority owners provided further assistance with developments and expansion of the company's business network.

In June 1997 the Singapore-based Thakral Company bought Orion's majority shares. This new owner wished to promote Orion's R&D activity, stabilize its position and use Orion's extended Eastern European networks for its own expansion. By mid-1998 Orion's main profile consisted of consumer electronics and the production of professional electronic equipment. The share of military-related activity was mostly limited to the provision of spare parts and servicing. The company found itself in a good economic and financial position and had stable markets. Approximately 20–30 percent of its production was exported, of which 95 percent went to the former Soviet

Union. The management was particularly proud of the fact that Orion was one of the few Hungarian electronic equipment producers that managed to save its research and production traditions (*Magyar Nemzet*, 9 June 1994; *Uzleti Het*, 2 December 1996; *Magyarorszag*, 13 June 1997; Venekei, interview, 1997).

Reorganization at the sectoral level

In the early 1990s, a rapid erosion and disintegration process took place within the Hungarian defense sector. The strong coherence and solidarity which characterized the sector in the past was suddenly only able to function when backed by financial resources or special assets. As a result, the companies found themselves alone in their struggle to survive.

Starting in 1993–1994, the first signs of reorganization and deliberate concentration could be discerned in the sector. Industry associations and lobby groups were organized to represent the interests of defense-related companies at the political level. In highly capital-intensive sectors such as telecommunications and the chemical industry, a process of concentration initiated by the enterprises themselves began to take shape. For example, Videoton reorganized what remained of the former military electronics industry, and a network of cross-ownership and intense cooperation emerged between the three major military-related chemical producers: Eszak-Magyarorszagi Vegyimuvek (EMV), Nitrokemia and Budapesti Vegyimuvek.

In 1993 the Defense Industrial Alliance—Hadiipari Szovetseg (HSZ)—was set up under the umbrella of the Ministry of International Economic Relations. With twenty-two

member companies, HSZ was presided over by Mr. Laszlo Kocsis, a department head in the Ministry.

Another representative organization, the Hungarian Defense Industry Association (MHE) was also formed in 1993. At the time it was established, MHE had thirty-seven member companies having both civilian and military profiles. The founding president was Dr. Geza Peter Kovacs, General Manager of the Dunai Repulogepgyar Rt. One of the Association's targets was to increase local suppliers' share of armed forces purchases, and to render it exclusive in some areas (*Nepszava*, 27 May 1995). The MHE regularly criticized the unsystematic approach which characterized the procurement policy of the armed forces, and the lack of official support for domestic defense industry enterprises.

Defense-related companies had high hopes that the law on public procurement which regulated the procedure of public orders of budgetary institutions would be of benefit to them, however once the law was introduced, the MHE claimed that it was not favorable to the Hungarian defense industry. The Association proposed modifications and lobbied for the initiation of a new 'defense economy law.' In anticipation of new purchases required for the modernization of the Hungarian armed forces, the MHE requisitioned the government to prescribe an obligatory share of its orders to Hungarian subcontractors (*Nepszabadsag*, 10 August 1996; *Magyar Nemzet*, 12 August 1997; *Nepszava*, 21 January 1998).

Major changes at the defense-related companies

According to officially published lists there were seventeen major companies in the Hungarian defense industry in 1988. By the end of 1993, at the C+D exhibition⁴, the Military Industrial Office made public a catalogue of forty-three private and state-owned companies involved in military production, and in 1997 the department of the Ministry of Industry and Trade listed sixty-two companies that were or wanted to become involved in defense-related activity in Hungary. The new firms were mainly successor firms established by the managers or

employees of former major military enterprises, often with the use of capital assets, know-how and networks from the original company. There were no significant green-field investments in the sector. The Appendix presents the ten-year trajectory of the seventeen defense industry firms listed as forming the core of the sector in 1988. It provides a summary of the ownership, production profile, organizational, output and workforce changes that took place in the sector between 1988 and 1998.

A list published in January 1998 presented thirteen enterprises in Hungary whose activities held strategic importance: Dunai Repulogepeggyar Rt, FEGARMY Fegyvergyarto Kft., Gamma Muvek, Hivadastechnikai Ipari es Kereskedelmi Szovetkezeti Rt.,

MATAV, MFS-Magyar Loszergyarto Kft., VT-Mechlabor, Mechanikai Muvek Rt., Raba Rt., Videoton, TKI, Antenna-Hungaria Rt. and MIKI (Nepszava, 28 January 1998). Of these, nine were successor firms of enterprises which had been among the top military producers in the peak year of 1988. Mechanikai Muvek and Raba had not usually appeared on the old official lists, but they were nonetheless renowned military producers. Hadastechnikai Ipari es Kereskedelmi Szovetkezeti Rt. and Antenna-Hungaria Rt. were minor offsprings of formerly important military-related companies.

Table 3: Summary of major changes in defense-related companies

Notes: Companies marked with an * are state-owned. Companies marked with ** are joint private and state-owned. Companies in *italics* were not listed in the original official list of the major companies in 1988, but are presented in this study.

<i>Restructuring</i>	<i>Profile change</i>			
	<i>Conversion</i>	<i>Military production in the waiting</i>	<i>Reduced military production</i>	<i>Predominantly military production</i>
<i>Successful restructuring</i>	Bakony, Siemens-Telefongyar		Videoton, Orion, TKI*, Gamma, MIKI*	Magyar Loszergyarto Kft.*, Dunai, FEG-Army*, Nike-Fiocchi
<i>Unaccomplished restructuring</i>	Danuvia, BHG*, EMV	FMV, Nitrokemia*	Currus*, MOM, Mechanikai Muvek*	Army-Coop, Mechlabor **

⁴ Originally ‘Conversion and Defense,’ and renamed ‘Central European Defense,’ a major military equipment show organized regularly in Budapest.

The Fate of Military-related Assets

During the 1990s the scope of defense-related activity and the corresponding workforce significantly decreased in Hungary. However, as mentioned above, most of the military-related assets were not converted consciously for civilian use, but were simply wasted or remained unused. Later, during the crisis and subsequent slow recuperation of the sector—and of the Hungarian economy as a whole—some of the remaining assets were gradually reintegrated in the civilian economy.

Workforce

At its peak the Hungarian defense industry had employed 30,000 people. According to MHE data, by mid-1998 there were only 5,000 employees in the sector. Many former employees had reached retirement age or opted for early retirement. The unskilled workers, women and Roma were made redundant on a large scale. This significant decrease of defense-related employment, however, was eased by the fact that the bulk of the defense industry was located in Budapest, the economic center of the country, thereby offering alternative employment opportunities. There, the skilled workers in particular were able to find new jobs relatively easily.

The real problems were felt in the countryside, in regions where chances for alternative employment were limited. This was the case in Borsod-Abauj-Zemplen County for example, where DIAG-Army Coop and EMV were located, or in small settlements such as Sirok in north Hungary, which was home to MFS-Magyar Loszergyarto. In late 1997

unemployment reached 18.9 percent in Borsod-Abauj-Zemplen county and 14.2 percent in Sirok, in both cases higher than the national average.

Know-how

During the very short period that the authorities proposed conversion and many company managers began to envisage it as an alternative to military production, many interesting conversion ideas and products emerged. The most successful Hungarian conversion product was a fire engine assembled on a tank chassis, which was used to fight fires in the Kuwaiti oil fields during the 1991 Gulf War. The engineers of Mechlabor designed an electronic wheelchair that was extremely versatile and cost approximately one-third that of similar products on the Western markets. An important part of the knowledge accumulated in the defense industry was transferred to the civilian telecommunication sector. In the absence of military orders, companies which had an important R&D division dedicated more energy to the development of new products for civilian use. Gamma Muvek created a whole new set of environmental protection and measuring instruments, MIKI developed new testing and measuring instruments, and TKI developed innovative new products in the fields of telecommunication, microwave optical systems, and even in biotechnology.

As far as strictly military-related knowledge was concerned, much was lost due to the collapse of large-scale military-related R&D and production

centers. However, there were many efforts on behalf of defense industry managers and concerned Ministry officials to rescue as much as possible. The new products developed by the surviving military-related R&D centers discussed below represented a certain continuity of Hungarian military-related know-how.

Production machinery

A lot of the machinery formerly used at military-related companies was thrown out, written off, or sold as raw material when companies went bankrupt or had to radically diminish their scope of activity and their assets. Some of the general-purpose technology could be reused in other production processes, eventually in civilian production, or could be sold.

Some of the special-purpose technology was sealed as cold capacity, but the bulk of it became impossible to use. Only a few companies were able to generate revenues from this specific machinery. MFS-Magyar Loszergyarto Kft., for example, sold to Eastern European countries several machine chains for ammunition production which had become superfluous due to the decrease in production. Bakony was able to generate some additional income by selling its military-related machinery to Vietnam.

Premises

In the past, defense-related enterprises had enjoyed an abundance of assets which generally included large premises. When the companies' financial difficulties became evident, many made use of their surplus real estate by selling or renting it out. In the process of diminishing overhead costs, TKI, FMV and Gamma Muvek used the income generated in this manner to service debts or cover other expenditures.

Siemens-Telefongyar was able to 'reconquer' its former industrial estate once its civilian activities became stronger. Large parts of the former headquarters of the company in Budapest had to be emptied during the crisis. In 1997 it was decided that the two other Siemens companies functioning in Budapest would move to Telefongyar's former industrial estate.

There were a few cases in which the large-scale unused company estates were constructively reused in the form of an industrial park. In these cases of 'indirect conversion' some of the former defense-related assets, workforce, technology, premises and infrastructure could be reused for civilian purposes. The first successful case of this type was the industrial park established in Szekesfehervar, on the vacant premises of the former Videoton state-owned enterprise. Some of Videoton's cooperation partners were located here, paying rents and partially using the workforce released by the company. The municipal government later established another industrial park on the territory of a former Soviet air base, providing additional work opportunities for those people who were laid off during the crisis.

The creation of industrial parks was already underway at the estate of Nitrokemia, with 28 companies (among them the US Dow Chemicals) making use of the vacated premises. There were also plans to create an industrial park on the unused premises of the former Bakony Muvek. The government of Veszprem agreed to contribute the territory of a nearby former Soviet military base. A private Limited was set up for the purpose of establishing an industrial park geared towards chemical production at EMV in Sajobabony. The municipal government proposed the creation of an industrial park on the territory of the former MFS in Sirok.

One major obstacle to the conversion of heavy weaponry facilities and former military bases was that of environmental damage. The transformation process at EMV and Nitrokemia, for example, was seriously hindered by the burden of environmental cleanup.

Networks

As noted above, the military-related sector had long been characterized by very strong ties of solidarity and mutual dependence. In the first period following the systemic changes, the old production networks broke down, causing serious bottlenecks in production. However, informal contacts among the major actors survived. In the next period of slow reconstruction, enterprise managements made new efforts to revive their social and economic networks, identifying them as crucial development assets.

Companies used their renewed ties of cooperation and solidarity to help each other and lobbied together through the creation of new political and professional representative organizations.

Enterprises tried to use their old intra-sectoral ties for new purposes, as did Videoton within its subcontractor system.

At the beginning of the transformation period external trade and cooperation networks were severely restricted, specifically those with the Eastern European business partners. However, company managements with a long-term perspective insisted on maintaining their networks in the former Eastern bloc even if they were not functional at the beginning. Videoton, Orion and Gamma Muvek, for example, all placed special emphasis on maintaining these ties and were able to profit from this continuity later on.

Companies that had important business contacts with Western enterprises intensified and formalized these through the formation of joint ventures. In the case of Danuvia this step did not prove to be very fruitful, while at Nike-Fiocchi it turned out to be a success. BHG had a long-standing production cooperation with the Canadian firm Northern Telecom and the Austrian Telephone Company. The two enterprises were among the few Western companies that had collaborated with Eastern European telecommunication companies during the Cold War, despite COCOM restrictions. Both companies tried to create a joint venture with BHG, but when the latter lost two bids for tender, they abandoned their projects. In this case the long-standing business relations and the goodwill created in the past did not prove sufficient enough to compensate for the weight of the new economic and political alliances.

There were companies that lost their former production and trade contacts but nonetheless tried to build new ones. Bakony, for example, actively sought new partners both in the countries of the former Soviet Union and among the Western automobile producers based in Hungary. At the same time, when it switched to civilian production, the company management did not even consider using its military-related business contacts with Vietnam to promote its civilian products. Videoton meanwhile demonstrated an impressive ability to build up a completely new business partnership network.

The military heritage

The military heritage left its mark on company trajectories even after they had stopped producing defense-related products. In the past, military-related companies had a specific rationale and pattern of functioning. For decades they had operated in a highly protected environment. When the socio-economic transformations began, the question of whether they would succeed in converting this heritage into a development asset or whether it would become a burden for further development was one of survival.

Many of the assets—such as extensive real estate and diverse production facilities and activities—which characterized the companies that had serviced the Hungarian defense industry in the past became dysfunctional when the industry collapsed. Even in cases where some of the military-related activity could eventually be recuperated, many assets remained superfluous and very difficult to reuse. In the case of DIGEP, MOM, FMV, BHG and Danuvia, once their protected and lucrative military divisions collapsed, the rest of the company proved unable to overcome this blow. The new civilian companies created on the vestiges of the former state-owned enterprises could hardly survive in the new competitive economic environment. This led to an enormous waste of productive assets, as the case study of MOM, below, shows.

In other cases, however, there was at least one—and sometimes more—civilian successor companies, created from the assets of a former defense-related enterprise, which became rather successful. These could be considered cases of indirect conversion. This occurred for example at Nitrokemia, EMV, FMS, and Godolloi Gepgyar.

An example of wasted assets: Magyar Optikai Muvek (MOM)

Magyar Optikai Muvek—Hungarian Optical Works, Budapest—was one the giants of Hungarian precision instrument production. The predecessor of the company was established in 1900 and had a long-standing tradition of optical and precision instrument development and production. Its products were well known and exported all over the world. In the late 1980s the company had almost 10,000 employees in its Budapest center and branch enterprises based in the countryside. Due to the loss of its massive Eastern European markets and increasing financial difficulties, the company went bankrupt by the spring of 1992. During the reorganization of MOM the former branch companies became independent, and several joint ventures and small-scale limited companies, centered on certain segments of the company's previous activities, were established. Some of these companies, like the German-owned Carl Zeiss Hungaria Limited and an American-Hungarian joint venture for the production of electronic cameras, were prospering. However, the bulk of the small-scale successor companies which aimed to continue the company's development and production traditions went bankrupt, including MOMFO Rt., the firm established at the Budapest center.

As of mid-1995 there were only two companies considered successor enterprises of the former MOM. Schmidt and Bender Hungaria Optikai Kft., which produced optical instruments, was majority German-owned. With a workforce of eighty-five, it moved to its new premises established at the industrial estate of the former FMV. G&D Trade Kft.—originally a Swiss-Hungarian, later only Hungarian-owned company—had 200 employees and specialized in construction and geodesic instruments. This company provided the occasional servicing of MOM-produced equipment used by the Hungarian armed forces. In November 1996 MOM's

former estate was sold to a German business group. All establishments were bulldozed away and the construction of a business and commercial center began on the premises (*Figyelő*, 6 August 1992; *Magyar Hirlap*, 11 June 1992, 6 November 1993 and 9 June 1995).

Cold capacities

From the early 1990s individual agreements signed by the companies and the Ministries regularized the conditions of maintaining cold capacities in Hungary. The latter contributed to the financial burdens of maintaining these assets. In a very restricted circle of companies, state authorities provided financial contributions to companies in order to upkeep their military-related productive capacities. The Ministry of Industry and Trade spent a yearly Ft 147 million to assist companies in maintaining their cold capacities, and another Ft 300 million was made available for the same purpose through the Ministry of Finance (*Magyar Nemzet*, 10 May 1998). In some cases this financial support was an important source of cash for the liquidity-strapped companies.⁵

Cold capacities had to be maintained by the company, often even after the enterprise ceased its defense-related production, until the supervising Ministries authorized their sale. Some companies, such as Mechlabor and Gamma Muvek, survived thanks to their fixed military-related assets which prevented their liquidation. In other cases, however, like at EMV, the unused military-related productive assets and the corresponding legal status became a major obstacle to development.

⁵ In the case of Eszak-Magyarországi Vegyimuvek, for example, it was believed that the sudden cut of this support was one of the reasons that led to the financial collapse of the company (*Magyar Hirlap*, 7 April 1997). According to Mr. Kocsis, EMV's chief engineer, the amount of this support had significantly diminished by 1990.

An example of partially rescued assets: Eszak-Magyarországi Vegyiművek (EMV)

Eszak-Magyarországi Vegyiművek was founded in 1949 for military-chemical production, producing gunpowder and its components. In the 1950s additional civilian profiles were introduced to utilize the enormous production capacities originally established for military purposes. By the end of the 1960s the company was producing gunpowder, drugs, intermediary pharmaceutical products and fertilizers.

Military-related orders began to decrease during the 1980s, and by 1986 military production at EMV had ground to a halt. All facilities connected to military-related production, including a new TNT plant, were sealed and turned into cold capacity. The existence of this cold capacity blocked the privatization process, since the prevalent laws forbade its sale. EMV only obtained permission from the Ministry of Defense to sell these facilities at the end of 1994.

After losing its military orders, in the early 1990s the company was faced with the collapse of its large-scale civilian markets in the CMEA, principally in the Soviet Union and within Hungary. In March 1992 a bankruptcy process was initiated against EMV. The company management tried to avoid liquidation by finding buyers for one of its divisions that had become an independent branch company and was fairly prosperous. Its eventual sale to an Austrian firm further improved its situation. The profits from this sale were used to create three other limited companies out of former EMV divisions. Difficulties were encountered in the sale of these companies due to EMV's military character, since the whole former state-owned enterprise consisted of one undivided real estate property. The new daughter companies could not own their own premises with the corresponding territories. Whereas personal connections assisted the first

limited company in overcoming the legal restrictions associated with separation from the parent company, this was not the case for the others, which faced bureaucratic formalities in attempting to claim their corresponding physical assets.

Between 1992 and 1997 EMV went through several complicated and painful transformation and reorganization processes. Both output and workforce were radically reduced. When the liquidation process began in 1992, there were still 2,000 people working at the company. In late 1997, 480 people were employed by the Austrian-owned limited and approximately 400 workers at EMV.

EMV was announced in several privatization tenders, all of which failed. In 1996 the liquidation agency in charge bought back and reunited the decentralized company assets. EMV was finally sold in April 1997 to a consortium formed by Hungarian companies and private persons. The largest shareholder, Budapesti Vegyiművek—a chemical company based in Budapest and a major business partner of EMV—wanted to use EMV's immense premises for its own extension. In May 1998 the company was resold to the American TRI Limited. All concerned partners declared that there would be new investments in the company and the problem of environmental damage would also be addressed (Kocsis, interview, 1997; *Napi Gazdaság*, 12 May 1998).

Regional level conversion

In the optimal case conversion should have taken place at enterprise-level. This could have diminished the waste of those resources formerly tied to military-related activities. Since genuine conversion took place rather rarely in Hungary, a second best option was regional level conversion. Regions formerly heavily dependent on the defense industry were seriously affected when the sector collapsed.

Defense industry managers could have foreseen the forthcoming crisis, since there were many warning signs that the WTO system was exhausted. The crisis was at the same time disconcerting for the regional authorities, which had just been in the process of learning about new possibilities and tools available to them for managing their local problems following the reorganization of the regional administration after 1990. Thus, regional authorities were faced with the double challenge of having to learn new methods of administrative and economic management, as well as urgent crisis management. This explains why in many places their attitude was still rather passive in face of the rapidly evolving local difficulties.

In some regional economic centers, however, regional level authorities or the companies themselves were able to find an efficient solution to the crisis. In Szekesfehervar and Ajka, for example, the collapse of the defense industry caused a serious regional crisis. Local regional authorities and managers, however, were able to cooperate and carry out a genuine transformation of their area. The new, competitive and predominantly civilian regional economy was gradually able to reabsorb the resources released by the reduced defense sector.

Bakony and several other military-related enterprises—for example major food factories that catered to the armed forces—were based in the county of Veszprem. Military-related orders were already gradually decreasing in the 1980s, and therefore the region had some time to adapt itself to the changing situation. This 'time allowance' made the transition smoother and gave the region better chances to reinsert itself into a renewed national-international economic network. At the same time the existence of several military bases located in Veszprem county—including one used by NATO—makes it likely that, despite the positive results of both enterprise and regional level conversion, the county will probably reattach itself to the military economy (Mazak, interview, 1998).

A New Turning Point

By 1997/98 the Hungarian military sector had relatively restabilized. This meant that a few companies, such as Videoton, Orion and FEG, were genuinely prospering. Others managed to survive with modest but relatively stable future prospects. Most of the companies that managed to keep themselves above water had unresolved financial and marketing problems. A small group of companies could continue their activities only with state assistance.

The relative consolidation of the Hungarian defense industry had occurred due to the restructuring efforts of some major companies, the increasing participation of foreign capital, the renewed but modest state assistance, general economic recovery and the country's invitation to join NATO.

In 1997 only 15 percent of the Hungarian defense industry output was destined for local use, while the rest was exported. While the Hungarian armed forces generated very few orders for the local defense industry, even this small amount of internal consumption was largely made possible with the participation of foreign companies, for example through off-set deals such as that concluded in 1997 with the French Matra Defense (*Magyar Nemzet*, 12 November 1997). According to an article written in 1996 by Mr. Bela Takacs of the Ministry of Industry and Trade, the Hungarian defense industry could survive only through external contacts: finding export markets, foreign partners and investors. The existing productive capacities of Hungarian defense-related companies could cover approximately 25–35 percent of the Hungarian armed forces' needs in

1996, and authorities in charge of the sector were committed to upholding these capacities (Takacs, 1996).

In a subsequent article published at the end of 1997, Mr. Takacs stated that military-related companies in Hungary no longer possessed redundant capacities or a non-productive workforce. The sector's productive capacity, he asserted, corresponded to marketing opportunities and was flexible enough to follow what would hopefully be a rapid increase in demand. Most producers had or were in the process of acquiring the quality certificates indispensable for international cooperation. Thanks to the continuous development of defense technology, the Hungarian defense industry had "several products of advanced (and extraordinary) technology." At the same time, Mr. Takacs added, "... the defense industry survives from one year to the other (and often from one month to the next) thanks to occasional exports and civilian production. ... It is entirely clear that only an increasing demand by the national defense and law enforcement agencies can put the industry on a stable path." (Takacs, 1997a; *Figyelő*, 16 October 1997).

These statements marked a turn in official policy. During most of the 1990s official sectoral representatives seemed to accept the fact that military expenditures, and within these the share of technological development, were modest. Export was considered the principal opportunity for the survival of the Hungarian defense industry. By 1997/98 however, it was regularly acknowledged that a precondition for increasing exports was an increase in internal demand in

order to obtain the necessary local references. New hopes were formulated envisaging the increase of defense industrial output instead of maintaining current levels. In 1997/98 the representatives of the sector quickly identified new opportunities open to the Hungarian defense industry. First was the relative stabilization of the Hungarian economy, the modest growth of GDP and the reduction of the budget deficit, all of which made active state promotion of certain productive branches possible. This could potentially include the defense industry. Second, and the more important opportunity, was the country's invitation to join NATO.

At the opening of the traditional C+D defense and avionics exhibition in Budapest in November 1997, Defense Minister Mr. Gyorgy Keleti stressed that the Hungarian defense industry will recover because it has to be prepared for the repair of NATO weaponry and for cooperation in the production of certain military-related products (*Nepszabadsag*, 12 November 1997). After the change of government in June 1998, the new Minister of Defense, Mr. Janos Szabo, declared that defense would require additional resources because its budget would be insufficient to accomplish the tasks required of it. He confirmed that the Hungarian defense industry had to be revived and Hungarian subcontractors should participate in the army's modernization project (*Nepszabadsag*, 1 July 1998).

According to negotiations with NATO representatives, Hungarian military expenditures are expected to increase to reach at least 2 percent of GDP by 2000.⁶ Within the increased military budget, a growing share was promised for development. According to Mr. Takacs's calculations, the amount might reach an annual sum of Ft30–40 billion, or between 15 and 20 percent of projected military expenditures. Even if the most important new equipment was expected to be purchased abroad, Hungarian defense industry contractors might receive more orders from the national armed forces.

Another channel through which the local defense industry was expected to benefit from the army's modernization was through off-set deals. In 1997 the French Matra Defense won a tender to provide the Hungarian armed forces with new air-defense equipment. Thanks to the accompanying off-set agreement, Ft22 billion worth of Hungarian products and work was sold (*Nepszabadsag*, 23 April 1998). Also in 1997, the Ministry of Defense announced a tender for telephone centers, and Lucent Technologies, Siemens, Alcatel, Schrack and Ericsson were invited to participate (*Figyelő*, 26 March 1998). Two more tenders of an even larger scale were to be decided by Hungarian authorities for the purchase of a new radio-locator system and the modernization of the fighter air fleet. In the latter case the world's most important producers were coming forth with promising offers.

In preparation for the tender for the new fighter aircraft, the Hungarian Ministry of Industry and Trade signed offset agreements with SAAB-Aerospace, McDonnell-Douglas Aerospace and Lockheed Martin.

According to the agreements all interested sellers would guarantee close to 100 percent off-sets. The sellers also offered special financial solutions to ease the conditions of payment. The Hungarian authorities indicated which production areas—electronics, vehicle production and software, for example—would be preferred. Mr. Douglas Miller, representative of McDonnell-Douglas Aerospace, mentioned that in the event that his company were to win the tender, it would cooperate with the Hungarian Arzenal, Videoton, Dunaferr and Graphisoft companies⁷ (*Figyelő*, 3 April 1997; *International Herald Tribune*, 20 June 1997; *Heti Világgazdaság*, 20 December 1997).

As far as the potential export products of the Hungarian defense industry were concerned, several were mentioned at a conference held in Budapest in April 1998, organized by the Center for Security and Defense Studies—Biztonsáspolitikai és Védelmi Kutatások Központja. Hungarian defense industry representatives presented a list of recently developed products destined principally for special niches in the world market. Among them were high-speed code deciphering systems, special sensor and detector systems, military software, drugs to use in case of nuclear accidents, high-caliber special handweapons and automatic rocket launchers (*Nepszabadsag*, 23 April 1998).

In 1997/98 several new military-related products were presented, revealing the systematic preparation of the Hungarian defense industry for the renewal of the sector. The Raba truck-producing company announced that the development of a whole new family of completely NATO-compatible military trucks. The

prototypes were produced with some elements imported from NATO member countries. Specialized researchers and industry representatives had also developed a new family of handweapons, the Gepard, that was promoted as a possible export hit.

Another sign of the renewed confidence in the strengthening of the Hungarian defense-related sector was apparent eagerness among both military-related and civilian companies to become subcontractors to the Hungarian armed forces (*Heti Világgazdaság*, 20 June 1998).

⁶ In June 1997, before the NATO meeting in Madrid, Minister of Defense György Keleti declared that he lobbied so defense expenditures could reach 1.5% of the GDP, but "only if the country can afford it. As member of the cabinet, I also have to think of the needs of education and health care," he was quoted as saying. (*Heti Világgazdaság*, 14 June, 1997.)

⁷ MDA already had a successful off-set deal in Hungary. In 1987 the Hungarian Police bought 22 MD-500 helicopters, which were paid for with Ikarus buses.

Conclusions

In the early 1990s the Hungarian defense industry went through a fundamental crisis. The crisis manifested the sector's compounded structural problems which had surfaced in response to the economic and political system changes. The structure and size of the defense industry had been determined by the external needs of the WTO and the highly protected environment in which it had functioned. This had shielded it from the realities of the Hungarian economy. After 1990, however, the sector had to cope with the dynamics of a recently introduced market economy and the corresponding institutional changes. The official protection which had in the past assured the industry's privileged existence became weak and inconsistent. There was no political force, backed with sufficient economic resources, able to push the sector either towards conversion or a genuine large-scale defense industry restructuring. Defense industry enterprises were principally left to themselves to find a way out of this situation. By 1995 the Hungarian defense industry became relatively consolidated. The bulk of the companies which had managed to survive became more efficient, more flexible and were able to find new markets. Through new business networks, they were able to mobilize external resources for their further development. Those companies that did not succeed in this could still count on eventual state assistance. The Hungarian defense industry was reduced to a level at which it could survive by and large on its own. The

enterprises' individual survival efforts were not coordinated at any level. Even those companies which accomplished major internal restructuring found that their efforts proved successful only if they found stable external markets and/or sources of finance. Since the revamped military-related companies were principally geared towards export, the structure of the military-related sector in Hungary was principally shaped by erratic, external market demand. It did not correspond to 'natural' needs—defined by the armed forces' needs—or political needs determined by the interests of state-level decision-makers. The transformation of the Hungarian defense industry could only be achieved with large material and human losses. Tens of thousands of employees became redundant, and immense material reserves, production machinery and know-how was wasted. Very few of the formerly military-related productive assets were consciously converted for civilian purposes. During the crisis defense-related companies were forced to learn independence and become more efficient if they wished to survive in the new economic environment. Those that were able to build on the positive elements of their defense industrial heritage and introduced fundamental changes in the way the company was run proved to be successful. These companies placed emphasis on continuing R&D programs, the preservation of a highly skilled team of managers and key workers, and adherence to strict quality controls. They managed to learn active marketing and financial management, introduced productivity-enhancing measures and strict budgeting policies, and established new external economic contacts. Despite their relative independence from a politically determined past and the discovery of new economic possibilities, even the

most successful companies lobbied intensely when the opportunity for state assistance arose. During most of the 1990s defense industry managers and Ministry officials alike seemed to accept the limitations forced on the sector by the changed economic and political realities. They maintained that the sector could survive via export-led restructuring and eventually growth. From the turn of 1997/98, however, more emphasis was placed on locally induced defense industry recovery. Since the modest economic recovery made it feasible, the representative organizations of the sector increasingly lobbied for more state orders and eventually for financial contributions. Following the invitation to become a member of NATO, Hungary pledged to increase its defense budget. The modernization of the national armed forces became inevitable. The modernization projects and the increasing competition between major Western companies to participate in them provided yet another development opportunity for the sector. It is most likely that instead of conversion and integration into the civilian economy, the Hungarian defense industry will revive in the near future.

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Appendix

Table: Main Hungarian military producers, 1988–1998

Note: Most large-scale companies were divided into several little ones. Only the military-related ones are listed in the above table. Rt= shareholders' company, Kft= Ltd.

<i>Enterprise</i>	<i>Change of name</i>	<i>Organizational change</i>	<i>Ownership change</i>
DIGEP-AG (Diosgyor)	Army-Coop- Diag Kft.	Military division of former SOE became independent company	100% in private Russian and Hungarian ownership
Fegyver es Gazkeszulekgyar (FEG) (Budapest)	FEGARMY Fegyvergyarto Kft.	Military division of former SOE became independent LTD.	100% in state ownership
Danuvia Gepipari Vallalat (Budapest)	Danuvia Gepipari Rt.	Decentralization	100% Hungarian private
Bakony Muvek (Veszprem)	Bakony Muvek Rt.	Major internal restructuring	100% Hungarian private
Matravideki Femmuvek (Sirok)	MFS- Magyar Loszergyarto Kft.	Military division of former SOE became independent company	100% state
Gamma Muvek (Budapest)	Gamma Rt.	Major internal restructuring	30% US and 70% Hungarian private ownership
Magyar Optikai Muvek (MOM) (Budapest)	MOM Vizmerestechnika Rt; Schmidt & Bender Hungaria Optika Kft.; G&D Trade Kft	Divided into several small-scale successor companies	Hungarian and foreign private ownership
Finommechanikai Muvek (Budapest)	-FMV Finommechanikai Rt. (Budapest) - HM Radar Rt. (Torokszenmiklos)	Divisions of former SOE became independent companies	100% private German and Hungarian owners - 100% state (MOD and AFI)
Orion (Budapest)	Yuganskorian, Orion	Major internal reorganizations	100% private, Russian and Singapore ownership
Videoton (Szekesfehervar)	Videoton - Rendszertechnika Kft.	Military division of former SOE became independent LTD within the holding	100% private Hungarian owners
BHG (Budapest)	BHG Hiradastechnikai Rt.	Internal reorganizations divided into 3 Ltd.s	100% state
Mechlabor (Budapest)	Vidoeton- Mechlabor Kft.	Decentralization	Hungarian state and private
TAKI (Budapest)	TKI Tavkozlesi Innovacios Rt.	Major internal restructuring	100% state-owned
Telefongyar (Budapest)	Siemens- Telefongyar	Major internal restructuring	Joint venture with Siemens
Labor MIM (Budapest)	-	-	-

<i>Profile change</i>	<i>Workforce</i>	<i>Output</i>	<i>Status in 1998</i>
100% military	1983–1985: 1,300–1,500 1997: 320	1983–1985: Ft1.2 bn–1.7 bn	Suspended
90% military	1980: 5,000 1993: 500 1997: 660	1994: Ft1.3 bn	Good
100% civilian, but listed as military-related	1973: 5,000 1997: 197	1990: Ft400 mn 1994: Ft240 mn	Uncertain
100% civilian	1989: 4,192 1997: 1,444	1988: Ft1.9 bn 1997: Ft4.4 bn	Good developments, but uncertain
90% military	1975: 3,700 1997: 200 (+ 400)	1997: Ft45 mn	Good developments, but uncertain
10% military	1989: 4,000 1994: 230 1997: 180	1989: Ft1.5 bn 1994: Ft375 mn	Good developments, but uncertain
Three of the successor LTDs were listed as military-related in 1997	1986: 3,500 1992: 1,100 1997: appr. 400	1988: Ft4 bn	Mother company bankrupt, some successors survived
- Mixed profile - 100% military	1988: 4,000 1994: 560 1997: 325	1988: Ft4 bn 1994: Ft1.2 bn	Uncertain
Predominantly civilian, listed as military-related	1988: 4,500 1997: 240	1993: Ft0.5 bn 1996: Ft1.25 bn	Prosperous
100% military	1988: 6,000 1998: 200	1994: Ft1 bn	Prosperous
100% civilian	1990: 8,000 1997: 300+100+150	1986: Ft6 bn 1995: Ft2.7 bn	Bad, uncertain
100% military	1988: 2,400 1998: 200	1988: Ft1.7 bn 1994: Ft270 mn	Stable
Mixed profile	1985: 1,200 1993: 300	1993: Ft250 mn	Good
100% civilian	1997: 382	1997: Ft17 bn	Properous
-	-	-	-

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