OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

19343

Distr.
RESTRICTED

IPCT/R.11
17 December 1991

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

IDENTIFICATION OF OPPORTUNITIES TO STRENGTHEN MANUFACTURING SYSTEMS OF SELECTED INDUSTRIES THROUGH AUTOMIZATION OF PRODUCTION PROCESS

TF/RER/90/001

HUNGARY

Terminal report

Part II

Prepared for the Government of ~~Poland~~ Hungary

by the United Nations Industrial Development Organization

Backstopping officer: Takao Nishimura,
New Technologies Unit

* Mention of company names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO). This document has not been edited.

V.91-31721

TABLE OF CONTENTS

List of Tables

Figures

List of Annex Tables

I. INTRODUCTION

UNIDO Mission to Poland and Hungary

This report is based on UNIDO Technical Assistance Project TF/RER/90/001 "Identification of Opportunity to Strengthen Manufacturing System of Selected Industries through Automation of the Production Process" which was implemented through a series of UNIDO missions, following requests made by the Polish as well as the Hungarian Governments.

The UNIDO Missions were fielded on aspects of the electrical and electronics as well as the pharmaceutical industries from 17 October to 8 November 1990, and on the automobile industry from 6 to 15 January 1991. For the preparation and arrangement of the above specialists missions, two short-term staff member missions were fielded in 1990.

The specialists comprised a UNIDO staff member from the New Technologies Unit in the Industrial TEchnology Development Division, Project Team Co-ordinator, Seichi MIMURA, Consultant for electric and electronics aspects, Masahiko YOSHITAKE, for pharmaceuticals, Akira OGI and Hironori TACHIMORI for the automobile industry.

The Missions worked in good co-operation and assistance with the national experts in Poland, MM. Jan POTEGA and Krzystof DABROWSKI, and in Hungary, MM. Dr. János SOMLO and Barna MEZEY.

Special thanks go to Mr. Ryszard BANDOROWICZ, Managing Director of PROMASZ, Poland, and to Mr. Tamás Sómjen, Deputy Director General of the Ministry of International Economic Relations, Hungary, for all the arrangements they did in line with the preparation and implementation of the project.

Background and objective

In Eastern Europe, the economic system used to be very much different from the market economy in the past, though some countries, namely Hungary, have introduced a number of changes pointing towards market economy. According to its system, the central plan was deciding on the economic policy of the country and allocating the whole production to individual enterprises. The pricing system had been established completely independently from the international

price level for natural resources and energy resources. There was no linkage with overseas markets. The level and pattern of investment was decided according to the priorities of the central plan rather than to consumers' demand and need of profit-oriented production enterprises. In practice, prices had remained unchanged, which caused severe shortages of industrial as well as consumer goods.

As a result of this policy and socio-economic structure, industries in east European countries were mainly based on resources, primary products and labour-intensive subsectors at the expenses of consumer goods and service sectors. Consequently, the heavy and defence industries were slowing a good growth.

Poland and Hungary are undergoing rapid political and economic reforms. Since 1990, the Governments have endeavoured to overcome the economic difficulties and to gradually introduce new economic policies which are concentrated on a "market economy" and "foreign trade" liberalization.

The objectives of this project are to identify and assess the needs of selected industries to upgrade their product quality through automatization as well as to improve their production efficiency and performance. Within the framework of a fact-finding and project identification mission, diagnostics, approaches to ailing manufacturing industries and identification of corrective measures for immediate and long-term action were carried out.

The Missions, in co-operation with the Governments involved have identified three industrial subsectors to be assessed in this project: they are the electrical and electronics, pharmaceutical and automobile industries.

The Missions have conducted a short survey by visiting and discussing with persons concerned their related production and research organizations and enterprises.

In the area of <u>electrical and electronics industry</u> these persons were:

in Poland: Unitra Serwis, Software houses (6 companies), MERA BLONIE, WAMEL, EMA ELESTER, ELWRO and IOPM.

in Hungary: MEDICOR, SZAMALK, MTA SZTAKI, VIDEOTON Automatika, VIDEOTON Audiotechnikai and VILATI.

In the area of pharmaceutical industry:

in Poland: POLFA in Terchomin, POLFA in Starogard Gdaanski, PABIANICKIE Zaklady Farmaceutyczne POLFA,

in Hungary: BIOCHIM Biotechnological Company, BIOREX Research and Development Co., MEDIPHARMA/BIOPHARM, Institute for Drug Research; CHINOIN, GEDEON RICHTER, the Institute HUMAN for Serobacteriological Production and Research, BIOGAL.

In the area of auto industry:

in Poland: TRANSBUD, POLMO ZELMOT, PZL WOLA

in Hungary: SPIRAL Autojavito Vallat, HUGAROSZERVIZ, CONTREX, MERKUR (as trading company), TUNGSRAM IKARUS Autokonszern.

At the time of the UNIDO Mission's arrival in the respective country, an orientation meeting was held with a counterpart organization where a programme of visits was discussed and enterprises were selected to be visited. Following this meeting, the Mission was sent immediately to visit the enterprises. Although the stay of the UNIDO experts in each country was very short, no longer than one week in one case, only a couple of days in the other, the Mission could achieve a very fruitful outcome of the survey and prepare this report, due to a well arranged programme organized by the national experts and due to the latter's very effective co-operation.

The observations made by the Mission were based on their very short visits and limited information collected in the field, but the survey led to a preliminary conclusion that many of the enterprises must solve other basic problems before they can successfully introduce automated production processes and apply modern technology. These basic problems are:

- marketing and market-oriented management,
- introduction of new production system and capabilities,
- training programmes at all employees levels, for managers, and for technical and skilled workers.

Recommendations have been formulated in this report on aspects of each of the respective industries and they are shown in the corresponding chapters.

This report is also intended to serve for potential overseas investors who may be interested in finding out about local co-operation in view of possible future joint ventures or simply for market co-operation.

II. RECENT ECONOMIC ENVIRONMENT

General Background

Hungary's post-war economic management system until the mid-60s was characterized by detailed central planning. While this centralized planning system generated significant economic growth and industrialization through resource mobilization, it also led to imbalances in the country's macro-economic framework and to inefficiencies in the micro-economic environment. In its efforts to correct such inefficiencies, the Government introduced reforms leading to partial decentralization in 1968, to a moratorium in the reform process and recentralization in 1972, and, since 1978, to a renewal of the reform process.

After the 1956 political upheavals, Hungary proceeded steadily with its economic development, albeit rather more slowly than some of its CMEA neighbours. Living standards rose rapidly until the late 70s when the mounting debt crisis forced domestic restraint, a policy which led to some years of stagnation.

Most of the economic productive activity has been organized in the form of state enterprises or cooperatives since the early 50s. The system of command planning was very much along Soviet lines with the same emphasis on heavy industry; it was effective in mobilizing resources and generating rapid growth, at least for a time. By the early 60s, labour was becoming scarcer and there were serious doubts about the ability of the traditional planning system to manage the transition from extensive to intensive growth (quantity to quality). After much debate, and experimentation with minor reforms, radical reforms were introduced in 1968: they gave much more economic independence to enterprises, and central planning became essentially confined to regulating investment and foreign trade with CMEA countries. However, reform met strong opposition in the mid-1970s and day- to-day government intervention was given a new lease of life. In 1980, the reform process was renewed, with moves to encourage the formation of new, small, production units of various kinds to make the economy more flexible. Even so, Hungary's industry is still highly concentrated, much of it has remained heavily subsidised until 1989 and managers have been slow in adapting to the new environment regarded as vital for the economy's long-term success.

Present economic setting

The Hungarian economic environment has not been conducive to industrial restructuring in the last decade. Following an economic crisis in the late 70s and early 80s, the Hungarian economy had stabilized by the end of 1984. The current account was in surplus, as was the Central Government budget. In 1985, the Government initiated a vigorous renewal of the economic reform programme, which had begun in 1968, and it introduced reforms to promote decentralization and reliance on market-based signals to guide economic actions. The macro-economic environment in which the reforms were implemented was not supportive, however. An expansional demand management policy in 1985-86 led to increased government expenditures and fiscal deficits, caused in large part by increased financial support by the State to enterprises, this reducing their financial discipline and incentive to respond to reforms. The initial supply response of the economy to renewal or reforms was poor. Consequently, economic performance deteriorated: real GDP declined by 0.3 per cent in 1985 and only grew by 1.5 per cent in 1986. Further, the unsatisfactory performance of non-ruble exports, growing non-ruble imports, and declining terms of trade led to worsening of trade and current account deficits, which were financed by higher foreign debt. By the end of 1986, the current account deficit and the fiscal deficit were 6.0 per cent and 4.3 per cent of GDP respectively.

The Government addressed the serious economic situation in the mid-1987 by taking corrective measures aiming at reducing the budget deficit, by tightening financial support to enterprises and reducing domestic demand. These measures were effective in reversing the deterioration in internal and external balances, but had less impact than expected due to continuously increasing household consumption. Despite strong domestic demand, non-ruble exports showed good performance in 1987, and increased by 5 per cent. The active exchange rate policy initiated in 1986, coupled with a 1987 change in the domestic pricing system that increased the relative profitability of non-ruble exports, contributed to the reverse in export performance. The supply side of the economy also improved as the GDP grew faster to 2.9 per cent in 1987. These positive trends have continued in 1988.

A wide range of political changes took place in 1989-90 as a new multiparty parliamentary system was introduced and a conservative coalition Government was appointed. An important improvement of the foreign economic balance happened

and an export surplus in the range of 1 billion US$ was achieved in 1990 with the convertible current account closing with a surplus, for the first time in a long period. The main instruments to achieve the objectives are continued progress in systemic reforms coupled with a reduction in budget deficit, ceilings on the growth of credit, strictly limited nominal wage increases, an active exchange rate policy, and an active interest rate policy to raise household and enterprise savings rates.

The industrial sector

The industrial sector has increasingly been the leading sector in Hungarian economy during the post-war period. The sector grew rapidly until the mid-70s due to emphasis given to heavy industries in the 50s and a subsequent strategy to diversify the industrial base in the 60s and 70s, leading to higher growth in the chemical and engineering industries. Since the mid-70s, the sector has grown considerably slower. Annual growth rates of about 7 per cent in the period 1960-75 were reduced to 4.1 per cent between 1975-80, and 2.4 per cent between 1980-87. The share of the industrial sector in GDP increased steadily from 18 per cent in 1950 to 31 per cent in 1980, to stabilize in the 80s. In 1987, the sector was representing about 33 per cent of GDP, 31 per cent of employment, 35 per cent of gross fixed investment, and 85 per cent of total exports. This performance improved in 1987 with an output growth of 3.7 per cent, after stagnating in 1985-86. The 1988 output is estimated to have grown by 0.5-1.0 per cent. The years 1989-90 have produced a contraction and as of 1990, a privatization process and market influences have gained momentum. A great number of previous trends have been discontinued and new databases will be established.

Trade

The economy is relatively open, with internationally traded goods and services amounting to a substantial portion of GDP. Up to the beginning of the 1980s, trade had been divided approximately 50:50 between CC and CME countries, though a part of the latter was also carried out in convertible currencies. In 1990, the trade in rubles and with CMEA countries sank rapidly. As of 1991, all new contracts with former CMEA member countries are being concluded on CC basis.

Table 1: Selected data on the socialized industrial sector, 1987
(Ft billion and per cent shares)

	GDP		Investment		Non-ruble exports	
	Amount	%	Amount	%	Amount	%
Mining	56.6	14.8	18.0	21.3	1.3	0.6
Electric energy	36.8	9.6	14.8	17.5	0.0	0.0
Metallurgy	12.4	3.2	3.5	4.2	22.3	10.8
Engineering	128.2	33.5	13.9	16.5	50.3	24.5
Building materials	17.3	4.6	2.5	3.0	3.4	1.7
Chemical industry	56.9	14.9	15.8	18.8	49.9	24.3
Light industry	52.8	13.8	5.8	6.9	34.1	16.6
Food processing	15.2	4.0	9.6	11.4	39.2	19.1
Others	6.4	1.7	0.4	0.5	5.1	2.5
Total	382.6	100.0	84.4	100.0	205.6	100.0

The CC current account deficit, which widened to US$ 1.4 billion in 1989, reflected the economy's growing openness, including a high level of personal imports after the opening of the Austrian border. The government policy, while further liberalizing the imports, was successful in producing a surplus to reduce the deficit.

Foreign trade is crucial to the well-being of the Hungarian economy, with merchandise exports equivalent to 33 per cent of GDP in 1989. The collapse in ruble trade in 1989-90 has seen a major shift in trade towards the West. While the Soviet Union had been Hungary's most important trading partner for a long time, followed by Germany, Czechoslovakia and Austria, the recently unified Germany is now occupying first place and trade with the Czechoslovakian Republic has also been reduced. Hungarian main exports are agricultural products, machinery and semi-finished manufactures. The major imports are fuel, semi-finished products and machinery.

Between 1981 and 1985, Hungary recorded a surplus in its hard-currency trade balance. Surpluses from hard-currency trade with the CMEA have been a major factor in maintaining an overall surplus in the convertible currency balance of trade during most of the 80s, while trade with the developed West was usually in deficit. Between 1983 and 1987, The Hungarian surplus in intra-CMEA hard-currency trade fell steadily. But in 1988, it rose to an estimated $309 million

and in 1989 to $334 million, mainly because of a strong increase of agricultural exports to the USSR.

In 1988, Hungary registered a $573 million hard-currency trade surplus (fob/cif), and in 1989, a $587 million surplus, both major improvements over the $361 million deficit recorded in 1987. The 1986 and 1987 trade deficits were due to a number of factors: sharply declined terms of trade; falling intra-CMEA hard-currency earnings; poor agricultural results; the need to meet Soviet calls for goods with a higher Western import content. But these external factors were exacerbated by the Hungarian exporters' inability to meet and overcome changing circumstances, this, in turn, being a problem rooted in the country's backward industrial structure and lack of market forces. In 1988 and 1989, a positive reverse in international prices, increased volume exports and substantially cut hard-currency imports were the main reasons behind Hungary's hard-currency trade surplus. In 1990, many Hungarian exporters have been successful in switching their exports from East to West and a hard-currency trade surplus of about 1 billion has been achieved.

In order to create a favourable environment for convertible currency exports, the Government has been engaged in active exchange rate policies since 1985, through which the effective exchange rate has been depreciated by about 5 per cent each year. During 1985-86, however, the policy was unable to overcome the worsening in non-ruble terms of trade. The situation improved in 1987 as export prices for intermediate goods improved. To promote exports and competition in trading activities, the Government has increasingly decentralized trade and introduced an automatic granting of trade rights from the beginning of 1988, subject to meeting specific criteria with respect to trade items and skills of personnel by enterprises. As of 1991, most such regulations have been abolished and at the time of this writing it is reported that over 20,000 companies and individuals have registered themselves as engaged in foreign trade activities.

Since 1975, the Government has provided enterprises with a set of incentives for export-oriented investments to promote exports to convertible currency markets. Any investment project, that exports at least 60-70 per cent of its output and can pay back the total cost of investment from net convertible currency receipts within five years from the start of investment, was eligible to exemption from accumulated assets tax, profit tax rebate of half of interest

payments, extended maturity of credit (up to 12 years) and state equity allocation. With the general change of economic regulations, the export incentive system has been reduced only to allocate some investment funds and facilities.

The eligibility criteria to participate in the programme, particularly the relatively high export content and short pay-back period, are fairly stringent and may exclude some profitable projects, especially large-scale and capital-intensive ventures. As a result of the programme, the increases in convertible currency exports for 1986 and 1987 are estimated around $ 210 million and $ 230 million respectively, which is substantial considering the size of the country total convertible currency exports, i.e. $4.1 billion in 1986 and $5.1 billion in 1987.

- Market and enterprises

Any improvement in the sector performance is hampered by a number of constraints which fall into two broad categories: the policy and institutional environment in which enterprises operate, and constraints at the enterprise level. At the policy level, the economic reforms which were initiated in 1968 and reinvigorated in 1985 have replaced the physical planning system with a new system of economic management, linked to markets. While this important achievement has improved the environment for economic efficiency in industry, some strategic issues remain which adversely affect the performance and restructuring of industry. These were broadly: limited domestic and international competition, limited resource mobility, and lack of financial discipline and weak autonomy on the part of enterprises as well as a lack of commitment for quality on the part of the enterprises. Within the overall economic stabilisation and reform programme, these three strategic issues are being addressed in a comprehensive industrial policy reform programme.

Despite the fact that the macroeconomic environment has recently changed completely, certain consequences of the previous system are still to be felt:

At the enterprise level, constraints toward improved performance include:

- insufficient market orientation caused by a number of factors, including lack of domestic competition, orientation of many enterprises toward less

demanding domestic and CMEA markets and limited exposure to foreign markets, and reliance on external trade organisations which insulated enterprises from their clients and suppliers; particularly in this field, however, conditions have been changed and a good response by many of the enterprises is reflected in the successful foreign trade performance in 1990 and the beginning of 1991;

- underdeveloped corporate management skills, particularly in the areas of strategic planning, marketing, product development, and financial management;
- inadequate organisational structures, lines of authority, and management information and accounting systems, particularly for cost control and budgeting;
- obsolete technology and aging production facilities, largely caused by constraints on foreign exchange availability and inadequate R&D efforts;
- proliferation of products manufactured by enterprises including a large number of low volume and unprofitable activities, contributing to high levels of vertical integration and lack of specialized component manufacture; and
- lack of sufficient quality inputs to produce due to underdeveloped feeder industries supplying parts and components, and restricted foreign exchange availability that has severely constrained alternate imports of necessary inputs.

Foreign firms are more and more interested in establishing joint ventures in Hungary. In 1980, only eight joint ventures had been agreed upon; the number rose to 280 at the end of 1988 and to 650 nine months later. However, only 65 per cent of the agreed-upon ventures were actually functioning by the end of 1988 and, although there were important exceptions, the great majority of them were either services or early exploratory exchanges. Only 10 per cent concerned the manufacturing industry and, to date, few of them have brought new productive capital into use. The total investment associated with these 650 ventures was $700 million including buildings, machinery, licenses and know-how. Recent announcements by General Motors, Ford, Suzuki, United Technology, Sanoti, Electrolux and others indicate that this figure will be rising substantially in the future. By the end of 1990, the number of joint-ventures had increased to about 2,000. New important productive investment agreements had been reached. However, ventures in trade and services with low capital share are still dominating.

Despite moves toward an economy where markets and competition play more important roles, State-owned enterprises are currently producing well over 4/5 of the industrial output. In most cases, ownership is now at arm's length, with management responsibility in the hands of Enterprise Councils or General Assemblies.

Reform programme

The main emphasis of the 1988-1990 reform programme was in those areas where an immediate impact on the country macro-economic problems was most likely to occur. This also applies to the realisation of the main objectives of the reform programme in the industrial sector (financial discipline, enhanced competition, and resource mobility).

Some of the most important measures taken in 1989-91 have been:

- reducing the budgetary deficit;
- eliminating subsidies of consumer prices/eliminating export subsidies with the exception of some agricultural products and subsidies to enterprises who had encountered losses earlier;
- liberalising some 90% of the import (a global quota system for a range of consumer goods and licensing of a very few articles of strategic importance maintained);
- imposing price setting for over 90 per cent of liberalised prices (the price office is closed and an office of competition has been established);
- passing a law on concession, a new law on bookkeeping based on OECD principles;
- adopting Act LXXXVI in 1990 on the prohibition of unfair market practices;
- facilitated entry of new enterprises and private entrepreneurship.

Employment

There will be social costs involved to implement the restructuring programme. The most significant of them will be the appearance of open unemployment. The right to a job has been embodied in the Hungarian constitution and pressure to maintain full employment has had a pervasive influence. As a consequence, hidden unemployment was an important feature of the economy as enterprises were very reluctant to make employees redundant, even when there was obvious over-staffing. At the same time, wage policies, which depressed wage levels,

stimulated demand for labour. Even in late 1989, Hungary suffered from a shortage of labour, particularly skilled labour.

Jobs are most at risk not only in two industries which have been undergoing restructuring: steel and coal mining but in all other sectors. In the steel industry, the previous Government had already decided to reduce the overall output from 3.4 to 2.6 million tons and to change the output composition.

From the mid-80s on, unemployment grew slowly but the number of unemployed people doubled during the second half of 1990 (1.7 per cent of the work force) and by March 1991, it was already representing 3 per cent. Unemployment benefits are paid to those made redundant by bankruptcy or enterprise rationalization. Agriculture is still the major employer but the private sector is also becoming one. In 1988, 347,000 people were working in the official private sector. By the mid-90s, this number will most certainly have increased substantially.

Small-business sector

In post-war Hungary, much emphasis had been placed on promoting heavy industry and developing enterprise activities in a concentrated fashion. Business activities in the private sector were heavily discriminated against. As a result, the industrial sector became dominated by large firms, and small-business activities lost their significance. During the 1980s, the policy environment for small business became steadily more positive. In line with the evolving legitimacy of the Hungarian private sector, the authorities introduced regulations in 1981-82 which moderated the control on employment limits and registration of small private-sector businesses. The supply response by the small-business sector was considerable. While its share of total output and employment (estimated at 7 and 5 per cent respectively) remained modest, it became the economy's most dynamic sector. During 1982-1987, in the context of liberalization but also continuing policy discrimination in many areas, and in the absence of a supportive framework, the small-business sector outperformed the overall economy and the industrial sector in terms of increased employment, output and productivity. A major step in the creation of opportunities for small firms was taken in January 1989 by introducing a greatly revised association (company law) framework and a simplified and unified company profit

taxation system, the common principle of both being neutrality in treating with enterprises of different ownership sectors.

In recent years, the Hungarian small-business sector has grown rapidly in terms of units and employment. Between 1984 and 1987, the proprietorship units increased at an annual rate of 5 per cent, partnerships at a rate of 32 per cent, and small co-operatives at a rate of 75 per cent. Small-business employment increased by 90,000-95,000 jobs over 1984-1987, compared with an estimated net loss of some 100,000 jobs in the economy as a whole. The reported output of small business expanded by 50 per cent annually during the same period.

The fastest growing small businesses have been in the transport, retail, personal services and construction sectors. The small-industry sector is also growing rapidly and is outperforming large-scale industries in terms of output and employment. The annual growth rate of gross output between 1985-87 for small industries was 28 per cent at current prices, compared to the 3.2 per cent growth rate experienced by socialized industries during that period.

Small businesses have encountered constraints in a number of areas: policy and regulatory framework, access to technology, financial and supporting services. These constraints are in many ways historical and related to the relatively recent official recognition of the sector as legitimate. On the other hand, the strength of the sector is also largely related to entrepreneurship and business skills which were developed while the sector was tightly restricted.

Banking and monetary system

As recently announced by the National Bank of Hungary, the monetary policy for 1990 gives priority to "an improvement in the external and internal balance and to control of inflation." Steps which are envisaged include:

- Holding the convertible currency current account deficit in 1990 at no more than US$ 550 million (actually achieved a surplus);
- Substantially reducing central bank loans to the state budget, thus making additional central bank credits available to the entrepreneurial sector (including private ventures and small business);
- Restricting planned growth targets of domestic money supply at 5 per cent less than the growth rate of GDP;

- Increasing flexibility of interest rate policies by reviewing the marginal interest rate of liquidity loans every month and the base rate on a quarterly basis.

The central bank also views the exchange rate policy as an integral element of monetary policies. As defined by the bank, the main objective of the exchange rate policy is to "establish the balance of supply and demand in the trade of the national currency against other currencies and to help reach equilibrium in the country's balance of payments." For example, between January 31 and February 20 1990, the bank devalued the HUF by 5 per cent, in three steps, against a basket of the most important convertible currencies. These steps followed an earlier devaluation at the end of 1989. Again a devaluation of 15 per cent has taken place in January 1991.

The major structural change of the financial system in 1989 was the integration of banking services for the enterprise and household sectors. Until January 1989, individuals were not permitted to have accounts in commercial banks but only in the National Savings Bank, the Post Office Savings Bank and the savings co-operatives. After 1 January 1989, individuals were allowed to open accounts in all commercial banks. Simultaneously, the National Savings Bank (NSB) was given permission to deal with enterprises. Interest rates in the enterprise and household sectors are being harmonised since January 1989. Also, as part of the decentralization of foreign exchange operations, the commercial banks have been able, since March 1989, to buy foreign exchange from the National Bank of Hungary on their clients' behalf and, since 1990, they are entitled to foreign exchange operations, with the exception of raising foreign loans unless specially authorised by the NBH.

The Hungarian financial system now consists of four basic types of institutions.

Institutions in the banking system (incomplete)

Domestic commercial banks	Specialized financial institutions
Budapest Bank (BB)	Construction Industry Bank
Commercial and Credit Bank (CCB)	Industrial Development Bank (IDB)
Hungarian Credit Bank (HCB)	Innofinance

Domestic commercial banks (cont'd)

Agrobank
Foreign Trade Bank (FTB)
General Banking of Venture Finance (GBVF)

Savings Banks

National Savings Bank (NSB)
Post Office Savings Bank
Savings Cooperatives (260)
(Lately savings banks are also operating as commercial banks)

Specialized financial institutions (cont'd)

Investbank
Small Ventures Bank (SVB)
Portfolio Bank
Mercantile Bank

Joint-Venture Banks

Central European International Bank (CEIB)
Citibank Budapest
Unicbank
General Banking and Trust Co. (GBTC)
Interbank
Bank Leumi
Creditanstalt

At the beginning of 1991, about eleven insurance companies, partly foreign owned, were operating in the country as joint ventures.

Investment

Investments in Hungary have been mainly done by the State, although the private sector is increasingly contributing to it (mainly housing but also small-scale private businesses). Since 1980, the real level of State investments has fallen by 14 per cent. However, the private sector, spurred by the 1980s rapidly growing number of private businesses, invested 22.3 per cent more in real terms over the same period, marking a 7 per cent increase in 1989. In the 80s, the steady decline of the State investments had led to a corresponding decline in the quality of manufacture output. This decline was further accentuated by priority given to the extracting and energy production sectors which actually increased their share of total State investments from 27.1 per cent in 1976-1980 to 38.0 per cent in 1981-85. Hungarian economists argue that the Government's investment policy has reinforced the country's antiquated production structure and contributed to its increasing inability to compete on Western markets. For the rest of the 80s, the Government pledged a major reversal in its investment policy; light industry and infrastructure were to receive greater attention. But in 1989, only limited success had been recorded.

With a view to privatization policy from 1990 onwards, the State investments are being carried out only in the field of infrastructure.

Table 2: Total investment by sector
(Ft bn; current prices)

	1984	1985	1986	1987	1988	1989
State enterprises	160.4	167.9	178.4	206.0	199.0	...
Co-operatives	27.9	26.3	28.9	37.6	33.0	...
Total socialist sector	188.8	194.1	207.4	243.5	232.0	269.5
Private sector	42.7	45.5	51.8	51.5	58.8	70.5
TOTAL INVESTMENT	231.5	239.6	259.2	295.1	290.8	340.0

Table 3: Composition of state sector investment by branches
(per cent of total)

	1976-80	1981-85	1986	1987	1988	1989
Industry	35.4	31.7	29.1	28.5	27.9	29.3
Construction	2.7	1.4	1.1	1.1	1.2	1.4
Agriculture & forestry	13.3	13.0	11.7	13.4	11.0	10.0
Transport & communications	12.0	11.2	11.7	12.0	12.6	11.5
Trade	4.2	4.4	3.6	3.9	3.8	5.3
Water	5.1	5.8	7.1	7.0	7.4	7.5
Other	0.4	0.5	0.6	0.6	0.8	0.6
Services	26.9	32.0	35.1	33.5	35.3	34.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Assessment of the economic situation in Hungary

The Government formed after the free elections held in Hungary in 1990 had to face unexpected external economic circumstances. The Gulf crisis, the collapse of the CMEA, the partial loss of the FRG market and the rise of oil prices have unfavourably affected the country's economic performance. The drought also caused serious losses in agriculture. These negative effects could be partially offset by the economic assistance provided by the Group of 24,

including the favourable trade policy measures of the majority of the OECD countries.

Under these circumstances, Hungary's GDP decreased by about 5 per cent in 1990. The fall in domestic consumption was larger, mainly due to the heavy debt service burden. The level of unemployment doubled last year, reaching about 2 per cent of the labour force. The rate of inflation was also higher than programmed (28 per cent). But the country's solvency could be maintained. In spite of the difficulties, the current account in convertible currencies improved by 1.5 billion dollars and after many years the deficit could be eliminated.

Exports in convertible currencies increased by 20 per cent, including a 22 per cent rise to the OECD countries. The balance of trade in convertible currencies reached a surplus of approximately 1 billion US dollars. At the same time, trade with the CMEA countries showed an opposite trend, exports decreased by 23 per cent and imports by 16 per cent.

In 1991, the industrial recession experienced in the previous year has continued. During the first quarter of 1991 the industrial output fell by 8.7 per cent over the same period of 1990. The restructuring of the industry has accelerated. As one of the results of this process the rate of unemployment has risen to 3.4 per cent and is expected to rise further (to 5-6 per cent by the end of the year). Inflation is likely to remain high for the whole year - forecast being 35-38 per cent - but in recent months we have witnessed a significant drop. The monthly increases over the previous months are as follows: January 7.5 per cent, February 4.4 per cent, March 3.5 per cent, April 2.4 per cent. Despite previous forecasts both the trade and the current account balance were in surplus in the first quarter of 1991. Although Hungary's debt burden remains heavy, the country continues to serve its debts and to maintain its credit worthiness.

The role of the State budget is still high in redistributing resources within the economy through taxes and subsidies. Expenditures of the consolidated State budget constituted more than half the GDP in 1990. The Government's aim is to reduce these expenditures by six percentage points by 1993 and more significantly over a longer term. In the context of our subsidy reduction

programme, subsidies were reduced from 13 per cent of the GDP in 1989 to 9 per cent in 1990. It is intended to further reduce subsidies in 1991 to no more than 7 per cent of the GDP, and 5 per cent in 1992 and 4 per cent in 1993.

The new tax laws introduced in 1988, basically changed and simplified the previous complicated system of taxation. The system including the value-added tax (VAT), the entrepreneurial profit tax and the personal income tax were designed with regard to the taxation forms used in the OECD countries. The VAT operates with three rates (0, 15 and 25 per cent). Food products, pharmaceuticals, basic services are falling under the zero VAT rate. For most products, representing about half the consumer expenditures, the 25 per cent rate is applied. Some changes in taxation will be introduced in 1992. The zero rate of value-added tax will be eliminated (except for a very small number of services) and the top rate is likely to be reduced to a maximum of 20 per cent. The top rate of personal income tax is expected to be lowered and the progressivity will be reduced by widening tax brackets.

Most domestic producers are now subject to competition from imports. Effective in January 1991, almost 90 per cent of consumer prices have been freed and the coverage of administered prices has been reduced to slightly more than 10 per cent. Centrally controlled prices remain only for textbooks, one type of milk, one type of white bread, railway tariffs, basic postal and telephone charges, drinking water and sewage, electricity, coal, natural gas and district heating. Local governments set local transport tariffs and housing rents on government and some privately owned flats. The Pricing Office, which was responsible for controlling prices, ceased to exist in January 1991.

The development of new private enterprises is accompanied by an accelerated privatization process initiated in 1990. According to the Government's medium-term strategy, privatization is to be accelerated with the primary objective of improving the efficiency of productive assets while ensuring that the process is transparent. The target is to privatize 35-40 per cent of Government-owned business assets by 1993. This is a feasible but ambitious target. Specific measures to implement the Government's medium-term strategy in 1992 will be elaborated in the 1992 Asset Policy Guidelines, which will be presented to Parliament by the end of 1991.

Privatization will be accomplished through four main channels. First, retail shops and restaurants will be auctioned to private owners through the Pre-privatization Programme which was approved by Parliament in September 1990. About 5,000-6,000 units are expected to be sold in the first two years and the remaining ones will be auctioned when their current lease expires. Second, the State Property Agency (SPA) will continue to launch "active" programmes, each involving about 20 enterprises. Finally, and most importantly, privatization initiated by the enterprise itself, or by a potential buyer, will be encouraged and the SPA's role will be limited to ensuring legality and transparency of the transaction.

Legal possibilities for capital investments in Hungary have been available since 1972. The amount of foreign capital involved has substantially increased in the recent period. By the end of 1990, it amounted to more than US$ 1 billion. The Act on the investments of foreigners in Hungary contains the guarantees for foreign direct investments, ensuring, inter alia the full transfer of profits and repatriation of invested capital. Joint ventures are granted additional preferences in taxation.

The entry of new businesses will also be facilitated by effective anti-trust policies that send a strong signal to business that competitive efficiency enhancing behaviour is acceptable and that conversely, monopolistic behaviour is not. An Office for Competition has been established to implement the new law prohibiting unfair market practices, investigate complaints of monopolistic and non-competitive behaviour, and to monitor mergers and acquisitions.

In 1987 a two-tier banking system was introduced. By the end of 1990, 31 commercial banks and financial institutions (including 11 banks with foreign participation) were set up. The National Bank of Hungary retained the functions of a central bank. It focuses on macro-economic and monetary policies, the main instrument being the regulation of the money supply through setting reserve rates, terms of refinancing and open-market operations.

Foreign trade in Hungary had been for a long time state monopoly. In 1987, all economic operators were granted the right to engage directly in convertible currency exports and imports with some exceptions. The de jure abolition of the state monopoly of foreign trade was carried out in 1990. Starting January 1, 1991, a large part of Hungary's foreign trade, which was previously conducted

1991, a large part of Hungary's foreign trade, which was previously conducted with CMEA countries under government control, was liberalized. This trade now takes place at world prices and in convertible currency without state intervention. This liberalization is major impetus to industrial restru··ıring and enhanced competitiveness. In 1991, the liberalization of imports has been extended and it now covers about 90 per cent of all imports. Within the remaining part which is subject to licensing, a global quota is established for consumer goods. The value of such a quota is US 4$ 630 million in 1991. For 1992, a significant increase is expected.

Summary

As a result of the hard currency liquidity crisis in 1982-83, the GDP growth has slowed down perceptibly as the Government attempted to restrict domestic growth as part of a package of measures to restore the hard currency trade balance. When it became clear that rescheduling had been avoided, the Government initiated an ill advised programme to speed up economy, which was a spurious success in 1984 when the GDP grew by 2.7 per cent. But by 1985, the economy inflexibility in the face of rapidly changing terms of trade revealed that, despite a massive influx of borrowed hard currency, the structure of the Hungarian economy had changed very little. In 1986, industrial growth increased but so did the hard currency trade deficit. In 1987, the GDP grew by 4.1 per cent, mainly on the strength of increased output by heavily subsidised companies, but the ha d currency trade deficit ($361 million) was only a slight improvement over that recorded in 1986. In 1988, the Government's austerity programme succeeded in cutting domestic demand. The GDP fell by 0.1 per cent, despite an exceptionally good year in agriculture. In 1989, higher prices on world markets boosted export earnings and a major improvement occurred on the hard currency trade balance, but continued austerity led to a 2.0 per cent decline in GDP.

III. THE INDUSTRIAL SITUATION

A. General description of industry at the end of 1980s

Improving performance in the industrial sector is vital to the long-term success of the Government's economic programme. Industry is the largest sector of the Hungarian economy, accounting for about 45 per cent of GDP and employment, and over 75 per cent of total exports in 1987.

Industrial restructuring was one of the primary objectives of the Seventh Five-Year Plan (1986-1990) which was discontinued, however, in line with the policy of abandoning the planning system. The objective of the programme was to change the Hungarian industrial structure to coincide with the country's perceived long-term comparative advantage. Lending to support this industrial restructuring formed the core of the World Bank's lending strategy in Hungary.

After two decades of rapid growth and diversification during the 50s and 60s, the performance of the industrial sector became unsatisfactory in the 80s, with an average of only 2 per cent annual growth and little structural change. In 1985, industrial output actually declined by 2.3 per cent. The sector encouragingly improved its performance in 1987 when its output increased by 4.1 per cent but there is no cause for complacency regarding the persistent urgency to build a foundation for increased competitiveness, especially if the additional output does not always fully satisfy the requirements of domestic or foreign buyers and the products are frequently exported at exceedingly low prices.

The sector can be divided into mining and electric energy subsectors, which together represented about 24 per cent of industrial value added in 1987, and manufacturing subsectors which accounted for the balance. The overall structure of the sector has been relatively stable over the last decade. At the subsectoral level, the share of engineering and chemical industries increased gradually, while mining, metallurgy and light industries showed a downward trend. Among manufacturing industries, engineering accounts for the largest share, representing one-third of industrial value added. It is followed by chemical and light industries, each accounting for 14-15 per cent. Among the engineering industries, transport equipment and general machinery occupy leading positions, while technology-intensive branches such as electronic equipment and precision instruments are emerging as new growth areas. In terms of investment, mining is

the leading subsector, followed by chemical, electric energy, and engineering industries. Regarding employment, the engineering and light industries (32 and 23 per cent respectively) are most important, followed by food processing (14 per cent) and chemical contributing a much smaller share (8 per cent).

Industry is dominated by large, in many cases vertically integrated, State enterprises, which make the sector highly concentrated and is contributing to a lack of domestic competition. Small, including private, firms have shown dynamic growth since early 1980s, but their share is still very limited by international standards.

The Hungarian industry is highly export oriented, export sales accounting for about half of the final demand for Hungarian industrial products, somewhat evenly split between CMEA and convertible-currency markets. Thus, Hungary has the foundation for further export growth. It is also vulnerable to market and competitive factors outside Hungary.

The subsectoral composition of industrial exports to the convertible currency markets is quite different from exports to the CMEA markets. While exports to convertible currency markets are somewhat evenly distributed among engineering products (24 per cent), chemical products (24 per cent), processed food (19 per cent), light industry products (17 per cent) and metals (11 per cent), exports to the CMEA markets are heavily concentrated on engineering products (63 per cent), mainly transport equipment and general machinery.

Industrial exports to convertible currency markets improved in 1987 with an estimated 5 per cent growth in volume, reversing their decline of 1985-86. The 1987 reverse was caused by strong up-turns in the engineering, chemical, light products and food-processing industries. It benefitted from supportive measures by the Government to make convertible currency exports more attractive. In 1988, the favorable export trend continued; in the first six months, the dollar value of industrial exports to convertible currency markets was about 20 per cent higher than the corresponding period in 1987. Metallurgy products showed a particularly high growth rate (30 per cent), followed by food processing. The export growth of engineering products has remained moderate.

The performance of Hungarian industry reflects many constraints which operate mainly at the enterprise level: insufficient market orientation;

underdeveloped corporate management skills; inadequate organization structures; lack of financial discipline; obsolete production facilities and out-dated technology; high levels of vertical integration, with enterprises manufacturing many low-volumes of unprofitable products; and insufficient inputs for reasonable levels of production.

In recent years, Hungary has made significant progress to remedy the problems inherent to the previous economic mechanisms. Recent reforms have made direct foreign investment in Hungary easier, extending to individuals the right to form limited-liability and joint-stock companies, eliminated the size limit of private firms, explicitly recognizing the role of market forces and individual initiative as major elements in the reform programme. The Government has also lowered the barriers to exit by implementing more vigorously the bankruptcy laws, for example, in the case of chronic loss-making enterprises and crisis subsectors such as coal and metallurgy.

Steps have been taken to encourage exports to convertible currency markets, to promote import competition and provide incentives to invest into exports to convertible-currency markets. The Government has eliminated guaranteed profitability of exports to CMEA markets and pursued an active exchange-rate policy to improve export competitiveness. Access to foreign trading rights has been liberalized.

The Government is committed to concentrate national R & D resources on selected areas and improve the technology development infrastructure. Measures are also being taken to increasingly orient R & D activities toward markets, such as increasing the contribution of industries to state-assisted research programmes.

The World Bank has supported the Hungarian Government's programme of structural readjustment through adjustment lending and a series of loans to back-up industrial restructuring and enable the country to achieve international competitiveness and increase its potential for exports to convertible-currency markets.

B. The engineering subsector (as of 1988) 1/

Engineering is the leading industrial subsector in terms of value added (one-third of total industrial value added in 1987), employment (32 per cent of employment in industry), and industrial exports to convertible currency markets (24 per cent). Furthermore, it influences other economic sectors by supplying capital goods and components. Among engineering industries, transport equipment and general machinery account for the largest share of value added, while technology-intensive branches such as electronic equipment and precision instruments, have grown the fastest. Figure I shows the share of engineering in the whole industrial output compared with other product groups.

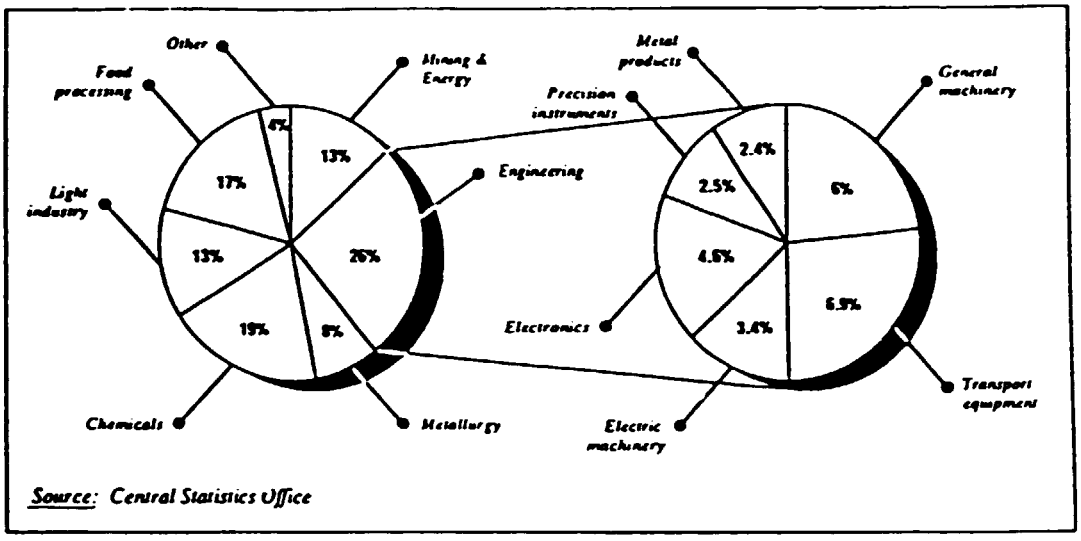


Figure I: Composition of gross industrial output, 1987

Since the 50s, the development of Hungarian engineering industries has been oriented, to a large extent, toward meeting the requirements of domestic as well as CMEA countries, which they served under multiple-year supply contracts. This has proven difficult. Engineering products, especially transport equipment and general machinery, accounted for 63 per cent of Hungarian industrial exports to the CMEA countries. The agreements facilitated economic scale of production and high levels of capacity utilization but they also led to a lack of competitive

1/ It is to be noted that the rapid collapse of trade with the former CMEA countries will have an impact on the whole subsector which cannot be estimated at present but may fundamentally alter the picture and figures given below.

pressure or incentives for exploratory development and experimentation for product enhancement or new product development.

As a group, the engineering industries have fallen behind modern developments in Western markets, posing major obstacles to Hungary's efforts to develop exports in convertible currency. On the longer term, Hungary has experienced an erosion of its market share for engineering products on convertible-currency markets. If the engineering industries do not succeed in narrowing the gap, they risk losing their traditional CMEA markets as well as failing in their attempt to maintain, much less to increase exports to convertible-currency markets.

As already stated, engineering products made up 24 per cent of the Hungarian industrial exports to CC markets in 1987. After a strong up-turn in 1987, engineering exports to CC markets grew moderately in 1988. Figure 2 shows the share of engineering and that of each product group in CC exports.

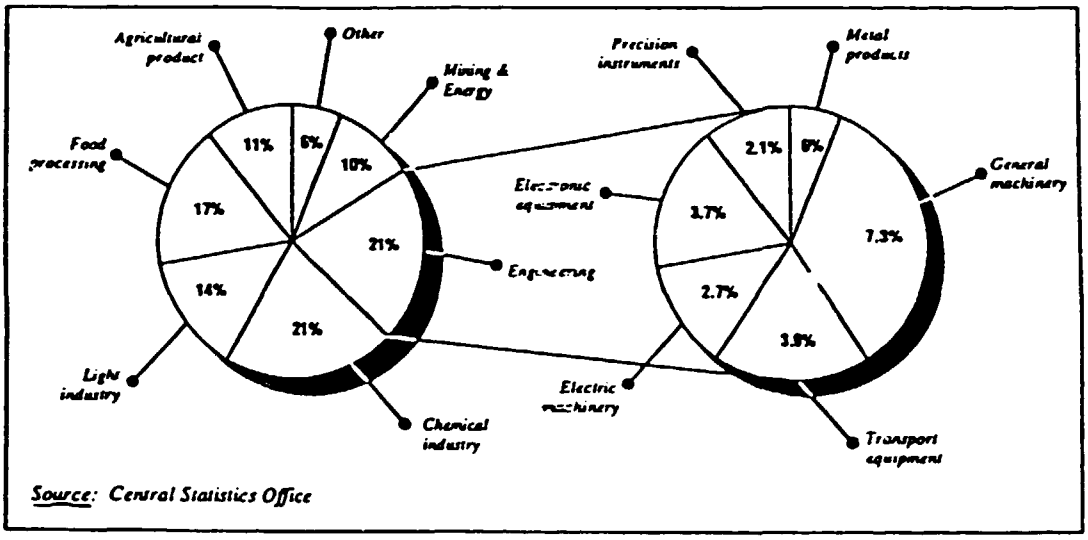


Figure II: Trade structure of industrial sector, 1987
(convertible currency)

In 1986, the authors of a joint World Bank/Hungarian study concluded that nearly three-quarters of the industrial sector was either actually or potentially competitive on international markets. Unfortunately, they also found that Hungary was in danger of losing its advantageous position in these

industries because of lagging productivity. On the longer range, Hungary should suffer increasing difficulties in trading with CC countries, unless the Hungarian industry adapts more rapidly to their requirements in terms of product range, technology, quality, delivery and service.

The need to increase productivity is especially acute in the context of the Government's economic stabilization programme, which has resulted in reduced investments, increased input prices and restricted foreign exchange availability for imported inputs. According to a World Bank report, between 1981 and 1983, the total factor productivity in engineering grew by 1.5 per cent, not an especially large gain, but one of the highest growth rates achieved by any subsector. The engineering increase in total factor productivity during this period accounted for more than half the increase in the subsector's gross output, which compares favorably with international norms.

Although Hungarian engineering is facing growing problems, a handful of companies in this subsector have an outstanding international reputation based on the success they have achieved. Their common characteristics include:

- Exposure to foreign competition;
- Better access to technological information abroad;
- A tradition of innovation, and an effective research and development staff;
- Strong western-style management practices;
- Access to credits and greater internal resources at their disposal than for other Hungarian enterprises in general.

World-wide developments in the engineering industries emphasize the importance of maintaining innovation and managerial competence. But, such attitudes should be nurtured by regulatory and macro-economic environment.

Because the engineering subsector produces such a wide range of products, it is difficult to generalize the trends on convertible currency markets. However, with a few exceptions, the international market for engineering products is currently in the midst of a cyclical up-swing. The international trade in engineering products is increasing at a much faster rate than for any other products. This has been largely brought about by rising demand for machinery in western Europe. Until recently, the EEC countries were Hungary's second largest export market after the USSR (by 1990, however, Germany alone became more important than the USSR). Given the uncertain impact on Hungary by the EEC

evolution toward a single market by 1992, and the continuing weakness of Middle-East and other developing markets, Hungarian exporters need to be alert to export opportunities on other CC markets, such as the non-EEC countries of Western Europe, the USA, Japan and other Pacific Rim countries. New opportunities were opened when EEC granted GSP-tariff status for Hungarian products and a free-trade agreement with EFTA. An association agreement with the EEC is currently under negotiation. It is expected that both will become operational in 1992.

Competing for this business means competing against a sizeable group of well entrenched international suppliers. Many worldwide engineering firms have been recently strengthened by a wave of restructuring measures and most Hungarian competitors are in a position to offer facilities such as export credit subsidies.

The worldwide pace of new product development and technological innovation has been rapid. For example, changing consumer preferences in prepared foods has led to numerous innovations in food preparation and packaging machinery. There has also been an industry-wide trend toward application of electronics to engineering products and production methods. Sophisticated production technology is developing rapidly and is likely to bring about large-scale changes in the comparative advantages of different producers. In particular, the introduction of CAD/CAM and Flexible Manufacturing Systems offers the prospect that high cost producers may become much more competitive by using technology to replace expensive skilled craftsmen.

A related trend in some engineering industries is to produce items to the individual user's specifications. Much of the growth is expected to come from special orders. Simultaneously, users are ordering in smaller quantities and requiring shorter delivery terms. In the light of such requirements, individual enterprises and countries show tendency to concentrate in areas where they are internationally competitive or have best chances of developing a competitive advantage. This, of course, presupposes substantial insight into foreign markets.

Within the Hungarian context, the trend towards granting increased autonomy to enterprises, combined with increasing pressure and opportunities to participate in the international division of labor, will make it possible to respond to

changing circumstances on the world market. Individual enterprises will be required to make their own business plans. Pressures for efficiency should encourage many large enterprises to become less vertically integrated and this, in turn, should create more opportunities for small businesses. While changes in the new Law of Economic Associations should facilitate the establishment of new organizational arrangements including new entrants into the engineering sector, industry needs to develop a wide range of capabilities, most especially improved management skills and attention to strategic marketing, these being further key elements to success.

Decisions made now will substantially influence development, not only in the immediate future but over the next decade as well. If Hungary is to become a world competitor in engineering, there must be a clear understanding of the changing nature of the market, of those Hungarian products which are likely to show maximum potential for development and sale, of the restraints and encumbrances which impede their development and successful market entry, and of the actions which must be taken to attain the product potential with certainty, both in the immediate and in the longer term.

Nature of the subsector

Engineering holds a most important role in the economic activity of Hungary. This significance clearly comes to light when the subsector is compared to other components of the economic activity and to those within industry. What follows is an attempt to depict the extent of this importance.

Overall economic activity in Hungary

By 1988, the economic activity of Hungary, as represented by GDP, reached HUF 1,207 billion (approximately US$ 23.9 billion) continuing with an overall rising trend. The components of the overall economic activity include nine categories which reflect the whole country's GDP. These categories encompass:

- industry,
- construction,
- agriculture and forestry,
- transport,
- post and telecommunications,
- trade,

- waterworks,
- other material activities,
- non-material activities.

Among these, industry is the largest of the nine sectors, comprising somewhat over a third of the total economy as measured by GDP. Table 4 compares major indicators by economic activity in 1988. For example, in 1988, the industrial sector accounted for 35.7 per cent of both GDP and net material product (NMP), 30.8 per cent of total employment, 49.1 per cent of gross production value (GPV), and 90.3 per cent of overall exports.

In comparison, the next largest overall category is agriculture and forestry, which, in the same year, accounted for approximately 17 per cent of GDP and NMP, 15.8 per cent of total employment, 16.6 per cent of GPV and 8.7 per cent of overall exports, although non-material activities or services have a slightly larger share of GDP and embrace a much higher proportion of the work force than agriculture and forestry.

In contrast, when compared with all other economic activities in the same year, the engineering subsector accounted for more than 12 per cent of all GPV, almost 61 and 22 per cent of all exports in rouble and convertible-currency trade respectively, and provided employment for about 10 per cent of the entire work force. These figures demonstrate that, on its own, the engineering subsector represents a strategically important activity within the Hungarian economy.

Table 4: Major indicators of economic activity, 1988

(billion Forints)

MAJOR INDICATORS OF ECONOMIC ACTIVITY, 1988

(In Billions of HUF)

	Gross Domestic Product	Net Mat. Product (Nat'l Income)	Gross Prod. Value	Export CMEA	Export CC	Employment (Thousands of persons)**
Industry*	430.9	350.8	1,473.7	198.5	256.8	1,407.9
Construction	96.9	89.4	210.5	1.0	4.0	283.5
Agriculture & Forestry	203.8	168.5	500.9	8.4	35.3	723.7
Transportation	81.2	60.5	143.3	--	--	290.9
Post & Telecommunications	19.0	15.5	24.6	--	--	75.7
Trade	125.6	124.1	220.7	--	--	449.4
Waterworks	16.9	12.1	37.2	--	--	80.6
Other material activities	14.9	11.4	23.3	--	--	44.9
Non-Material Activities	218.5	149.4	368.9	--	--	1,215.0
Total	1,207.7	981.7	3,003.1	207.9	296.1	4,571.6
Engineering	--	--	367.0	126.0	65.1	460.4

* Includes Food Processing
** Average for the Year

Sources: Hungarian Central Statistical Office, Statistical Yearbook, 1988, pp. 54, 57, 60.
Ibid. Statistical Yearbook of External Trade, 1988, pp. 80, 84.

Industrial sector and components

The Hungarian industrial sector is traditionally divided into eight categories, or subsectors, all representing different activities of this economic sector:1/

1/ Statistical data for the engineering subsector do not normally include the engineering manufacturing activities of other industrial sectors such as agriculture, construction or food processing. Where relevant, an appropriate notation is made.

Mining	Building material
Electrical energy	Metallurgy
Engineering	Chemicals
Light industry	Other industries

The major indicators of industrial activity by subsector are included in Table 5. The data shows that, among the eight industrial subsectors, engineering is clearly the important one in all respects. In 1988, the engineering subsector accounted for 25 per cent of all gross production value generated by the industrial activity in the country. In comparison, the next most important subsector in terms of GPV - chemical industries - reached only 19 per cent of the total. The importance of the engineering subsector in trade is also much in evidence in the table. In 1988, the subsector's exports to CMEA and CC countries represented 63 and 25 per cent of all industrial exports, respectively; imports from CMEA and CC origin correspondingly accounted for 37 and 36 per cent. Chemical industries, the second most important subsector with respect to most of these indicators, achieved an 11 per cent share in the value of exports to CMEA countries and 19 per cent to CC countries, while the imports from hard currency countries accounted for 27 per cent. In the case of CMEA imports, the mining and energy subsectors together accounted for 29 per cent of the value of all imports, making their combined share second only to that of the engineering subsector. Finally, engineering employs approximately 33 per cent of all persons working in industry, followed as a distant second by light industries, with a 23 per cent share of the total.

The importance of the engineering subsector with respect to industry has remained relatively stable in the last twenty years. Figure III presents the gross production value, employment and gross value of assets trends representing the last two decades. In each case, the share of the engineering subsector has been more or less stable in Hungarian industry, particularly as regards employment.

Table 5: Major indicators of industrial activity, 1988

(million Forints)

MAJOR INDICATORS OF INDUSTRIAL ACTIVITY, 1988

(In Millions of HUF)

	Gross Product Value	Export		Import		Number of Employees (000's)*
		CMEA	CC	CMEA	CC	
Mining/Energy	193,054.7	1,156.4	11,683.2	58,206.2	9,904.3	145.3
Metallurgy	132,633.0	6,635.8	34,325.1	14,756.3	18,521.0	78.8
Chemical	281,476.7	21,662.1	49,495.1	24,919.6	67,698.4	107.7
Light Industry	190,107.3	20,647.8	40,239.5	19,107.5	31,452.3	318.3
Other Industries	60,421.7	2,531.5	9,188.0	3,674.7	15,401.3	94.4
Food Processing	249,055.3	19,879.9	46,800.4	4,362.4	20,435.3	203.0
Engineering	366,951.3	125,962.0	65,111.8	75,235.7	91,248.4	460.4
Total	1,473,700.0	198,475.5	256,843.1	200,262.4	254,661.0	1,407.9

*Yearly Average

Source: Hungarian Central Statistical Office, Statistical Yearbook, 1988, pp. 54, 60.

Ibid, Yearbook of Industrial Statistics, 1988, pp. 31-32.

Ibid, Statistical Yearbook of External Trade, 1988, pp. 54-55, 78-79.

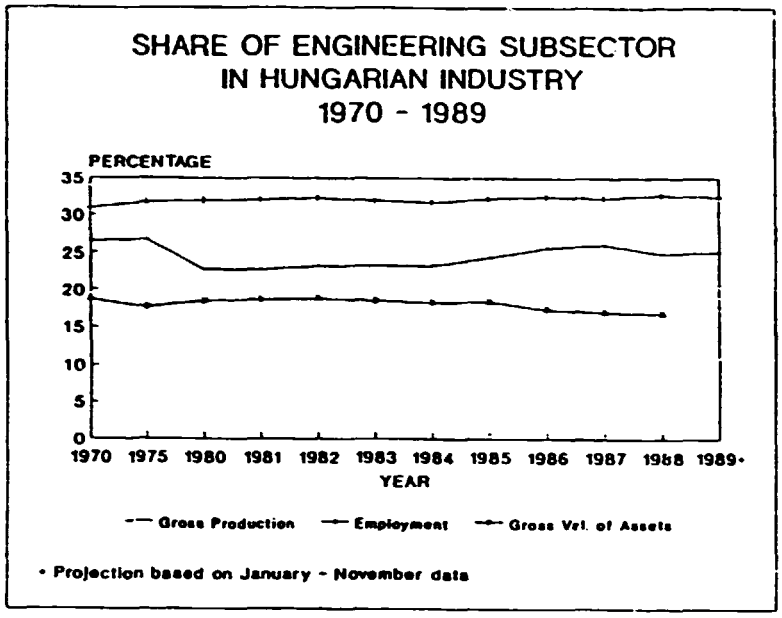


Figure III: Share of engineering subsector in Hungarian industry

Source: Hungarian Central Statistical Office, Statistical Yearbook 1980, 1985, 1988.
Ibid, Yearbook of Industrial Statistics, 1988
Ibid. Monthly Statistical Information, 1989/12.

Characteristics of the engineering subsector

The engineering subsector in Hungary is defined as comprising six categories, referred to as product groups.1/ These are:

- General machinery
- Transportation equipment
- Electrical machinery
- Electronics, telecommunications and vacuum engineering
- Precision engineering and instruments
- Metalware and fittings.

Comparisons among engineering product groups indicate, as shown in Table 6, that their relative importance to each other varies depending on the type of performance indicator being considered. General machinery is the most important

1/ Statistical data on industry and the engineering subsector incorporate three categories of activities for each subsector and product group. These are manufacturing, maintenance and other services. Throughout this study, the emphasis has been mainly on the manufacturing activity.

in terms of gross production value, convertible currency exports, employment, sales and value added, but it comes second when measured in terms of CMEA exports and imports and pre-tax profits while, for these same two indicators, transportation equipment is the most important. This last product group comes second also in terms of gross production value, exports and sales, and third, after telecommunications and vacuum engineering, in terms of CC exports, number of employees and value added.

Table 6: Major indicators of engineering subsector activity, 1988

MAJOR INDICATORS OF ENGINEERING SUBSECTOR ACTIVITY, 1988

(In Millions of HUF)

	Gross Production Value	Export		Import		Number of Employees (000's Persons) Yearly Average	Sales	Value Added	Pre-Tax Profit
		CMEA	CC	CMEA	CC				
General Machinery	88,422.0	34,075.2	24,056.1	23,414.6	40,493.1	128.1	89.4	25.0	3.2
Transportation Equipment	86,948.3	42,907.0	10,567.9	28,426.9	10,295.3	81.7	83.8	17.5	3.9
Electrical Machinery	48,632.1	4,261.8	7,795.9	4,325.1	5,576.1	52.1	52.0	11.9	2.7
Electronics, Telecommunication and Vacuum Engineering	67,790.2	21,068.9	10,805.1	9,294.9	9,679.6	94.4	64.4	22.5	2.9
Precision Engineering and Instruments	36,842.5	21,392.3	6,903.2	6,790.0	16,899.2	50.7	38.4	14.5	1.6
Metalware and Fittings	38,316.2	2,256.7	4,983.5	2,984.2	8,305.2	53.5	41.4	11.9	2.5
Total	366,951.3	125,962.0	65,111.8	75,235.7	91,248.4	460.4	369.4	103.2	16.8

Source: Ministry of Industry, Annual Report on Industrial Subsectors, 1989

The importance of engineering in trade is most significant, as already mentioned, since it accounts for 38 per cent of the combined value of exports to CMEA and convertible currency countries. Detailed statistical data on convertible- and non-convertible currency exports by category of engineering product are included in Appendix to this report. Figure 4 summarizes the export structure of the subsector by six product categories.

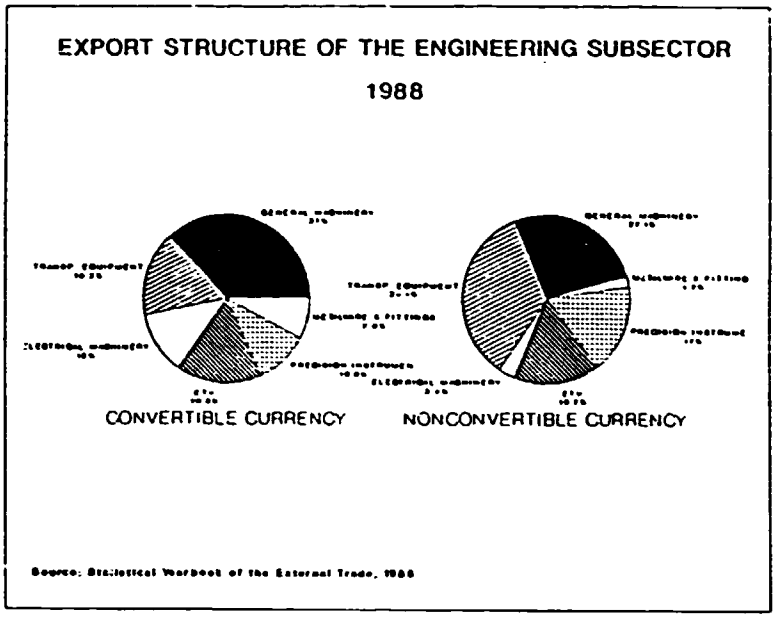


Figure 4: Export structure of the engineering subsector, 1988

Source: Hungarian Central Statistical Office, Statistical Yearbook of External Trade, 1988.

In 1988, general machinery accounted for well over one third of all convertible currency exports for the engineering subsector. Electronics, telecommunications and vacuum engineering, as well as transportation equipment, accounted for about one-sixth each. Conversely, transportation equipment accounted for one-third of all trade in non-convertible currency, followed by general machinery with slightly above one-fourth, and by precision engineering and instruments with less than one-fifth of the total value.

Parts and subassemblies accounted for 35 per cent of general machinery exports to convertible-currency countries, and for 57 per cent of transportation equipment, 17 per cent of precision engineering and instruments, 6 per cent of electrical machinery, 5 per cent of electronics, telecommunications and vacuum engineering equipment and 3 pert cent of metalware and fittings exports to CC countries.

Current structure of the subsector [1/]

This section examines the current structure of Hungary's engineering subsector and its components, six product groups indicating the broad product categories of the subsector.

The current structure of the subsector can be described in several different ways: for example, by number and approximate size of enterprises, by ownership structure and by nature of supervision exercised over individual enterprises, or by degree of concentration currently exhibited by the subsector and each of the product groups.

Structure according to number, size and employment characteristics[1/]

In 1988, the engineering subsector counted 1,231 enterprises ranging in size from very small to very large according to Hungarian standards. However, this number only represented those enterprises which were part of the "socialist sector", and excluded all those belonging to private individuals or entities.

Table 7 shows the increase in number of engineering enterprises since 1986, averaging 22.5 per cent annually, from 813 to 1,231 enterprises in 1988, a net expansion of over 50 per cent. The same table shows that during this period, all product groups experienced a substantial increase in number, the most significant ones being electronics, telecommunications and vacuum engineering (95 per cent), precision engineering and instruments (67 per cent), and general machinery (57 per cent).

All these increases can be attributed to the breakdown of large state conglomerates, the spin-off and proliferation of subsidiary enterprises, and the creation of other types of enterprises such as joint ventures, which can largely be ascribed to the enactment of several new laws and regulations that made this possible during the mid- and late 80s. However, it should be noted that this significant increase in number of enterprises has not been matched by an equal

---

1/ A study prepared by A.T. Kearney is being used.

or even approximate increase in productive capacity of the subsector in any of the product groups. 1/

The same table shows that, in terms of number of enterprises by product group, general machinery enterprises accounted for 35.5 per cent of the whole subsector in 1988, making it the largest group. This is reinforced by the fact that this group is also the largest in terms of gross production value of fixed assets and employment.

Table 7: Trends in numbers of enterprises

TRENDS IN NUMBERS OF ENTERPRISES

Product Group	Overall Number of Enterprises in Subsector			Size of Enterprise by Sales 1988		Number of Entries by Type of Activity 1988		Number of Employees 1988		
	1986	1987	1988	Large ≥HUF 250M	Small <HUF 250M	Manu-facturing	Other	Total	In Manu-facturing	Average per Ent*
General Machinery	279	354	437	82	355	265	172	119,020	103,351	600
Transportation Equipment	145	161	170	25	145	37	133	75,880	56,694	2,359
Electrical Machinery	79	97	111	31	80	74	37	49,453	47,201	813
Electronics, Telecommunications and Vacuum Engineering	81	134	158	22	136	55	103	86,152	80,110	3,313
Precision Engineering and Instruments	100	122	167	33	134	125	42	47,030	44,045	722
Metalware and Fittings	129	153	188	33	155	183	5	49,216	48,661	450
Subsector Total	813	1,021	1,231	226	1,005	739	492	426,801	380,062	840

* Average figures are based on the actual number of enterprises reporting employment figures in 1988

Source: Ministry of Industry data.

Enterprises in the metalware and fittings branch follow as distant second, accounting for about 15 per cent of all enterprises in the subsector. Then come transportation equipment (14 per cent). Other product groups which ensue are

---

1/ It can only be assumed that a steep increase of engineering product exports to convertible currency markets in 1990-91 will be attributed, at least in part, to new small private enterprises but up to recently statistical data were available from companies with more than 50 workers.

precision engineering and instruments (14 per cent), electronics, telecommunications and vacuum engineering (13 per cent), and electric machinery (9 per cent). This break-down has remained fairly stable, for the most part, in the last 3 years.

The engineering enterprises are also classified in three activity categories: these can consist in production or manufacturing, maintenance, or assembly of engineering products. In 1988, the enterprises dedicated to production or manufacture of engineered products accounted for 60 per cent of the whole, while those in maintenance and assembly accounted for 35 and 5 per cent, respectively. The assembly enterprises were concentrating exclusively on general machinery products. As to transportation equipment and electronics, telecommunications and vacuum engineering, most of their enterprises were dedicated to maintenance (79 and 65 per cent), respectively. This analysis is mostly focused on production or manufacturing enterprises.

In some instances, an artificial classification linked with size has been used to distinguish two types: size is defined as either large or small, according to specific criteria which, in 1988, were set as volume of sales being 250 million forints or above, at the same time with at least 50 employees. Any enterprise that met or surpassed these two conditions was classified as large and the others as small. Accordingly, in 1988, large enterprises numbered 226, and small ones 1,005.

Among the large enterprises, 88.5 per cent were engaged in production/manufacturing activities, 10.6 per cent in maintenance, and less than one per cent in the assembly of engineering products. By contrast, out of the 1,005 small enterprises, only 53.5 per cent were in production/manufacturing, 40.7 per cent in maintenance, and 5.7 per cent in assembly.

In terms of employment, in 1988, general machinery provided jobs to 28 per cent of all laborforce employed in engineering. This was followed by electronics, telecommunications and vacuum engineering, accounting for an additional 20 per cent, and 18 per cent of all employment for transportation equipment.

Each of the other product groups accounted for approximately 11 per cent of total employment.1/ When focusing on enterprises engaged only in production/ manufacture of engineering products, the proportion distribution of labor force was found among product groups.

Finally, when comparing figures representing the average number of employees per manufacturing enterprise,2/ it was found that, while the overall average for the subsector was 840 employees per enterprise, electronics, telecommunications and vacuum engineering groups had an average of 3,313 employees per enterprise, and transportation equipment an average of 2,359 employees. The averages for these two groups seemed to indicate that the scale of operations was substantially larger, or their activities much more labor intensive than those of other product groups. The rest of the groups had averages below 820 employees per enterprise.

Structure according to organizational ownership 3/

From the point of view of organizational structure, industry and, by extension engineering, consisted essentially of state-owned enterprises and industrial co-operatives. These two categories accounted for all enterprises classified in the socialist sector of the economic activity.

1/ The employment figures used in this part of the analysis correspond to those of enterprises which actually reported their employment figures. There was a large number of them who did not. For that reason, unless otherwise specified, any aggregate employment figure cited here represents underestimates of the real situation.

2/ These averages were calculated on the basis of the following information provided by manufacturing enterprises.

Product group	Total No. of enterprises	No. of Enterprises reporting
141	265	172
142	37	24
143	74	58
144	55	29
145	125	61
146	183	108
Subsector total	739	452

3/ It should be noted that in recent years, "small enterprises" have been created on the basis of private entrepreneurship.

The two categories were derived from the nationalization of enterprises in the late 40s, when private companies of ten employees and more became state-owned and those with less than ten became industrial co-operatives. Over time, the original co-operations have expanded substantially in their membership, and they currently are playing a substantial role in the sector's production and maintenance activities. 1/

In 1988, as shown in Table 8, 492 enterprises (40 per cent of the subsectors) were state-owned establishments and the remaining 739 (60 per cent) were co-operatives.

Table 8: Distribution of enterprises by size and organizational structure, 1988

Product Group	Total Number of Enterprises	State-Owned			Cooperatives		
		Large	Small	Total	Large	Small	Total
General Machinery	437	62	68	130	20	287	307
Transportation Equipment	170	22	83	105	3	62	65
Electrical Machinery	111	22	21	43	9	59	68
Electronics, Telecommunications and Vacuum Engineering	158	19	91	110	3	45	48
Precision Engineering and Instruments	167	21	32	53	12	102	114
Metalware and Fittings	188	30	21	51	3	134	137
Subsector Total	1,231	176	316	492	50	689	739
Percentage of Total	100.0%	14.3%	25.7%	40.0%	4.0%	56.0%	60.0%

Source: Ministry of Industry Department of Statistics

1/ With a view to the recent policies, the ownership structure described below and the management supervision structure (3.2.6) have lost most of their meaning. Nevertheless, they still have some bearing on the present transitional situation. It is to be noticed, however, that related data are changing almost daily.

When the enterprises were classified according to size, as defined in the previous paragraph, of all enterprises comprising the engineering subsector, approximately 14 per cent (176), were large and 26 per cent (316) were small state-owned enterprises. The remaining ones were large for 4 per cent (50) and small co-operatives for 56 per cent (689). Viewed in a somewhat different way, more than half the subsector's enterprises were small co-operatives. As evidenced by the table, co-operatives substantially outnumbered state-owned enterprises, accounting for 35 per cent of the whole category. Conversely, among the small state-owned enterprises, those dealing with electronics, telecommunications and vacuum engineering were the most numerous, making about 29 per cent of the whole classification.

A similar review of co-operatives reveals that general machinery was the product group with the largest share of co-operatives under each classification considered here. This group accounted for about 41 per cent of all co-operatives of the subsector, as well as 40 and 42 per cent of all large and small co-operatives respectively. It is interesting to note that out of the 1,231 enterprises and co-operatives in the subsector, approximately 23 per cent were small co-operatives in the general machinery group. Significantly, small co-operatives comprised 93 per cent of all engineering co-operatives.

As to privately owned engineering companies, until 1988, they were considered too small to be statistically significant. For that reason, there is no information available regarding the number of companies and their production, finance and economic indicators. It is now conceivable that, as these become more common and gain importance, detailed information will be collected on them as for the rest of enterprises and co-operatives. This will allow measuring their real impact on and importance for the engineering subsector.

Structure according to management supervision 1/

A third approach used in defining the structure of the engineering subsector is to classify enterprises according to the nature of their supervision. It defines the type of organization that is responsible with the supervision of

---

1/ See footnote on page 39.

their activities. There are usually three types of entities, ministries, local councils and co-operatives. However, for the purpose of the analysis, the supervision by ministries is subdivided in that of the Ministry of Industry exclusively and that of other ministries. Table 9 presents the distribution of the enterprises by type of supervision.

Table 9: Distribution of enterprises according to supervising entity by product group 1988

DISTRIBUTION OF ENTERPRISES ACCORDING TO SUPERVISING ENTITY BY PRODUCT GROUP
1988

Product Group	Total Number of Enterprises	Supervising Entity: Ministry of Industry	Other Ministries	Local Councils	Co-operatives
General Machinery	437	75	44	11	307
Transportation Equipment	170	15	31	59	65
Electrical Machinery	111	23	9	11	68
Electronics, Telecommunications and Vacuum Engineering	158	21	9	80	48
Precision Engineering and Instruments	167	19	30	4	114
Metalware and Fittings	188	29	17	5	137
Subsector Total	1,231	182	140	170	739
Percentage of Total	100.0%	14.8%	11.4%	13.8%	60.0%

Source: Ministry of Industry, Department of Statistics.

According to this table, 182 out of 1,231 enterprises included in the engineering subsector in 1988 (15 per cent of the total) were under the supervision of the Ministry of Industry. Another 140, i.e. 11 per cent, were supervised by other ministries, and 170 (14 per cent) were under the local Councils management. The remaining establishments were co-operatives totalling 739 (60 per cent).

Local Councils were prevalent in electronics, telecommunications and vacuum engineering, accounting for 50 per cent of all establishments in that product group and in transportation equipment, where they accounted for 35 per cent. Enterprises under a local council supervision are typically very small; many of them were set up to meet local demand of certain items and provide repairs/maintenance or even to ensure local employment.

Concentration in the engineering subsector

One of the most significant characteristics of the engineering subsector is its degree of concentration. Statistics on value of sales and exports reveal that 80 per cent of the subsector activities are concentrated on very few enterprises representing 4-8 per cent of all the subsector. Table 10 presents the breakdown, by product group, of the concentration exhibited by each of these with respect to value of sales and exports, including total exports as well as CMEA and convertible currency.

Table 10: Enterprise concentration according to sales and exports by product group, 1988

	Total Number of Enterprises	Enterprises Accounting for 80% of...							
		Sales		Total Exports		CMEA Exports		CC Exports	
		No.	%	No.	%	No.	%	No.	%
General Machinery	437	41	9.0	20	5.0	17	4.0	20	5.0
Transportation Equipment	170	4	2.0	3	2.0	3	2.0	3	2.0
Electrical Machinery	111	12	11.0	7	6.0	5	4.0	7	6.0
Electronics, Telecommunications and Vacuum Engineering	158	7	4.0	5	3.0	5	3.0	2	1.0
Precision Engineering and Instruments	167	18	11.0	10	6.0	10	6.0	9	5.0
Metalware and Fittings	188	17	9.0	12	6.0	7	4.0	14	7.0
Subsector Total	1,231	99	8.0	57	5.0	47	4.0	55	5.0

Source: Ministry of Industry, Department of Statistics.

This high concentration is all the more evident when the individual product groups are examined and the phenomenon is particularly apparent in transportation equipment. This group is dominated essentially by three enterprises comprising about 80 per cent of all exports as well as CMEA and CC exports, while gross production value, in the same proportion, is covered by four enterprises.

Electronics, telecommunications and vacuum engineering are only slightly less concentrated, although they exhibit concentration to a highest degree when considered as convertible currency exports. In this particular case, one per cent or just two enterprises account for more than 80 per cent of all CC exports in this product group. The rest of the groups are relatively less concentrated than those just discussed; however, when considered in relation to worldwide industry standards, each of the product groups, and by extension of the engineering subsector, are all extremely concentrated.

Geographical distribution of subsector enterprises

As far as geographical distribution is concerned, prior to World War II, Budapest was Hungary's industrial centre; in 1934, about 60 per cent of all manufacturing workers were still employed in Budapest. Subsequently, and in keeping with the concept of "socialist reconstruction", decisions were made to decentralize industry and establish industrial centers in previously underdeveloped areas. For example, between 1950 and 1954, 75 new state-owned enterprises were founded, of which only 16 were located in Budapest. Table 11 shows the incidence of industrial investment by region.

Table 11: Industrial investments by region, 1956-1988

	1956-60 %	1961-65 %	1966-70 %	1971-75 %	1976-80 %	1988 %
Budapest and Environment	34.4	31.8	29.6	29.6	24.2	24.2
Northern Hungary	17.7	19.7	20.8	21.0	18.8	15.4
Northern Transdanubia	25.6	23.9	24.8	23.6	21.9	19.7
Southern Transdanubia	14.8	10.4	8.1	9.4	15.4	15.9
Great Plains	7.5	14.2	16.7	16.4	19.7	24.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Tatai Zoltan, Iparunk teruleti szerkezentenek atalakitasa. Kossuth, 1984, p. 231.
Teruleti Statisztikai Evkonyv 1988.

C. The electronics industry (up to 1988)

The production of electronic goods in Hungary between 1985-1988 was about US$ 1.1-1.3 billion. This figure does not exactly reflect the real value because of the inaccurate currency estimation of home and CMEA countries production and market values.

The drastic changes in prices for electronic goods on the international market were followed by significant delay and damping because of isolation and stabilized export prices. At the real price level, the use of electronic goods per person in Hungary was the same as in Italy in 1985. Since then, the delay has significantly increased in comparison with Western Europe. This was caused by low growth of production volume, technology obsolescence and withdrawal of electronic imports.

In the field of computer products, Hungary displayed a production value of 13.6 billion Forints in 1988, out of which 45 per cent were the exports share (compared with 1981, when the export share was 69 per cent). There occurred a significant development in this field up to 1985, followed by stagnation and decline in some groups of products. The product structure was determined by the CMEA co-operation on the basis of two or more sided agreements and deliveries were performed according to specialized production. Recently, significant structural changes have been implemented:

- The production of general purpose computers went from 46 per cent in 1980 to 18 per cent in 1985. Then, due to a sharp increase in personal computer production, it increased to 36 per cent in 1988 its share of the whole computer technology related products.
- The volume of peripheral devices increased by 3.2 times between 1981 and 1985. These products were mostly export oriented, specialized devices produced in large series. Their proportion in the whole computer technology and related products was nearly 65 per cent (62 per cent in exports). Later, exports decreased sharply both in volume and in share.

The reason for this short stop was that the Hungarian makers were following several types of foreign system developers and products with relatively stabilized characteristics. In the face of the fast developing international

microelectronic market, the country experienced a drawback both in production methods and in price/performance relations.

In fact, the personal computer production had been based on parts and units purchased by importing in hard currency. These products, however, were not compatible on not-rouble oriented markets. For the computer systems market, the domestic application is characteristic (out of general purpose computer systems produced in 1981, 70 per cent, in 1985 65 per cent, in 1988 only 28 per cent were exported).

A similar tendency could be observed in the production of peripheral units (it declined from 65 to 51 per cent). At the same time, only 4-5 per cent of telecommunication and network products were used domestically.

The computer technology production value for one employed person was 2.1 times higher in 1988 than in 1980 and 1.5 times higher than in 1985. The value of machines and devices for one blue-collar worker was 97 per cent more in 1988 than in 1980 and 41 per cent more than in 1985.

The number of employed persons in middle- and large-size companies went rapidly down after 1987. At the same time, small companies rose which could better adapt to the market demands. These companies had good import backgrounds, they were oriented toward complete computer service and could increase domestic sales.

The liberalization of imports in 1989 has helped technical development. The convertible market restrictions have been eliminated or made easier. Nevertheless, the Hungarian cost structure and level are still very far from the international standards.

Table 12 shows the share of different product groups in the computer branch. Table 13 shows the marketing value.

The first important computer produced in Hungary was the small computer R-10, accepted as standard in the CMEA computer system. VIDEOTON, a huge enterprise of several ten thousand workers (located in Székesfehérvar) was its producer together with monitors, line printers and other peripheral devices.

Then PDP-11 computers produced by KFKI (SzM-4 in CMEA system standards) became the basic product.

Table 12: Share of different product groups in computer technology production

Product group	Industrial sales			Share of exports		
	1981	1985	1988	1981	1985	1988
Data transmission and network device	10.3	11.9	7.7	13.1	15.9	16.3
Central processor units	6.0	5.0	8.7	3.5	4.6	7.7
General purpose computers	45.8	18.4	35.7	46.3	17.6	21.8
Peripheral devices	37.9	64.7	47.9	37.1	61.9	54.2
Computer products all together	100.0	100.0	100.0	100.0	100.0	100.0

Table 13: Marketing value of computer products (1981 = 100.0)

Product group	Industrial sales		Share of exports	
	1985	1988	1985	1988
Data transmission and network device	189.7	281.0	187.1	184.7
Central processor units	218.6	210.4	226.6	229.2
General purpose computers	158.0	405.5	250.0	410.8
Peripheral devices	76.2	219.0	71.0	86.9
Computer products all together	324.0	355.4	311.9	270.0

KFKI, the Central Research Institute of Physics of the Hungarian Academy of Sciences, had also an important role to play in computer design and production. PDP copiers were also on its production list (although with a low volume of production). At first PDP-11, later VAX computers were produced by self-made technology.

At the beginning of the 80s, more than 50 microcomputers were developed and partly produced. The developers were very different, ranging from huge companies, research and teaching institutes to some new and small firms.

When IBM PCs invaded the market, the Hungarian computer situation was very much affected. Developing activities were replaced by adaptation and sale of mostly far East devices.

The production of microcomputers in the country was: 236 in 1980, 2,735 in 1985 and 6,699 in 1989 according to the Hungarian Industry 1980-1989 (a Ministry of Industry publication). The need for microcomputers is estimated between 10,000-20,000 thousand per year.

In the field of software development and adaptation, the following institutions have had leading roles:

- **MTA SzTAKI** - Computer and Automation Institute of the Hungarian Academy of Sciences. Basic computer language development (e.g., ADA), special purpose languages (e.g., NC programming), CAD and CAM development co-ordination, information systems, applied software, electronics design, etc.

- **SzKI** - Computer Co-ordination Institute (up to recently: Computer Research and Innovation Center). Computer hardware and software development, microcomputers, MPROLOG-family, expert systems, RECOGNITA (text recognition system) etc.

- **SzAMALK** - Computer Application Institute. Basic co-ordination institute for computer application software and sale of United System of Computers of COMECON countries. Education and information center. Provides computer services. A system house.

In recent years, small companies have become stronger, both in hardware and software servicing and sale. Some of these companies: Müszertechnika, Mikrosystem, Control.

In other branches of electric and electronic goods, the following facts give an insight:

- In the field of public use telecommunication devices (TV sets, radios, etc.), the production value in 1988 was 9.5 billion Forints, out of which 23.3 per cent only were exports.
- Investments of the Hungarian Post and Telecommunication was in 1987 4,515 million Forints.
- The Hungarian industry produced in 1988 for 32,800 million Forints for telecommunications. More than 58 per cent of the production was exported.

- The telephone stations for 100 persons were 15.8 in 1988, 16.7 in 1989.
- Electronic parts applied to industry were valued at 11,300 million Forints in 1988. Out of these, 62 per cent were imports paid mostly in convertible currency.
- Semiconductors have been significantly backward in comparison with modern countries.
- The production of automatic control devices was 7,500 million Forints in 1988, of which 35 per cent were exported. Demand for control devices has increased in the country. For example, 86 per cent of CNC control units for machine tools have been used at home.
- The number of programmable robots was only 89 in 1988 and went up to 155 in 1990.
- The electronic industry in Hungarian machine-building companies had a production worth some 70,000 million Forint in 1988, 60 per cent of which (41,700 million Forints) were exported. The value of exports, 79 per cent, went to rouble-accounting countries (mostly the Soviet Union).

Table 14: Sale characteristics of electronics during the period 1986-1988

Products	Sale value of industries			
	Value in 1988 (million Ft)	Share in product group		
		1986	1987	1988
Total electronic devices	52 247	70.6	74.8	75.2
Wired telecommunication	10 149	14.1	14.7	14.6
Unwired telecommunication	8 049	12.2	12.3	11.6
Appliances, instruments	7 254	9.9	11.3	10.4
Computer and computer technology	5 873	4.9	7.1	8.5
Control and peripheral	5 891	7.7	6.9	8.5
Total electric devices	17 203	29.4	25.2	24.8
Machine tools	3 394	5.2	5.4	4.9
Surface preparing	1 381	1.1	1.5	2.0
Industrial robot and manipulators	432	1.3	0.7	0.6
Swimming working machine	899	2.5	2.3	1.3
Medical instruments (electronized)	588	1.3	1.3	0.8
TOTAL - ELECTRONICS AND MACHINES	69 456	100.0	100.0	100.0

Some attempts have been made to decentralize the engineering subsector from Budapest, where it has traditionally been concentrated, but these mostly founded

on the fact that other regions lacked the technical skills available in the capital. Consequently, as shown in Table 15, Budapest and its suburbs have remained the main manufacturing center for the production of engineering products. To the extent that feeder industries and intra-industry co-operative arrangements have been developed, it thus appears to have been largely on the basis of historical proximity.

Table 15: Location of engineering enterprises (manufacturing only) a/

			Sales	
	Number	Percentage	Value b/	Percentage
Budapest	329	45.07	192.4	52.07
Surroundings of Budapest	107	14.66	33.4	9.04
Northern Hungary	42	5.75	17.6	4.76
Northern Transdanubia	69	9.45	64.2	17.37
Southern Transdanubia	58	7.94	12.7	3.44
Great Plains	125	17.13	49.2	13.32
TOTAL	730	100.00	369.5	100.00

Source: Szenzor-MC estimates

a/ excludes small co-operatives.
b/ in billion Forints.

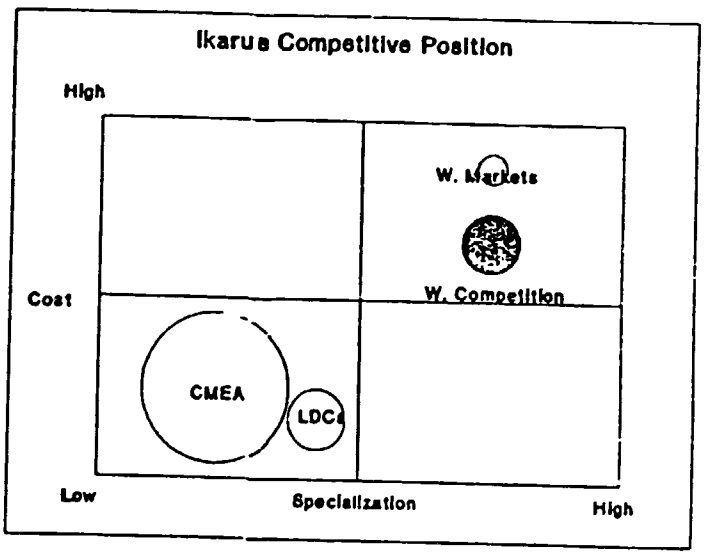
To summarize, the engineering subsector is not only geographically concentrated, it is also highly centralized in that the bulk of production is generated by a very small number of companies and these, in turn, were basically state-owned. This concentration has been coupled with a philosophy which traditionally encouraged vertical integration and self-sufficiency as well as virtual monopolies for the production of certain products.

D. Automobile industry

For the time being, there is no automobile production in Hungary. But, in the field of road vehicles, bus production is a very significant economic factor, suppleted by equally important motor-part manufacturing. Three companies share the basic rule of bus production:

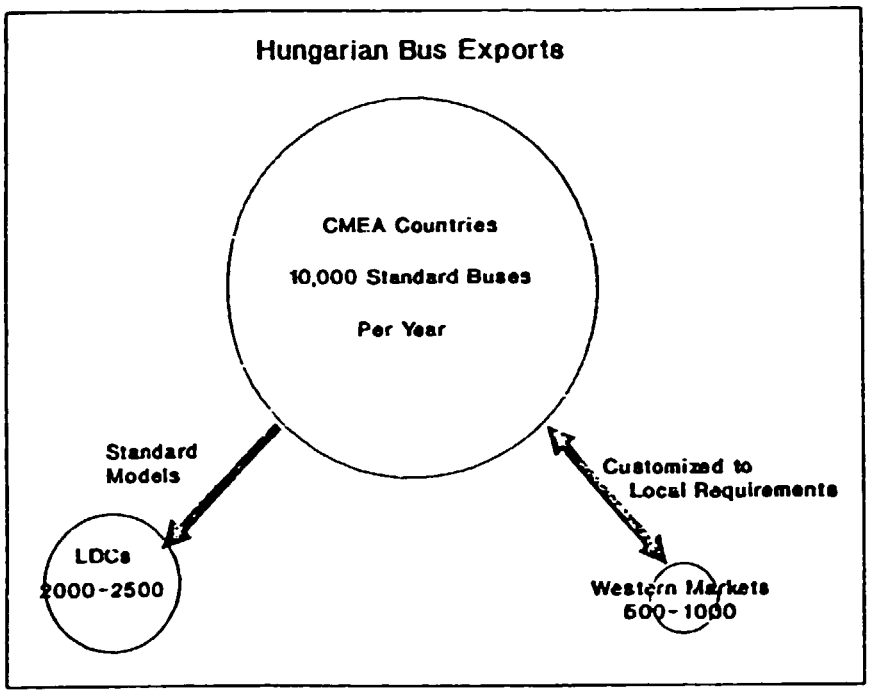
- **IKARUS**, for body works, assembling, painting, etc., as final producer,
- **RABA** (located in Győr), axles, engines and other parts/components,
- **CSEPEL AUTO**, producers of chassis and other parts/components.

The number of buses produced by IKARUS (in co-operation with RABA and CsEPEL AUTO) is significant as shown in Figure V and VI.



- Distribution through US busmaker
- Bus designed specifically for US market
- Modular design
- Focus on quality, features
- Targets government transportation grant recipients - less price-sensitive

Figure V. Ikarus' US strategy exploits its strengths



- Distributes bus designed specifically for US market
- Sales of new bus rose 0-330 buses (10% market) in three years.

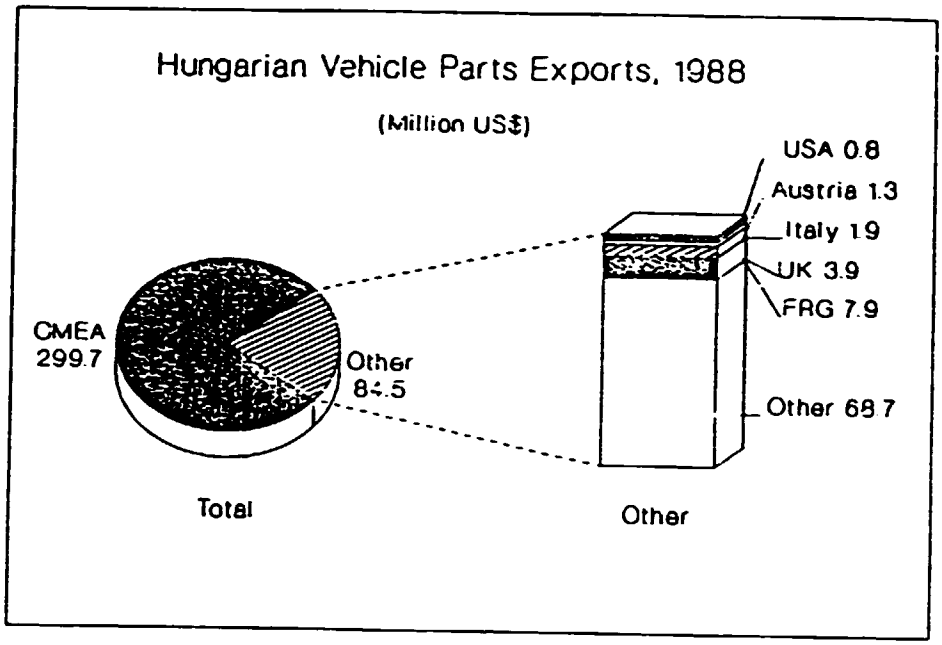
Figure VI. Ikarus has gained a significant position in the US city transit bus market

Table 16: Export characteristics of buses and other vehicles

Product	Unit	Total export			Exports in convertible currency		
		1980	1985	1989	1980	1985	1989
Parts of buses and other vehicles	Million Forints	5 613.8	12 691.3	42 680.3	1 568.0	9 935.2	7 163.6

Source: Hungarian Industry 1980-1989; a Ministry of Industry publication)

The vehicle spare parts exports are shown in Figure VII.



- Usually offset trade against car exports to Hungary, e.g.
  - Plastic parts (Volkswagen)
  - Sparkplugs, filters (GM/Opel)

Figure VII. Exports of small quantity of parts to Western automakers

A global picture of the significant place the Hungarian road vehicle production occupies can be obtained from the report prepared by the Boston Consulting Group on behalf of the Hungarian Ministry of Industry.1/ The findings of the report were as follows:

> "The Hungarian road vehicle industry has a very important role for the national economy. As one of the main employers this sector employs about 2 percent of the total Hungarian workforce. The generation of 17.6 percent of mechanical engineering industry sales underlines the importance of this sector.

1/ Restructuring Programme for the Hungarian Road Vehicle Industry (February 2, 1988).

"The Hungarian road vehicle industry functions as the country's locomotive in mechanical engineering and production. There are a number of interdependences with other national industrial sectors as steel industry, chemical industry, rubber industry, etc.

"A high non-CMEA orientation of e.g. Raba's axle business exposes this company among the other Hungarian road vehicle companies as a flagship in technology. Feedback on performance of the current product range is received as well as a lot of new developments in hard currency markets.

ROAD VEHICLE INDUSTRY IS MORE IMPORTANT FOR HUNGARY THAN FOR OTHER COUNTRIES

Hungary RVI 1/
- Employs about 2% of all Hungarian employees
- Generates 17.6% of mechanical engineering industries' sales
- Functions as a manufacturing locomotive
- Flagship in technology

Source: Boston Consulting Group Analysis.

"The Hungarian road vehicle industry generates about 10 percent of the gross national product of Hungary. Therefore this sector plays in comparison to other countries a more crucial role. Even West-Germany with a very strong automotive industry creates only 8 percent of its gross national product within this sector. In other developed countries, e.g. Sweden and newly industrialized countries, e.g. South Korea, the automotive industry does not play such an important role for the national economy."

IN COMPARISON TO OTHER COUNTRIES RVI PLAYS A MORE CRUCIAL ROLE IN HUNGARY

	Hungary	West Germany	Sweden	South Korea
GNP 1985 (Bn $)	22	631	100	85
RVI 1985 (Bn $)	2	53	5	3
RVI in % of GNP	10	8	5	4

Source: United Nations, Boston Consulting Group.

"During the time period between 1980 and 1985 the 3 major HRVI companies almost doubled their convertible currency trade balance. The companies increased their net $ income from 521.0 to 101.7 M $. The main contributions

---

1/ RVI = Road Vehicle Industry

were done by Raba (62.3 M$) and Ikarus (32.1 M$)., Due to the present structure of the HRVI, Csepel has only one important customer Ikarus, the contribution of the third major company was very low (7.3 M$).

"There was still an increase of the net $ trade balance between 1985 and 1987 up to 4,920 M FT, which is 4.4% of total HRVI sales. Compared to the total Hungarian economy, which results in net $ trade balance of 6.3% of total sales the HRVI appears as one very important factor of the national economy.

"Due to a high amount of barter trade characterized business with non-CMEA countries (Yugoslavia, China etc.) the net $ real cash balance is only 50%": 2,890 M Ft.

KEY PROBLEMS OF THE INDUSTRY 1/

- It is a very large industry in both absolute and relative terms.
- Relative to the GNP its importance is higher than the automotive industries of Germany, Sweden or Korea.
- It is the country's technological locomotive in mechanical engineering and the breeding ground for future generations of engineers, industrial managers and skilled workers.
- Both its size and structure are not the result of a natural competitive interaction.

Retrenchment is neither desirable nor necessary. Structural change is!

KEY PROBLEMS OF THE INDUSTRY 2/

- While it has to rely almost exclusively on convertible currency imports in order to keep pace (albeit at some distance) with the accelerating standards of manufacturing and design, its revenue generation is closely tied to CMEA markets.
  - It turns dollars into rubels; a situation which the national economy cannot support in the long term.
- It is deadlocked between the desire to produce higher quality goods and the inability/unwillingness of its traditional customers to appreciate and pay for such goods.
  - Thus it cannot recoup the substantial investment needed for gearing up for quality and efficiency on the thin basis of convertible currency sales.
- The companies appear doomed if they do and doomed if they don't.

1/ The consequences are clearly felt with the present problems of the USSR to finance imports. A strong market position resulted, however, in the present negotiations to establish ... involving Soviet importers and Far East capital.

2/ Since 1991, trade with former CMEA countries has been carried out also in convertible currencies.

KEY PROBLEMS OF THE INDUSTRY (3)

- For a country with such talented, inquisitive and well-educated people the level of inefficiency, sloth, apathy and indufference at corporate levels is historic tragedy. Blaming the well known causes is both justified and futile.
- There are no glamorous ways for getting out of this trap. One can't leave it by the way of the front door. If those who are responsible have the courage, objectivity, humility and discipline to consider the service entrance, BCG has no doubt about the vitality of this industry.

At present, in connection with the changing of the character of CMEA countries' co-operation, and also with the Hungarian companies' conditions and co-operation, huge problems have arisen. At the same time, a modern automobile industry is being born, mostly due to the SUZUKI co-operation for passenger car production.

- RABA, Győr, co-operating with General Motors of USA has established a motor factory for GM car-engines to be produced in big series. Car assembling will also be performed (GM cars).
- In the city of Székesfehérvar, FORD has established a factory for the production of electro-components.
- SUZUKI has the most important and determining role to play in the development of the automobile industry in Hungary. The first car is scheduled to appear in 1992. The number of cars gradually planned to be built is 60,000 cars per year (the first year, 35,000; the second year, 45 000; the third year, 50,000 and the fourth year, 60,000).
- AUTOKONSERN-SUZUKI Factory in Esztergom - The establishment of the common company producing Suzuki cars is at its final stage. The co-operative partners Autokonsern, Suzuki, C. Itoh, are taking the final steps toward realization. A detailed study of the situation is available in a report prepared under the commission of the Government Committee of Technical Development.1/

The AUTOKONSERN-SUZUKI factory in Esztergom is making the sheet metal, welding, painting and final assembling work and contributes 20% of the value of

---

1/ "Establishment of Hungarian Suzuki Share-holding Company for Car Production V.I and II, October 1990, 355 pages (in Hungarian).

the cars. The Hungarian participation is planned to grow gradually due to the contribution of co-operating companies.

In the above-mentioned report, a thorough examination of possible contributing companies has been made. More than 30 companies were analyzed. Below are some examples of possible co-operating factories:

- **SPIRAL** (Budapest)* (SPIRAL Car Repair Co.) - factory with 1,500 workers. Annual income: 8,000 million Forints. Most important parts produced:
  . mufflers,
  . pistons, cylinders, pins, joints, etc.
  . shacles, cables, special parts and units.

The most significant fields of activities are car sales and repairs. Nissan and Volvo cars are sold and serviced by the company. The factory production is well organized and universal equipment in use. No CNC or robot are used in the production. For one of the export products, Mercedes mufflers, special equipment has been bought from Germany and is used.

SPIRAL plans to deliver mufflers for Hungarian Suzuki cars but for that purpose, the factory is in significant need of technical developments.

SPIRAL also intends to go deeper into customer servicing. In this field, the company needs:

- know-how,
- computer hardware and software,
- organization skills.

Accumulator and Battery Factory (Budapest)* - factory with 1,050 workers, planned for 1990 with an income of 2,200 million Forints.
At the time being, the factory produces:
. car batteries (6 or 12 V) - 500,000-600,000 per year
. industrial accumulators,
. dry batteries, etc.

The production of car batteries is based on Globe Union USA (recently: Johnson Control) equipment and technology with the continuous transfer of development results.

The production of plum powder is fully automatized. Assembling and control are made with specialized automatic devices, too.

For the Suzuki car battery production, the Furukawa type production should be adopted. In this respect, the factory needs technical and organizational development.

IKARUS (Ikarus Part sister factory Co), located in Mór* - This sister company of IKARUS is specialized in seat production for Ikarus buses. The factory supplies all bus seats for Ikarus. Accordingly, the transfer line highly automatized in transport mechanized production is established. The tube bending and welding work are fixture helped. CNC or robot equipment is not being used.

The most developed part is the textile cover production which is very well organized and is at a good technological level. Another product line is for cable hornes. They have western countries' export from this type of production.

FINANSZESELRERYGYAR, EGER (Precision Equipment Factory) located in Eger; has 3,000 workers on three plants, an annual income of $ 40-45 million per year, out of which $12-13 million for exports.
This factory has as main lines of products:

- compressors for vacuum cleaners (500,000/year)
- industrial pneumatics (MECMAN licencwe)
- car pneumatic devices, tires, e.g. gase springs (some 200,000 units per year)

This factory is one of the most advanced in this line of machine production. It has an automated transfer line for compressors, also automatic storage and transport devices (AGV).

In the production of pneumatic device parts, intensive and organized CNC machinery is commonly used.

A licence agreement with SOMA is under way for the production of gas springs.

Graboplast Rt (location: Győr) - share-holding company (35% belong to USA, Holland, FRG companies).

It produces imitation leather articles, partly to be used in cars (5-20% of production).

PEMÜ - Plastic Company of Pest-district - 2,400 workers and an annual income of 4,500 million Forints.

Its present production comprises:

- plastic tubes and fittings from polypropilene, kopolimer,
- tubes, strings from silicon-rubber
- bars, tubes, teflon plates
- valves,
- pumps.

The factory produces parts for Volkswagen Gulf and Zetta (steering-wheels, bumpers, laths), at the rate of 100,000 units/year.

Rimoczi and Sons Part Factory (Budapest) - small private factory of 137 productive workers.

The production covers:

- gears of different ypes,
- spherical joints,
- cardane elements, etc.

TAURUS Technical Rubber Factory (Budapest) - a huge rubber product factory which can contribute to the production of 19 ypes of parts for the Hungarian Suzuki car production.

At present, the factory has exports to Germany in the automobile part branch.

Salgotarjan Plane-glass Factory (located in Salgotarjan) - a Hungarian-Japanese common company established one and a half years ago in the frame of a basic factory. Discussions on co-operation are under way with ASAHI/ GLAUERBEL Co.

The factory has good chances to become a delivery partner for glass products to the Hungarian Suzuki cars.

Other companies which also have a chance for co-operation, can be mentioned

- **Bakony Müvek** (Veszprém)
- **Elzett** (Budapest and Sopron)
- **MMG Automatika Müvek** (Budapest)
- **KONTAKTA** (Budapest), etc.

Specific mention should be made of TUNGSRAM factory, supplying at present the Japanese and 12-15 per cent of Western European OEM industries in the field of auto lamps.

A few contributors are engaged in special technologies but most of them are connected with general manufacturing technology. An analysis of the situation in this field is given below.

The basic problems of the bus and motor vehicle part production in Hungary are:

- orientation to markets with low demands,
- obsolete, not modern machine tools and other technological devices,
- low organization level of production,
- bad motivation on the part of workers.

In the production of motor vehicles and parts, the traditional Hungarian quality control methods are common when the control is performed after production.

A detailed analysis of manufacturing operations in engineering industries has been made by the survey material, the preparation of which was organized by A.T. Kearney International Consulting Services.1/

1/ "Engineering Subsector Study", March 1989, Budapest, commissioned by the Ministry of Industry of Hungary.

"Manufacturing Operations

a. Equipment and Processes. The existing level of equipment and processes within the engineering subsector was found to be inadequate for the near-term needs of the enterprises. Only a concerted effort in this area will bring the enterprises up to a reasonable competitive level.
In the Team's view, the enterprises should concentrate on solid, modern but conventional equipment, and leave the introduction of high-tech equipment for a later date. Introducing a few pieces of high-tech equipment into outdated manufacturing facilities will not greatly increase productivity.

"b. Equipment Maintenance. As has been suggested for facility maintenance, the existing needs of the plants in the area of equipment maintenance ar extensive, and considerable effort is needed in this area. The maintenance and upkeep of plant equipment should be part of an overall maintenance system, including the work order, the materials management, and the work control systems.

"c. Product Development. The introduction of a product development function within the enterprises' organization should allow enterprises to become more responsible to market demands and competitive in new markets.

"Product development should be approached from three different perspectives:

- Enterprises without a product development function which are presently large enough to support it.

- Enterprises with an existing product development function which needs upgrading.

- Enterprises too small for a full-time product development function, which need to pool their needs with other small enterprises or contract out for such services.

"d. Work methods and standards. Enterprises can benefit significantly from programs to improve work methods. Much of the increase in the effectiveness of the work force will be achieved by applyiung industrial engineering approaches to the manner in which actual work is done.

"Together with work flow, facility layout and shop floor control designs, accurate work standfards should be developed for:

- Production planning
- Production control
- Shop floor loading
- Shop floor control
- Measurement of effectiveness
- Incentive pay systems.

"e. Manufacturing Information Systems. Programs to address the needs of manufacturing information systems should be undertaken in conjunction with work on the overall enterprise management information system, but should have a specific focus of providing shop floor information, relating to:

- Personnel
  - Facilities
  - Equipment
  - Production planning
  - Work scheduling
  - Materials
  - Quality control

"f. Tooling and tooling control. While the area of tooling was found to be in fairly good condition in most of the enterprises, there is an opportunity to improve tooling and tooling services by giving greater attention to the way tools are acquired, controlled and utilized. Suggested for examination are:

- Cutting tools
- Press dies
- Jigs and fixtures
- Gauges and inspection devices
- Tooling control practices and facilities
- Tooling skills

"g. Materials management. Initiatives aimed at improving materials management will require examination of issues such as unreliable suppliers, poor-quality materials, lack of competition among suppliers, lack of in-house material services control, materials with long-lead times, unresponsive suppliers, poor materials storage and inventories, all of them affecting:

- Raw materials in stock
- Semi-finished components parts in stock
- Finished components in stock
- Assemblies in stock
- Component parts in process
- Subassemblies in process

"h. Shop floor controls. The critical function of shop floor controls and documentation should be examined in the majority of plants within the subsector. The introduction of effective shop floor controls will enable the enterprises to manage work much more effectively.

"i. Work flow. The issue of work flow needs to be addressed in conjunction with the subject of facility layout. The two cannot be separated if the plant is to optimize the effectiveness of its facilities and materials.

"Work flow analyses need to be made so that optimum layouts can be achieved. These analyses should consider:

- The overall systems of goods and materials flow
- The advantages of planned material flows
- The existing movement system
- The processes required
- The size and composition of the materials
- The facility itself
- The people who will do the moving
- The volume of production

- The number of operations
- The storage requirements

"j. Quality control. Enterprise programs to ensure quality control will be critical to the success of the plants. Existing levels of quality control were found to be severely inadequate. A review of the current quality control procedures and practices is needed for the enterprises to be competitive in a "quality" marketplace.

"In reviewing the quality programs, and developing a plan to significantly raise the level of quality in plant, attention needs to be paid to:

- Product design specifications
- Process capability
- Product reliability
- Quality assurance procedures
- The cost-of-quality
- The quality control organization
- Quality control procedures (inspection, testing)
- Raw materials/purchased parts quality control
- Work in process quality control
- Finished goods quality control
- The attitudes toward quality

"k. Worker effectiveness. Programs to increase worker effectiveness should be aimed primarily at finding the motivational techniques that encourage greater levels of productivity, use of appropriate methods and meeting of requisite standards. In designing these programs, enterprises will need to consider, in conjunction with methods and standards:

- The culture of the enterprise
- Employee motivation
- The quality of supervision
- The incentives that generate good performance

"l. Work-in-process. The enterprises should approach the problems related to handling work-in-process as an opportunity to expedite the conversion of raw materials into finished goods.

"Work-in-process needs to be coordinated with other efforts, including:

- Production planning and scheduling
- Inventory management
- Work flow patterns
- Shop floor controls

"The specific plans for handling work-in-process will vary with each enterprise, but each plan should track where all of the material is, where it is going, and when it will be received at its final destination.

"m. Utilization. The low level of labor utilization observed in the enterprises indicates that significant benefits can be achieved by addressing the subject from an engineering perspective. Approaches to maximize the utilization of the available labor resource will primarily be a function of:

- Production planning
- Shop floor controls
- Supervision

"The programs to deal with the subject should be undertaken in conjunction with projects related to worker effectiveness, methods and standards, and shop floor controls.

"Technology

"Enterprise programs for enhancing technology should consider two major thrusts:

- The application of technology to the product line
- The application of technology to the equipment and process

"Further, there will be a need to assess several sources for the provision of technology:

- Purchased technology
- Technologies developed by the enterprises as part of their in-house R & D efforts
- Technologies developed by outside agencies such as the R & D institutes.

"Technology infusion projects must also consider constraints, such as:

- Small economy constraints
- Thinly spread resources
- Inward-looking focus
- Lack of institutional framework
- Government policies and practices

"Emphasis should be placed on:

- Product design technology
- Product materials technology
- Product process technology
- Information systems technology

"The types and levels of technology will be enterprise-dependent, but should consider such areas as:

- Computer-integrated manufacturing systems (CIMS)
- Numerical control equipment (NC)
- Computer numerical control (CNC)
- Distributed numerical design (DNC)
- Computer-aided design (CAD)
- Computer-aided engineering (CAE)
- The "focused factory"
- Factory automation

"The programs to bring advanced levels of technology to the enterprise must be conducted in light of the needs of the plant. Not every enterprise will receive cost-effective benefits from higher levels of technology."

All the above facts which are valid for the whole engineering subsector are especially true for the automobile and automotive parts industry.

For the Hungarian automobile and auto-parts industry, including customer servicing, the following topics are the most important and those where technical assistance can benefit the most:

- Modern quality assurance systems, know-how, devices,
- Robot application culture for high quality production,
- Modern methods for production planning and control, J.I.T. methodology, know-how, devices (software),
- High-tech education and training,
- Customer service systems, know-how, organization skills, etc.

E. Pharmaceutical industry

Historical development

The Hungarian pharmaceutical industry dates back to 1901, when a drug-manufacturing license was granted to the Chemical Works of Gedeon Richter Ltd. Chinoin Pharmaceutical and Chemical Works Ltd. was established in 1910 and the Swiss firm Dr. A. Wander created an affiliate (today's EGIS Pharmaceuticals) in 1912 to satisfy demand for its products in the Eastern European markets. Alkaloida Chemical Company was founded in 1927 to utilize János Kabay's patent for the industrial-scale manufacture of morphine alkaloids from dry, threshed poppy capsules.

Pharmaceuticals became the most developed branch of the Hungarian chemical industry between the two world wars. Two factors played an important role in this process. One was the close co-operation with academic research institutes and the establishment of one's own R & D capacity. The other decisive factor was the creation of an international marketing network. The two large firms Chinoin and Richter had several affiliates and joint ventures abroad, among others in Austria, Belgium, Brazil, Egypt, Greece, Italy, Mexico, Spain and Turkey. Alkaloida Chemical Factory established a morphine manufacturing joint venture in Poland and in Slovakia. The German Bayer A.G. had a majority share holding in Magyar Pharma, Budapest.

The pharmaceutical external trade balance in Hungary has been positive since 1927. Pharmaceutical imports accounted for only some 60 per cent of pharmaceutical exports, and Hungarian drug preparations were exported to 42 countries. The number of pharmaceutical manufacturers reached 36 by the end of the 1930s.

The evolution trend was interrupted by the Second World War. Contacts with foreign affiliates and joint ventures became loose or even ceased to exist. Efforts were concentrated on the rehabilitation of manufacturing capacities in the after-war years. In 1948, industry was nationalized and, simultaneously, the small pharmaceutical firms were merged with one of the large drug companies. As a result of the prevailing political economic ideology, production was separated from (internal and external) trade and from R & D activities.

Medimpex was established with exclusive rights to import and export of pharmaceuticals, whereas domestic trade became the priviledge of GYóGYért Pharmaceutical Goods Company.

Sectoral research institutes were organized for industrial R & D programmes. The Central Biological Research Institute was created in 1949 and the Pharmaceutical Industrial Research Institute was established in 1950. These two institutes were merged in 1952 under the name of the latter.

The pharmaceutical industry could profit from the fact that the separation of the three fundamental functions of a firm was made less rigid in this branch of industry than in others, the harmful consequences being relatively low.

Medimpex possessed a monopoly for the foreign trade of pharmaceuticals, but it nonetheless pioneered to invclve industrial experts in major business decisions from the mid-fifties, within the frame of external constraints, of course. As a result, many international co-operation agreements (licencing contracts, manufacturing co-operation, joint R & D projects) were concluded by the end of the sixties. The very first agreements were signed between Ciba and Chinoin, and between Janssen and G. Richter. They have been successfully con tinued and are going on also today. This can partly be attributed to the inter national co-operation and favourable business experience of the involved parties between the two world wars.

The situation was equally or perhaps more favourable in the field of research and development. The establishment of the sectoral research institutes was not accompanied by drastic interruption of such activities in the firms, partly because a nucleus of research organization remained with the companies, which did their best to make them grow, and partly because most members of the staff at the sectoral research institutes were recruited from the R & D units of pharmaceutical firms, thus personal contacts assured the transfer of R & D results from laboratory to production plant.

The primary objective after the Second World War was to reduce the development gap between Hungarian and international firms and to keep pace with the industrial aspects of the first therapeutic revolution taking place in the fifties. Many independent process patents were elaborated for the manufacture of new, large-volume products. For example, Chinoin started the industrial-scale production of the first antibiotic, penicillin, in Hungary in 1950. A new factory, Biogal, was established for the manufacture of penicillin in 1952.

R & D activities have never been limited to the so-called reproductive research and new, original Hungarian products have been marketed continuously both on the domestic market and abroad. The new economic reform was initiated in 1968 and R & D efforts were focused on new products rather than on new processes.

As a result of both the development of foreign economic relations and the international success of several new drugs, the Hungarian pharmaceutical industry has remained competitive in several segments of the world drug market, and it has the intellectual and economic potentials to retain or even improve this competitiveness.

Current structure and role of the Hungarian pharmaceutical industry in the Hungarian chemical industry and in the world pharmaceutical industry

The Hungarian pharmaceutical industry consisted of eight large firms between 1952 and 1990. Six of these firms (five pharmaceutical manufacturers, Alkaloida, Biogal, Chinoin, EGIS and Richter, and a fine chemical manufacturer, Reanal) co-ordinated their activities through the Association of Hungarian Pharmaceutical Industry (till 31 December 1990) and were supervised by the Ministry of Industry and Trade. The Human Institute for Serobacteriological Production

and Research has manufactured human biological products, whereas Phylaxia has produced veterinary biological and feed additives. Human works under the super vision of the Ministry of Health and Social Welfare, and Phylaxia was supervised by the Ministry of Agriculture. In addition, a number of small-scale companies were established as affiliates or joint ventures in 1989 (Table 1[1/]) and this process is expected to accelerate between 1990 and 1992.

In 1989, the gross output of the Hungarian pharmaceutical industry amounted to HUF 51,572 million, or HUF 51,818 million, respectively, if the simplified accounting reports of the small entrepreneurs are also taken into account. The share of the seven large pharmaceutical firms (Alkaloida, Biogal, Chinoin, EGIS, Richter, Human and Phylaxia) in the total production was HUF 49,256 billion, or 95.5 and 95.1 per cent of the gross output, respectively (Table 2).

The share of these seven firms in the gross output of the Hungarian pharmaceutical industry was even higher before 1989. On the other hand, detailed information is available on the operation of these firms from 1980 onwards, thus the analysis of their figures is suitable to describe the whole Hungarian pharmaceutical industry.

Using the Statistical Yearbook 1989 of the Central Statistical Bureau as source of information, the following statements can be made as regards the position of the Hungarian pharmaceutical industry within the chemical and manu facturing industries.

The pharmaceutical industry accounted for 1.7 per cent of the total industrial employment, 2.8 per cent of the assets as per the balance sheet, 3.0 per cent of the gross fixed assets, 3.0 per cent of the gross industrial output, 3.1 per cent of the net operating revenues, 4.5 per cent of the value added, 6.6 per cent of the total export - within this, 8.8 per cent of the rubel exports and 5.4 per cent of the non-rubel exports-, and 5.3 per cent of the operational revenues before taxes and financial distortions. These figures show that competitiveness and profitability of the pharmaceutical industry significantly exceed the average values of the Hungarian manufacturing industries.

1/ All tables referred to in this chapter on the pharmaceutical industry can be found in the Annexes.

Hungarian pharmaceutical firms have been favourably placed among the manufacturing industry companies. The 1989 ranking was prepared according to the statements of accounts. Five of the seven large firms (Richter, Chinoin, EGIS, Biogal and Alkaloida) were ranked by their net operating revenues among the top 100 Hungarian manufacturing firms in 1989. Richter was ranked tenth by the net operating revenues, fourth by the total export and rubel export, sixth by the non-rubel export, and seventh by the gross profits. Chinoin, EGIS and Biogal are also among the leading companies (Table 4).

The pharmaceutical industry grew significantly quicker than the manufact uring industries in general between 1980 and 1989. Its annual average change was 10.0 per cent for this period, while the corresponding figure for the whole industry was 7.1 per cent. Index for domestic pharmaceutical manufacturers' prices grew much less than the industrial manufacturers' price index in general, nonetheless, the share of the pharmaceutical industry in gross output increased from 2.4 per cent in 1980 to 3.0 per cent in 1989, due to the above-average dynamic development of the pharmaceutical industry (Table 5).

The 1989 shipments of the Hungarian pharmaceutical industry were converted into US dollars for the sake of international comparability. Domestic figures were converted by the official rates of exchange and the conversion values used in the Soviet-Hungarian foreign trade were used for the calculation of the US dollar values of rubel exports.

In 1989, the total operating revenues amounted to US$ 1,100-1,200 million. After deducting the inter-firm trade and revenues from the sales of pesticides, cosmetics and other goods, the pharmaceutical sales were between US$ 850 and 900 million. The projected sales for 1990 are expected at about US$ 950 million, calculated in the same way as above. The 1989 and 1990 sales account for about 0.64 per cent of the global sales of US$ 135-140 billion (1989) and US$ 145-150 billion (1990) of the world pharmaceutical industry.

The order of magnitude of annual sales in the Hungarian pharmaceutical industry corresponds to that of a multinational company ranking about fortieth among the leading world pahrmaceutical manufacturers in 1989. The real weight of the Hungarian pharmaceutical industry is somewhat higher than its 0.64 per cent in world production. In 1989, the total Hungarian pharmaceutical exports in US$ 400 million represented two-thirds of all non-rubel pharmaceutical

imports to the Soviet Union. In addition to their dominant role on the markets of former CMEA countries, the Hungarian pharmaceutical companies have R & D and business co-operation agreements with leading pharmaceutical firms of the world. The Hungarian pharmaceutical industry has also contributed to the development of medical therapy. Original Hungarian drugs -Jumex (selegiline), Cavinton (vinpocetine) and Osteochin (ipriflavone)- have been marketed successfully in several OECD countries, including the USA and Japan.

The annual pesticide sales of US$ 120 million account for about 0.6 per cent of the US$ 20 billion world market. The relative order of magnitude of pesticide shipments is the same as that of pharmaceutical sales, but the international significance of pesticide manufacturing is relatively low.

Pharmaceutical industry shipments and structure of sales

Distribution of total industry shipments by the seven large Hungarian pharmaceutical firms is shown in Table 6. The ranking list is led by Richter with a 30 per cent share, followed by Chinoin with 21 per cent. The shipments of the largest company are valued about twelve times that of the smallest firm.

Domestic sales of HUF 20,755 million account for 39.9 per cent of total shipments, followed by the HUF 16,600 million (31.9%) of non-rubel exports and HUF 14,643 million (28.2%) of rubel exports.

As regards domestic sales, Biogal is leading (24.0%), followed by Chinoin (20.0%), Richter (12.7%) and EGIS (15.0%). Differences among companies on the domestic market are relatively small: the leader sells only five times as much as the lowest ranking firm.

Richter leads by 32.6 per cent the list of non-rubel exporters, followed by Chinoin (22.7%) and EGIS (18.0%). Exports of the two smallest firms are insignificant in comparison with those of Richter.

Richter also leads the list of rubel exporters by an outstanding share of 47.2 per cent, followed by Chinoin (20.4%) and EGIS (19.3%). All the remaining companies play an insignificant role.

In conclusion, those export-oriented large firms have been playing a dominant role in recent foreign trade as they were also important exporters between the two world wars and keep on spending a high share of their sales on R & D activities. Biogal has joined this group during the past decade but even the predominantly domestic market-oriented Human exported 12 per cent of its production in 1989.

Ruble exports to the CMEA countries have gradually developed to reach some SUR 500 million in 1989. Opportunities existed in all Eastern countries after World War II and thanks to their accumulated industrial experience, Hungarian pharmaceutical firms were the first in the CMEA countries to produce many important new drugs (new sulfonamides, aminosalicylic acid, aneurine, cyanocobalamine, cholecalciferol, isoniazid, penicillin, streptomycin, chloramphenicol, other antibiotics, and so on). The main objectives of the pharmaceutical industry development strategy were to achieve the highest possible degree of self-dependence and provide modern drugs to meet people's health needs. Continuously increasing exports to the CMEA countries were a key factor of success in achieving these strategic objectives. The regulatory policies of the government's health authorities favoured this development. The registration and GMP requirements were set close to the standards and practice of industrially developed countries and this has also increased the competitiveness of Hungarian drugs in the CMEA countries.

Analysis of the 1981-1989 trend of net sales in current prices (Table 7) leads to the following statements:

- The annual change was higher in the first half of the studied period than in the second half. An extreme decline in rubel export growth rate during the past four years is particularly noticeable. This change is not due to decreased demand but rather to limited barted trade combined with the new exchange rate policy of the government;

- Increased non-rubel exports are exceptional, particularly in the years 1985-1989 mainly due to those government regulations which reduced the number of factors constraining exports and/or gave firms incentives to increase their sales abroad (gradually liberalized imports and exchange rate policy played an important role). It was vital that the increasing number of international co-operation agreements with Western firms be

permitted to sell original Hungarian drugs on the world market and narrow down the gap between Hungarian and international GMP and GLP standards;

- As to domestic market, the annual increase has practically remained the same during the whole period.

The seven large pharmaceutical manufacturers also produce and sell pesticides, cosmetics, and pharmaceutical chemical intermediates; in addition, certain services are also contributing to the operating revenues (Table 8). Pharmaceutical sales account for 77 to 79 per cent of total revenues and this share has remained practically constant between 1981 and 1989. Within pharmaceutical sales, the ratio of domestic and non-rubel sales increased, whereas that of rubel exports declined.

Pesticides sales fell from 14.2 per cent in 1981 to 9.4 per cent in 1989. The 37.3 per cent share of non-rubel exports in 1989 deserves mentioning because it represents an important increase in comparison to the 23.9 per cent in 1981 and the 25.0 per cent in 1985.

The 13.8 per cent share of other income in the 1989 total revenues is relatively high; the corresponding figure was only 8.3 and 9.5 per cent in 1981 and 1985, respectively; it should, however, be mentioned that standardized statistics are available only for recent years. Previously, other income was included in pharmaceutical sales. It may be emphasized that 2.5 per cent from the 1989 total of 13.8 per cent came from licence and know-how fees and royalties and originates completely from non-rubel foreign trade.

The structure of 1989 sales by product ranges is detailed in Table 9. The share of pharmaceuticals is the highest (89.1 per cent) in rubel exports, the lowest (69.3 per cent) in non-rubel exports, with domestic sales (74.1 per cent) ranging in between.

The share of pesticide sales is the highest (11.0 per cent) in the non-rubel exports and the lowest in rubel exports. The share of domestic sales in the total revenues is slightly less than that of rubel exports.

The share of other income in total revenues is highest in the non-rubel exports (19.7 per cent) but if this figure is corrected to 7.8 per cent of

intellectual property exports, then the share of other income (16.9 per cent) becomes highest in domestic sales.

Pharmaceutical preparations are playing a decisive role in domestic sales and rubel exports, whereas medicinal chemicals account for 80 per cent of non-rubel exports. Most medicinal chemicals are exported to industrial countries but this export structure is unfavourable even if one part of these exports is supplied to licencees of Hungarian pharmaceutical firms. This export structure also reveals that the Hungarian pharmaceutical industry does not have an international marketing network.

Making use of the opportunities offered by the 1968 economic reform in Hungary, Medimpex started to establish manufacturing and trading affiliates and joint ventures as well as scientific and trade offices abroad in early 1970s and this process continued also in the past decade when Medimpex became a joint venture of six pharmaceutical manufacturing firms. Commercial capital has, however, never been available to create an efficient international marketing network.

At present, there are five manufacturing subsidiaries and joint ventures (in Bangladesh, India, Mexico, Nigeria and Switzerland), and nine trading companies (in Austria, France, Germany, Italy, Jamaica, The Netherlands, Spain, the United Kingdom and the USA). There are nine trade and three scientific offices and six offices exercising both functions, thus the total number of offices is 18.

The functions and activities of foreign trade are being reorganized. Pharmaceutical manufacturers were given foreign trade rights for R & D and technical co-operation on 1 January 1982 and the large firms exploited this opportunity immediately, while other companies exercised their rights step by step over several years.

After 1 January 1990, Chinoin and Richter applied for and were granted foreign trade rights for non-rubel exports. Chinoin applied also for import rights and established a separate affiliate, Chinoin Trade Ltd., to carry out foreign trade activities.

It goes without saying that privatization with foreign operating capital involved will cause further changes in foreign trade activities.

Domestic pharmaceutical distribution and consumption in 1989

Total pharmaceutical consumption, calculated at manufacturers' prices as of 1 January 1990 was 17,889 Forints in 1989. The structure of consumption by source of supply was:

	Million Forints	Per cent
Domestic manufacturers	13 096	73.2
Rubel imports	2 254	12.6
Non-rubel imports	2 539	14.2

The number of pharmaceutical preparations - counting each dosage form, each strength and each packing unit as a separate product - was 1,217 products, distributed as follows:

Distributors	Number
Alkaloida	72
Biogal	93
Chinoin	157
EGIS	180
Richter	210
Reanal	1
Sub-total, domestic manufacturers	713 (58.5%)
Rubel imports	174 (14.3%)
Non-rubel imports	330 (27.1%)

These figures reveal that demand for large-volume products are primarily satisfied by domestic sources. Low-volume drugs and new products are imported mainly from Western countries.

The complete reorganization of domestic pharmaceutical distribution began in 1991. The monopoly of pharmaceutical wholesalers has been abolished in principle, but the first effects will only become visible in the second half of the year. Several wholesale companies are being established mainly upon initiative of pharmacy centres. Real changes can only be expected, however, from liberalization of imports of finished drugs and from privatization of pharmacies. This

processs may be accompanied by conversion of present galenical laboratories into small-scale manufacturing enterprises.

The social security system will also change. Several options have been proposed but no decision has yet been taken. It seems to be unavoidable that patients will have to contribute more to drug expenditures due to the permanent increase in inflation rate.

On the basis of several years of experience, drug consumption is only temporarily elastic to price increases and the original trend continues after a short stagnation interval.

The effects of liberalized pharmaceutical imports are quite unpredictable. Increased imports of pharmaceutical preparations are foreseeable since the current demand for such drugs is not satisfied. Liberalization of imports will abolish the domestic manufacturers' obligation to supply registered drugs. This, together with depressed prices (about 35 to 40 per cent of international level) for locally manufactured drugs is expected to result in price increases. A similar effect can be anticipated from the US$ payment of future imports from eastern European countries.

Research and Development, technology level

Although the pharmaceutical industry has not been able to keep pace with the technical development occurring in industrial countries, the gap is much smaller in this sector than in other Hungarian manufacturing industries.

Three new syntheses and 37 NCEs represent outstanding R & D results in the post-war period. The internationally successful Cavinton (vinpocetine), Jumex (selegiline) and Osteochin (ipriflavone) have demonstrated that co-operation strategies are the best options for world-wide marketing of Hungarian products in the pharmaceutical industry.

The general efficiency of R & D is characterized to some extent by patent statistics. Member firms of the Union of Hungarian Pharmaceutical Industry and their three joint research institutes were granted 1,790 patents between 1971 and 1987, and 2,278 patent applications are still pending today.

SCRIP publishes company statistics each year and larger Hungarian pharmaceutical firms - Chinoin, EGIS and Richter - are always listed among the 100 leading companies. The SCRIP list has only an informative character, as there are firms which do not reply to SCRIP's questionnaire - nonetheless, it shows that Hungarian pharmaceutical companies are keeping up with the leading group of international research-based industry.

Only process patents are granted for pharmaceuticals in Hungary at present but the preparatory steps have been taken to introduce product patents. Domestic companies make use of the opportunities offered by process patent protection and the majority of the Hungarian pharmaceutical industry patents are concerned with new, independent process inventions for the manufacture of medicinal chemicals.

In 1989, original Hungarian drugs accounted for 18.8 per cent of the sales. The share of licensed-in products was 22.5 per cent and the share of the so-called reproductive preparations amounted to 55.3 per cent.

The bulk of the latter group consists of generic products not protected by any patent anywhere, but there is also a smaller but still significant group of products manufactured by independent process patents which cannot be marketed in countries with product-patent protection.

Priority given to new product research has suppressed process and unit operation development. It follows partly from this strategy that the quality and presentation of products, and the commercial synthesis routes are chemically up to international standards but that the industrial chemical technology, the machinery and equipment, and the unit operations are below the world level. Production plants do not practically use computer-controlled manufacturing processes.

The development gap is also quite wide in pharmaceutical technology. This is reflected in the fact that there are only 14 pharmaceutical dosage forms on the Hungarian market, whereas the same number on the world market is 58. Biotechnological research is about one decade behind the international level.

The basis of pharmaceutical industry research consists, first of all, in R & D organizations of the firms, of the three joint research institutes -

primarily the Pharmaceutical Research Institute - and some hundred academic and university research institutes implementing contract R & D projects.

Table 10 shows that around 3,130 persons (14.5 per cent of the total staff) are engaged in R & D at the six firms working under the supervision of the Ministry of Industry and Trade. Of the R & D staff, 37 per cent have university degrees. The largest R & D organizations are found in Chinoin and Richter, inventors of internationally most successful NCEs.

The Hungarian pharmaceutical R & D basis is very heterogeneous and this constrains the full exploitation of the intellectual potential available in certain fields. More R & D funds and better R & D management would be necessary to improve current efficiency.

As a result of low domestic drug prices, very high (30 per cent) special tax on rubel exports and central taxes on above-industry-average profits, pharmaceutical firms can only spend some 5 per cent of their net income on R & D projects. International competitors spend 12-16 per cent, or even more of their net operating revenues on R & D. Since Hungarian pharmaceutical firms are relatively small, they should spend more than the international average to make sure that they maintain the minimum threshold expenditure required for successful marketing of NCEs. The firms hope that the market economy system will help them achieve this objective.

Table 11 contains informative data on the R & D expenditures of the Hungarian pharmaceutical industry between 1975 and 1989.

Fixed assets and investment

The gross value of fixed assets of the Hungarian pharmaceutical industry was 38,336 million Forints on 31 December 1989. The net value was 36,153 million Forints, therefore the net/gross ratio was 65.9 per cent. The gross value of fixed assets of the seven largest companies represented 94.3 per cent of the national total.

Investment has totaled 21 billion Forints between 1985 and 1990, which is more than twice (9.6 billion) that of the former five-year period, even if the currently high degree of inflation is taken into account. This investment was

made possible by a credit from the World Bank to support the Fine Chemical Industry Programme.

Of the 12,677 million Forints invested in 1990, 10,479 F were spent on establishing production units. Three plants were built in Biogal (2,361 million), four plants in Chinoin (3,084 million), three plants in EGIS (1,883 million), one plant in Reanal (117 million) and two plants in Richter (3,035 million). These investments assure that the GMP regulations can be observed in the manufacture of pharmaceutical preparations and they have also solved the capacity problems in the production of medicinal chemicals. Eight of these production plants were put into operation in 1989 and one in 1990, thus first results are expected only between 1991 and 1993.

Non-productive investments amount to 2,198 million Forints, of which 1,920 were spent on the joint waste incinerator plant of the pharmaceutical firms at Dorog, and 278 million invested in instruments and equipment to improve the efficiency of R & D activities.

The present macroeconomic and financial government policies reduce profit ability and consequently development funds at company level and bank credits are not available for investment due to the increased debts of companies. Involvement of foreign capital seems to be the only solution to this problem.

Changes in industrial structure

Privatization of the state-owned pharmaceutical firms has been started and several small- and medium-scale enterprises have been established since 1989.

Human and Phylaxia have always served interests of public health and they will presumably remain state-owned also in future. Chinoin took the first step in so-called spontaneous privatization the end of 1989, and involvement of a French firm, Sanofi, has already been approved by the State Property Agency. Richter is included among 30 companies for first privatization programmes of the State Property Agency. The Japanese Nomura Consulting Firm has won the tender to prepare and implement Richter's privatization procedure. Biogal was converted into a share company in 1989, while Alkaloida, EGIS and Reanal are being transformed into share companies and their privatization is anticipated to take place in the second stage.

Privatization cannot be carried out without participation of foreign capital. The ideal partners are international pharmaceutical firms which possess venture capital for new product R & D and a global marketing network to exploit opportunities from the sales of NCEs. Access to modern new products and processes is an additional advantage. The foreign party may find the leading position attractive and four decades of experience of the Hungarian pharmaceutical industry in the markets of former CMEA countries, first of all the Soviet Union, as well as the R & D investment opportunities not exploited mainly due to lack of capital.

Small- and medium-scale pharmaceutical firms did not exist between 1949 and 1989; therefore, large companies have had to manufacture several low-volume essential drugs. Small-scale companies are more flexible than large firms and the manufacture of essential drugs demanded in minor quantities is more feasible at the small-scale level. Such small-scale manufacturing plants have been established since 1989, partly as affiliates of large companies and partly as joint ventures. New R & D firms - Biorex Research and Development Ltd. and Medipharm Research and Development ltd. - were established in recent years to develop and market new drugs and parapharmaceutical products, usually based on the potential utilization of a patent. The inventors are generally shareholders in R & D ventures which are characterized by close co-operation with academic research institutes, high intellectual resources and innovative, dynamic management structures.

The future of the three joint R & D institutes in the large pharmaceutical firms is not yet clear, once they have been privatized by their owners. With a staff of 789 employees, the Pharmaceutical Research Institute is the largest and accounts for 25 per cent of the research institutes working under the supervision of the Ministry of Industry and Trade.

Problems

The main weak points which more or less characterize all these firms are the following:

- Lack of capital to develop NCEs, including international marketing facilities;

- Low technical level of fine chemical production, as regards the applied machinery, equipment and unit operations;
- Complete lack of or low-level application of high technology (e.g., molecular design in R & D, computer-controlled chemical synthesis, and total quality management);
- Lack of international marketing network and low-level marketing activities.

There are, of course, other problems but they are much less significant than the above ones. For example, inappropriate management of the product development cycle wich results in loss of patent protection period; improper preparation to introduce product patents; organization and management of firms that do not meet the requirements (business and profit oriented) of the market economy in all respects; partly unsatisfactory quality assurance system; generally too low a productivity, too broad a range of products or too small a number of environment-friendly technologies and yet to improve inter-firm coordination.

The fundamental problems and their consequences are already being reduced, thanks to the ever greater pressure of the markets, but a final solution is only expected from privatization with the involvement of foreign capital. Once this has successfully been achieved, the secondary weak points will quickly disappear.

IV. RECOMMENDATIONS FOR TECHNICAL ASSISTANCE

General description

As recommendations, the report has identified these areas that the Government and enterprises can work on over the next several years, trying to bring the private and public enterprises up to a level of competitiveness vis-a-vis the Western countries.

A. Government initiatives

Hungary needs an economic, financial and legal environment which clearly permits and encourages competition and unrestricted entry into and exit from the marketplace, encourages the creation and operation of self-employment activities, promotes small and medium-size enterprises, abolishes subsidies, liberalizes investment and financing, rationalizes taxation, supports the break-up (and when rational, recombination) of enterprises, based on market demands as well as efficiency and effectiveness considerations, develops an infrastructure which really supports industry and commerce, encourages healthy profit-making across the board, and provides "safety-net" services to the labor force during the next few years of restructuring.

While the above listing is clearly a general one, a few examples might serve to illustrate the need for such sweeping changes. Most of the issues are either addressed to by new legislative measures or are under preparation to be presented to the Parliament or other competent bodies respectively. Nevertheless, implementation and wide-scale application requires also external assistance.

Property laws

A clear and unequivocal law on property is needed. Given the circumstances under which pre-WW II laws, regulations and rights on property were severely modified, a new law may require differential treatment of land and buildings for housing, for industrial and commercial enterprises, and for the agriculture sector. A political debate on the most appropriate solution is still going on.

Freedom of entry

Anyone should be free to start any type of business, by merely fulfilling some very simple and straight forward requirements, and then succeeding or failing on his own. An enlightened approach in this area would certainly foster the formulation of small and agile import and export firms, the emergence of parts and materials suppliers, the creation of small and medium service organizations, the initiation of single-person, self-employed businesses, and other similar and beneficial activities. The legal framework is already established; however, skill and capital supply have to be up-graded.

Investment and finance

Freedom to invest and finance granted to Hungarian and foreign concerns (banks, venture capital firms, financial intermediaries, etc.) would tend to break the paralysis that exists between the present array of banks (and their funds, at high interest rates) and the enterprises (and their pressing needs) and, quite important, provide funds for new, small, medium and large ventures, without unnecessary bureaucratic processes. A precarious internal and external balance situation limits the freedom to select most appropriate measures.

Accounting standards

The establishment of consistent and widely acceptable accounting standards would permit the clear identification of all costs associated with the production of goods and services, and the auditable determination of operating profits and losses. A law is passed to be introduced by 1992, but the transition from old to new accounts and its application require wide-scale retraining and an amount of practical guidance.

Communications infrastructure

All productive sectors of the Hungarian economy would benefit from such an essential infrastructural capability - as well as many other infrastructural assets including feeder roads and main highways, an improved telecommunication network to promote investment. A law on concessions has been passed. A newly established fund of the Ministry of International Economic Relations may

contribute, through competitive competitive bidding, to infrastructural investment connected with the operation of newly established joint ventures.

Education and training

The proper design and increased funding of education, training and retraining institutions for those elements of the labor force that are displaced through the restructuring process ahead, Government, quasi-independent institutions, academic bodies, R & D centers and enterprises, should reexamine the whole panoply of activities under way, and determine which should be continued, combined or promptly discontinued, which levels of effort and ensuing resources ought to be applied, where would it be more cost-effective to carry out the undertakings, and what sources of funds should be considered.

A. i. Enterprise-specific initiatives

Enterprises must take proactive steps to ensure that educational institutions provide a pool of adequately trained engineers to meet industry requirements, bvoth in terms of numbers and qualifications. An "association" of enterprises is needed that can speak for the entire engineering subsector to exert pressure on both the government and the educational institutions to provide for the needs of the enterprises. It should be the role of such an "enterprise association" to help determine the needs of the plants in terms of curriculum, to ensure that the schools are aware of the specific qualifications needed in their engineering graduats.

The role of the government in this process should be one of supporting the needs of educational institutions. Without adequate facilities and staffs, the institutions will have difficulty meeting the needs of the enterprises.

Research and development

The changes needed in the area of R & D will necessitate close co-ordination between the Government, the enterprises, and the present array of R & D institutions. Changes needed include:

- Reducing the number of institutions, to ensure that the available funds are being expended effectively and redundant actvities are eliminated;

- Consolidating institutions to reduce excess capacity;
- Funding R & D activities according to basic objectives, i.e., pure research by the government, or applied research by enterprises or enterprise-contracted, specialized groups;
- Co-ordination R & D activities by some central agency.

A.ii. Enterprise-specific actions

Suggestions for improvements within the enterprises should be assessed by the enterprises themselves in the light of real or perceived needs -under the growing pressures of open market forces demanding global quality levels, prompt deliveries, competitive price structures, proactive after-sale services, etc. The implementation of such improvements can and should consider a mix of enterprise-level resources such as the utilization of in-house talents, proper application of new internal financial resources created by restructuring, regrouping, overhead and idle personnel reductions, greater foreign exchange incomes, among others, and outside resources such as government-supported new programmes, the use of grant and loan monies from bilateral and multilateral sources, and the proper application of new monies supplied by investors and new partners.

B. i. Electrical and electronics industries

The enterprises investigated by the Mission are related to electrical and electronics industries and include a wide variety of industries or organizations like computer manufacturers, power electrical equipment manufacturers, or automatic control devices manufacturers, institute of IT, software house, etc. Though the companies visited are of considerable importance in their own fields, they cannot be considered as characteristic of the whole subsectors. These Hungarian enterprises are:

- **MEDICOR** manufacturing medical electronics equipment
- **SZAMALK** information processing and computer application centre
- **MTA SZTAKI** research institute of software for industrial automation,
- **VIDEOTON AUTOMATIKA** manufacturing hammer-bank type computer printers, and various types of NC & robot controllers,
- **VIDEOTON AUDIOTECHNIKAI** manufacturing TV sets and audio speakers,
- **VILATI** manufacturer of automation equipment and control units.

The main objective given to the project team was to assess selected manufacturing plants in order to improve their production efficiency and product quality, and to make proposals as to how to introduce most appropriate automated production processes to suit particular manufacturing industries.

However, under the present economic situation, the manufacturing industries in the country had several problems and in many of the factories these must be solved before applying automated production processes. For this reason, the report is strongly emphasizing management, marketing and general engineering.

Progress of privatization in State-owned enterprises

- Introduction of market principles and foreign trade liberalization

Hungary is undergoing rapid political and economic reforms. When the project team visited the country, many of the problems were still floating but the Government has strived to overcome the economic difficulties which are unavoidable in a period of transition, and new policies have been gradually formulated and carried out.

In order to help this situation, many study msisions and delegations from Western countries have visited Hungary in 199-, for example, the Japanese survey mission on the economic and investment environment in Hungary which has made good work in May 1990 and issued a report.

The most important key factors for economic reforms are two points: one is the introduction of the market principle and the other, is the foreign trade liberalization, which incidentally are two mutually related factors.

In Hungary, in the political aspect, it is said that the revolution has been promoted by top people and incessant efforts to reform the economic mechanism, under difficult conditions have been made by the government since the 1956 revolt. Although there is stumbling for a time, Hungary took the initiative of introducing the market principle in 1968, with the economic reformation. An obsolete structure, inadequate response to challenges and a number of other factors have caused huge external debts in the past (about $21 billion), but as far as the economic independence of the CMEA economic systems and westernization

are concerned, Hungary has always been more than one step ahead of the other eastern countries.

Privatization of State-owned enterprises

Privatizing state-owned enterprises is a very important element for the introduction of a market principle and foreign trade liberalization. All problems are connected with this implementation.

Most companies visited were State-onwed; many enjoyed monopolization and subsidies for a long time under the central-planning economy.

The privatization process is closely similar in Poland and Hungary and, in most cases, is developed according to the following model:

- spontaneous privatization initiated by the management,
- privatization launched by the State Property Agency,
- "Pre-privatization programme" mainly for small trade and service outlet,
- foreign unification.

In certain cases, the state-owned enterprises are first transforming themselves into joint stock or other corporate forms of company. Where the shareholders etc. are companies still totally or mostly state-owned, separation of individual plants or units are not necessarily taking place (e.g., the major holding companies are to be privatized in their integral form, instead of individual ... being sold separately. In other cases, a holding is established with the participation of several companies and transformed from the previous big or monopolistic company.

Still another form is when individual plants, once parts of the former company, become independent while the bulk of the original "parent" company keeps on operating as a separate entity and selecting another form of transformation.

With a view to lack of internal capital in most cases foreign capital is also sought. However, only Hungarian companies or private persons are entitled to bid for the privatization of small shops or service outlets (it is to be noticed that joint ventures are treated as Hungarian companies).

The MEDICOR group and VIDEOTON have already completed the 1st phase and established several medium-scale companies; Privatization in these groups seems to be going smoothly.

Earnest desire to co-operate and assist by enterprises of western countries

On the way to privatization, many State-owned or private enterprises, once separated, somewhat place their hope in the co-operation they may receive from enterprises of advanced Western countries, especially multinationals. There are several degrees of co-operation: for example, simple sales assistance from western markets, sub-contracted work to make use of Hungarian labour forces, technical assistance such as providing license or products design, production engineering, OEM, and joint ventures at various levels, from partial to 100 per cent share-holding.

Although there seems to be slight differences in the management's way of thinking concerning the company and employees, in comparison with that of western enterprises, most top managers have expressed calm judgement on how to and in what way their organization should be reformed.

The substance of co-operation can be largely classified in four categories:

- Marketing co-operation on the Western market;
- Technology co-operation, i.e. licenses, development, product design, production engineering, supply of components and parts;
- Finance co-operation, especially investment financing;
- Management technology co-operation; introduction to western-style management.

The most desirable form of co-operation is the joint-venture with capital investment through which all existing problems may be solved with a stroke.

The developing countries in South-East Asia have achieved a quite good progress in industrial development by using similar policies. Generally speaking, the organic combination of all four above elements, marketing, technology, finance, and management, is essential to rapid industrial development. These four elements related mutually form a tetragonal pylamid model, the pivotal element of which is management. Figure VIII shows this relationship.

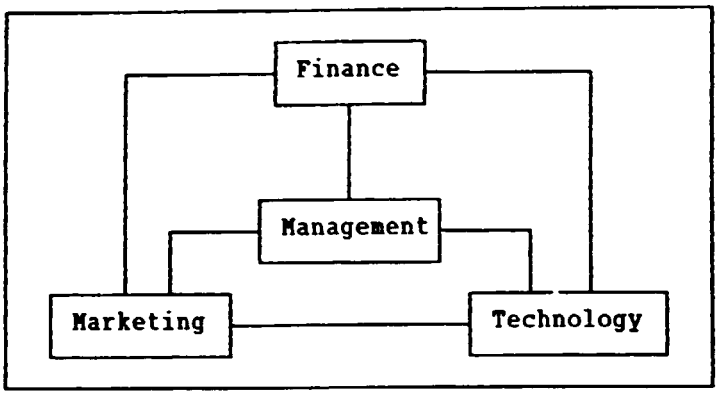


Figure VIII: Tetra of industrial development

Inviting investment of foreign capital, especially from multinational or transnational companies, can rapidly introduce these four elements and smoothly fix them at the same time. Singapore is the country where this policy was applied with a 100 per cent success. Other ASEAN countries such as Malaysia, Thailand, Indonesia have also introduced part of the same idea in their policy.

It can be said that the same approach should be applied to Hungarian industries, i.e., the industrial systems should be incorporated into the world economy through international trade and investment. The only points to be borne in mind in doing so are that, introducing multinational capital will cause trouble with local companies and, consequently, this dual economic situation is liable to become acute, and that the constitution of the national economy is bound to be influenced and react to the fluctuations of the global economy. On the other hand, the Hungarian economy is in any way subjected to the impacts of world economics because of its opened nature.

Existing advantages of Hungarian companies

Most of the companies investigated emphasized several advantages that they would be able to offer to western partners at the time of co-operation:

- Marketing capability and experience in eastern countries (CMEA market),
- Skillful labour forces at low cost,
- High-level engineering powers with experience,
- Production capability (production facilities and know-how).

These advantages have become clearer and more understandable to us as we went along with our visits and talks with management and engineers. Details are given in the following chapter.

Marketing capability and experience in the Eastern countries (CMEA market)

Most companies investigated have a fairly high rate of exports in their turnover, as shown in Table 17.

Table 17: Export rate to turnover

Company	Rate of export to turnover (%)		Rate of domestic to turnover (%)
MEDICOR	83 (93)	››	17
VIDEOTON (AUTOMATIKA)	85 (80)	››	15
VILATI	56 (93)	›	44
ELWLO	58 (98)	›	42

Source: 1989 data ()% to export portion, for CMEA

On the basis of the actual results obtained in the past, the Hungarian managers have emphasized firstly their marketing capability in the eastern countries as an advantage which they could offer to western partners. The eastern market, where some 400 million people are living, is somewhat attractive to western enterprises. But it should be noticed that the contents of the marketing capability referred to is quite different from that of the western market. Although at present the payment difficulties, particularly in the USA are creating obstacles, the personal contacts, language skill, familiarity with GOST standards etc. offer good prospects on the long run.

Different types of market in the socialist countries

There seems to have been three (3) different types of market in the past:

- the domestic market which was controlled intentionally by the government through various subsidies and deductions;
- the CMEA market, in the form of mutual transactions between governments,
- the western market.

These respective markets have quite different characteristics in their sales systems, price systems, delivery conditions, distribution systems, settlement of accounts, etc. and most enterprises studied have not performed marketing activities on all three markets in the past.

The CMEA market systems were basically government-to-government transactions among eastern countries but, as a matter of course, the large part of these transactions was the radiate connexion between USSR and other eastern countries. It is also said that a fairly large portion of these transactions were low-cost energy (oil and natural gas) of USSR against industrial products of other eastern countries, but trading among eastern countries was not so high. The pattern of this system structure is not likely to change quickly in the near future.

This pattern may be quite similar to the one in South East Asia where the developing countries have made quite good progress through business transactions mostly connected radially with the USA and Japan, but the contents of the systems was quite different.

Specific character of the CMEA market

Generally speaking, it can be said that there are three specific disadvantages in the transactions of the CMEA market; they are related to products, sales systems and settlement of accounts.

(i) First of all, most products cannot satisfy the western markets regarding Q (quality), C (cost) and D (delivery) of products. This problem is caused basically by the so-called "product-out concept" of the State enterprises (the reverse concept being "market-in concept"), and the trading systems through state trading corporation weaken or rather counteract the sensitivity of the feedback response concerning the market needs. In order to develop products, an accurate and unin terrupted feedback of the needs of the market is essential, otherwise the speed of development will lag and, consequently, products will always become out of date.

(ii) Investing in the distribution systems is not performed properly by the enterprises' independent will. As the CMEA market was made up

by State distribution systems, management might have not paid enough attention to the distribution systems. Marketing is always a very costly item on the western market.

(iii) One of the peculiar points in the CMEA trading systems was their account settlement by transferring accounts into Rubles which were not exchangeable, even on the domestic market of eastern countries. Another point was the pricing systems where the average prices of the past 5-year on the world market were being kept as a rule in prevailing practice. These transaction rules do not meet with the general conditions of the western market.

It has been revealed that some of the visited companies had realized an unusually high profit recently, seemingly induced under the above conditions (2) and (3).

Marketing capability in the CMEA systems

With the above characteristics, the marketing capability, which was emphasized as an advantage to offer to partners, can only be useful for business transactions within the CMEA systems; it does not have the same meaning on the western market. On the other hand, to obtain rapid economic reformations by introducing market principle and trade liberalization, the CMEA trading systems should be changed. It can be said that promptly demolishing the CMEA systems will hasten privatization of the State enterprises.

Even after termination of the CMEA trading systems, new privatized enterprises will be able to make the most out of the human relations they have long maintained among eastern countries and which they alone can pursue.

Skillful labour forces a low cost

The second advantage that was emphasized is skillful labour forces at low cost. In fact at the time of the visit, VILATI had co-operated with an automobile company in West Germany by subcontracting work, which was only offering surplus labour forces, and VIDEOTON AUDIOTECHNIKAI which operated under fairly high investment and low cost labour forces, had also co-operated with French and

Japanese companies by OEM production. Table 18 shows the average wages of the visited companies, approximately.

Per capita turnover. The scale level is medium compared to advanced western countries and the amount of the Hungarian per capita turnover is surprisingly low, i.e. US$ 15,400 to 31,000. It is about 10-20 per cent the average Japanese SME (small- and medium-scale enterprises). It is assumed that utilizing advanced management techniques and because of a market system environment, efficiency can be highly improved.

Average wages. On the other hand, the average monthly wages in October 1990 are shown in the chart below. The average monthly wages were about US$ 154-279.

Table 18: Average wages in Hungary

Company	Annual turnover 1989 or 1990 (mUS$)	Number of employees	Per head turnover (US$)	Monthly average wages or standard
MEDICOR (MICRO)	16.2	712	22,154	262
SZAMALK	31.5	1,300	24,154	(269)*
VIDEOTON (AUTO)	25.4	850	29,846	185
VILATI	26.2	1,504	17,615	162
Japanese SME (electric & electronics industries- average)			128,000	2,169 US$

* assumption

It becomes about 1.4 times when fringe benefits are included. These figures are approximately 10 per cent of the Japanese SME (US$ 2,170), and the wages per hour are about 50 per cent of those of HongKong or South Korea back in 1984. Accordingly, supposing that the internal processing rate in the factory is 50 per cent of the sales, the required wages to produce a 1 US dollar output

is 34 cents in Hungary (unit manufacturing labour cost), which comes to the same as the 1985 level of HongKong and South Korea.

Skill and quality of labour. We are under the impression that the quality and working attitude of the workers are at a fairly high level, possibly because the living and cultural standards of the Hungarian people are historically so modest that they are essentially industrious. Most companies have maintained a sizeable number of experienced skilled workers in their factory.

In comparison with workers in South East Asia, it seems that systematic training is not up to the level, one of the possible reasons lying in the management concept about the workers' role in the factory.

As economic reformation progresses, wages will raise depending on the improved country-wide economic situation and its results on the companies' business. Company heads, therefore, cannot depend permanently on cheap labour; they gave to find out the optimum combination between investment and labour cost.

As to training, there are two training systems, one "off-the-job", the other "on-the-job", but on-the-job training with objectives is more important. In the case of joint-ventures, a recommendable procedure is as follows:

(i) Select most profitable products for the near future;
(ii) Separate from the existing company. Establish a new joint-venture with a foreign enterprise;
(iii) Invest in the world's most advanced systems and facilities;
(iv) Shift a minimum number of good workers and train them;
(v) Prepare sales systems, train salesmen;
(vi) Establish high-level management aiming at high productivity and high wages, train middle-level managers;
(vii) Shift surplus of workers from former company to new company in a step-by-step operation, after training them, according to the growth of the new company.

High-level engineering powers with experience

Among the enterprises investigated, MEDICOR, SZAMALK, VIDEOTON and VILATI have had a relatively large number of engineers.

Apart from industrial enterprises, we have also visited several technical institutes, information processing centres, a technical university where a large number of highly qualified and long experienced engineers have been maintained. For example, SZTAKI (Industrial Research Centre) has 400-500 researchers.

Engineers with academic orientation

Generally speaking, the level of engineering knowledge of all engineers we have met seems to be fairly high, with an academic orientation. Most qualified engineers have had experience in development, product design or research, but few of them seem to have worked in production engineering. Many are knowledgeable in computer science applied to business systems but not many specialists have experience in industrial systems.

In Budapest Technical University, we have seen CAD CAM experiments conducted by students and simulation on the cell level model of CIM (Computer Integrated Manufacturing) systems: A combination system of automatic warehouse, AGV, NC lathe, machining center, etc. and controlled by PC data communication network: The level of the curriculum may be almost the same as in the Singapore Technical University. The only differences may be that, in Singapore, there are manyu graduates participating in any job of development, design or production engineering on their own will.

Production capabilities (production facilities, technical know-how and production management)

Regarding production capabilities, some common characteristics enumerated among the enterprises visited are listed below:

(i) Obsolete production facilities, insufficient investment, insufficient facilities and assets per capita,

(ii) "Holding one set of production process" principle, too high rate of internal processing,

(iii) Lack of consideration concerning the total system balance of elementary processes,

(iv) Obsolescence of large tool shop,

(v) Lack of consideration concerning MH (material handling),

(vi) Insufficient quality control,

(vii) Poor quality of components and parts,

(viii) Inadequate production efficiency control,

(ix) Poor maintenance of production facilities and infrastructure,

(x) Deficient consideration in process improvement,

(xi) Insufficient safety control for workers,

(xii) Superfluous staff and workers.

Among the factories investigated, the following are at a relatively better level: MEDICOR, VIDEOTON (AUDIO), VILATI.

Obsolete facilities

Some of the companies have recently restarted to invest in new production processes but this is still limited to a few unit processes such as: precision tool grinder, electric discharge machine, wire-cutting machine, NC machine, machining center, turret punch press, painting systems, etc. During our visits, we got a fresh impression in the investment of VILATI which is about US$ 6.5 million investment to improve PCB (4 layers) process line on a World Bank loan.

On the whole, it seems that the management does not give enough consideration to ROI (return of investment) and the life cycle of the products. A remote cause may lie in the poor feed-back response on the market needs.

(a) "Holding one set of production processes" principle

Most companies investigated have had a high ratio of internal processing to output; it is a good thing from the viewpoint of increasing value added but it is impossible to keep high productivity and efficiency through all processes. In the past, such problems would not have come up under cheap labour cost.

There is also a problem of industrial structure in the State; the important thing is to bring up SME (small- and medium-scale industries) into the industrial areas and expect a synergical effect by mutual co-operation.

(b) Poor quality of components and parts

The quality of components and parts, especially electronic components, is at a fairly low level. The concerned governmental offices and respective industrial associations should consider means to procure them from western countries, otherwise they cannot compete on the western market. Under previous regulations, access to convertible currency import was limited. At present, already the import for industrial input is liberalized as well as restrictions on high technology items imposed by the CMEA regulations are either abolished or substantially eased.

In one word, "all factories and workers are in an exhausted condition but there is much hope."

Proposals

As mentioned in the above chapter, there are four (4) important areas for developing industries, and the State policy and foreign assistance should be carried out in close co-operation through these four areas.

This time, we are making a proposal in two (2) areas, i.e. Marketing and Technology.

Marketing

In any country, developing industry begins with marketing; managers should keep in mind that "there should be a business at the beginning". All other functions such as financing, technology and management can have objectives only if there is a business.

It is costly to do marketing but it is necessary to invest a fairly large sum of money in marketing. Considering the present financial situation in Hungary, most companies will not be able to afford to invest money in developing a new market. Therefore, at least for the time being, we would like to

recommend the following threefold strategic approach to the western market and suggest some ideas for the eastern market.

Threefold strategic approach to the western market

(a) Offering excess labour forces to companies in the neighbouring western countries.

(b) Approach trading companies of western countries positively.

This is effective only when the company has strong confidence in the products. Even in that case, the company should re-organize the quality assurance department and after-service network. Quality control should be done strictly in regards to quality level of components (QCD), parts must be more than PPM (a defect part per million) level, especially for electronic products. After-service network is useful to feed back the market needs.

(c) Have a positive approach to multinational and transnational manufacturing companies in advanced western countries.

Positive approach means that one should go out and look (instead of waiting) for eventual partners, lately multinational companies are not necessarily large-scale companies but there are many strong medium-scale companies as well.

The type of co-operation should be joint venture or OEM production although, regretfully so, the appraisal level of products and working quality in the country at present is considerably low. Therefore, original products design and production process will be done under the partners' guidance.

In such case, the largest merit is less marketing costs by using the partners' distribution systems. It is useful also to gain time for reformations.

Strategic approach to the eastern market

(a) The eastern market, especially the USSR market, should be maintained with efforts. The reason is that most of the companies investigated, even now, have had a quite high rate of export in their sales to the

eastern market, under the CMEA transaction systems. It is impossible to convert the fruits of such a large market to other markets within one or two years, and it is also not wise from the viewpoint of human relationships established historically.

But the companies' marketing systems should be changed to the western style, continuing their dependence on the CMEA transaction systems will only delay and check reformation.

The recommendable policy, therefore, is to establish and maintain only one western-style marketing system by which all three markets should be covered. Transaction rules and distribution systems should be planned and executed by their own will and financed even on the eastern market.

The number of orders received will be reduced temporarily but they can establish the real market on a long run.

(b) Establish a joint venture with USSR enterprises which have sound management and technology will get fruitful results in the long-range term.

Technical assistance

Table 19 shows the rough appraisal on the existing situations of enterprises investigated in regards with the following points:

- Present market situation
- Products and their engineering level
- Production engineering and facilities level
- Components and parts level.

The appraisal level A is for the most advanced products and manufacturing process in the western countries.

Table 19: Appraisal on market and technology

Company	Present market situation	Products and products engineering	Production engineering	Level of components and parts
MEDICOR	fairly good	B	C	C - D
VIDEOTON AUTOMATIKA	no good	B - C	C	C - D
VIDEOTON AUDIOTECHNIKAI	good	A - B	B	B - C
VILATI	no good	B - C	C - D	C - D

Appraisal level:

Market	Very good	Engineering	A
	Fairly good		B
	Good		C
	No good		D

One of the noticeable points in the above chart is that the quality level of components and parts which are mixed imported parts from eastern countries and domestically made ones, does not meet the requirements of export products for the western market. It is not exagerated to say that the quality of final products depends mainly on the quality of its components and parts, especially in electronics products.

Regarding products and product engineering, most companies have made efforts to develop new products themselves and at times have also bought license or product designs from western companies, but generally speaking, products made in eastern countries are not only refined but also obsolete. We are under the impression that the causes of this peculiar situation lie in the following two points:

(i) Lack of self propagate power in engineering

The key factor of engineering development is in establishing dynamic propagate power in the company.

Nowadays, engineering is so rapidly progressing and changeable in the world that the products or engineering developed for a business purpose at a certain time, are good only for the time-being and get old gradually with time. Even though we could get many engineering items from all over the world, it is no use if they have become obsolete.

Developing engineering is an endless race against time.

(ii) Lack of high sensitivity on feed-back response from the market. Export-oriented enterprises cannot succeed in their business, unless they have high sensitivity of feed-back response from the market.

Products and product engineering

The most effective policy for the time being is to proceed positively in technical collaboration with foreign enterprises or by buying technical licenses, patents from advanced companies. In this case, management and financing to develop products shall be prepared by their own capability.

As an example, during the period between 1955 and 1965, many Japanese manufacturing enterprises had taken this strategic policy and despatched quite a lot of study missions and delegations to the USA and Europe to acquire new and useful technology. But the financing for investment had been prepared by their own savings and management had been carried out in their own way which became later the so-called "Japanese-style management".

In order to succeed with this policy, companies should have enough information resources.

Production engineering

Although improving products should have top priority in the reformation, there are many other areas in the back of the factory where production engineering and pertinent investment can drastically improve and activate the existing process.

Automation or robotic engineering is one of the tools to improve manufacturing processes but it should be applied carefully once management policy, market trend, existing process, production quantity, engineering level and financial situation etc. have been carefully studied.

Therefore, with regard to production engineering, we would like to offer the following effective proposal. It means a "Production Engineering Centre" to be established by the government. In view of the present conditions, it is only

feasible and promising if financial and technical input can be secured from a very advanced country like Japan. The details are as follows:

PLAN FOR A PRODUCTION TECHNOLOGY CENTRE IN HUNGARY

1. Name. The centre should be given a name that appeals to managers and engineers. For example:

- Production Engineering Centre (PEC)
- Automation Application Centre (AAC)
- Scientific and Production Centre of Robotics and Automation (CRA)
- Automation Leasing and Consultancy Centre (ALC)

2. Objective. The objective of PEC is to promote and help reform and activate national industries by applying advanced production technology and effective investment.

The Centre should carry the following activities:

(a) Practical consultancy for industrial companies, especially small- and medium-scale industries;

(b) Information on production technology. Information library, education, publication, etc.

(c) Co-operation to effectively apply the government incentive financing scheme.

3. Industrial area of consultancy. All types of industrial companies, from process to discrete products industries, from large to small-scale industries.

4. Organization and employees. The number of employees at the beginning should be limited to the minimum required, approximately 20 people may be enough. This should be reviewed every year, according to results.

Management		2	
Administration		2	
Consultants			
Experienced engineers	4		
Younger engineers	10		
		14	
Information centre		2	
Technical advisers		2	(specialists from western countries)
TOTAL		22	

5. Government support

(a) Subsidising personnel expenses (95 per cent), low-cost office rent, free transportation;

(b) Preferable application of incentive financing programme to improve manufacturing industries;

(c) Technical support from institutes/universities, etc.

(d) Positive support by introducing companies to consultancy.

6. Consultancy activities

(a) Consulting phase:

(i) Investigation study

(ii) Feasibility study

(iii) Implementation study

(iv) Result monitoring.

(b) Free consulting for SME,

(c) Formal consulting charges,

Charges to be paid by clients: 10 per cent of total expenses

(Total expenses are estimated on a man-hour accounting basis. This policy is important for two reasons: one is easy marketing and the other is obligation of clients)

(d) Information centre (adjacent to the Centre)

(i) Technical information library. Technical papers, books, catalogues, magazines, VTR tapes, etc.

(ii) Publication. Technical information news, free publication, public relations paper, etc.

7. Other activities

Seminars, training sessions, study tours (overseas, in-land), etc.

8. International co-operation

UNIDO (Industrial Technology Development Office)

Aid from industrially advanced western countries.

B.ii. Automobile industry

In Hungary, all passenger cars have historically been imported, since there is no passenger car production in the country. The Achilles' tendon of the automotive industry is the historical failure to enter the automotive parts production. Therefore, there exist many importing companies of passenger cars. There are 120 repairshops, 60 per cent of which are private, while 40 per cent are state owned.

SPIRAL AUTOJAVITO VALLALAT (Budapest)

Persons visited: CSURI Istvan (igazgato gazdasagi helyettese), TORBA LAJOS (osztalyezeto), Geza HALMI (sales manager)

Visited by : Tamas SOMJEN (Ministry of International Economic Relations), Janos SOMLO (Budapest Technical University), S. MIMURA (UNIDO), N. SATO (JETRO), H. TACHIHORI (specialist).

SPIRAL has 6 divisions, 4 repairshops, 2 spare-part plants and 7 part/accessory shops. The total number of employees is 1,300, of which 60 per cent are repair workers. Sales have amounted to US$ 15 million in 1990. Repair work is done on 300 cars/day at the main plant in Budapest. This company manufactures cylinders (100,000 pieces), hose cramps (50 million pieces), mirrors, pistons, hand brakes, wide drums, etc.

Recommendations

This company has broad technology as it produces several kinds of automotive parts besides the repair work. The main plant is located in downtown Budapest. These two advantages over other companies could lead this company to develop a comprehensive automotive activity programme. Therefore, it is recommended:

- that SPIRAL introduces advanced management system for car sales and repair work;
- that a partner(s) is(are) found for a joint venture in automotive parts.

This would bring SPIRAL to the level of a leading automotive company in Hungary.

HUNGAROSZERVIZ (Budapest)

This company has been a private organization from the beginning when it was established by 17 owners in 1951. It has three plants with 340 employees in Budapest. Sales amount to US$ 9 million in 1990; new car sales, repair work and sales of parts and car accessories. It imports GM/Opel, Hundai, Japanese cars and Bosch parts. It is under contract with 9 repairshops and makes training for their workers at its main plant.

The future plans include:

- Modernization of repairshops,
- Systematic operation for new car sales/repair work/second-hand car sales by applying "one model-one plant" system

Recommendations

The employees as well as managers have the mentality of free-world companies and the firm has a concrete future plan. Therefore, it is recommended that it sends its managers to be trained abroad so that they can develop an international business which will be most important for the company in the future.

CONTREX (Budapest)

Persons visited: Peter SIMON (Managing Director)
Visited by : Tamas SOMJEN (Ministry of International Economic Relations), Janos SOMLO (Budapest Technical University), S. MIMURA (UNIDO), N. SATO (JETRO), H. TACHIMORI (specialist).

CONTREX has 30 repair shops and 9 people for new cars sales. It has been importing Mitsubishi cars for the last two years, and is going to employ 65-70 people in 1991. This company may become a joint venture with Mitsubishi Motor Co. in the near future. The Rent-a-car business has been given up due to poor sales.

Recommendations

As this company has plans for the future, our recommendation is to have their mechanical workers trained, possibly abroad.

MERKUR CAR TRADING CO (Budapest)

Persons visited: Janos OROSZI (Dipl. Okonom Generaldirektor), Gyula SZABO (Deputy Director)

Visited by : Tamas SOMJEN (Ministry of International Economic Relations), Janos SOMLO (Budapest Technical University), S. MIMURA (UNIDO), N. SATO (JETRO), H. TACHIMORI (specialist).

MERKUR was the biggest car dealer under the Ministry of Trade and Industry, having 11,000 employees with 15 showrooms and 11 second-hand car shops in all regions of Hungary. The record sales were 150,000 new cars and 24,000 second-hand cars in 1987. This company has large property and computer control system for car sales and automotive parts (more than 6,000 different kinds). Their problem is how to organize their restructure into private companies in the near future.

Recommendations

Although it is not difficult to finance, this company has to make efforts to establish high-level service technology because it has not been accustomed to repair work. It would be better for them to co-operate with advanced automotive companies.

TUNGSRAM (Kaposvar)

Persons visited: Antal SZABO (Ministerial Councellor), Jozsef TAR (Deputy Director), Victoria SCHMIDT (Sales Manager), Thomas WEISZ (Sales Director), Andras GERBER (Chief Engineer), Antal VILLANYI (Head of Development)

Visited by : Tamas SOMJEN (Ministry of International Economic Relations), Janos SOMLO (Budapest Technical University), S. MIMURA (UNIDO), N. SATO (JETRO), H. TACHIMORI (specialist).

TUNGSRAM, established in 1986, was a traditional bulb manufacturer in Hungary. Now, it is a comprehensive light-source manufacturing company, e.g. it supplies H4 lamps for the Japanese car industry, according to JIT and applies TQM. It is also an electronics firm, producing printed circuit boards, brown tubes, industrial robots, voltage regulators for automobiles, etc. It has 17,000 employees, exporting 80 per cent of the products, of which two-thirds are going to western Europe and the USA. In 1990, General Electric Light Co. has owned 50 per cent of its stocks. Sales amounted to US$ 5 billion in 1990. The development and manufacturing of electronics and automation components constitute a fairly independent activity within the company.

Recommendations

This company has such a high level of technology that it is able to compete with advanced free-world companies. As the Achilles' tendon for the Hungarian automotive industry in Hungary is the production of automotive parts, TUNGSRAM could contribute to the country by introducing sophisticated electronic parts technology for the automotive industry from advanced companies in Europe, the USA and Japan.

B.111 Pharmaceutical Industry

General comments

The history of chemical and pharmaceutical industries in Hungary is highlighted by very high levels of science and technology. However, improvement in these fields has been very slow in the past half century.

Hungary differs from many east European countries in that it undertook its economic reform more than 20 years ago. Since 1968, Hungary has been promoting economic reforms based on free-market principles. Hungarian enterprises are also more independent than those in other east European countries. As a result the country is now considered the most westernized among east European countries in terms of economics.

As to the social situation in Hungary, political conditions and the quality of life have remained stable for a long time through the realistic policy of

"Hungarian socialism". Through this policy, reconstruction after the war was accomplished successfully. Since 1985, however, economic activities have slowed down due to inactive investment resulting from high inflation on a decrease in energy supplies from the USSR. With these circumstances, economic reforms have progressed in the form of elimination of price control on most goods, reduction of subsidies, and others.

Regarding legal reforms, much progress has been made. This includes activation of the "Business Bankruptcy Law", "Company Law", "Foreign Investment Law", and "Income Tax Law", among others. Further, a value-added tax was introduced and a stock market was recently established.

Recommendations to Hungarian pharmaceutical firms

Based on the circumstances mentioned above, how should Hungarian pharmaceutical firms direct their efforts in the future? Recommendations are given below.

3.2.1 Self-help efforts. As the reform process in Hungary has been going on, current reforms are gradual and mild compared with those in Poland. For the reconstruction of their economy, however, assistance from the West is very important. To obtain such assistance, self-help efforts to improve economic conditions and decrease political and economic risks are required. Potential Western partners or investors will avoid risks of severe inflation and debt rescheduling.

Such efforts on the part of Hungarian firms should be:

- Successful reform of potential and economic fields and promotion of privatization programme, including self-relance of enterprises;
- Establishment of external debt policy;
- Rapid establishment of external convertibility of Forints.

Case study of co-operation in pharmaceutical field. Some pharmaceutical firms in Hungary have already substantial experience in co-operating with the West in various fields. Consequently, they also have experienced

inspections and approvals (from international organizations such as FDA in the USA or WHO) to produce their pharmaceuticals. Such experience is a major advantage and will make further co-operation much easier.

Actually some of the firms visited seemed to have a level of technology and facilities competitive with the West.

3.2.3 Computerization. Recommendations regarding computerization are: One fact noted during the visit is that currently computers are widely used in laboratories and pilot plants. Further utilization of computers connected to a network in these areas is practical and recommended.

Recommendations to potential Western partners

Some Hungarian firms already have close contact with Western firms and seem to require no additional assistance. Actually, there are many successful examples of co-operation in this country.

In general, however, in order to reconstruct the Hungarian pharmaceutical industry, more financial and technological assistance is needed. Western countries, including Japan, should offer generous assistance.

In annex to this report, proposals are summarized which were presented by the management of the firms the Mission visited. They should be referred to for a definite study of co-operation with them.

(a) Potential of pharmaceutical industry
As mentioned, the Hungarian pharmaceutical industry has had a high scientific and technological level in the past and this high potential remains despite a recent slow-down.

In addition, high education level is an advantage for the Hungarian pharmaceutical industry. Further, lower expenses for labor and researchers are also advantages.

As mentioned above, Hungary introduced free-market principles very early, as evidenced by the "Joint Venture Law", enacted in 1972. There were 1,800 joint ventures in Hungary by June 1990, and they are increasing rapidly.

(b) Expected areas of assistance

(i) Upgrading productivity

In discussing productivity, several definitions can be considered: (a) production per capita; (b) production per facility; and (c) production per unit of raw material.

During our brief factory visits, it became apparent that at least (i) and (ii) were relatively low and (iii) could not be determined without a review of operational data. Actually, an over abundance of operators were observed in the plants - a result of, and ironically perpetuating low wage levels. Another fact noted was that only a small part of the equipment was in operation while most of it was idle. Major cause for such operations is a poor maintenance level, because of insufficient capital- a weak point of the planned economy.

There is a significant opportunity to improve productivity with financial and technical assistance from the West.

(c) Upgrading product quality.

At the factories visited, it was noted that the product quality was generally good. However, product quality still needs to be improved before products can be exported to Western markets at a comparable price.

Thus, the Hungarian pharmaceutical firms also need financial and technical assistance from the West in quality control areas.

(d) Environmental control technology

Both water and air in the country are seriously polluted like in other east European countries. The situation in Hungary is almost the same as in Poland, except that recently there has been a severe energy shortage. The pollution problem is very pressing, and Japanese pollution control technologies could be successfully applied in Hungary.

(e) Assistance to recently established small enterprises

There are two groups of recently established small enterprises among the eight groups visited. They seem to be exceptionally active and creative for east European companies. They are able to develop innovative drugs and should be given special attention by potential Western partners.

(f) Medical system improvement needs

Statistical reports of the mortality rate show that the death rate in Hungary was 10.1 persons per 1,000 people in the 1960s, increasing to 13.7 in 1988. The increase was especially rapid in males.

The report indicates that the major causes of death are circulatory illness (53%) and tumors (21%).

Further, the report indicates that the causes for high death rates are:

- directly connected with smoking and alcoholism, among others,
- indirectly, to pollution, poor medical facilities and services.

The number of medical doctors was reported at 31.9 per 10,000 people, while this rate is 19.5 in Poland and 15.1 in Japan (1988 data).

Although Hungary has many doctors, the medical treatment system and health education services are inadequate. Assistance in medical treatment system and health education services is slightly out the scope of this project. However, it is emphasized that such assistance is urgently needed.

(g) Education and training

As a result of the socialist system, people in Hungary have not been exposed to the latest Western technology and know-how. They should receive training in many areas such as proper operation of a market economy system, management know-how, quality control know-how and environmental control technology.

The problem of limited knowledge of English is found in some regions of Hungary. Ideally, some international organization or some Western government should establish a system to educate and provide technology, know-how and tra ıing in English, either in Hungary or in a Western country.

If the training center for east European trainees is established in Japan, they could receive not only the technical training itself, but also gain some cultural knowledge about Japan. This would greatly improve mutual understanding between both countries.

ANNEX A

GENERAL FIGURES ON NATIONAL ECONOMY

Table A.1 Joint ventures newly registered in 1990

Foreign currencies	Number of joint ventures	Capital paid in foreign currency, measured in millions of forints
US dollars	593	8 976.7
British pounds	163	893.3
German marks	1 413	5 572.7
Swiss francs	251	839.4
Austrian schillings	893	5 947.9
Japanese yen	1	0.5
Italian lire	169	819.8
South Korean won	80	290.0
Finnish marks	24	240.6
Spanish pesetas	6	25.0
French francs	58	646.3
Dutch guilders	43	744.1
Belgian francs	30	98.3
Canadian dollars	43	143.0
IEP	1	0.5
Soviet roubles	12	62.7
Other	137	29.8
TOTAL	3 917	25 330.8 (2)

1. Only newly-registered joint ventures with foreign partners are included.

2. This sum represents 35.8 per cent of the capital invested in these newly-registered joint ventures in 1990. The cash contribution was 20 439.5 million forints, while the in-kind contribution was 4 891.3 million forints.

Source: Hungarian Central Statistical Office.

Table A.2 Joint ventures registered in 1990 by industrial sectors (millions of forints)

	Number of ventures	Capital	Capital in foreign currencies
Mining	1	700.0	210.0
Electricity	3	5.0	1.2
Iron and steel, non-ferrous metals	13	3 371.2	363.6
Manufacture of machinery and equipment	381	4 837.3	2 414.4
Manufacture of non-metallic mineral products	43	845.2	455.7
Manufacture of chemicals	90	6 354.4	2 581.1
Manufacture of textiles, wood, paper, leather	217	11 223.7	4 048.7
Other manufactured goods	21	386.3	202.5
Manufacture of food and beverages	68	10 156.4	4 968.6
Construction	341	5 263.5	1 695.2
Agriculture	45	978.9	247.5
Transport	95	558.9	212.3
Domestic trade	1 281	13 336.6	3 418.1
Foreign trade	512	4 211.1	1 448.1
Other material goods and services	117	1 304.7	651.7
Business and personal services	352	6 130.0	2 788.0
Health, social and cultural services	209	1 088.6	499.6
Community services	25	54.9	23.1
Total	3 814	70 808.7	25 330.8

Source: Hungarian Central Statistical Office.

Table A.3 Measures to privatise Hungarian enterprises (1985-1991)

Designation of Legislation	Main Provisions	Changes Envisaged
Amendment to Act on State Enterprises 1985	Management and ownership rights transferred to enterprise councils	
Act No. VI of 1988 on Economic Associations (Company Act)	Allowed for creation of limited liability companies, joint stock companies, unlimited partnerships and other forms of business association; provided basic guarantees for private and foreign investors	
Act No. XXIV on 1988 on Foreign Investment as amended in 1989 and 1990	Provided for foreign participation and even 100% ownership of Hungarian enterprises, full repatriation of profits, generous tax allowances	
Act No. XIII of 1989 on the Transformation of Business Organisations and Companies (Transformation Act)	Allowed Hungarian SOEs and co-operatives to transform themselves into limited liability, joint stock companies, etc. if management agrees and if outside investor willing to subscribe to at least 20% of assets	
Act No. VII of 1990 on Foundation of State Property Agency and Act No. VIII of 1990 on Protection of State Assets	Transfer of most property rights attaching to State-owned enterprises to SPA; SPA set up to oversee privatisation process of State's shares, except for housing and land	
Act No. LXXIV of 1990 on the privatisation of assets of State-owned enterprises engaged in retailing, catering and consumer services (Pre-Privatisation Act)	Concerns simplified procedure for sale of small retail businesses to Hungarian residents only	
Bankruptcy Act of 1986 as amended in 1990	Enable creditors to initiate bankruptcy proceedings; amendment designed to facilitate liquidations	New Bill before Parliament to speed up liquidations
Act on the Prohibition of Unfair Marketing Practices of 1990	Framework for controlling anti-competitive practices and mergers; Economic Competition Office has advisory role in privatisation cases involving restructuring	
Land Compensation Act of 1991	Partial compensation to former land-owners up to a maximum 5 million forints per claimant, in form of land, vouchers or annuities	Act declared unconstitutional on 29 May 1991; sent back to Parliament

Table A.4 Population, labour force and employment, 1980-1990

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	(thousands, beginning of period)										
General population characteristics											
Total population(1)	10,709.5	10,705.5	10,694.7	10,671.5	10,640.2	10,598.6	10,559.6	10,509.0	10,463.8	10,421.1	10,375.3
Persons under working age	2,339.0	2,356.0	2,359.0	2,343.2	2,315.1	2,284.6	2,265.5	2,233.7	2,203.0	2,168.1	2,205.2
Working-age population(2)	6,175.0	6,140.2	6,107.1	6,083.2	6,070.5	6,056.0	6,028.4	5,999.4	5,988.1	5,968.7	5,877.3
Retirement-age population	2,195.5	2,209.3	2,228.6	2,245.0	2,254.6	2,258.0	2,265.7	2,275.9	2,272.7	2,284.3	2,292.8
Men	757.8	756.5	766.1	774.8	777.7	773.0	775.2	781.7	776.7	783.6	803.9
Women	1,437.7	1,452.8	1,462.5	1,470.2	1,476.9	1,485.0	1,490.5	1,494.2	1,496.0	1,500.7	1,488.9
Total labour force	6,403.5	6,335.3	6,272.0	6,231.0	6,212.8	6,191.1	6,158.7	6,128.7	6,113.4	6,087.3	5,987.7
Those employed below working age	3.2	3.2	4.7	3.8	4.8	3.8	3.8	3.1	3.7	3.1	3.0
Working age men(3)	3,227.1	3,212.5	3,198.9	3,186.8	3,182.6	3,173.8	3,162.2	3,147.0	3,137.1	3,129.3	3,049.2
Working age women(3)	2,947.9	2,927.7	2,908.2	2,896.4	2,887.9	2,882.2	2,866.2	2,852.4	2,851.0	2,839.4	2,828.1
Employed above working age(4)	225.3	191.9	160.2	144.0	137.5	131.3	126.5	126.2	121.6	115.5	107.4
Men	71.2	55.5	39.8	35.0	32.5	32.7	32.3	35.2	36.2	35.9	43.5
Women	154.1	136.4	120.4	109.0	105.0	98.6	94.2	91.0	85.4	79.6	63.9
Distribution of labour force											
Inactive dependents	723.9	721.8	689.8	685.3	700.2	700.7	747.2	631.6	640.9	623.1	..
Students(5)	367.2	374.2	369.4	380.1	394.4	420.8	426.0	426.3	431.7	450.6	483.0
Other dependents	356.7	347.6	320.4	305.2	305.8	279.9	321.2	205.3	209.2	172.5	..
Inactive working age labour force(6)	602.0	595.0	576.3	571.6	570.2	574.8	516.2	609.6	624.7	638.2	..
Total inactive	1,325.9	1,316.8	1,266.1	1,256.9	1,270.4	1,275.5	1,263.4	1,241.2	1,265.6	1,261.3	1,188.9
Active labour force(7)	5,077.6	5,018.5	5,005.9	4,974.1	4,942.4	4,915.6	4,895.3	4,887.5	4,847.8	4,826.0	4,798.8
Active domestically	5,073.6	5,014.5	5,001.9	4,970.1	4,940.0	4,912.9	4,892.5	4,885.2	4,844.8	4,822.7	4,795.2
Active abroad	4.0	4.0	4.0	4.0	2.4	2.4	2.8	2.3	3.0	3.3	3.6

1. The 1980 and 1990 data are based on the census counts of those years. Estimates for intervening years were obtained by adjusting recorded migration statistics.
2. Men of 15-59 years and women of 15-54 years.
3. Whether or not actually employed.
4. Excluding employed persons receiving old age pensions.
5. Including students with part-time jobs.
6. Handicapped persons and persons in early retirement receiving pensions, whether or not actually employed and women on maternity leave drawing social benefits, whether or not actually employed.
7. Total labour force minus total inactive. This estimate of the "active labour force" differs from the ILO-OECD concept because it excludes persons in receipt of handicapped or old-age pensions and students whether or not they are employed, and because it includes employed persons under the legal working age.

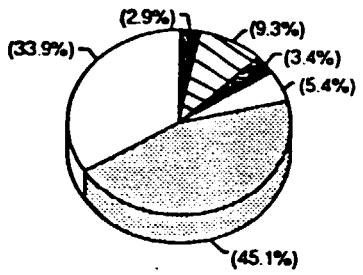
Table A.5 Average monthly wages by branch, 1970-1990 (1)

	1970	1975	1980	1985	1988(2)	1989	Prelim. 1990
			(in forints)				
Industry							
Heavy industry	2229	3006	4220	6409	9901	11571	13166
Mining	3004	4149	5991	8674	14071	15586	18018
Electrical energy	2184	2861	4148	6618	9918	11652	13959
Metallurgy	2230	3184	4513	6839	10619	12980	14666
Engineering	2078	2788	3845	5830	8749	10330	11616
Construction materials	2065	2769	3873	5616	8376	9954	11886
Chemicals	2045	2854	4105	6594	11042	12945	14568
Light industry	1841	2441	3458	5020	7210	8417	9802
Wood processing	1963	2560	3510	4946	7109	8642	9960
Paper	1972	2744	4104	6620	10386	11513	12785
Printing	2023	2807	3862	6036	9437	11623	14327
Textiles	1854	2536	3643	5213	7512	8580	9981
Textile clothing	1697	2210	3137	4459	6194	7314	8530
Leather, fur & shoes	1852	2396	3405	4928	7263	9233	9086
Handicrafts	1673	2147	2902	4151	5723	6729	7531
Food processing	1944	2703	3775	5519	8852	10762	12160
Other industries	1901	2468	3375	4751	7063	8294	91184
Total	2093	2817	3963	5945	9122	10723	12236
Construction	2352	3113	4228	6123	9687	11578	13223
Agriculture & forestry	2128	2543	3581	5094	7669	9039	9688
Transportation & communication	2237	3004	4167	5917	8441	9959	11858
Trade	1987	2532	3439	5199	7648	9339	11642
Water management	-	2890	3996	5918	9059	10625	11876
Other material sectors	-	-	-	5474	8470	10269	11305
Total	-	2776	3862	5655	8583	10163	11647
Non-material sectors	2087	2866	3997	5706	8504	9641	-
Personal & business services	-	2637	3556	5375	8386	10192	-
Health, social & cultural services	-	2591	3737	5395	7246	8477	-
Govt. & other services	-	3360	4647	6319	10728	11420	-
Total	2129	2844	3892	5667	8562	10018	-

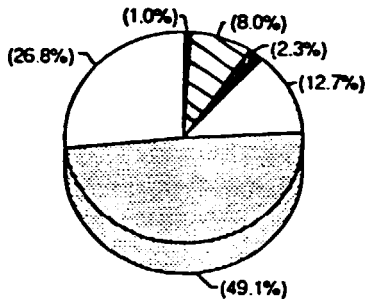
1. Gross wages, i.e. before deduction of social security taxes and income taxes paid by employees.
2. Before 1988 the social security taxes paid by employees was a progressive rate.
In 1988 a flat 10% social security rate was introduced accompanied by a progressive income tax.
This results in a sharp rise in 1988 in gross wages.

Table A.6 General Government subsidies and transfers, 1988-1991

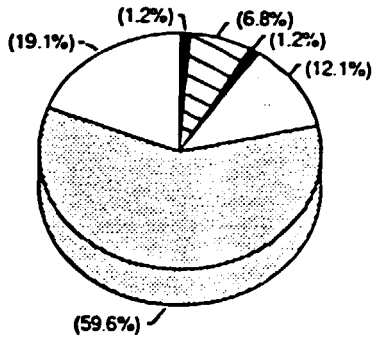
1988 - Total: 478.7 bn forints



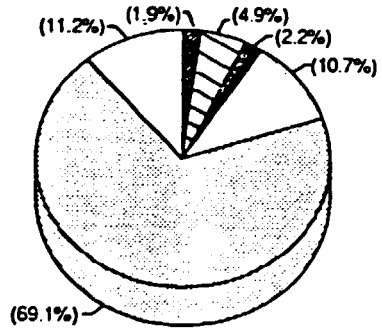
1989 - Total: 548.8 bn forints



1990 - Total: 602.9 bn forints



1991 - Total: 640.5 bn forints (1)

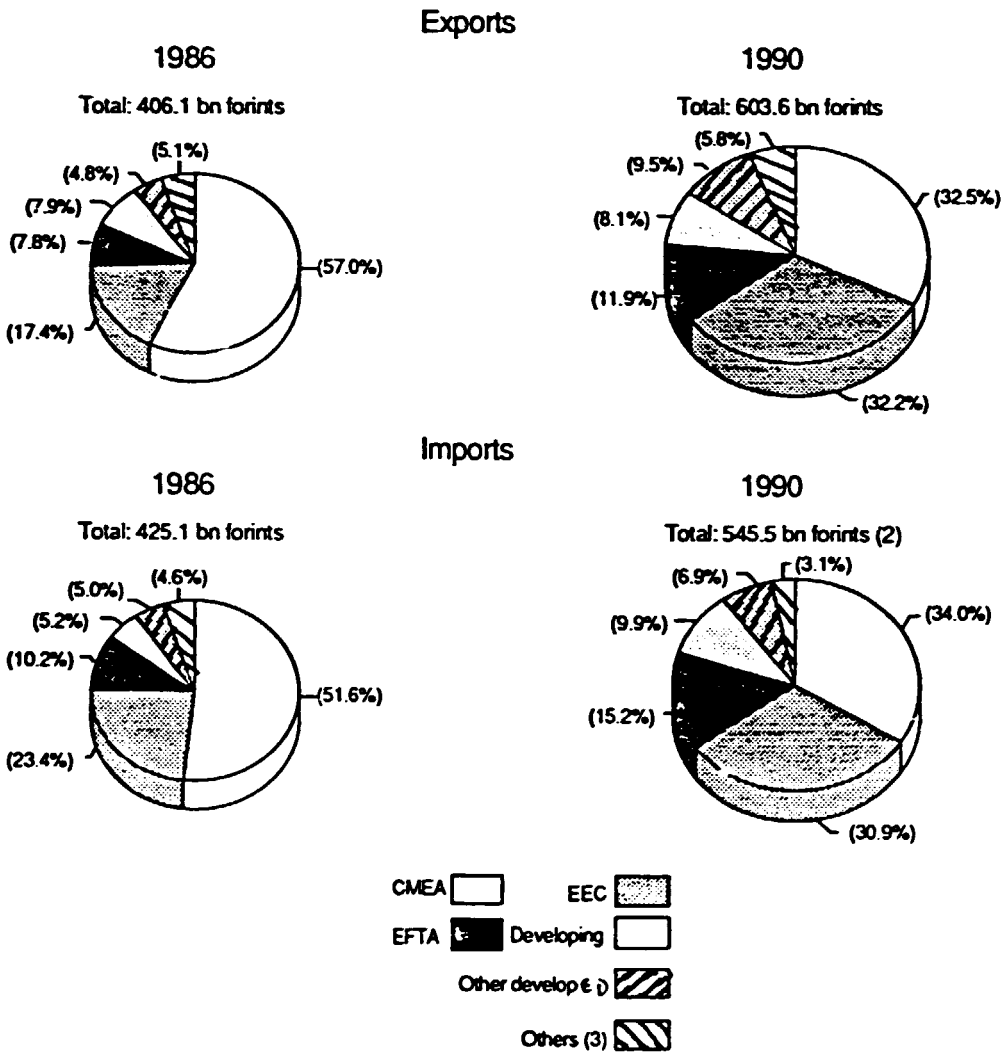


Producer subsidies
Consumer subsidies
Agricultural supports
Housing subsidies
Social security (2)
Other (3)

1. Official government projections
2. Includes pensions and other benefits
3. Includes other central government transfers, local government subsidies, capital transfers from central and local governments, and other central government subsidies

Source: Ministry of Finance (see survey Table III-3).

Table A.7 Regional distribution of Hungarian trade (1)



1. As measured by Hungarian statistics based on trade evaluated at current prices.
2. Due to rounding the total does not equal that given in Table 3.
3. Yugoslavia and the People's Republic of China.

Source: Hungarian Central Statistical Office. Appendix VII,table 6.

Table A.8 Industrial production, 1976-1990 (1)

	Gross production 1989	Employment 1989	Percentage change, constant prices 1976-80	1981-8	1986	1987	1988	1989	1990
	(percentage share)		(average year-on-year percentage change in gross production)						
Heavy industry	69.0	60.5	3.7	2.1	2.3	4.2	0.7	-0.7	-10.2
Mining	5.7	6.9	0.5	-0.1	-0.1	-0.4	-3.7	-5.2	-11.8
Electrical energy	6.2	3.1	5.9	2.9	2.1	4.5	0.1	2.2	0.2
Metallurgy	10.5	5.3	1.5	-0.1	2.8	0.9	4.3	4.4	-19.0
Engineering	24.8	32.6	3.2	3.4	3.7	4.7	0.0	0.2	-13.7
Construction materials	3.1	4.5	4.3	0.0	2.3	6.9	1.6	-1.6	-5.0
Chemicals	18.5	8.1	6.4	2.3	1.4	6.1	1.3	-3.9	-5.4
Oil refining	4.6	0.4	2.2	-0.7	2.7	4.3	-2.6	-5.5	-4.0
Organic & inorganic	2.9	1.1	10.2	2.6	1.1	6.5	3.2	-4.6	-10.5
Fertilizers & pesticides	1.7	1.1	7.8	1.6	-4.9	3.8	-4.8	-15.3	-20.6
Plastics	1.3	1.4	5.6	6.0	4.0	14.4	5.0	6.5	-5.5
Plastic components	1.3	0.6	11.4	2.2	-2.3	4.4	9.8	-2.8	-9.0
Rubber	1.0	0.7	3.7	1.4	4.7	6.4	1.0	8.7	-20.7
Pharmaceuticals	3.0	1.7	8.9	8.4	1.6	4.6	9.5	-5.0	3.1
Light industry	12.4	22.4	2.1	1.1	1.1	2.9	0.2	-4.8	-10.0
Wood processing	1.9	3.0	3.3	0.6	4.0	7.4	2.0	3.9	-2.0
Paper	1.5	1.0	4.2	2.8	9.7	6.2	4.2	-4.2	-4.7
Printing	1.3	1.4	6.3	4.5	6.0	6.8	3.0	3.7	-11.5
Textiles	4.2	6.5	1.9	0.6	-0.9	2.7	1.2	-4.5	-10.2
Textile clothing	1.4	4.4	2.5	-0.6	-8.1	-0.2	1.7	-11.5	-11.3
Leather & fur & shoes	1.8	3.7	-2.0	1.9	6.2	-0.2	-8.5	-12.6	-16.4
Handicrafts	0.5	2.2	4.8	-1.4	-10.4	-3.0	1.7	-10.2	-25.9
Food processing	17.8	15.0	3.3	2.0	1.3	3.2	-2.5	1.0	-0.9
Meat	3.6	2.7	1.6	1.9	-0.6	-0.2	-7.1	-5.4	-3.3
Poultry & eggs	1.5	1.2	3.6	4.5	4.7	5.8	8.9	2.1	-1.5
Milk	2.4	1.5	7.4	2.1	2.0	6.7	-1.0	-1.4	-6.3
Canned goods	1.9	2.2	1.2	-0.5	4.8	4.9	-0.2	2.9	-2.7
Flour	2.2	1.6	2.8	1.3	-0.1	5.2	-2.2	5.2	3.8
Beer	0.6	0.7	4.9	3.0	7.4	2.8	5.5	11.4	5.6
Other industries	0.8	2.1	4.5	1.2	-2.9	1.2	-4.3	12.0	-22.4
Total (2)	100.0	100.0	3.3	1.9	1.9	3.8	0.0	1.0	-8.5

1. From 1989 onwards, industrial production figures include data from firms which have 50 or more employees.

2. If the industrial production of enterprises with less than 50 employees is taken into account, then 1990 industrial production declined by 5.0 percent.

Source: Hungarian Central Statistical Office

Table A.9 Number of economic organisations by legal status

	1985	1986	1987	1988	1989	1990 6 months	1990 12 months	1991 3 months
State-owned Enterprises and Trusts	1 910	1 940	1 955	1 986	2 001	2 007	2 008	2 005
Subsidiaries	254	345	397	391	398	401	359	354
Unincorporated Joint Ventures	251	276	302	309	327	293	237	228
Associations	57	61	69	78	105	186	201	203
Joint Stock Corporations	.	.	.	.	.	.	.	.
Limited Liability Corporations	62	74	137	451	4 485	12 159	18 317	22 695
Cooperatives								
Agriculture (1)	1 350	1 340	1 337	1 333	1 333	1 341	1 348	1 356
Other Cooperatives	2 735	2 719	2 658	2 439	2 510	2 564	2 629	2 650
Small Cooperatives	762	1 278	2 154	3 108	3 233	3 224	3 155	3 153
Societies	435	455	498	534	470	491	n.a.	n.a.
TOTAL	7 816	8 488	9 577	10 745	15 169	23 191	29 470	33 914

1. Agricultural cooperatives, agricultural trusts, fishing trusts, and specialised agricultural cooperatives.

Source: Central Statistical Office, Statisztikai Havi Közlemenyek (various issues).

Table A.10 First privatization programme

Name of state-owned enterprise	Total assets (1) (mn forints)	Main activity	Recommended method of privatisation	Status
1. IBUSZ	2,144.3	Tourism, financial services, foreign currency	Public sale of 37 per cent of shares	Advisors selected
2. Richter Gedeon RT	17,481.4	Production of pharmaceuticals, pesticides, cosmetics and other chemicals	Strategic foreign partner	Advisors selected
3. HUNGEXPO	1,654	Organisation of exhibitions and trade fairs	Strategic foreign partner	Advisors selected
4. Salgglas	1,724.3	Plate glass manufacturing and processing	n/a	Advisors selected
5. Gamma Muvek	1,753.7	Manufacture of medical, geophysical, communication and computer instruments	n/a	Advisors selected
6. Kunep	515	Housing and social construction	Strategic foreign partner	Advisors selected
7. Holloházi Porcelángyár	484.1	Porcelain manufacture	Strategic foreign partner	Advisors selected
8. HUNGARHOTELS	10,935.6	Hotels and catering	public sale	Advisors selected
9. Danubius Szállodavállalat	6,640	Hotel and spa	Public sale and strategic foreign partner	Advisors selected
10. Pannónia Szállodavallalat	6,201	Hotel and catering	Public sale and strategic foreign partner	Advisors selected
11. MÉH Trószt	3,769	Scrap collection and conversion	n/a	Advisors selected
12. TRITEX RT	694.3	Clothing wholesaler	Strategic foreign partner	Advisors selected
13. KNER Nyomda	1,566.1	Printing	Strategic foreign partner	
14. PIETRA	973.5	Manufacture of bricks and other building materials	Strategic foreign partner	Advisors selected Advisors selected
15. INTERGLOB	1,062	Transport	Strategic foreign partner	Advisors selected
16. Volán-TEFU	2,404.9	Transport	Strategic foreign partner	Advisors selected
17. Erdögép	146.4	Forest machinery producer	Employee share ownership	Advisors selected
18. IDEX	4,400	Foreign trade in industrial products	Public sale and strategic foreign partner	Advisors selected
19. Pannonplast	4,122.3	Production of industrial and household artificial materials	Strategic foreign partner	Advisors selected
20. Centrum Áruházak	5,218.9	Department store	Public sale of at least 40 per cent of shares and strategic foreign partner	Advisors selected

Source: Background Information to First Privatisation Programme, State Property Agency, Budapest, September 1990 and Newsletter Hungary, Vol. 3 no.1, January 1991, pp.6 and 7.

Table A.11 Export and import flows to major trade partners (1980-1990)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	(billions of forints, current prices)										
	Exports										
Total	264.7	286.1	301.4	338.7	379.0	410.3	406.2	432.5	492.3	571.3	603.6
Ruble transactions, with:	120.5	131.3	140.9	159.8	176.7	201.3	213.5	211.4	204.9	215.9	158.9
CMEA countries	120.3	131.0	140.8	159.4	176.3	200.7	213.2	210.6	203.7	214.9	158.1
Soviet Union	66.1	76.8	83.4	96.4	107.1	122.8	130.0	132.2	123.8	129.4	106.4
East Germany	18.0	18.6	19.0	20.6	22.5	24.6	25.7	24.4	25.0	29.1	15.4
Poland	9.7	8.6	9.9	12.1	11.8	13.1	15.2	14.9	14.2	14.2	5.7
Czechoslovakia	14.7	15.4	16.0	16.7	20.2	22.8	23.8	22.1	24.0	26.9	23.0
Bulgaria	2.9	3.3	4.5	5.3	4.8	5.4	6.1	5.6	4.8	3.3	1.3
Romania	5.7	5.4	4.6	4.7	5.5	6.9	8.1	7.9	8.4	8.0	3.5
Yugoslavia	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
People's Republic of China	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-ruble transactions, with:	144.2	154.9	160.5	178.9	202.3	209.0	192.6	221.1	287.4	355.4	444.7
CMEA countries	22.8	29.2	30.5	27.8	29.0	27.1	18.4	17.8	24.3	25.6	37.9
Soviet Union	15.9	21.0	24.2	21.1	17.2	19.5	12.1	13.5	14.5	15.3	18.2
East Germany	1.1	2.2	0.9	1.3	2.0	1.2	1.2	0.8	1.5	1.8	3.4
Poland	1.2	1.5	2.2	2.7	5.9	3.1	2.5	0.5	2.4	3.9	4.3
Czechoslovakia	2.1	2.5	1.7	1.0	1.1	1.2	0.9	0.5	2.9	2.1	2.0
Bulgaria	1.1	1.1	0.7	1.3	1.2	0.7	0.5	1.0	1.5	0.9	0.5
Romania	1.1	0.6	0.5	0.2	0.5	0.3	0.3	0.1	0.2	0.3	7.2
Developed capitalist count.	85.4	81.7	78.7	93.6	112.8	118.2	121.9	151.9	197.7	251.2	323.8
EEC	52.1	50.2	49.0	54.2	60.9	64.8	70.7	87.4	111.5	142.4	194.2
Fed. Rep. Germany	26.1	25.6	22.6	25.6	28.1	32.0	34.2	43.1	54.0	67.8	101.6
France	4.7	4.6	4.7	5.1	5.9	5.6	6.4	8.4	9.8	13.7	16.3
Italy	12.1	9.5	11.0	12.1	13.3	12.3	13.0	15.9	21.0	26.7	35.4
Great Britain	2.9	2.9	2.8	3.3	4.4	5.0	4.9	6.1	8.8	10.3	12.2
EFTA	18.4	22.7	19.5	24.9	32.7	27.6	31.6	36.1	48.4	60.8	72.1
Austria	11.2	12.2	11.0	15.2	19.3	21.9	19.2	21.7	28.1	37.1	45.3
Finland	1.9	1.8	1.8	1.8	1.9	2.0	2.1	2.9	4.5	5.8	6.0
Non-EEC, non-EFTA	14.9	8.8	10.2	14.4	19.2	25.9	19.6	28.4	37.7	48.0	57.4
United States	3.6	4.4	4.6	7.3	10.9	9.6	9.7	13.4	14.8	19.1	21.3
Japan	0.4	0.6	0.7	1.0	1.7	1.4	2.2	3.3	5.0	6.6	7.0
Developing countries	26.5	33.2	39.8	43.5	44.2	43.2	31.9	35.3	42.4	48.1	49.0
Yugoslavia	7.8	9.7	10.3	12.1	13.2	14.8	12.5	11.0	13.8	23.6	28.6
People's Republic of China	1.7	1.1	1.2	2.0	3.2	5.6	7.9	5.0	9.1	7.0	5.2

Table A.11 Export and import flows to major trade partners (1980-1990) (continued)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
					(billions of forints, current prices)						
					Imports						
Total	284.5	301.3	300.2	327.2	353.6	394.7	425.1	444.0	460.9	523.5	544.9
Ruble transactions, with:	135.0	141.6	154.7	172.1	180.7	190.6	210.9	207.8	199.7	200.8	159.3
CMEA countries	134.5	141.2	154.3	170.6	179.3	108.7	209.3	205.5	196.7	198.5	158.6
Soviet Union	79.9	85.5	92.6	102.5	108.6	113.2	125.8	121.1	112.3	113.5	87.2
East Germany	19.1	19.6	21.5	23.7	24.3	26.0	28.8	29.1	29.0	31.1	30.7
Poland	9.8	9.5	11.7	13.6	14.6	16.0	17.4	16.2	17.1	15.6	9.5
Czechoslovakia	14.9	14.7	16.6	17.9	18.9	19.4	21.6	23.5	22.5	24.2	23.0
Bulgaria	3.7	4.0	4.5	5.5	5.4	5.9	5.8	5.6	6.2	4.2	2.9
Romania	5.8	5.6	6.0	6.2	6.1	6.6	8.0	7.9	7.7	7.8	4.2
Yugoslavia	0.0	0.0	0.0	1.0	1.1	1.3	1.0	0.2	0.0	0.4	0.0
People's Republic of China	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-ruble transactions, with:	149.5	159.7	145.5	155.1	172.8	204.1	214.2	236.2	261.3	322.7	385.6
CMEA countries	5.5	5.8	3.0	4.5	5.3	13.2	10.1	10.6	8.4	8.9	26.6
Soviet Union	2.0	2.9	1.0	0.5	0.8	8.3	4.7	5.9	3.8	2.0	16.7
East Germany	1.4	0.7	0.3	0.4	0.3	0.4	0.4	0.3	0.6	1.5	1.6
Poland	1.0	1.0	0.9	2.3	2.7	3.0	3.3	2.1	2.2	1.6	3.5
Czechoslovakia	0.5	0.5	0.4	0.6	0.5	0.9	1.1	1.3	1.2	2.8	2.4
Bulgaria	0.2	0.2	0.1	0.2	0.2	0.0	0.2	0.3	0.2	0.3	1.6
Romania	0.5	0.5	0.3	0.4	0.8	0.5	0.4	0.7	0.5	0.7	0.7
Developed capitalist count.	115.4	123.0	115.5	120.3	132.5	155.4	164.2	184.0	200.9	259.0	289.5
EEC	65.8	72.0	67.9	69.6	76.1	86.2	99.5	110.2	117.8	151.4	168.6
Fed.Rep.Germany	34.8	36.8	35.7	36.8	41.5	46.5	54.1	61.5	63.8	83.6	94.5
France	6.6	7.9	7.2	6.6	6.7	7.5	8.1	8.8	9.4	11.5	11.2
Italy	9.2	9.4	8.8	8.3	9.4	11.2	11.9	12.4	14.6	17.7	22.1
Great Britain	6.2	7.1	6.2	7.1	7.0	7.8	7.8	7.6	8.5	11.5	11.5
EFTA	34.8	35.0	30.4	22.6	33.9	41.7	43.5	49.4	56.8	72.2	83.1
Austria	15.7	17.6	15.8	16.6	19.7	26.2	26.9	29.2	33.6	45.0	54.2
Finland	3.2	2.4	3.0	2.0	2.6	2.4	2.4	2.8	3.8	4.0	3.6
Non-EEC, non-EFTA	14.7	16.0	17.2	28.1	22.5	27.5	21.1	24.5	26.3	35.4	37.7
United States	7.4	7.1	6.3	9.2	9.3	11.5	8.2	10.7	9.5	13.1	14.4
Japan	4.4	4.5	3.9	4.2	4.2	6.8	6.3	5.5	6.5	8.2	11.4
Developing countries	19.2	20.1	16.0	16.7	18.7	19.1	22.0	22.8	30.4	31.3	54.0
Yugoslavia	7.5	9.1	9.8	12.3	14.1	13.2	10.6	9.4	13.6	17.8	12.3
People's Republic of China	2.0	1.7	1.1	1.3	2.2	3.2	7.3	9.2	7.8	5.5	3.1

Table A.12 Hungarian trade by major trading partners
(billions of forints and shares of total trade (1))

	1980		1986		1989		1990	
	value	%	value	%	value	%	value	%
Exports								
Soviet Union	82.0	31.0	142.1	35.0	144.7	25.3	124.6	20.6
GDR (2)	19.1	7.2	26.9	6.6	30.9	5.4	18.8	3.1
CSFR	16.8	6.3	24.7	6.1	29.0	5.1	25.0	4.1
Poland	10.9	4.1	17.7	4.4	18.1	3.1	10.0	1.6
Romania	6.3	2.4	8.4	2.1	8.3	1.4	10.7	1.8
Bulgaria	4.0	1.5	6.6	1.6	4.2	0.7	1.8	0.3
FRG (2)	26.1	9.9	34.2	8.4	67.8	11.9	101.6	16.8
Austria	11.2	4.2	19.2	4.7	37.1	6.5	45.3	7.5
Italy	12.1	4.6	13.0	3.2	26.7	4.7	35.4	5.9
Yugoslavia	7.9	3.0	12.5	3.1	23.6	4.1	28.6	4.7
USA	3.6	1.3	9.7	2.4	19.1	3.3	21.3	3.5
France	4.7	1.8	6.4	1.6	13.7	2.4	16.3	2.7
Great Britain	2.9	1.1	4.9	1.2	10.3	1.8	12.2	2.0
Japan	0.4	0.1	2.2	0.5	6.6	1.2	7.0	1.2
% of total		78.5		80.9		76.9		75.8

	1980		1986		1989		1990	
	value	%	value	%	value	%	value	%
Imports								
Soviet Union	81.9	28.8	130.5	30.8	115.5	22.1	103.9	19.1
GDR (2)	20.5	7.2	28.8	6.7	32.6	6.2	32.3	5.9
CSFR	15.4	5.4	22.7	5.1	27.0	5.2	25.4	4.7
Poland	10.8	3.8	20.7	4.8	17.2	3.3	13.0	2.4
Romania	6.3	2.2	8.4	2.0	8.5	1.6	4.9	0.9
Bulgaria	3.9	1.4	6.0	1.4	4.5	0.9	4.5	0.8
FRG (2)	34.8	12.2	54.1	11.8	83.6	16.0	94.5	17.3
Austria	15.7	5.5	26.9	6.3	45.0	8.6	54.2	9.9
Italy	9.2	3.2	11.9	2.8	17.7	3.4	22.1	4.1
Yugoslavia	7.5	2.6	11.6	2.7	18.2	3.5	12.3	2.2
USA	7.4	2.6	8.2	1.9	13.1	2.5	14.4	2.6
France	6.6	2.3	8.1	1.9	11.5	2.2	11.2	2.0
Great Britain	6.2	2.2	7.8	1.8	11.5	2.2	11.5	2.1
Japan	4.4	1.5	6.3	1.5	8.2	1.6	11.4	2.1
% of total		78.9		82.7		79.3		76.1

1. As measured by Hungarian statistics based on trade evaluated at current prices.
2. From 2 October 1990, there is a great deal of confusion about how trade to Germany was apportioned between the western and eastern part of Germany.

Table A.13 Hungarian exports by major commodity categories (billion of forints and shares of total)

	1980		1986		1989		1990	
	value	%	value	%	value	%	value	%
Total exports								
Energy, elect.	4.8	1.8	7.8	1.9	13.5	2.4	15.3	2.5
Raw materials	79.0	29.8	122.6	30.2	207.5	36.3	227.9	37.8
Machinery	73.3	27.7	126.3	31.1	137.1	24.0	121.4	20.1
Ind. consumer	45.4	17.2	67.2	16.5	89.5	15.7	99.7	16.5
Food	62.2	23.5	82.3	20.3	123.7	21.6	139.3	23.1
Total	264.7	100.0	406.2	100.0	571.3	100.0	603.6	100.0
Rouble exports								
Energy, elect.	0.6	0.2	1.2	0.3	0.9	0.1	0.5	0.1
Raw materials	26.7	10.1	47.7	11.7	50.4	8.8	33.1	5.5
Machinery	55.6	21.0	98.4	24.2	100.0	17.5	69.7	11.5
Ind. consumer	20.9	7.9	35.7	8.8	36.5	6.4	30.4	5.0
Food	16.8	6.3	30.5	7.5	28.1	4.9	25.2	4.2
Sub-total	120.5	45.5	213.5	52.6	215.9	37.8	158.9	26.3
Non-rouble exports								
Energy, elect.	4.2	1.6	6.6	1.6	12.6	2.2	14.8	2.5
Raw materials	52.3	19.7	74.9	18.4	157.1	27.5	194.8	32.3
Machinery	17.7	6.7	27.9	6.9	37.1	6.5	51.7	8.5
Ind. consumer	24.5	9.3	31.5	7.8	53.0	9.3	69.3	11.5
Food	45.5	17.2	51.8	12.8	95.6	16.7	114.1	18.9
Sub-total	144.2	54.5	192.6	47.4	355.4	62.2	444.7	73.7

Note: The above Hungarian trade nomenclature is based on the following:

- -- Energy, elect. includes: crude petroleum, petroleum products, solid fuels, combustible gases and electricy energy.
- -- Raw materials include: raw materials and semi-finished products for the textile industry, metallic and nonmetallic products, chemical products, fertilisers, building materials, crude skin, and pharmaceutical raw materials.
- -- Machinery includes: machine tools, industrial equipment, laboratory equipment, and agricultural equipment.
- -- Industrial consumer goods include: clothing, footwear, furniture, package medecine, household and cultural goods.
- -- Food includes: foodstuffs and materials for the food processing industry.

Source: Hungarian Central Statistical Office.
Due to rounding, figures may not add up.

Table A.14 Hungarian imports by major commodity categories
(billions of forints and shares of total)

	1980		1986		1989		1990	
	value	%	value	%	value	%	value	%
Total imports								
Energy, elect.	37.7	13.3	78.1	18.4	57.6	11.0	75.3	13.8
Raw materials	140.0	49.2	192.4	45.3	264.8	50.6	252.1	46.3
Machinery	57.8	20.3	74.1	17.4	95.1	18.1	97.4	17.9
Ind. consumer	25.6	9.0	50.1	11.8	68.6	13.1	78.8	14.4
Food	23.3	8.2	30.4	7.1	37.5	7.2	41.4	7.6
Total	284.5	100.0	425.1	100.0	523.5	100.0	544.9	100.0
Rouble imports								
Energy, elect.	34.3	12.1	68.3	16.1	55.2	10.6	42.2	7.7
Raw materials	46.0	16.2	69.4	16.4	70.9	13.6	56.3	10.3
Machinery	37.0	13.0	43.3	10.2	38.9	7.4	27.4	5.0
Ind. consumer	14.2	5.0	23.9	5.6	30.9	5.9	28.3	5.2
Food	3.4	1.2	6.0	1.4	4.9	0.9	5.2	1.0
Sub-total	135.0	47.5	210.9	49.6	200.8	38.4	159.3	29.2
Non-rouble imports								
Energy, elect.	3.4	1.2	9.8	2.3	2.4	0.5	33.1	6.1
Raw materials	94.0	33.0	123.0	28.9	193.8	37.0	195.7	35.9
Machinery	20.9	7.3	30.7	7.2	56.2	10.7	70.1	12.9
Ind. consumer	11.4	4.0	26.2	6.2	37.6	7.2	50.5	9.3
Food	19.9	7.0	24.4	5.7	32.6	6.2	36.2	6.6
Sub-total	149.5	52.5	214.2	50.4	322.7	61.6	385.6	70.8

Source: Hungarian Central Statistical Office. See note in Table 8.
Due to rounding, figures may not add up.

ANNEX B

PHARMACEUTICAL INDUSTRY

ANNEX B-1

LIST OF PHARMACEUTICAL MANUFACTURING COMPANIES
IN HUNGARY IN 1989

1. ALKALOIDA[1/] Chemical Company
2. BIOGAL Pharmaceutical Works
3. CHINOIN Pharmaceutical and Chemical Works Ltd.
4. EGIS Pharmaceuticals
5. Chemical Works of Gedeon RICHTER Ltd.
6. Human Institute for Serobacteriological Production and Research
7. PHYLAXIA Veterinary Biologicals Company
8. REANAL Factory of Laboratory Chemicals
9. BIOCHIN Biotechnological Subsidiary
10. EGAL Chemical Industrial Joint Venture
11. LATI Joint Venture
12. PHARMAVIT Pharmaceutical and Food Industrial Share Company
13. B&Z Joint Venture
14. MONOPHARM Ltd.
15. TRIGON Biotechnological Subsidiary
16. BIO-SER Veterinary Products Manufacturing Ltd.
17. CHEMIE-PAL Chemical Manufacturing and Trade Ltd.
18. APIPHARMA Pharmaceutical-Medical Ltd.
19. ARHUMEX Pharmaceutical Chemical Manufacturing Ltd.

1/ The generally used abbreviated name is printed in capital letters.

Table B.2 Gross output of the pharmaceutical industry in Hungary in 1989

No.	Company	Production MFt	Share in totals (%) I.	II.	III.
1.	ALKALOIDA	4,772	9.2	9.2	9.7
2.	BIOGAL	7,182	13.9	13.9	14.6
3.	CHINOIN	10,191	19.7	19.8	20.7
4.	EGIS	8,514	16.4	16.5	17.3
5.	RICHTER	15,415	29.7	29.9	31.3
6.	HUMAN	2,156	4.2	4.2	4.4
7.	PHYLAXIA	1,026	2.0	2.0	2.1
Sub-total, 1-7		49,256	95.1	95.5	100.0
8.	REANAL	1,336	2.6	2.6	
9.	BIOCHIN	546	1.0	1.0	
10.	EGAL	196	0.4	0.4	
11.	LATI	105	0.2	0.2	
12.	PHARMAVIT	133	0.2	0.3	
Sub-total, 1-12		51,572	99.5	100.0	
Sub-total, 13-19		246	0.5		
T O T A L		51,818	100.0		

Table B.3 Share of the production of the pharmaceutical industry in the Hungarian chemical industry and manufacturing industries (billion FT and per cent)

Item	Manufacturing industries	Chem ind.	Pharma ind.	Pharma share in Chem. ind.	Pharma share in Mfg. ind.
	Ft	Ft		%	
Gross output	1,717.5	322.3	51.6	16.0	3.0
Value added[1/]	446.0	83.2	20.0	24.0	4.5
Net sales	1,625.2	312.2	50.3	16.1	3.1
Total exports	450.6	97.2	29.8	30.7	6.6
Rubel exports	174.8	24.9	14.8	61.9	8.5
Non-rubel exports	275.8	73.3	15.0	20.5	5.4
Fixed assets, gross value	1,284.3	204.3	38.3	18.7	3.0
Own assets	1,065.5	155.5	29.9	19.2	2.8
Investment	786.7	129.4	23.2	17.9	2.9
Profit before tax	299.3	65.6	15.9	24.3	5.3
Net profit	104.7	30.4	3.4	11.3	3.3
No.of empl.& workers 10^3	1,356.4	110.2	23.1	11.4	1.7

1/ Figures exclude food industries.

Table B.4 Ranking of pharmaceutical firms among Hungarian manufacturing industrial companies in 1989

Firm:	RICHTER	CHINOIN	EGIS	BIOGAL	ALKALOIDA
Net sales	10	16	21	22	54
Domestic sales	56	40	64	29	93
Total exports	4	9	10	15	24
Rubel exports	4	6	7	21	22
Non-rubel exports	6	9	13	17	34
Own assets	12	19	21	35	40
Fixed assets, gross value	10	18	23	24	45
Gross profit	7	13	58	10	43
Profit-share in net sales	32	41	74	17	39
No. of employees	20	34	36	57	72

Table B.5 Gross output and net sales of the pharmaceutical industry in Hungary between 1980 and 1989
(current MFt. and per cent)

Item	1980		1985		1989		Change index			Annual ave. change		
	Value	%	Value	%	Value	%	80/85 %	89/85 %	89/80 %	80-85 %	85-89 %	00-89 %
Gross output	18,330		33,406		49,256		183.9	148.4	273.0	13.0	10.4	11.8
Net sales:	18,638	100.0	34,899	100.0	51,987	100.0	187.3	149.0	278.9	13.3	10.5	12.0
domestic	8,172	43.8	14,215	40.7	20,744	39.9	173.9	145.9	253.8	11.7	9.9	10.9
rubel exports	6,370	34.2	12,561	36.0	14,643	28.2	197.2	116.6	229.9	14.5	3.9	9.7
non-rubel exp.	4,096	22.0	8,123	23.3	16,600	31.9	198.3	204.4	405.3	14.7	19.5	16.8
Total exports	10,466	56.2	20,684	59.3	31,243	60.1	197.6	151.1	298.5	14.6	10.9	12.9

Table B.6 Gross output and net sales of Hungarian pharmaceutical firms in 1989 (current MFT and per cent)

Firm	Gross output		Net sales		Domestic sales			Rubel exports			Non-rubel exports		
	Value	I	Value	I	Value	I	II	Value	I	II	Value	I	II
Alkaloida	4,772	9.7	4,673	9.0	2,257	10.9	43.3	876	6.0	18.7	1,540	9.3	33.0
Biogal	7,182	14.6	8,360	16.0	4,988	24.0	59.6	923	6.3	11.0	2,458	14.8	29.4
Chinoin	10,191	20.7	10,908	21.0	4,154	20.0	38.1	2,990	20.4	27.4	3,764	22.7	34.5
EGIS	8,514	17.3	8,919	17.1	3,224	15.0	34.9	2,819	19.3	31.6	2,986	18.0	33.5
Richter	15,415	31.3	15,576	30.0	3,249	15.7	20.9	6,917	47.2	44.4	5,410	32.6	34.7
Human	2,156	4.4	2,252	4.3	1,981	9.6	36.7	50	0.3	2.2	221	1.3	9.8
Phylaxia	1,026	2.1	1,290	2.5	1,001	4.8	88.0	68	0.5	5.3	221	1.3	17.1
TOTAL	49,256	100.0	51,987	100.0	20,744	100.0	77.6	14,643	100.0	28.2	16,660	100.0	31.9

I ..... Share in seven companies total %

II ..... Share in the companies own net sales %

Table B.7 Sales structure by markets
of the seven large Hungarian pharmaceutical companies between 1981 and 1989
(current MFt and per cent)

Item	1981 Value	1981 %	1985 Value	1985 %	1989 Value	1989 %	Per cent change 85/81	Per cent change 89/84	Index 89/81	Annual ave. per cent 81-85	Annual ave. per cent 85-89	Annual ave. per cent 81-89
Domestic sales	9,010	41.5	14,214	40.7	20,744	39.9	157.8	145.9	230.2	12.1	9.9	11.0
Rubel exports	7,876	36.2	12,561	36.0	14,643	28.2	159.5	116.6	185.9	12.4	3.9	8.1
Non-rubel exports	4,846	22.3	8,123	23.3	16,600	31.9	167.6	204.4	342.6	13.6	19.5	16.7
TOTAL SALES	21,732	100.0	34,899	100.0	51.987	100.0	160.6	149.0	239.2	12.7	10.5	11.5

Table B.8 Sales structure by product range
of the seven large pharmarceutical companies between 1981 and 1989
(current MFt and per cent)

	1981		1985		1989		Distrib. by markets		
	Value	%	Value	%	Value	%	1981	1985	1989
Pharmaceuticals	16,798	77.3	27,474	78.7	39,910	76.8	100.0	100.0	100.0
- domestic	5,862		10,353		15,360		34.9	37.7	38.5
- rubel exports	6,828		10,306		13,050		40.6	37.5	32.7
- non-rubel exports	4,108		6,815		11,500		24.5	24.8	28.8
Pesticides	3,086	14.2	4,545	13.0	4,910	9.4	100.0	100.0	100.0
- domestic	1,300		1,154		1,873		42.1	25.4	38.2
- rubel exports	1,048		2,255		1,204		34.0	49.6	24.5
- non-rubel exports	738		1,136		1,833		23.9	25.0	37.3
Others	1,848	8.5	2,880	8.3	7.167	13.8	100.0	100.0	100.0
- domestic	1,848		2,708		3,511		100.0	94.0	49.0
- rubel exports					389			6.0	5.4
- non-rubel exports			172		1,971				45.6
of which licence know-how					1,296	2.5			18.1
TOTAL SALES	21,732	100.90	34,899	100.0	51,987	100.0			

Table B.9 Sales structure by markets, by product range of the seven large pharmaceutical companies between 1981 and 1989 (current MFt and per cent)

	1981		1985		1989	
	Value	%	Value	%	Value	%
Domestic sales	9,010	100.0	14,215	100.0	20.744	100.0
- pharmaceuticals	2,862	65.1	10,353	72.8	15,360	74.1
- pesticides	1,300	14.4	1,154	8.1	1,873	9.0
- others	1,848	20.5	2,708	19.1	3,511	16.9
Rubel exports	7,876	100.0	12,561	100.0	14,643	100.0
- pharmaceuticals	6,828	86.7	10,306	82.0	13,050	89.1
- pesticides	1,048	13.3	2,255	18.0	1,204	8.2
- others					389	2.7
Non-rubel exports	4,846	100.0	8,123	100.0	16,600	100.0
- pharmaceuticals	4,108	84.8	6,815	83.9	11,500	69.3
- pesticides	738	15.2	1,136	14.0	1,833	11.0
- others			172	2.1	3,267	19.7
of which licence fees					1,296	7.8

Table B.10 R&D staff statistics in member companies of the Hungarian Pharmaceutical Manufacturers' Association in 1989

Member company	Total no. employees and workers	R & D staff: University graduate	R & D staff: Total	Total R&D staff %
Alkaloida	2,051	42	148	4.8
Biogal	2,747	103	235	7.5
Chinoin	4,260	222	562	18.0
EGIS	4,141	112	289	9.3
Richter	6,182	292	743	23.9
Reanal	630	23	27	0.9
Inst.f.Drug Research	789	262	789	25.3
Res.Inst.f.Medicinal Plants	140	32	140	4.5
R&D Co.f.Organic Chem.Ind.	181	61	181	5.8
TOTAL	21,595	1,156	3,114	100.0

Table B.11

R & D expenditures 1975-1989 in the pharmaceutical industry world wide

(current million USD)

Year	USA	UK	France	F.R.G.	Italy	Switzerland	Sweden	Holland	Belgium	Japan	Hungary ×
1975	1052	142	185	370	75	131	34	50	25	426	12,0
1980	1869	358	482	952	172	218	53	91	49	798	23,3
1985	4136	760	...	1600	391	281		124		2000	47,3
1986	4600	771	720	...	518					2693	48,3
1987	5500	795		2040	678			135		3032	51,0
1988	6500	...	975	...	715						49,3
1989	7300	...	1140	...	...						55,8

× 1 USD = 50 Ft up to 1985, 1 USD = 60 Ft from 1986 on wards

Table B.12 Fixed assets of the Hungarian pharmaceutical industry (on 31 December 1989)

No.	Company	Fixed assets, MFt		Net value per	Percent shares %			
		gross value	net value	gross value %	I		II	
1	Alkaloida	2880	1760	61,1	8,0		7,3	
2	Biogal	5457	4251	77,9	15,1		17,7	
3	Chinoin	7818	5191	66,4	21,6		21,6	
4	EGIS	6362	4046	63,6	17,6		16,9	
5	Richter	11940	7689	64,4	33,0		32,1	
6	Human	966	653	67,6	2,7		2,7	
7	Phylaxia	731	389	53,2	2,0		1,6	
Subtotal companies 1-7		36154	23979	66,3	94,3	100,0	93,7	100,0
8	Reanal	424	610	69,5				
9	Biochin	549	114	20,8				
10	EGAL	449	327	72,9				
11	LATI	182	148	81,2				
12	Pharmavit	195	195	99,9				
Subtotal companies 1-12		37953	25373	66,9				
Subtotal companies 13-19		383	226	59,0				
Total		38336	25599	66,8	100,0		100,0	

I. Percent shares in gross value

II. Percent shares in net value

ANNEX B.13

PHARMACEUTICAL COMPANIES VISITED

1. BIOCHIN Biotechnological Company

(1) BIOCHIN has a plan to modernize their fermentation process and facilities to lower production costs.

The management of BIOCHIN expressed their desire for foreign partners to help to realize their plan.

For this purpose, a subsidiary will be established to accept foreign partners who can contribute financial aid and technical assistance.

They are particularly interested in learning modernization techniques.

For reference, they provided a project study entitled "Process Control of Fermentation" which is shown on the following page.

(2) The next theme they are facing is the technology to protect the workers and the environment during the production of highly cyto-toxic anti-cancer antibiotics with which they are undertaking laboratory scale developmental work.

They are anticipating the cooperation of foreign partners to solve this problem.

A more detailed explanation was submitted and is shown below.

P R O C E S S C O N T R O L O F
F E R M E N T A T I O N

(Short introduction to a project study)

Process control in fermentation by means of microprocessors/ computers is a general practice. Biochin has already made very important steps in this field: the pilot plant is fully computer controlled and one of the producing fermenters (20 m^3) is equipped with a process control system.
Having experience in application of microprocessors/ computers for process control in fermentation we intend to expand it to all the producing fermenters (about 10 fermenters, about 400 m^3 of working volume).

Parameters to be regulatad

- temperature
- back pressure
- air - flow
- agitation (r.p.m.)
- dissolved oxygen
- pH
- foaming

Parameters to be registrated

- characteristic of energy supply (steam, cooling water, compressed air)
- dissolved and/or exhaust carbon dioxide
- etc.

BIOCHIN is currently undertaking laboratory scale developmenttal work in connection with the production of an anti-cancer antibiotic. The compound is highly cyto-toxic, consequently appropriate steps are necessary to protect the workers during the production process. In addition to these steps the protection of the environment must also be observed. A conceptual design of a contained small scale production facility should be first prepared, based on the process design which has been developed by BIOCHIN's staff.
The production steps are as follows:

1. Fermentation: 1 or 2 m^3 working volume fermenters will be used

2. Filtration: Vacuum drum filtration or filtration in a ceramic filter are considered

3. Chromatographic steps
   The product will be purified by column chromatography in 2 steps. Between or after the chromatographic steps the collected fractions will be pH adjusted and/or concentrated by reverse osmosis.

4. The final step is liophylization

2. BIOREX Research and Development Co.

The management of the firm expressed their proposal to Japanese partners for supporting BIOREX's projects in three ways:

(1) Apparatuses to measure and process biological signals.

BIOREX has developed a prototype system to carry out the measurement and processing of biological signals, or biological parameters obtained from test animals. They request financial support to carry out further development of the system for large-scale production.

(2) Instalment of an analytical laboratory with high class analytical devices

BIOREX has a plan to set up a central analytical laboratory to provide analytical services to small enterprises. This laboratory would rely on Japanese quality management know-how and Japanese analytical apparatuses.

(3) Financing of contractual R & D made on behalf of BIOREX by academic or foreign institutions.

BIOREX expects the Japanese party might finance the contractual R & D done on behalf of BIOREX. As an example of their recently developed product, "EPASELL-a biologically active preparation of exclusively natural constituents" was introduced.

A full explanation of their proposal appears below.

Proposal to Japanese partners for supporting Biorex' projects

1. Apparatuses to measure and process biological signals.

Back-ground

Biorex' pharmacological laboratory has developed a system to carry out the measurement and processing of biological signals. This system is a prototype providing for scaling up developmental activities.

Its short description and evaluation

The biological signals passing in 12 channels paralelly get into the central unit where they are converted to digital signals. The digital signals are processed further using a software which can be improved to an unlimited extent. The output signals are derived in a GLP conform manner.
There is no similar system available comprising all these features at the same time.
Nevertheless, its several member units are in need of further developmental activity to get a technically more integrated system which provides for a large scale production.
To carry them out, financial support is required.

2. Installment of an analytical laboratory with high class analytical devices

Back-ground

Quite a number of small, private chemical and pharmaceutical companies are expected to come into life during the forthcoming years with a view to changes taking place in Hungary. These companies will not afford keeping wholly owned, state-of-art analytical laboratories which is a standard for international acception.

Proposal and evaluation

Biorex deems both professionaly and economically viable to set up a well equipped central analytical laboratory. This laboratory would render analytical services for the small, recently established enterprises.

Premises could be provided by the Institute of Experimental Medicine as a tenancy with the whole infrastructure of the entire Institute in the back-ground.

This would be an analytical laboratory relying on Japanese quality management know-how, and Japanese analytical apparatuses.

This laboratory could be a reference place to the Japanese party for further extensions.

3. Financing of contractual R and D made on behalf of Biorex by academical or foreign institutions.

Back-ground

Biorex has a number of projects part of which are paramedicinal preparations of natural origin , while there are 2 original developments among the projects, too.

During 1991, at least 9 of the former category will be launched in Hungary. The originalities are expected to be medicines somewhat later.

Proposal

The Japanese party might finance the contractual R and D made on behalf Biorex to an agreable extent as well as the costs of international partnership acquisiton.

3. Medipharma/Biopharm

Medipharma and Biopharm have several newly developed products:

"Celladam-biological response modifier",
"Onion-Cyclodextrin Complex", "Water-soluble Primycin",
"Macrocyclic ligand for radioactive isotope removal" and
"Aminoreg-stimulant of the regeneration of living tissues".

Some of these are produced by Hungarian pharmaceutical manufacturers on a contract basis and sold on the market, and others are in the development stage.

The management of each firm has suggested cooperation with Western enterprises in the fields of R & D and marketing of these products.

4. Institute for Drug Research

The Institute for Drug Research (IDR) was founded in 1950 as the research and development center for the Hungarian pharmaceutical industry.

The activity of the institute now covers the full innovation line of the pharmaceutical research and development, starting with the preparation of new chemical entities up to clinical trials for new drugs originated from IDR and also from other companies on an entrusted contract basis.

IDR recently has extended its activity to the foreign business sphere, entering into direct contacts with various foreign companies.

The management of IDR expressed that they are ready to further extend their contacts with foreign companies in any field of the pharmaceutical innovation line. This includes sponsoring research projects by foreign companies, licensing selected new drug candidates, service work in various fields on a contract basis etc.

The features IDC presented are shown below.

INSTITUTE FOR DRUG RESEARCH

BUDAPEST - HUNGARY

The Institute for Drug Research (IDR) was founded in 1950 as the research and development center for the Hungarian pharmaceutical industry. Since then it has developeo to the largest institute of its kind in Central Europe, exclusively devoted to the research and development of pharmaceutical products.

IDR presently has about 700 employees, including 250 graduated researchers; over 100 of them have higher university or academic degrees (Dr.univ.,Ph.D.,D.Sc. etc.). The number of patent applications filed annually is 15-20; scientific papers published in Hungarian and foreign journals or presented on domestic and international conferences amount to over 150 a year.

The activity of the Institute covers the full innovation line of the pharmaceutical research and development. It includes

- preparation of new chemical entities (NCE's) by synthetic or microbiological (including genetic engineering) methods,
- analytical investigation and
- biological (pharmacological, biochemical, chemoterapeutical) evaluation of NCE's;
- technological development of,
- formulation of, and
- preclinical safety studies (pharmacokinetics and metabolism - including radiolabelling -, toxicology, reproductive toxicology, genotoxicology) on selected new drug candidates;
- filing IND's;
- protocol design and monitoring of Phase I-II clinical trials and human bioavailability studies

GMP requirements have been adopted in technological development and preclinical safety studies are carried out in full conformity with GLP requirements.
The research activity of the Institute is mainly centered at CNS-affecting and cardiovascular agents as well as chemotherapeutics. During the years 10 original drugs - based on the research and development work of IDR - have been put on the market in Hungary and abroad by different Hungarian companies. Presently 15 novel compounds originated from IDR are in different stages of preclinical or clinical development under the sponsorship of Hungarian or foreign companies. Besides, several original research projects in CNS, cardiovascular, immunological and gastrointestinal fields are in progress - including one for r-DNA hirudin production.

Beside maintaining good co-operation with the Hungarian pharmaceutical industry, IDR recently has extended its activity to foreign business sphere, entering into direct contacts with different foreign companies.
The form of co-operation include

- original research projects, sponsored by American and Japanese companies,
- licensing selected new drug candidates as well as
- service work in various fields of technological and preclinical development on a contract basis.

Several toxicology studies - including a two-year carcinogenicity study - have already been accepted by Western European and Japanese regulatory authorities. American regulatory requirements can also be met.
IDR is ready to further extend its contacts at any field of the pharmaceutical innovation line - utilizing its 40 year experience in drug research and development.

INSTITUTE FOR DRUG RESEARCH
Budapest,
Szabadságharcosok útja 47–49
Mailing address:
Budapest, P. O. Box 82
H–1325 Hungary
Phone: 36-1-690-011
Telex: 22-4219, Fax: 1-693-229

5. Chinoin Pharmaceutical and Chemical Works Co., Ltd.

Chinoin is the second biggest pharmaceutical enterprise in Hungary and has interaction with western pharmaceutical enterprises such as Ciba-Geigy, Hoechst, Takeda.

Management of Chinoin expressed a plan to sell "CHEMIFLEX Direct" in Western markets. CHEMIFLEX Direct is a flexible process control system for autoclaves developed by Chinoin.

According to a Chinoin brochure, CHEMIFLEX Direct makes full use of the latest developments in microelectronics. It also meets reliability requirements, due to its remarkable multi-stage protection system consisting of software protection, hardware protection, high level production of electronic devices and strict quality control.

6. Chemical Works of Gedeon Richter Ltd.

Gedeon Richter is the biggest pharmaceutical enterprise in Hungary and has a wide field of activities encompassing human drugs, veterinary rugs, cosmetics and agricultural chemicals.

The endeavours of the management are to increase production by expanding export markets. To support this strategy, a major part of Richter's products has been exported in the past years.

For the past three years, the breakdown of Richter's sales is as follows: 30 to 35 per cent to CMEA countries (80 to 85 per cent of which is to USSR); more than 30 per cent to western countries and 30 to 32 per cent to the domestic market.

Richter has long-term research and development agreements with the Belgian Firm Janssen and American Home Products and also has license agreements with seven Japanese firms and co-research agreements with two Japanese firms.

Richter is now in the process of a privatization programme which started with evaluation work in November 1990.

Richter's management indicated that possible fields of cooperation with western firms would be R & D, manufacturing, marketing and finance. As an example of equipment which Richter has developed, the U extractor, or universal type vibrating extractor, was introduced.

This extractor can be successfully used for the extraction of contents from medical plants.

7. The Institute HUMAN for Serobacteriological Production and Research

Activities of the Institute Human cover the following four fields:

(1) Vaccines

The Institute manufactures various kinds of vaccines, 80 per cent of which are licensed from the Canadian firm, Confirmer, and has already been approved by the US Regulations of WHO.

(2) Diagnostics

Products of this field include Enzyme Labeled Immuno-assay Analyst (ELISA) for clinical laboratories, Resistance Checker for antibiotics such as penicillin, cephalospollin and Pregnancy tester, among others.

(3) Biochemical Department

Products of this field are blood derivatives such as Human Albumin and Immuno Globulin. The Institute has had difficulty obtaining very fresh blood which it needed to manufacture products of good quality and is studying a new gathering and handling system of blood.

(4) Conventional pharmaceuticals

The Institute has production lines for eye-drop dosages, injections and infusions.

The Institute Human now has license agreements with 18 pharmaceutical firms, including Confirmer, Novo and Aji-no-moto.

It is actively executing new construction and reconstruction works for production plants.

8. Biogal Pharmaceutical Co. Ltd.

The main activity of Biogal has been the fermentation production of various antibiotics since its foundation in 1952.

Its products include human drugs, veterinary drugs, feed additives, nutriments and cosmetics.

Investment projects are active and a new formulation plant began production in July 1990.

Management of the firm proposed the following ideas for possible cooperation:

(1) Improvement of Total Quality Assurance System (TQAS)

Biogal has developed TQAS which covers R & D, production and marketing.

Management of Biogal considers, however, that improvement of the system is needed to meet the requirements of Western market.

They are seeking for a partner to give the technical advice and financial assistance.

(2) Development of Information System

Biogal is operating information systems for business (OA), manufacturing (FA) and R & D (LA), however interaction between these systems is insufficient.

The management of Biogal considers that further developments, mainly for the interface of each unit should be promoted. Therefore, they expect assistance for survey and improvement works to existing systems.

(3) Cooperation about research

(i) New pharmacological research
Biogal is planning to enter the EC integrated market by 1992 and requests an improvement of the existing toxicological research system to help materialize this plan.

For this purpose, Biogal is seeking assistance from Western partners.

(ii) Development of Pilot Fermenter System
BIOGAL and an engineering firm have jointly developed a computerized fermenter control system named "BIOCARD 300" for 300-litre volume fermenter units.

Biogal is looking for assistance to further improve this system.

(4) Computerized production system

Biogal is seeking assistance to modernize down-stream processes, utilizing computers to target improvements in man-power efficiency and product quality.

ANNEX C

ELECTRICAL AND ELECTRONICS INDUSTRY

COMPANIES VISITED

1	Name of Co.	MEDICOR, MIKROMED LTD. LIABILITY CO.
2	Ownership	MEDICOR group, Private, J.V.(USSR)
3	Establishment	1987
4	Capital	Registered 473,844,000 HUF. Owner equity 547,558,000 HUF. MEDICOR Holding Co. 50% VNIMP(USSR R&D Institute) 50%
5	Employees	712 (Workers 406, Engineers 120)
6	Turnover	1989 995,463,000 HUF. 80% Export
7	Products	Electrocardiograph(ECG) 350mHUF 30% Neurophysiological Ins't. 350mHUF 30% (EEG 280mHUF. Others 70mHUF.) Electromograph(EMG) 60-80mHUF 5% Data processing systems,etc. 35%
8	Request from the company	1 Following the recent market change, they want to reduce production cost by new investment, automation, reviewing of assembly line and test process, for which Japanese assistance is expected. 2 They want direct business transaction with Japanese electronics parts makers.
9	Recommendation	

1 Generally speaking, the company is one of the best companies visited, a successful joint venture with USSR by which they maintain engineering and the USSR market.

2 For competing with western manufacturers' products, apply thorough CCC(Competitive Cost Comparison) method and VE(Value engineering) for cost reduction and improvement of quality.

3 Overall reviewing production process and production systems by new investment.

4 Despatch study mission to western countries, including Japan, for collecting information regarding electronics component and parts. Japanese international trading companies are also useful for procurement of parts.

1	Name of Co.	SZAMALK
2	Ownership	State, Under going Privatization
3	Establishment	1982
4	Capital	NA, Difficult to answer at present
5	Employees	1300 (1990-10)
6	Turnover	2 Billion HUF. 1989
7	Products	Computer application business and related services. (System design, Software, Hardware, Application, After service and Training.)
8	Request from the company	1 Welcome any form of collaboration with western enterprises, especially with foreign capital. 2 Partial or 100% Joint venture.
9	Recommendation	

1	Name of Co.	MTA SzTAKI
2	Ownership	Computer and Automation Institute, Hungarian Academy of Sciences.
3	Establishment	1976 (CAD department)
4	Capital	
5	Employees	400-500 researchers in MTA SzTAKI
6	Subjects of research	Mechanical engineering and Automation division. Robotics, Process control, CAD, CAM, CIM, etc.
7	Demonstration	1 Surface modeler for interporating free form curve networks with topology, by FFS-G (Press formation of automobile sheet plate) 2 Application of GLOUBUS. 3 Jig assembly by FF-Solid.
8	Impression	

1 The department has fairly high level of software development capability regarding industrial automation. It is excellent thing that they have hewed their way by their own efforts without much help from outside country, since 1976 when 3D free-form geometric modeling research had been started under the guidance of Dr.Josef Hatvany, Steven Coons and Malcolm Sabinand.

2 One of the regrettable things is that they did not have much practical systems to be applied their softwares in the domestic market. It is closely related to the development of industries and volume of investment in the country. As a matter of fact, there are few companies applied high level CAD, Robotics, NC controller etc. to their production process, therefore it seems that these excellent results of research could not get fruitful results and synergy effects among the domestic industries.

3 There is a big possibility to cooperate with western manufacturing companies on software business, but it might be limited to a certain level by several restrictions on business.

1	Name of Co.	VIDEOTON AUTOMATIKA (VAJE)
2	Ownership	Private, previously State
3	Establishment	1988
4	Capital	Capital investment 1,507 mHUF. Share VIDEOTON ELECTRONICS (VEV) 61.5% SIMERA AG 38.5%
5	Employees	850 (Workers 400, Eng'rs 130, Adm. 130)
6	Turnover	1,6 Billion HUF. 1989
7	Products	Line printer 3200 sets (1989) (Hammer bank type 2000 sets) Equipment for automation (NC, CNC, Robot controller 200 sets)
8	Request from the company	1 Cooperation with western mfg. company Technical assistance, Marketing assistance, Joint venture 2 Purchasing license of newly developed line printer, such as laser printer, or inject printer, at least 2000 l/m. 3 Knowledge of western style marketing
9	Recommendation	

1 Overall reviewing of,
Products, Quality control, Production management, Individual production process.
The quality level of existing products will not be able to meet with requirements in western market.
Application of CCC (Competitive Cost Comparison) and VE (Value engineering) will be useful for improvement.

2 Apart from line printer, more diversification of products is essential, otherwise they can not cope with global economic fluctuation in the western market in future, even if they could develop western market.

3 For getting more latest marketing as well as technical information, despatch overseas study mission to western countries, especially to Japan.

1	Name of Co.	VIDEOTON AUDIOTECHNIKAI Kft.
2	Ownership	Private, previously State
3	Establishment	1988
4	Capital	NA
5	Employees	1600 (Workers 1000, Eng'rs 80, Adm. 160)
6 7	Turnovers & Products	NA, Quantity only Speaker (Various type) 1,080,000 sets Speaker box 40,000 sets TV 350,000 sets
8	Request from the company	1 Marketing Speaker-More business contracts with western enterprises TV-OEM contract other than Thomson Co.
9	Recommendation	

1 Generally speaking, the company is one of the best companies visited, this time, with good management and facilities, Production engineering level is within an inch of that in the advanced western enterprises.

2 From the viewpoint of profit management, though the profit is not so high, the present operation will be not bad. But the important strategy for future is how to develop their own products.

Therefore, we would like to suggest that it will be better to find out their own way in manufacturing electronics components, with continuing OEM assembly business for the time being.

3 As a manufacturer of electronics home appliances, more investment for sales publicity and demonstration is required.

4 More strict consideration to procurement of component and parts.

5 Reviewing labour cost 20-25% (Which might be our miss understanding) of total cost.

1	Name of Co.	VILATI AUTOMATIKA VALLALAT
2	Ownership	State
3	Establishment	1960
4	Capital	Assets 1000 mHUF.
5	Employees	1504 (1989) Workers 777 (Skilled 141) Development & Construction 320 (Higher graduate 215) (Development 130)
6	Turnover	1989 1620 mHUF. 1990 1650 mHUF. (Export 44%)
7	Products	Process control systems and equipment CNC, Robot and other controller DC, AC, drive systems Traffic control systems and equipment PCB (up to 4 layers), Cubicle
8	Request from the company	1 Any form of cooperation, especially Joint venture (partial or 100%) with western enterprises. Separation of individual division for establishing a new Joint venture company is also acceptable. 2 Assistance for marketing in western countries.
9	Recommendation	

1 Generally speaking, the company is one of the best companies visited this time, we have received an impression that R&D, and Design department in Budapest have fairly high level of engineering capabilities and good facilities, but, on the other hand, the production department (main factory is EGER) is rather back behind in improvement of production systems and investment.

There is a good possibility that some western multi-national companies, including Japanese enterprises, show interest in Joint venture for producing electronics products in the eastern country.

2 Some suggestions.

Finding out good partner of OEM production, for this purpose, send study mission to western countries, including Japan, and get more information. Joint venture sometimes starts from OEM relationship.

Development of western style marketing systems in eastern market by their own efforts.

Better to develop more domestic market

3 Overall reviewing production systems.

ANNEX D

AUTOMOBILE INDUSTRY - COMPANIES VISITED

Brief Introduction on

CONTREX Trading Co. Ltd.

ADDRESS	(1) H-1016 BUDAPEST, Meszaros utca 56/a, Hungary (2) H-1021 BUDAPEST, Alkotas u. 20-24, Hungary		
TEL. TELEFAX	155-0284 175-3575 155-0402 156-7401	Telex: 22-3067 22-3295	Fax: 156-7886 156-3485
FOUNDATION & HISTORY	1986 - CONTREX Affiliated Co. for International Trade and 1991 - CONTREX Trading Co. ltd		
SALES AMOUNT			
MARKET	Budapest - Hungary		
MAJOR PRODUCTS	<u>New car sales</u> Mitsubishi cars	<u>Repair work</u> Mitsubishi cars Guarantee and sales repair	
PLANT(S)	two plants		
NUMBER OF EMPLOYEES	40 (1990), approx. 60-75 (1991)		
REMARKS			

Brief Introduction on

MERKUR UNTERNEHMEN FÜR PKW-VERTRIEB

ADDRESS	H-1063 BUDAPEST, VI, SZIV, u. 60.- Hungary		
TEL. TELEFAX	Telephone: 132-6356, 2721	Telex: 224-539	Fax: 112-9691
FOUNDATION & HISTORY			
SALES AMOUNT			
MARKET	All regions in Hungary		
MAJOR PRODUCTS	New car sales	Second-hand car sales	Repair work
PLANT(S)	15 show-rooms	11 second-hand car shops	
NUMBER OF EMPLOYEES	1,100 + 1,000		
REMARKS	The biggest car trading company		

Brief Introduction

of

HUNGAROSZERVIZ

ADDRESS	1372.Budapest,XIV.Mexikói út 15-19. Hungary		
TEL.TELEFAX	Tel:1833-9o2, 2518-555, 1636-o87 Fax:1633-245, 1636-o87		
FUNDATION AND HISTORY	Established in o1.Juli.1952 by 17 private owners and continued the private ownerships		
SALES AMOUNT	USD 9 million (199o)		
MARKET	Budapest, Kecskemét, Szentes, Pápa, Debrecen		
MAJOR PRODUCTS	New car sales	Car repair work	Parts and accessaries sales
	GM/Opel	GM/Opel	Bosch
	Hyundai	Hyundai	Hyundai
	Japanese cars	Suzuki/Maruti	Opel
		Toyota	Ford
		Ford	Riedex
PLANT(S)	Three plants for repair work in Budapest		
EMPLOYEES	32o		
REMARKS	It has contracted with nine repairshops in other region in Hungary		

Brief Introduction

of

SPIRAL AUTO VÁLLALAT

ADDRESS	1134 Budapest, Szabolcs u. 32-34. Hungary		
TEL.TELEFAX	Tel: 140-1973	Telex: 22-4480	Telefax: 120-1851
FUNDATION & HISTORY			
SALES AMOUNT	15 million USD (1990)		
MARKET	All region in Hungary, Germany, Franch, Italy		
MAJOR PRODUCTS	- cars repair work - cars dealers activity - small trucks,	Car spare parts: - exhaust silencer systems - pistons - hose cramps - cilinders - parcking brakelock - wire drums (Made and trade activity)	Spare parts retails and whole sales.
PLANT(S)	Four repair network	Two spare parts plants (factory)	Eight shops
EMPLOYEES	1100		
REMARKS			