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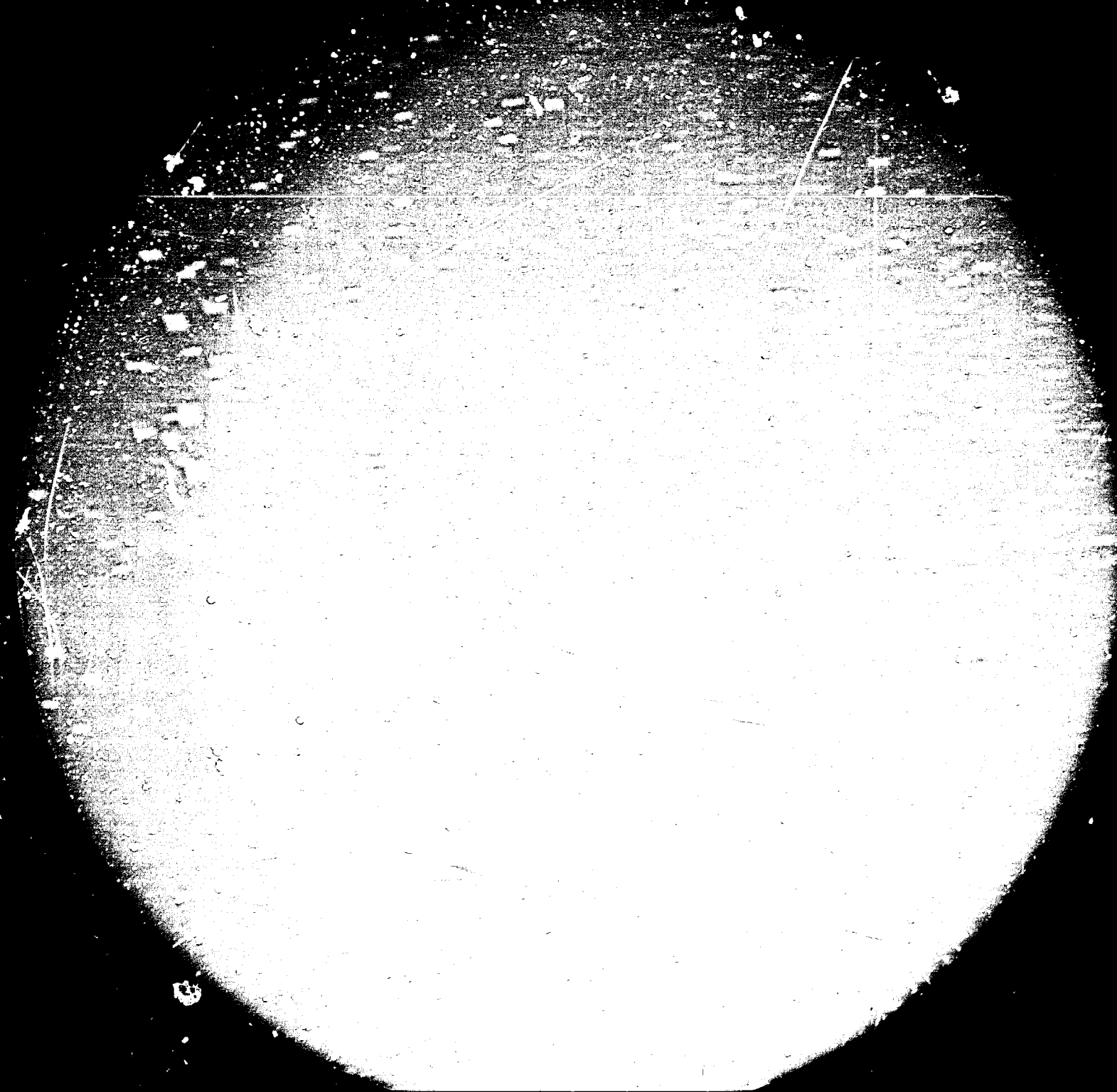
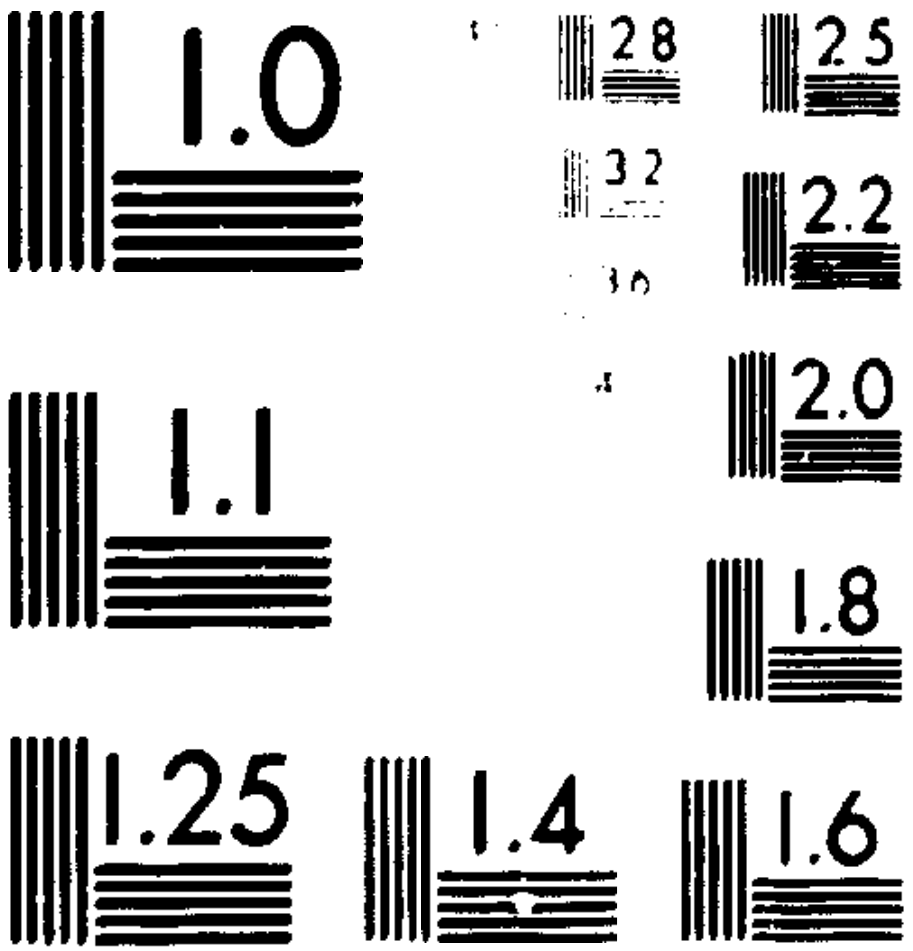
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org





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TECHNOLOGY EXPORTS FROM DEVELOPING COUNTRIES

The Case of Yugoslavia *

by

A. Zagorowski

UNIDO Consultant

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PREFACE

The present report entitled "Technology Exports from Developing Countries - The Case of Yugoslavia", constitutes the continuation of an earlier publication (UNIDO/IS.218) which covered the cases of Argentina and Portugal.

On the basis of informal agreement between UNIDO and the World Bank, each of the two organizations agreed to study different groups of countries, particularly from the point of view of development of capabilities for technology generation and commercialization by local industries and R+D establishments.

UNIDO efforts concentrated on exports of intangible technology in way of licences and know-how, various services, etc. with only a broad look into DFI, export of capital equipment and machinery.

The studies carried out at present by the World Bank cover different countries and broader spectrum of the phenomenon commonly described as exports of technology from developing countries.

The present volume describes the picture of Yugoslavia, which being a developing country of planned economy, provided an interesting case to look into, both in terms of actual developments leading into technology exports and providing a comparable case with other developing countries of market economy character.

In the present volume, neither general conclusions nor comparative analysis among a selected sample of countries are presented as yet; this

will constitute the integral part of other volumes which will include two more countries (Egypt and Pakistan) where surveys are being carried currently.

The report consists of three chapters: Chapter one picturing the overall view of Yugoslavian economy and unique management system; chapter two covering macro analysis of technology exports from Yugoslavia and, chapter three, with case studies of individual companies' exports.

The report and survey have been prepared by Mr. A. Zagorowski, in co-operation and under the guidance of UNIDO Secretariat.

Chapter I

THE YUGOSLAV ECONOMIC AND MANAGEMENT SYSTEM

1.1 Introduction

In the postwar period, Yugoslavia has achieved outstanding results in socio-economic development, despite great difficulties caused by large-scale destruction during the war and unexpected international and political developments. By the end of the Seventies per capita gross domestic product had reached a figure of about $US 2,000, which ranged Yugoslavia among industrially medium developed countries. In the thirty-year period (1948-1977), gross domestic product grew at an average annual rate of about 6 per cent, topping in 1977 the 1947 figure six times. This was primarily the result of the big rise in industrial production, which grew at an average annual rate of about 9 per cent, an increase of 14 times in the thirty-year period. With a simultaneous rise in per capita production of over four times, a powerful material base had been created for raising the standard of living. Parallel with this, qualitatively new social relations based on self-management have become a powerful factor in the further development of the material base of Yugoslav society.

The steady expansion of Yugoslavia's productive forces is, among other things, attributable to technical, technological and scientific development, primarily the fast development of automation and the application of new technological procedures in production. Large-scale investment and its composition, the introduction of modern plant and equipment, a rise in

employment, a corresponding level of electrification and use of chemicals, and the expansion of scientific research, have been decisive for the technical, technological and material development of the country.1/

Yugoslavia has entered the median stage of industrialization in which technical progress should assume preponderance over other factors of economic development.

Table 1

Republics	Land area '000 sq km	Population '000
Serbia	88,4	9,149
Autonomouos provinces		
Vojevodina	21,5	2,013
Kosovo-Methohija	10,9	1,586
Croatia	56,5	4,609
Slovenia	20,3	1,833
Bosnia and Hercegovina	51,1	4,203
Macedonia	25,7	1,876
Montenegro	13,8	592
TOTAL	255,8	22,262

Source: Statistical Yearbook of the Socialist Federal Republic of Yugoslavia.

The total labour force including independent farmers and artisans is around 8 million of which the public sector number around 5,5 million.

1/ The Socialist Federal Republic of Yugoslavia consists of six republics and two autonomous provinces.

The post war political development was characterized by an extreme centralism until 1950 when the concept of self management was born, and much power and administration were subsequently delegated to the republic and provincial governments, local authorities and individual enterprises. This process was carried a step further in 1965 by economic reforms aimed at creating a more free market economy. Official state interventionism was further reduced by 1971 and 1974 constitution amendments. The new constitution proclaimed on February 1974 introduced the concept of "delegated democracy". Its essential aim is to ensure that the federal republic and provincial legislatures consist of delegates elected by secret ballot from Basic Organizations of Associated Labour/BOALs/, enterprises, social organizations, local authorities, the armed forces, private farmers, etc. Its provisions have now largely been implemented by so called "systematic" laws relating mainly to the status of productive enterprises, economic chambers, banks, joint ventures and representations of foreign firms.

Second only in importance to the 1974 Constitution is the Associated Labour Law of 25 November 1976 which is the Yugoslav corporation charter. It is the legal foundation of economic activities.

The Higher Federal Assembly of Yugoslavia consists of two chambers; the Chamber of Republics and Autonomous Provinces and the Federal Chamber. After Tito's death on 5 May 1980 the Collective Presidency assumed presidential authority with the president elected annually by a rotation system.

Yugoslavia is a full member of the UN and its affiliates, IMF, IBRD, IFC, IDA and GATT.

It is an associate member of the OECD, and has a preferential trade agreement with the EEC which is due to run until 1985.

1.2 The Yugoslav Economy

Economic development and planning policy

Before the Second World War, Yugoslavia was an undeveloped agrarian country with an average annual growth rate of some 2 per cent. The war meant a major setback to the economy, and industrial output in 1946 was about 20 per cent lower than in 1939.

The first five year plan began in 1947 its main aims being the development of heavy industry, power production and land reform. In 1953, the principle of self-management socialism was established, and transfer of ownership and responsibility for means of production from the state to the employees of enterprises took place. The second five year plan 1957-1960 emphasized industrialization and a remarkable 12.9 per cent of annual growth rate was achieved. The outcome of 1961-1965 plan was less satisfactory due to agricultural difficulties and only 7 per cent annual growth rate was achieved. Major economic reforms were introduced in 1965. Their broad aims were to increase reliance on the price mechanism in resource allocation, to further reduce the role of the central government, and to develop self-management by granting even more freedom in internal and external trade affairs. The dinar was devalued in 1965, export subsidies abolished, and a programme of import liberalization introduced.

The structure of the banking system was changed and a major part of the government financial resources was transferred to banks and enterprises.

The 1966-1970 plan set an annual social product growth target at 8 per cent; the outcome was an average rate of 6.3 per cent annually. Price stabilization proved increasingly difficult and a temporary selective price-freeze was imposed in October 1970.

The transition to a more open economy was accompanied by mounting trade deficits as industrial imports and consumers incomes rose. In 1967, legislation was introduced to encourage foreign investment and technology to Yugoslavia by permitting joint ownership of enterprises. This law was further liberalized in 1971. Economic reforms of 1971 accompanied the fourth five year plan for 1971-1975.

This was again indicative, with individual enterprises expected to adapt their own plans to conform with national goals. The plan stressed particularly: price stabilization, assistance to less developed regions, better resource allocation, increased productivity and more integration in world economy.

Inflationary phenomena and balance of payments problems became acute during the early seventies.

In January 1971, the dinar was devalued for the second time and import surcharge imposed until December 1972.

The dinar, which was floated in mid 1973 was devalued in October 1974 and again in June 1980, by 30 per cent.

Although a small current surplus was achieved in 1976, the trade deficit reoccured in 1977, 1978 and 1979 amounting to $US 1.80, 1.43 and 2.5 billion respectively.

An opinion was expressed by some authorities in Yugoslavia that a certain balance of payments deficit is not harmful to the economy, but the 1979 figure was considered too high: hence the June 1980 devaluation.

Despite an increasingly unfavourable external environment Yugoslavia has been successful in sustaining the momentum of industrial growth during the seventies. Between 1971 and 1979, the industrial output increased at an annual rate of slightly over 7 per cent in constant prices, this rate of industrial growth exceeds that achieved in the 1965-1971 period when world markets were more conductive to rapid industrial expansion.

The pattern of industrial growth 1965-1979 is shown below.

Table 2

	Average Growth Rates 1965-1971	1971-1979
Total industrial output	6.4	7.1
Capital goods	6.3	8.8
Intermediate and semi processed goods	5.9	5.3
Consumer goods	6.5	7.1
Industrial employment	1.6	4.2
Industrial fixed assets	7.7	7.9[a/]
Industrial exports	7.3	5.0
Industrial imports	11.3	4.6

Source: Statistical Yearbook of Yugoslavia 1980, 1976, 1972.

a/ 1971-1978.

The National Plan Targets 1971-1985 are as in the table below.

Table 3

(Annual percentage increases, constant prices)

	1971-1975	1976-1980	1981-1985[b/]
Social product	7.5	7.0	4-4.5
Investment	8.0	...	1.5
Economic	...	8.5	7-7.5
Non-economic	...	7.5	...
Productivity	5.0	4.0	2.0
Industrial production	8.0	8.9	4-4.5
Living standards	7.0	7.0	2.7
Exports	12.0	8-14[a/]	8.0
Imports	10.0	4-10[a/]	1.1
Employment	3.0	4.0	2.5

Source: Social Plan of Yugoslavia and Yugoslav press.

a/ Nominal value growth rates.

b/ Preliminary - the targets may be slightly reduced.

Investment

Yugoslavia channels a considerable portion of its total resources into domestic investment.

Between 1970 and 1978, the share of gross investment in GDP climbed from 31 to 34 per cent. Industry absorbed a substantial and rising share of this overall investment.

Table 4

Share of industry in gross fixed capital formation (per cent)

Country	Year	Mining and Quarrying	Manufac-turing	Gas Electricity and Water	Construc-tion	Total Industry
Yugoslavia	1970	-	32.7	-	..1	35.7
	1978	-	38.1	-	3.1	41.2
Greece	1970	1 5	14.2	8.2	2.5	26.4
	1978	1.3	12.6	9.6	0.8	24.3
Hungary	1970	-	34.5	-	3.6	38.1
	1978	-	39.6	-	3.1	42.7
Italy	1970	-	23.4	6.2	1.3	30.0
	1978	-	27.0	-	-	27.0
Japan	1970	0.7	22.2	3.9	2.6	29.4
	1978	0.3	15.3	4.3	2.2	22.1
Korea (Rep. of)	1970	0.5	19.6	11.2	1.2	32.5
	1978	0.8	20.9	9.5	1.8	33.0
Poland	1970	-	36.3	-	4.1	40.4
	1978	-	36.6	-	5.0	41.6
Pakistan	1970	0.4	21.2	9.7	1.4	32.7
	1978	0.7	26.1	7.3	2.8	36.9
Portugal	1970	0.8	31.0	8.3	2.2	42.3
	1976	0.2	27.4	12.1	2.8	42.5

Source: UN Yearbook of National Account Statistics, Volume I.

During the same period, the total industrial investment (excluding construction) increased from 33 to 38 per cent of gross fixed capital formation or from 9 to 12 per cent of GDP. As can be seen from Table 4, the share of gross fixed capital formation in industry is markedly higher than in other South European countries (such as Greece or Italy) or in the economies of Japan or Korea.

It is, however, closely comparable to the performance of other eastern European economies such as Hungary and Poland in comparable period of time.

Structure of the economy

The structure of the ownership in the Yugoslav economy is clearly illustrated by the structure of Social Product1/ by Economic Sectors as given below:

Table 5 (per cent)

	1960	1970	1975	1977
Total economy	100	100	100	100
Public sector	75.5	81.6	84.5	85.2
Private sector	24.5	18.4	15.5	14.8

Source: Institute for Industrial Economics, Beograd.

1/ Social Product - value indicator of the final production results, i.e. the sum of national income and depreciation.

All the basic and other industries in Yugoslavia are nationalized, the private sector is neither represented in foreign nor in domestic trade.

The main domain of the private sector is the agriculture. The contribution of the private sector in Social Product in 1977 was:

- Agriculture 76 per cent
- Arts and crafts 41 per cent

The other domains of private sector are: construction 12.5 per cent, catering 11.5 per cent and transport 6 per cent.

Regional differences

There are marked differences in the levels of economic development of various republics and provinces and in their participation in the Yugoslav export. The 1978 export figures are shown below: (per cent)

SR Macedonia	5.0
SR Bosnia Herzegovina	12.6
SR Slovenia	19.4
SR Croatia	28.0
SR Serbia	23.6
SAP Vojevodina	7.4
SAP Kosovo	2.2
SR Montenegro	1.8
	100.0

In the less developed regions, which comprise the republics of Bosnia-Herzegovina, Macedonia and Montenegro and the autonomous province Kosovo, the economic output per capita varied between 37 and 70 per cent of the national average in 1978. Household incomes per capita varied between 46 and 82 per cent of the national average. Industrial growth is regarded as

one of the most important tools of the economic development of the country as a whole and of less developed regions (LDR) in particular. Successive economic plans have called for above average rates of growth of industrial output and employment in the less developed regions in order to reduce the disparities in regional levels of economic development.

The pattern of industrial growth over time in the LDR and more developed region (MDR) is show below:

Table 6

Regional variations of industrial growth 1971-1978
(Annual percentage rates)

	LDR	MDR	Yugoslavia
Industrial output[a/]	7.3	6.9	7.1
Industrial fixed assets[a/]	8.4	7.4	7.7
Industrial employment	5.4	2.9	4.2
Labour productivity	1.9	4.0	2.9

Source: Statistical Yearbook 1980 of Yugoslavia and Federal Institute of Statistics.

a/ at constant 1972 prices.

Industrial enterprises

The total number of industrial enterprises or independent techno-economic units, has constantly been changing under the influence of both growth and organizational factors.

Growth factors were represented by intensive construction and establishment of new enterprises (units) within or apart from the existing ones, whereas organizational factors have had a two direction impact on the total number of enterprises. The integration process which

characterizes late sixties and early seventies reduced the total number of enterprises, while new organizational framework suggested by the constitutional amendments (1972), the new constitution (1974) and the Associated Labour Act (1976), which required establishment of so called "basic organizations of associated labour" i.e. relatively small independent techno-economic units had the opposite effect - they increased considerably the total number of enterprises (units). The size of industrial enterprises (units) and the relevant value added is presented below:

Table 7

	1960	1970	1975	1977
Number of units (enterprises)	2,556	2,374	6,493	7,731
Employees per unit	420	612	285	258
Value added per unit (min. dinars 1972 prices)	9.5	26.0	14.4	14.6

Source: Federal Institute of Statistics, Belgrade, 1978.

Migrant workers

Since 1965, when employment abroad was negligible, a significant number of Yugoslav workers have found a temporary employment outside the country, particularly in western Europe. The migrant work force reached the estimated peak level of 1.1 million workers, or 14 per cent of the total domestic labour force in 1973.

But the onset of recession in western Europe reinforced by a change in policies toward migrant workers in the host countries has sharply curtailed the demand for migrant workers. Between 1974 and 1977, over a quarter million workers returned to Yugoslavia.

Following this surge, the reflux of migrant workers has slowed to an estimated 10,000-15,000 persons per year. As a result, only about 150,000 migrants returned during the 1976-1980 plan, rather than the 250,000 projected at the outset of the plan. Many of the remaining 800,000 migrant workers temporarily employed abroad are gradually becoming in effect longer term residents of the host countries.

The inflows of migrant worker's remittances (private transfer) play an important role in the Yugoslav economy. According to World Bank, Staff Working Paper No. 481, in 1978-1979, the percentage of remittances to exports (of merchandise) was 42.5 per cent.

The comparable values for other countries having their workers in West Europe were in some cases even higher - Turkey 76.7 per cent and Morocco 51.3 per cent. Among the countries with lower percentage of remittances to exports were - Greece 30.0 per cent, Portugal 18.1 per cent and Spain 13.1 per cent.

Analyzing the problem of migrant workers from the point of view of technology transfer from Yugoslavia, we should note a significant fact that workers returning from abroad are usually well qualified specialists.

Their professional experience gained during their employment abroad is utilized in their homeland and becomes a valuable contribution to exports from Yugoslavia in general, and to exports of technical services in particular.

It often happens that importers of technical services from Yugoslavia request inclusion of specialists with employment experience abroad, in the Federal Republic of Germany, Austria or Switzerland in particular, into assembling or service teams. Migrant workers, therefore, are potential, and even effective, exporters of technology in the form of technical services in many cases.

1.3 The Role of Exports in the Yugoslav Economy

Developing its economic, technical and training capacities and using positive experiences from abroad, Yugoslavia has achieved the level which now ranks her among more developed of the developing countries. Yugoslavia is also one of the most important producers of manufactured goods among developing countries. The value-added in manufacturing is only 10 per cent lower than in India, for example, a country with 30 times higher than Yugoslavia's population.

Since most of the Yugoslavian production is performed by modern medium and large enterprises the capital stock in manufacturing is almost certainly much larger than in India.

Among developing countries, Yugoslavia's exports of manufactures are exceeded only by East Asian countries: Republic of Korea, China, Taiwan, Hong Kong and Singapore.

The growth of the Yugoslav economy was noted in particular after World War II and was the driving force of technology exports.

There are several reasons why Yugoslavia is building the ability to export her technologies:

First - The Yugoslav industry has developed several fine and unique processes during the last 35 years since the end of the war. Some of what were to be mentioned is further parts of this study.

Second - It has absorbed, digested and, in many cases, improved imported technologies. It is also probable that after 10-15 years since the introduction of technology any restrictions to exporting the same technology disappeared due to patents expiration or due to agreement conditions with the licensor.

Third - gradually the Yugoslav firms have gained experience in the export of technologies and have surplus personnel, which could be made available for this sort of work.

Yugoslavia's export strategy has concentrated on two objectives: first to progress from the export of basic industrial commodities to the export of more complex manufactured goods; second to narrow the commodity trade deficit by increasing the proportion of merchandise imports covered by exports. The structure of commodity trade has shifted in the direction desired by the policymakers.

The share of manufactured goods in total exports climbed from 55 per cent in 1970 to 66 per cent by 1977, the share of metals and minerals declined from 19 per cent to 14 per cent. On the other hand, Yugoslavia failed to reverse the downward trend in the coverage of imports by exports manifested since 1965. In 1971, exports covered 56 per cent of the cost of imports, by 1979 the import coverage dropped below 50 per cent.

Although changing external circumstances required that the Yugoslav industry redirects itself towards a more export oriented pattern of development, this shift did not take place. Industrial exports grew more slowly in real terms between 1971 and 1979 (5.0 per cent per annum) than they did between 1965 and 1971 (7.3 per cent).

This performance was well below the 8 per cent growth targets foreseen in Yugoslavia's 1971-1975 and 1976-1980 five-year plans and has been a source of continuing weakness in the country's balance of payments.

The primary orientation of Yugoslav enterprises has remained production for the domestic market. Yugoslav enterprises have responded more readily to the needs of the booming domestic market than to the economy's need for increased foreign exchange earnings.

In part, the country's disappointing export performance has been a reflection of the emphasis on import substitution in industrial planning. But it is also a reflection of the more general policy environment which has dampened the incentive to export. While there are many individual Yugoslav enterprises which are aggressive exporters, exporting is still a marginal activity in the production plans of most firms.

The result is that Yugoslav industrial exports tend to be highly cyclical with respect to domestic market conditions.

Yugoslav enterprises increase their exports significantly when domestic demand weakens (as in 1973, 1976 and 1980) but relatively few enterprises have geared their expansion plans to a long term thrust into export markets.

This reduces the motivation for enterprises to tie their production decisions to the discipline of maintaining their export competitiveness at overseas markets.

Consequently, Yugoslavia possesses a highly diversified industrial export structure with a far lower degree of commodity export concentration than other newly industrialized countries. The 1980 trade results were reasonable, export coverage of imports was 59.6 per cent, compared with 48.5 per cent in 1979 and 56.8 per cent in 1978.

The expectations for 1981 are even better - 63.4 per cent. The balance of Yugoslav trade in the late seventies is shown in table 8.

Table 8

Balance of payments
US $ million

	1976	1977	1978	1979	1980[1]	1981[2]
Trade balance	-2 489	-4 380	-4 317	-7 225	-6 086	-6 025
Imports, cif	7 367	9 634	9 988	14 019	15 064	16 475
Exports, fob	4 878	5 254	5 671	6 794	8 978	10 450
Balance on services and transfers	2 654	2 798	3 061	3 564	3 795	4 225
Inflow	4 404	4 820	5 775	7 732	9 322	9 810
Workers' and emigrants' remittances	1 884	2 097	2 921	3 393	4 050	
Turism	802	841	1 050	1 183	1 500	
Transportation	908	1 071	1 150	1 405	1 669	
Interest	90	123	155	188	197	
Other	720	688	499	1 563	1 906	
Outflow	1 750	2 022	2 714	4 168	5 527	5 585
Workers' and emigrants' remittances	469	670	1 176	1 683	2 511	
Turism	77	90	120	155	130	
Transportation	479	503	565	674	837	
Interest	369	381	455	821	1 281	
Other	356	378	398	835	768	
Balance on current account	165	-1 582	-1 256	-3 661	-2 291	-1 800
Long-term capital	1 093	1 402	1 350	1 084	1 923	
Short-term capital /including bilateral acc. and errors omissions/	-243	67	-108	8533	298	
Exceptional financing	50	75	350	250	250	
Reserve movements /net/	1 065	-38	336	-1 474	180	
of which:						
Foreign exchange	1 203	51	257	-1 188	523	
Use of IMF credit	189	-112	-74	286	343	

1 Preliminary data.
2 Official forecasts.
3 Of which: bilateral acc. 665 million dollars.

Sources: National Bank of Yugoslavia and direct communication to the OECD.

Exports breakdown

The general breakdown of exports and imports shows the predominance of raw materials and semi manufacturers in the Yugoslav foreign trade. Nevertheless, the share of capital and consumer goods in exports is higher than their share in the Yugoslav imports.

Table 9

	Exports		Imports	
	1978	1979	1978	1979
Raw materials semi-manufactures	51.3	63.3	115.9	151.8
Capital goods	20.7	20.7	46.8	57.3
Consumer goods	31.6	34.4	20.5	25.6
Total	103.6	118.4	183.2	234.7

Source: E.I.U.

(billion dinars, current prices)

Trade in billion dinars (1980 prices) was on export side:

Raw materials and semi-manufacturers	127.9
Capital goods	37.1
Consumer goods	79.8
Total	244.8

On import side:

Raw materials and semi-manufacturers	309.0
Capital goods	78.5
Consumer goods	23.5
Total	411.0

Chapter II

TECHNOLOGY EXPORTS FROM YUGOSLAVIA - MACRO ANALYSIS

2.1 Introduction

The term "technology exports" is mostly used as a definition of export of knowledge related to industrial technologies, civil engineering projects and agricultural technologies. It may also relate to engineering services, technology and to export of capital through direct investments or joint ventures. The terms of industrial technologies embraces not only manufacturing processes exported in the form of patents and know-how licenses, but also engineering, consulting and technical services.

Civil engineering technologies are contained in turn key projects, consultancy exports and engineering services.

The export of technology may be effected on commercial or non-commercial basis, by way of intergovernmental agreements, through education, emigration and publications. This survey concentrates basically on commercial transfers and exports of technology.

2.2 Foreign trade transactions

Yugoslavia's international economic relations are, in principle, free and are primarily motivated by the interest of economic organizations in the development of the exchange of goods, as well as of other forms of co-operations with foreign partners.

In the performance of foreign trade transactions with firms and private persons abroad, economic organizations act according to the regulations, rules of fair business conduct and general business morals. They are obliged to guard their own reputation and that of other economic organizations.

Before the establishment of a business relationship with a foreign partner, a Yugoslav firm is obliged to ask the Yugoslav Chamber of Economy for business information and advice.

Legal regulations of foreign trade

The legal basis of Yugoslavia's international economic relations is defined through the following laws:

- the Law on the Turnover Goods and Services with Foreign Countries
- the Law on Carrying out Economic Activities Abroad
- the Law on Foreign Currency Transactions and Credit Relations with Foreign Countries; and
- the Customs Law and the Law on the Customs Tariff.

These regulations, adapted to the new Constitution of the SFRY, were fully implemented in 1978.

According to the new system of international economic relations, the economic organizations have to draw up plans of their international economic relations, plans of the inflow and outflow of foreign exchange and plans of their international credit relations, all based on their development plans. On the basis of these, the projections of the balance of payments position and of foreign exchange balances of the republics and autonomous provinces are prepared, defining their obligations and responsibilities for the fulfilment of targets set for the unified Yugoslav balance of payments and the foreign exchange balance. That means that the domestic enterprises are vitally interested in exports and in its effectiveness. As in the social and economic life in general, various forms of self-management arrangements, social contracts, as well as the agreements among the republics and autonomous provinces, have a great importance for economic organizations in their business activity in international economic relations.

Self-mangement interest communities for international economic relations are engaged in the fulfilment of tasks and execution of transactions involving foreign exchange or international credits in republic and autonomous provinces. They all, in turn, are members of the Yugoslav Interest Community for International Economic Relations.

Matters which are related to the business activity of enterprises performing international business transactions or conducting business activities abroad, are under the competence of co-ordination committees attached to the competent authority in the republics, autonomous provinces and to the Federal Executive Council.

In order to co-ordinate their mutual interests and to fulfil the mutually agreed policy of international economic relations, economic organizations conducting business with a determined country or a group of countries are compulsory members of sections for the enhancement of international economic relations of the Yugoslav Chamber of Economy.

Co-ordination committees

Co-ordination committees attached the republic on and provincial authorities perform a controlling function, discuss and put forward proposals concerning matters of conducting business by foreign trade organizations, such as:

- development of socio-economic and self-management relations
- implementation of self-management and social contracts
- organization and development of the network of foreign trade organizations at home and abroad
- legality of conducting business operations in foreign trade
- giving their consent to the registration into the public register of organizations entitled to conduct business in foreign trade.

Sections for the enhancement of international economic relations of the Yugoslav Chamber of Economy

The economic organizations concerned conclude through these sections self-government agreements in order to:

- elaborate a programme of co-operation with a certain country or a group of countries for which the section has been established

- analyze conditions and exchange information on trends on foreign markets

- decide on and organize their joint appearance on markets, a joint economic representation and publishing activities

- determine general rules of business with particular countries.

Economic chambers

The Yugoslav Chamber of Economy is a self-government obligatory association of economic organizations and their business associations. Its main task is to promote the activity of its members and to co-ordinate their particular and common interests. The Yugoslav Chamber of Economy incorporates a Court of Honour and Foreign Trade Arbitration for business and naval cases concerning foreign trade relations. Each republic and autonomous province have also their own Chamber of Economy.

The foreign trade operations

The domestic economic organizations can perform foreign trade transactions only if they are registered in the register kept at the District Commercial Court.

Foreign trade network abroad is organized through the following forms:

- enterprises belonging to Yugoslav economic organizations located abroad

- banks and other financial organizations, especially founded for that purpose

- insurance organizations

- joint ventures with foreign firms including direct investment

- business units of Yugoslav economic organizations abroad
- joint economic representations
- agency companies
- working units of economic organizations which execute civil engineering projects abroad.

Yugoslav enterprises abroad

The approval for the incorporation of an enterprise abroad is provided by the Federal Secretariat for Foreign Trade, following a previous expertise by the Federal Secretariat of Finances and the Federal Administrative Body competent for domestic activity of the founding domestic enterprise.

Some considerations on transfer of foreign technology and development of domestic technology

In the period until 1976-1977, Yugoslavia achieved extraordinary results in many spheres of technical and technological progress. However, these results were in the greatest measure accomplished through the transfer of foreign technology, since this was the most suitable way of extricating the country from inherited backwardness and to raise its technology to a modern level. Transfer of technology from industrially developed countries was principally effected through purchases of equipment and licences. Half of the installed equipment is foreign-made. In recent years, Yugoslav business organizations have increasingly begun to resort to modern forms of economic and technological co-operation with foreign countries, such as long-term co-production arrangements, joint ventures, assignment of the construction of capital projects to foreign contractors, assignment and acquisition of industrial property rights, establishment of Yugoslav enterprises abroad, formation of joint companies abroad, and construction of capital projects abroad. In addition to the wish to establish

co-operation on terms of full equality, efforts to strengthen modern forms of co-operation are also stimulated by the need to bring the level of technology of domestic partners as close as possible to that of foreign partners. As a result, this co-operation is still to some extent confined to purchases of industrial property rights (technology) and assignment of the construction of capital projects to foreign contractors.

Table 9a

Production and consumption of major products in Yugoslavia and some other countries in 1975

	Per capita consumption		Per capita in production, in kg		Consumption of nitrogenous fertilizers, in kg per hectare of arable land
	Energy total, in tons of pit coal equivalent	Electricity, in kWh	Crude steel	Plastics	
Belgium	5.58	3,638	1,182	...	207.3
Czechoslovakia	7.15	3,557	968	16.9	97.2
Denmark	5.27	3,267	111	9.1	127.0
France	3.94	3,188	408	19.6	90.8
Germany, Federal Republic of	5.34	4,429	654	43.8	152.4
Italy	3.01	2,314	387	26.0	58.8
Netherlands	5.78	3,608	353	3.6	538.3
Romania	3.80	2,058	449	8.9	75.1
Sweden	6.18	8,778	685	...	85.1
Switzerland	3.64	4,516	66	...	109.6
Turkey	...	339	37	...	16.0
United Kingdom	5.26	4,166	361	23.4	149.7
Yugoslavia	1.93	1,591	137	3.5	44.8

Source: Statistički bilten, No. 1098 and Statistčki godišnjak Jugoslavije for 1979, Federal Bureau of Statistics.

Table 9b

Indices and growth rates of production and consumption of major products in Yugoslavia

	Indices 1975/1966	Growth rates 1967-1975
Total energy consumption in tons of pit coal equivalent	161	5.5
Net per capita electricity consumption	217	9.0
Per capita crude steel consumption	144	4.1
Per capita plastics consumption	104	0.4
Consumption of nitrogenous fertilizers per hectare of arable land	187	7.2
Number of tractors per 100 hectares of arable land	453	18.3

Among the contracts for economic and technological co-operation executed with foreign parties in 1976, first place was taken by contracts for the construction of capital projects abroad (37.7 per cent), followed by purchases of industrial property rights (20.5), establishment of enterprises abroad (13.3 per cent), and long-term co-production arrangements (11.3 per cent). Much less numerous were contracts for the investment of foreign capital in domestic organizations of associated labour (joint ventures), establishment of joint companies abroad, and business and technical co-operation. However, most unfavourable was the ratio of acquisition to assignment of industrial property rights, i.e. patents, licences, know-how, technical documentation, etc. Yugoslavia buys much more than she sells.

In addition to positive results, transfer of foreign technology has also had many disadvantages: Unco-ordinated and unselective imports of technology, acceptance of restrictive clauses stipulated in contracts, etc., the greatest

weakness being, however, insufficient stimulation of domestic technological creativity. This is best illustrated by data on the total number of inventions, technical advancements and rationalization made by workers and organizations of associated labour. In per capita number of patents Yugoslavia lags behind a number of developed countries of West Europe (Austria, France, Sweden, the Federal Republic of Germany, Great Britain) 20 to 50 times. (Table 9c)

Another unfavourable development is seen in the fact that over 80 per cent of all patents are by individuals and less than 20 per cent by work organizations and institutes. Under conditions of the increasingly complex effect of technical and technological progress and increasingly organized research and development in the world, there is little chance for individuals to accomplish any technological achievement of major significance.

Table 9c

Number of patents reported and registered

	1967-1976 averages		Registered in 1976	
	Reported	Registered	Total	Per 10,000 population
Austria	11,213	8,242	6,412	8.54
Czechoslovakia	9,058	5,406	7,000	4.69
Denmark	6,593	3,154	2,276	4.49
Finland	3,754	1,239	1,212	2.56
France	46,507	34,767	29,754	5.62
Germany, Federal Republic of	65,035	19,903	20,965	3.41
Netherlands	17,649	2,891	3,589	2.61
Norway	4,886	2,155	2,093	5.19
Romania	3,542	2,248	1,695	0.79
Sweden	17,007	10,001	8,855	10.77
Switzerland	18,440			
United Kingdom	59,288	40,431	39,797	7.12
Yugoslavia	3,249	721	393	0.18

2.3 Forms of Yugoslav Technology Exports

For the purpose of the present report the following forms of technology exports are considered:

a) Patent, know-how, trade mark licences,

b) Supply of services, technical assistance,

c) Capital investment projects abroad,

d) Joint ventures and investments abroad,

e) Education and technical co-operation with developing countries.

a) Patent, know-how, trade mark licences

As described in Chapter I, Yugoslavia's trade with developing countries is well established.

The demand of these countries for licenses or patent rights without a simultaneous delivery of complete documentation, equipment and technical services of all kinds is negligible. It is obvious because a utilization of an acquired license or patent rights requires a highly qualified technical and scientific personnel. The lack of such personnel is felt acutely by nearly all developing countries.

On the other hand, there are, practically, no statistical data concerning the turnover in this particular branch of technology with developing and other countries.

A sale of patent, know-how, or trade mark licenses is often represented under a heading "engineering", "construction documentation", "package project", or a "supply of a complete industrial installation" and is neither represented separately, nor registered.

This survery, therefore, will not deal with this group of technologies separately, nor attempts at a statistical analysis. Some separate cases of sales of such technologies are mentioned in Chapter III while discussing activities of various companies.

b) Supply of services, technical assistance rendered by Yugoslav specialists

Supply of services is, in most cases, connected with the supply of equipment or complete installations by Yugoslav firms. Consulting and technical services exports are concentrated in civil engineering in agriculture and in processing industries in the form of feasibility studies, technical reports, supervision during construction, erection and starting up of the production.

In some cases, the technical assistance and supervision in production are provided for the customer during a longer period of one to three years and, in such cases, additional training of local personnel is often included.

Other forms of technical assistance and co-operation with mainly developing countries have been evident recently. They were in corporation of Yugoslav experts in consulting missions, complex programmes and projects, assistance in the foundation of research projects etc.

932 Yugoslav experts took part in consulting missions in 62 developing countries since 1965.

Joint development programmes represent a new form of co-operation between Yugoslav educational and corresponding institutions in India, Mexico, Cuba, Nigeria and Libya. Thus, for instance, the Mining-

Geological Faculty of Belgrade delivers lecturers for Nigeria. There are medical centres formed in Libya and Kuwait and rehabilitation centres in Brazil, Senegal and Egypt with active participation of Yugoslav specialists.

Yugoslavia participated also in the establishment of a training centre for technicians of twenty profiles and for workers in Algeria and in the foundation of a Foreign Languages Institute in Angola.

In the last four years, 24 Yugoslav missions consisting of some 70 specialists have visited developing countries. In 1954-1980, about 7,300 Yugoslav specialists were sent to developing countries on the basis of international agreements on technical co-operation. About 2,720 specialists worked in 42 developing countries at the end of 1980, mostly in the sphere of public health, agriculture, energy, raw materials extraction and civil construction. These arrangements are considered beneficial for both parties.

Developing countries receive concrete assistance in solving their problems and Yugoslavia rendering the assistance is promoting her exports.

c) Capital investment projects abroad

The Law on the Turnover of Goods and Services with Foreign Countries specifies conditions to be fulfilled before conclusion of the contract and ensures maximum utilization of domestic capacities to execute all kinds of operations which are part of the contract and the use of Yugoslav technology, equipment and materials, if they are competitive on the world market according to the contract conditions.

The domestic economic organization has also to declare that it posesses the necessary productive capacity and staff to execute the contract, and that it has ensured subcontractors if they are necessary for successful execution of the project. The Law on the Turnover of Goods and Services with Foreign Countries stipulates that the following activities are understood under the heading of investment project:

- preparation of expertises and studies, elaboration of technical documentation for investment projects
- melioration surveys, land reclamation projects
- all kinds of engineering, geological, mining and hydrotechnical projects
- assembling of equipment
- putting all kinds of installations or complete plants into operation
- technical asstistance.

Capital investment projects contracted by Yugoslav firms abroad represent an advanced form of technology transfer. The highest share - of almost 65 per cent is that of the developing countries. Most of these projects were executed in the Middle East, Africa and Latin America.

Investment goods represent about 25.5 per cent of Yugoslav exports. According to the 1981-1985 five year plan the total value of investment goods export will reach $US 20 billion ($US 7.9 billion in the previous five year period).

In 1976-1980, the credit amounting to $US 1.2 billion was granted for stimulation of this kind of exports and the sum of such credit for the 1981-1985 period is expected to reach $US 3.5 billion.

The Yugoslav firms have already concluded contracts amounting to some $US 1.5 billion with the execution time by the end of 1985. The Yugoslav Bank for International Economic Co-operation participates in these contracts. Some further contracts for export of investment goods of a value of $US 1.7 billion are now under negotiations.

d) Joint ventures and investments abroad

The Yugoslav legislation on joint venture agreements between foreign and domestic enterprises concerns primarily mixed enterprises located in Yugoslavia. This legislation was introduced in 1967 and has been gradually liberalized particularly in 1971. Investments are normally limited to manufacturing enterprises and ventures are generally expected to introduce new technology in Yugoslavia. Though the joint venture agreements have been mainly directed to the domestic production area, their influence on exports is noticable.

Products manufactured by joint-venture corporations can be exported through the intermediary of Yugoslav authorised export enterprises.

In 1980, some 200 joint ventures were registered in Yugoslavia, 60 per cent of them were with US, West German and Italian companies.

The foreign equity in joint ventures was in 46 per cent have been of financial character, in 29 per cent of technological character (presumably licenses, know-how) and 25 per cent in the form of supplies and industrial plants.

There are also numerous examples of mixed capital enterprises established abroad. Positive experience was gained in execution of capital investment project and inititated the establishment of mixed capital enterprises (joint

ventures), mainly in civil engineering and construction but also in mining, oil exploration, forestry and agriculture, as well as in services and in trade. In early 1981 some 33 Yugoslav firms had their mixed capital firms abroad or declared their readiness to establish such companies in the near future.

Almost 63 per cent of the total foreign investment by Yugoslav firms relates to developing countries. The Yugoslav firms investment in mixed capital enterprises abroad is at the level of 20.5 per cent of the total capital invested abroad.

It is worth mentioning some more important enterprises that were established during the last three years.

Three among them are in Egypt and two of them were established in 1979; one formed by Yugoslav truck works RAKOVICA and the Egyptian company EL NASR, with the aim to produce tractors for the Egyptian market, and the other organized by the Yugoslav ENERGOINVEST and the Egyptian ELDZEK for the production of telecommunication equipment. The third formed in 1981 - the Rachid Shipping Company was established in Alexandria as a joint venture with Jugolinia of Rijeka for the purpose of transportation of Egyptian goods mainly to the US.

Two joint venture companies were formed in Libya in 1979, namely: El Karamah and Libyan Engineering Agricultural Co., and one enterprise in Kuwait - Kuwait Contracting Co.

Another example of joint venture in developing countries was the agreement reached in 1979 between the Yugoslav petroleum processing enterprise NAFTAGAS and the Algerian National Oil Corporation SONATRACH. Both companies will jointly explore a 12,000 square kilometers area in the Sahara, under the agreement concluded initially for four years.

NAFTAGAS will invest $US 20 million in the joint venture and will be entitled to a 49 per cent share in any oil found over a period of 15 years.

NAFTAGAS is already operating under similar arrangements in Gabon and Guinea and may do so in Tunisia.

Table 10

Direct investment in developing countries (in $US million)

1975	430.4
1976	531.9
1977	848.6
1978	768.8

Source: Economic Intelligence Unit.

e) Education and technical co-operation with developing countries

Yugoslavia maintains relations with more than 100 developing countries applying various forms of scientific, technical and cultural co-operation.

Basic agreements have been signed with 76 countries, while long-term ten-year and three-year programmes have been signed with 52 countries.

Although these agreements are usually characterized by a classical technical assistance, the fact is that Yugoslavia is among countries maintaining the developed co-opertion in the sphere of science, technology and education with developing countries. Most frequently, the arrangements

comprise personnel education. From 1958 till November 1980, regular education was completed by 1,782 pupils and students. There were about 1000 students at Yugoslav universities, about 650 students at specialist and post graduate courses, while practical training was attended by about 2,000 specialists.

In 1979, alone 157 candidates from 39 countries were granted various Yugoslav scholarships.

About 12,000 foreigners 9,500 of whom came from the developing countries, stayed in Yugoslavia in connection with agreements on scientific, technical, cultural and educational co-operation. In the 1974 - 1980 period, 160 specialized groups of about 500 participants were staying in Yugoslavia. Their domain of interest covered industry, agriculture, energy, forestry, health, social and public services.

It is an example worth mentioning that the Administration for International Scientific, Eductional, Cultural Co-operation of the SR of Serbia organized 45 "study tours" (each from 1 to 3 weeks) for 340 experts from 20 developing countries only in 1980. They visited 114 Yugoslav enterprises.

The study tours were covering the following areas:

- construction of equipment
- agriculture
- geology
- civil engineering
- water engineering
- self-management and social policy.

There are also intergovernmental agreements signed by Yugoslavia. Two agreements and two programmes were signed with Peru and Malta respectively during the XXI UNESCO General Conference, as well as a two year programme with Cyprus and a three year programme with Mongolia. There is also a protocol signed with the African Institute of Culture which represents 19 countries of the African Continent.

Holland and some UN specialized agencies also participate along with Yugoslavia in these programmes.

2.4 Directions of Export and Nature of Technology Supplies

Exports of technology nearly always appear together with exports of machinery, equipment and other types of goods, and therefore, we should analyze the directions of flow of commodities export in order to become aware of the directions of technology exports.

Irrespectively of other possible, or existing divisions, the directions of Yugoslav exports can be divided into three main groups:

- developed market economy countries, the most important being West Germany, Italy and the United States
- socialist countries (CMEA) and the USSR as biggest partner in this group
- developing countries, where apart from Arab oil producing countries the following five: India, Turkey, Brazil, Argentina and Angola are at present the main trading partners.

The 1968-1980 trade results are given in table 11.

The detailed breakdown of goods, equipment and materials exported to the major trading partners in the developed countries and monthly averages of exports to socialist (CMEA) countries are given in table 12.

Table 11 Imports and exports by area
Millions of US dollars

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
							Imports, cif						
OECD countries	1 147	1 379	1 981	2 140	2 113	2 820	4 562	4 677	4 038	5 481	5 890	8 530	7 955
EEC	796	963	1 334	1 435	1 423	1 905	3 016	3 162	2 876	3 806	3 829	5 699	5 220
Italy	269	317	378	396	400	531	889	869	760	1 029	827	1 146	1 117
Germany	320	389	567	617	604	856	1 356	1 437	1 233	1 571	1 801	2 887	2 500
United States	90	93	160	198	198	185	357	417	370	546	615	1 059	1 015
Other	261	323	487	507	492	730	1 189	1 098	792	1 129	1 446	1 772	1 720
Centrally planned economies[1]	489	511	593	778	802	1 117	1 755	1 907	2 259	2 781	2 498	3 542	4 526
of which: USSR	188	168	193	281	283	408	752	807	1 002	1 301	1 375	1 793	2 698
Developing countries	160	245	300	336	316	574	1 225	1 112	1 070	1 371	1 595	1 947	2 583
In Africa	48	72	78	85	100	146	292	159	258	323	397	570	936
In America	44	51	81	78	93	189	275	185	212	327	222	317	468
In Far-East	38	65	71	83	65	63	114	180	118	164	440	67	86
In Middle-East	30	57	70	90	57	176	544	588	482	555	536	993	1 093
Total	1 796	2 134	2 874	3 253	3 232	4 511	7 542	7 697	7 367	9 633	9 983	14 019	15 064
							Exports, fob						
OECD countries	656	822	942	960	1 272	1 588	1 773	1 452	2 040	2 101	2 437	2 986	3 358
EEC	418	563	655	645	809	1 018	1 044	930	1 327	1 395	1 305	1 928	2 365
Italy	177	226	255	226	308	465	432	372	596	664	531	716	833
Germany	122	162	198	210	264	319	364	316	426	390	472	739	778
United States	89	93	90	109	150	233	316	265	354	297	371	373	393
Other	148	166	197	206	313	337	413	258	359	409	761	685	600
Centrally planned economies[1]	434	455	545	666	807	970	1 581	1 924	2 069	2 109	2 180	2 731	4 137
of which: USSR	207	206	242	267	329	407	668	1 012	1 142	1 138	1 394	1 401	2 489
Developing countries	173	198	192	188	138	295	451	696	769	1 046	1 051	1 077	1 483
In Europe	1	1	10	1	1	1	1	3	4	6	3	4	5
In Africa	52	57	60	68	55	113	170	289	307	469	467	543	735
In America	20	39	22	42	43	66	62	69	57	122	47	74	57
In Far-East	65	63	65	41	20	55	90	161	203	151	300	42	51
In Middle-East	35	37	35	36	39	60	128	175	198	298	234	454	635
Total	1 264	1 474	1 679	1 814	2 237	2 853	3 805	4 072	4 878	5 256	5 668	6 794	8 978

1 Countries of Mutual Economic Assistance (CMEA), P.R. of China, and Albania.
Source: Direct communication to the OECD.

Table 12

YUGOSLAVIA'S EXPORTS, monthly averages[a/] '000 $

	W.GERMANY		ITALY		USA		FRANCE		UK	
Imports from Yugoslavia	1978	1979	1979	1980	1979	1980	1978	1979	1979	1980
Live animals, meat cereals, fruit and vegetables	4,343	5,881	12.390	12,592	4,509	2,887	1,341	1,777	256	308
Wood, lumber, cork	922	1,907	16,047	21,212	83	85	354	210	381	211
Fibers and textile	1,210	2,256	3,791	3,925	230	197	264	426	523	235
Petroleum products, chemicals	1,960	6,519	4,869	10,672	1,195	4.107	587	1,802	1,221	470
Iron and steel	1,212	1,480	1,687	2,930	2,686	1,435	384	467	139	80
Non-ferrous metals	1,732	3,373	4,613	3,844	4,006	5,071	493	366	603	757
Machinery and appliances	11,398	14,662	3,630	5,203	2,602	3,105	3,488	4,976	1,601	1,967
Transport equipment	2,602	3,993	2,870	4,001	139	397	4,437	5,595	414	3,017
Clothing	29,035	33,099	220	291	1,494	773	361	616	621	636
Total including other items	77,435	100,226	60,337	76,391	32,405	37,191	14,394	20,217	9,075	11,012
Exports to Socialist Countries	Total [b/]		USSR		Czechoslovakia		E.Germany		Poland	
Jan - June 1979 and 1980 [c/]	190,304	229,986	103,640	134,750	21,238	27,174	20,770	20,469	16,966	18,391

a/ Figures from partners trade accounts

b/ Including also Bulgaria and Rumania

c/ Figures from Yugoslavian statistics

Source: Qarterly Economic Review of Yugoslavia 2nd Quarter 1981, E.I.U.

The share of developed countries in the Yugoslav exports in 1979 was 43.7 per cent and 37.1 per cent in 1980.

In 1980, exports to highly industrialized countries were up by 13 per cent while imports were down by 7 per cent.

The largest export markets in this group in 1980 were Italy with 9.3 per cent of total Yugoslav exports, West Germany - 8.7 per cent and the US 4.4 per cent. The export structure to these countries is shown in table 11.

Imports from Italy in 1980 constituted 7.6 per cent of total Yugoslavian imports, from West Germany 16.6 per cent and from the US - 7.0 per cent.

The socialist countries (CMEA) participated in 40.5 per cent in the Yugoslav export in 1979 and 46.1 per cent in 1980. Exports to these countries were increased in 1980 by more than 49 per cent and imports went up by 28 per cent. In the first half of 1981, this trend of growth was continued.

The main partner in this group, the USSR, purchases 27.7 per cent in the total Yugoslav exports and delivers 17.8 per cent of imports.

Machinery, equipment and highly processed industrial products constitute about 60 per cent of the Yugoslav exports to CMEA countries.

Yugoslavia maintains permanent relations with 95 and ad hoc relations with 15 developing countries.

Yugoslav exports to these countries constituted 15.8 per cent of the total Yugoslav exports in 1979 and 16.5 per cent of 1980 exports.

These exports rose by 44 per cent and imports went up by 32 per cent last year.

About 70 per cent of the Yugoslav trade in 1980 with developing countries falls to Middle East countries. The main trade partner in this group is Iraq. The turnover between the two countries in 1981 is expected to reach $US 1.0 billion, with the Yugoslav imports amounting to some $US 600 million. Some 10,000 Yugoslav workers, technicians and engineers were sent to Iraq by the construction enterprises in the recent years.

The other countries of Asia participate with an 18 per cent share in the Yugoslav export, the African countries share is 8 per cent and the Latin American countries share amounts to 4 per cent.

Civil engineering works and investment goods such as various types of machinery, mining equipment, steel structures and electric power equipment predominates in exports to developing countries. It is expected that this type of export will grow in the coming five years 15 to 20 per cent annually.

The other export items are the consulting and civil engineering services, transport equipment, ships and agricultural products.

The share of Middle East countries in the Yugoslav imports from developing countries reaches circa 50 per cent. Countries of Africa contributed 22 per cent in 1980, Latin America - 16 per cent and the remaining countries of Asia - 12 per cent. The main products imported from these countries are petroleum and some raw materials.

37.4 per cent of Yugoslav exports in 1980 were directed to OECD countries and 52 per cent of imports originated from them. The share of EEC countries was 26 per cent and 34.6 per cent respectively.

The possibilities of determining directions and volumes of technology exports in the case of Yugoslavia are limited because of, firstly, the lack of uniformity in terminology. It often happens that only sales of patent, know-how and trade mark licenses are considered as exports of technology. Consulting and engineering services are, sometimes, also included in this group. On the other hand, in spite of the fact that there are defined principles of registration of export contracts with the authorized organizations, e.g. with the regional branch offices of the Chamber of Economy, such registration does not assure a sufficiently detailed information concerning the character of the exported commodity. This happens most often in cases of sales of complete plants or installations together with the technical documentation and services. The third factor making it difficult to determine directions and volume of technology exports is the lack of component specifications of contract prices. It makes it often impossible to determine the exact value of exported technologies.

The Federal Institute of Statistics (Belgrade), however, published in 1978 data concerning exportation of Yugoslav technologies. It was a percentage division of the number and the value of contracts concluded in 1976 with the three groups of countries discussed above.

	Developing countries	Socialist countries	Developed countries	Total
Number of Contracts	12.5	11.0	76.5	100
Value of Contracts	19.6	16.5	63.9	100

Having in mind the earlier mentioned doubts concerning a possibility of determining directions and volumes of technology exports, we should consider this division a derivative of the commodity exports rather than straightforward statistic suitable for the purpose of this report.

Nature of Technology Supplies

General offer of the Yugoslav Industry

The Yugoslav Chamber of Economy indicates about 130 enterprises offering some 200 technologies to the prospective users, mainly in developing countries, in their catalogue issued in 1978. The enterprises represent the following industries:

- Metal processing industry - 47 enterprises, including automobile industry, agricultural machinery, machine tools and tools industry and house appliances industry
- Chemical industry - 25 enterprises, including cosmetics, pharmaceuticals and chemicals
- Food processing - 13 enterprises
- Construction and building materials industry - 11 enterprises
- Electric industry - 7 enterprises.

The other enterprises belong to: coal-mining, petroleum processing, non-ferrous metallurgy, building materials, agriculture, textile industry, wood processing and others.

Although the above catalogue was issued in 1978, about 80 per cent of its contents is still up to date, according to the information received from potential technology exporters while preparing this survey.

A large part of technologies supplied by Yugoslav firms are those connected with construction of industrial plants and civil engineering works.

In 1979, Yugoslav firms were conducting this type of activity in 48 countries of which 13 were in Africa, 15 in Asia and 13 in Europe. There were mainly civil engineering works with low participation of specialized equipment, 5 to 7 per cent of them were based on foreign documentation and technologies.

According to "International Construction Week" and "Engineering News Record" (USA) statistics, based on contract values in 1978, five of Yugoslav firms were on the list of 168 world leading construction firms from 34 countries.

These were: Ivan Milutovic, Energoprojekt, Hidrotechnika, Ingra and Mavrovo.

In 1979, the total value of Yugoslav civil engineering contracts abroad amounted to $US 1.25 billion out of which 70 per cent were in developing countries.

An intensive transfer of technology to developing countries could be seen in the area of agriculture. It is executed through the co-operation of Yugoslav enterprises with FAO or on the basis of direct government-to-government agreements.

There are about 100 projects now under implementation. They concern both agriculture technologies and food processing. These projects include also irrigation systems and land reclamation works.

At the end of 1979, the value of above projects was estimated at about $US 1.3 billion.

2.5 Promotional System

Allocation of foreign exchange

Because of the shortages of foreign exchange in the past few years, various measures have been introduced to stimulate exports and induce enterprises to economize on imports. Prior to the dinar devaluation in mid 1980, there was a combination of premium on certain types of exports, import duties and a system whereby enterprises needing foreign exchange had either to earn it or enter into agreements with enterprises with surpluses to obtain access to foreign exchange.

Such agreements were co-ordinated through Communities of Interest (SIZ) for Foreign Economic Relations at the republic or at the provincial level.

Since dinar devaluation, while export premiums and import duties have been reduced, the system of exchange allocation, if anything, has been made more rigid and each enterprise is now forced to earn foreign exchange to cover its needs.

Research and development incentives

In order to stimulate R and D in the enterprises, special provisions have been foreseen, namely:

- tax reduction for investments in R and D
- duty-free import of supplies serving R and D purposes
- a variety of depreciation schemes for R and D facilities of tangible and not-tangible basis (know-how)
- reduction of income tax for scientific enterprises.

Though these provisions should be of a considerable value to the enterprises, the current situation is not satisfactory because, according to

the estimation of the Institute for Industrial Economies in Belgrade, only 20 per cent of the total number of domestic patents (1966-1976) originated in industrial enterprises and research institutes, while 80 per cent resulted from individual efforts.

Promotions through credit system

In addition to the arrangements explained above it is necessary to add that in 1979 a special export bank - The Yugoslav Bank for International Economic Co-operation - was established replacing the previous Export Insurance Fund. Its operations are guaranteed by The National Bank of Yugoslavia (NBY).

The Yugoslav Bank for International Economic Co-operation is granting supplementary credits to the exporting enterprises, and in particular, exporting capital goods and ships. The credits are available for periods ranging from three to ten years, at different interest rates.

Export to developing countries is stimulated by a lower level of interest rates.

The Export Insurance Fund which was operated before, provided credits amounting to $US 1.6 billion during eleven years of its activities which resulted in export business worth $US 2.5 billion. The Yugoslav Bank for International Economic Co-operation intends to concentrate itself during the next five years, on financing exports of machinery, transport equipment and construction services, which currently account for a quarter of all exports. It is expected that their value will reach $US 20 billion in the 1981-1985 period.

Chapter III

TECHNOLOGY EXPORTS FROM YUGOSLAV FIRMS - CASE STUDIES

The earlier chapters describe the economic situation in Yugoslavia, directions of industrial development, as well as forms and directions of technology exports on the grounds of data compiled from sources published by the Federal Institute of Statistics, Belgrade, the National Bank of Yugoslavia, OECD, World Bank and other organizations mentioned in the text of previous chapters.

This chapter presents results of individual interviews with companies that answered the prepared questionnaire either in writing or in the course of direct discussions with the UNIDO consultant during his fact-finding tour of these companies. The questionnaire constitutes the Appendix 1 to this survey. The questions were to clarify the following basic problems:

1. What are the main characteristics of the surveyed companies?
2. What were their motives of exporting technology?
3. What is the impact of export activities on the development of the the company?
4. What is the impact of the existing promotional system on the development of technology exports?

Methodology of sampling

The questionnaire was sent to companies selected basically from the catalogue entitled "Yugoslav Technologies Available for Transfer, 1978" published by the Yugoslav Chamber of Economy, Belgrade. The questionnaire

together with a covering letter explaining the purpose of the UNIDO survey was sent to 100 companies selected from this catalogue. It was the intention to obtain a possibly broad representative sample of small, medium and big companies representing possibly a large scope of production and technical services. It was also attempted to obtain a possibly equal representation of separate industrial sectors.

Suggestions and advice of the Yugoslav Chamber of Economy, as well as of the Chamber of Economy of the Socialist Republic of Croatia, the Chamber of Economy of the Socialist Republic of Slovenia, the Administration for International Scientific, Educational, Cultural and Technical Co-operation of the Socialist Republic of Serbia, and the assistance of the International Center for Public Enterprises in Developing Countries in Ljubljana proved very helpful in completing the list of companies to be surveyed.

The questionnaire produced 14 answers by mail. Other answers were obtained through direct interviews. The interviews were conducted with 23 companies including some of those that had already given answers by mail. 29 companies were selected altogether.

The present survey describes only some trends appearing in the Yugoslav exportation of technology in 1974 - 1980 because of the fact that it is based on the sample composed of 29 companies. Any more detailed conclusions or observations would require a further research in depth.

3.1 Characteristics of the Sample

All the 29 surveyed companies represented the public sector. They were domiciled in Croatia (14), Slovenia (8) and Serbia (7).[1/] A majority of them were manufacturing companies. Some of them were engineering, consulting or R and D organizations.

Table 13

	Field of Activity	Number of Cases
1.	Manufacturing companies	21
	- machine building	6
	- chemistry and rubber	4
	- building materials	1
	- shipbuilding	2
	- electronics	1
	- fine mechanics	
	- pharmacy	2
	- furniture	2
	- textiles	1
	- beverages	1
2.	Consulting and engineering	4
3.	R and D	4
	TOTAL	29

1/ Selection of regions where surveys have been carried out have been done in an arbitrary manner on a basis of industry concentration.

Some of the companies belong to leading in their sectors of industry. Some of them are small and medium size. Such diversity makes it possible to analyse results of export activities of big companies usually having large possibilities of approaching their customers and having clear competitive edge, as well as analyse performance of medium and small companies. In the latter case, there may appear certain analogies to the situation of similar companies in other developing countries enabling to observe similarities and difficulties and to suggest possible assistance in organizing export activities.

A more detailed description of the scope of activities of these companies is given in Annex 2, and therefore, only a general description of some groups of companies is given below. Among the companies of the machine building industry group there are three that may be considered the leading manufacturers in their sector:

PRVOMAJSKA - machine tools and accessories, control instruments, reduction gears;

JEDINSTVO - equipment and complete installations for food processing;

RADE KONCAR - power generation installations, electrical rotating machinery, transformers, electric locomotives.

The chemical industry is represented, among others, by one of the biggest and oldest chemical companies in Yugoslavia - KEMIJSKI KOMBINAT CHROMOS producing paints and varnishes, printing inks, pigments, organic dyes, agricultural chemicals and synthetic resins. The rubber industry is represented by SAVA-car, tractor, truck and bicycle tires, conveyor belts, hoses and synthetic leather.

Among companies producing ships' equipment, the VULKAN corporation (deck equipment, overhead cranes) is an important manufacturer, while the 3MAJ company (ships, diesel engines, steel constructions) is leading in this sector. KRKA (pharmaceutics, cosmetics) and ZDRAVLJE (drugs, cosmetics, extracts of herbs) are, in turn, leading producers among pharmaceutical companies. In the Yugoslav engineering companies group, the companies listed below are undoubtedly among the most experienced in their sector and certainly are good representatives of this field of activity so important for transfer of technology:

INA INZENJERING - member of the INA Group (chemical and petrochemical industries);

PKB AGROINZENJERING - agro-industrial consulting and engineering;

INDUSTROGRADNJA - civil engineering, package projects, construction.

The R and D organizations of Yugoslavia are represented by:

INSTITUT ZA KUKURUZ (Maize Research Institute);

RUDARSKI INSTITUT ZEMUN (underground and open cast mining, mineral dressing);

IMUNOLZSKI ZAVOD (studies, research and production of immunobiological substances);

METALURSKI INSTITUT HASAN BRKIC (research and development in iron and steel).

The employment in the surveyed companies was as follows:

Table 14

Size of companies (according to the number of employees)

	Up to 200	201-500	501-1500	1501-5000	Over 5000
No. of cases	2	10	7	6	4

It should be noted that a majority of these companies are relatively big according to Yugoslav standards (see chapter I). Only one company recorded a decrease of employment during the surveyed period (1974-1980). The number of employees in all the remaining companies was increasing. The rate of its growth varied between a few per cent to nearly a hundred per cent during this period. R and D organizations, consulting and engineering companies were characterised by the most rapid growth of employment. A relatively rapid growth of employment was also recorded by the pharmaceutical and chemical companies under survey.

The years of operations of the surveyed companies calculated from the year of their establishment is presented below:

Table 15

Years of operations of individual corporations

	Before 1939	1945-1954	1955-1971	After 1971
No. of cases	5 x/	16	7 xx/	1

x/ Including two companies established in the XIX-th century: KEMIJSKI KOMBINAT CHROMOS was established in 1890, and JUB in 1875.

xx/ Some of the companies were established as a result of mergers among companies existing for several decades. The new companies utilise the experience gained by their predecessors. Among such companies, we may include INA INZENJERING which, although established in 1964, utilises the experience of companies established in 1882 and in 1952.

Organizational development strategy

A majority of companies (17) envisage production primarily for the Yugoslav market in the future, and all the 17 companies expect to maintain the present level of exports, or an increase of exports. Some of the surveyed companies wish to commence exports of new technologies or products.

Seven (7) of the companies envisage a similar level output for the domestic market and for export in the future. Five (5) of the companies envisage a major stress on export activities.

There were seven (7) manufacturing companies, four (4) consulting and engineering companies and one (1) R and D organization in the two latter groups.

Table 16

Sources of technology exploited (number of cases)

	Manufacturing companies	Consulting and engineering companies	R and D organizations	Total
1. Growth based exclusively on internally generated technology	8	2	2	12
2. Growth supported by importation	10	2	1	13
3. Growth based mainly on importation	3	-	1	4
TOTAL	21	4	4	29

It results from the above table that in the case of manufacturing companies the growth of the majority of them was supported by imported technologies (10). It is stressed, at the same time, that the number of companies basing their growth on internally generated technologies (8) was much higher than the number of those basing their growth mainly on imported technologies.

Among the consulting and engineering companies, there was the same number of those basing their activity on imported technology, and those basing on the internally generated technology, while a majority of R and D organizations based their growth on internally generated technologies.

Among the 8 manufacturing companies claiming a total technological independence, one was established in 1875, another in 1936, another one in 1945, two in 1946 and the other two in 1948 and the remaining one in 1953. Five (5) of them belong to the machine building and precision industry, two (2) to the chemical industry and one (1) to the electric industry. Among the 3 manufacturing companies claiming that their growth is based mainly on importation, one represented shipbuilding industry, one furniture industry and one - building materials industry.

Table 17

Range of changes in the imported technology

	Content	No. of cases
1.	No change	5
2.	Minor changes	4
3.	Significant change	7
4.	Radical change	1
	TOTAL	17

Among motives behind these changes the following were dominating (according to frequency of their quoting):

- savings on costs
- lack of certain materials
- improved performance
- consumer reaction
- market needs
- improvement of environment conditions
- saving of energy.

More than a half (9) of these companies maintained that they did not introduce any, or only minor changes/improvements.

The lack of changes/improvements in purchased technology can be explained either by the reservations made by the owner of the technology for the period of the validity of the contract, or by the lack of stimuli towards an introduction of changes and improvements, a high cost of these changes and improvements, or finally with a lack of own solutions improving the purchased technology (this concerns the cases when an introduction of changes is formally possible).

It should be stressed that all the mentioned companies (9) have their own R and D personnel or can avail themselves of services granted by an R and D organization.

Among the 8 companies that introduces significant or radical changes, 6 declared a relatively minor cost of this operation, 1 - a medium cost and 1 - a significant cost.

Research and development work within organizations

19 manufacturing companies informed that they have specialized groups conducting R and D activities. Two of them had R and D departments formed in 1981. Two companies stated that they did not conduct any R and D activities.

Among the companies that conducted their own R and D activities, four availed themselves additionally of services granted by a specialized research institute catering for the whole industrial branch.

The number of personnel engaged in R and D activities ranged most often between 20 and 50 persons (8 companies). 6 companies stated that the number of persons concerned with R and D activities exceeds 50, while two companies had teams composed of less than 20 persons. The remaining manufacturing companies did not state the number of persons engaged in R and D activities. It was difficult to establish explicitly the ratio between the number of employees and the number of persons engaged in R and D activities. On the other hand, a majority of companies (9) that answered the question on R and D expenditures estimated that they constituted about 1.2 - 1.3 per cent of the running cost of the company.

9 of the manufacturing companies declared that they are patent or patent application holders registered mainly in Yugoslavia. All the consulting and engineering companies conducted research activities. Two of them co-operated with specialized research institutes. Three declared that they are patent holders and one of them elaborated apart from patented solutions certain "improvements" and "useful proposals" utilized in factories throughout their sector of industry. One of the companies stated that the cost of its

research work amounted to 2 per cent of incomes, the other declared this figure as 5.8 per cent, while another estimated this cost at 4 per cent of the total expenditure.

Among the R and D organizations under survey, one declared that 1/3 of expenditures is designated for R and D and the whole organization is self-financing. Another organization stated that 1/3 of its personnel and 40 per cent of expenditures are engaged in R and D. In the third organization, 22 per cent of the personnel were concerned with research into future solutions in its sector of industry. The fourth stated the figure of $US 3 million as R and D investment compared with the value of production $US 4.1 million in 1981. Three of the surveyed organizations were patent holders.

3.2 Characteristics of Technology Exports

Motives for entering technology export markets

In spite of a considerable development of many sectors of the Yugoslav industry, the industry is not export oriented. It is mostly concerned with catering for the domestic market and/or import substitution.

On of the very important motives for stimulating export activity quoted by the surveyed companies is the necessity of obtaining transferable foreign exchange by Yugoslav companies for purchase of either some specialized equipment necessary for development of production or components and raw materials necessary for day-to-day production. This motive was quoted nine times and is reflected under the heading "Other" in the Table below.

Table 18

Basic motives for exportation x/

Motive	No. of Cases
1. Higher profits abroad	6
2. Excess capacities	9
3. Corporate policies	11
4. Offer of a government subsidy	4
5. Need to circumvent tariffs and quotas	3
6. Exploit accumlated experience and know-how	17
7. Threats to existing markets	2
8. Other	12

x/ The figures cannot be added as the companies quoted several reasons at a time.

The exportation resulting from the wish to exploit the accumulated experience and know-how is the most frequently quoted motive in the Table above. The experience embraces both self-generated original technologies and the knowledge resulting from purchases and utilization of foreign technologies. Among the remaining frequently quoted motives, there are: existence of excess capacities which was quoted by consulting and engineering companies (2), R and D organizations (2) and manufacturing companies (5) along with corporate policies which should be considered rather a conglomerate of all the motives quoted in the Table above.

Sophistication of the export work in comparison to the domestic performance

Among the 16 manufacturing companies that have given an answer to the above question, 13 stated that there is no difference between export and domestic production and 3 were of the opinion that the export work is less sophisticated than the domestic performance. A half of the consulting and engineering companies did not see any difference between the export and domestic performance, while the other half considered the export performance more sophisticated than domestic. Two of the R and D organizations did not find the export performance any different than the domestic performance, while two considered it less sophisticated.

As far as a fresh technological effort required to launch an export project is concerned, the obtained results are as follows:

Table 19

Effort	No. of Cases
1. No adaptations	6
2. Minor adaptations	11
3. Significant changes in existing technology	3
4. Additional R and D work	4
TOTAL	24

Among companies that introduced changes in their technologies, 8 quoted requirements of the foreign customer as a reason. The other causes for changes were the local climatic conditions and the need for an adaptation to local raw materials. Some of the engineering companies stated that a preparation of designs for export required extra studies, a more detailed engineering and a participation of best specialists available.

Exporter's advantage over his international competition

According to the companies that answered this question, the following should be included among the advantages (according to the number of answers):

1. Quality of technology - 16
2. Cost of technology - 9
3. Political, commercial and cultural links - 11
4. Experience in dealing with foreign buyers - 4.

(The figures cannot be added because the companies stated several reasons at a time.)

The following were mentioned among the remaining advantages:

Sophisticated type of production and specific original know-how (3), permanent links with traditional customers (2), good credit conditions (1), lack of any special advantages - everything depends on negotiations (1), participation in a joint venture (1). 6 companies did not answer this question. It is characteristic that manufacturing companies most frequently quoted "quality of production" as the main advantage, while engineering companies and R and D organizations named good co-operation with the customer and attractive know-how.

Speaking about the role of political, commercial and cultural links, many of the companies had in mind the particularly close links between Yugoslavia and developing countries which facilitate exportation for Yugoslav companies.

Nature of the exporter's disadvantage vis-a-vis foreign competitors

According to the companies that answered this question, the following should be considered as major disadvantages (number of answers) (the presented figures cannot be summed up because the companies mentioned several factors simultaneously in some cases):

1. The brandname of the competitor was known to the potential customer - 5
2. Better financial conditions offered by competitors, better credit terms - 4
3. Lower prices quoted by competitors - 3 (two companies stressed that the competition quoted unjustified low prices)
4. The competition presented their quotation earlier and offered earlier delivery times - 2

5. The competition offered a more modern technology - 2

6. The lack of proper marketing - 2.

Moreover, the surveyed companies mentioned also such disadvantages as: better experience of competing companies, support granted to competing companies by their governments. One company did not see any difference between the advantages enjoyed by the Yugoslav and the competing companies. 10 companies did not answer this question.

Presence of foreign co-operation in exports

Thirteen companies informed that they maintain various forms of co-operation with foreign partners: in three cases, it was joint ventures, in four cases, the companies purchased components and raw materials from their permanent foreign partners, in one case, the co-operation embraced packaging and distribution of commodities abroad, in one case, it was a joint construction activity, in still another case, there was a joint production of equipment. Two companies informed that they made attempts to commence a joint production with a foreign partner. One company permanently co-operated with foreign classification companies. As far as the foreign partners are concerned, they represented private entities, state enterprises and government institutions.

Organization of export activities

Among answers to the question about the first contact with a foreign customer and the manner in which the information about the potential customer reached the company were the following:

1. Direct contact (mail, personal) - 11 answers
2. Through the intermediary of Yugoslav trade organizations or official representatives abroad - 9
3. International fairs, symposia, congresses - 6
4. Through the intermediary of the Yugoslav Chamber of Economy - 5
5. Intergovernmental contacts and agreements - 3
6. The customer arranging initial contacts - 3.

Among the remaining methods of finding a potential customer and establishing initial contacts, the following were mentioned:

- marketing analyses
- assistance of Yugoslav banks
- exchange of experts and training of foreign personnel in Yugoslavia
- through UN and other international organizations
- foreign agents.

Four companies did not give an answer to this question. As far as the future prospects are concerned, 17 companies informed that they are negotiating new projects, placed new quotations, have chances to win new customers or envisage a continuation and development of commercial relations with their present customers. The remaining companies did not give an answer to this question.

The question concerning evaluation of the quality of co-operation with their foreign partners was answered by 13 companies. They all considered this co-operation good or without any major problems. The remaining respondents did not comment on the subject.

Among examples of good co-operation, there were quoted: counter-supply of parts and components for an approximately equal value, purchase of sophisticated equipment, activities of mixed capital companies.

Exchange of personnel, education of foreign students, post graduate studies of foreign specialists in Yugoslavia and organization of international symposia were also mentioned. Answers to this question often overlapped with answers to the question No. 19g of the questionnaire, that is foreign co-operation.

Financing of exports - a majority of companies that answered this question stated that the financial conditions were based on a letter of credit or cash against documents - 6 answers. 5 companies informed that their export was supported by credit from Yugoslav banks. The four companies informed that their transactions were partly financed from abroad. Among them, there were three mixed capital companies established abroad.

3.3 Technology Export and Company Development

15 companies were of the opinion that indirect financial earnings associated with exports of technology exist, while 4 companies did not encounter this phenomenon.

The remaining companies did not give an answer to this question. Among indirect exports related to exports of technology, the following were mentioned: complementary exports of raw materials, products and equipment, export of technical services, occasional supply of management and technical expertise, feasibility studies and pre-design.

Feed-back of technology export to domestic technical activity

14 companies gave an answer to this question. 6 of them were of the opinion that the export of technology exerted an impact on an introduction of additional adaptations to their own technologies. It was also stated that exports favourably influence the quality of their own production, and causing an increase of experience motivation for a further development. There was one case when an adaptation of technology to local (customer's) raw materials led to an elaboration of a completely new technology.

The question concerning perspectives of technology exports in the future was positively answered by 21 companies. 14 companies considered these perspectives as "good". A number of the companies considered that there is an interest in their technologies in developing countries in particular. Some of the companies hoped to sell technology as a result of an earlier sale of commodities.

3.4 Technology Export and the Promotional System

According to answers obtained, the assistance granted to exporting companies should be divided into the following categories:

1. A government tax reduction system for investments in R and D, reduction of income tax for scientific enterprises, a duty-free importation of supplies serving R and D purposes - 7 answers;
2. Export permium - 5;
3. Export credits granted by Yugoslav banks - 4;
4. Financial aid - 4.

(The above figures could not be summed up because some companies gave several answers.)

Among other forms of assistance, the respondents mentioned also assistance granted by the Yugoslav Chamber of Economy (1) and assistance by private persons (1).

6 companies stated that they encountered no or a negligible assistance in exports of technology. 5 companies did not answer the question.

None of the companies answering the question about the real value of the aid, considered it as "decisive".

9 companies considered it "important". A majority of them were those that were granted credit or a financial aid. 5 companies considered the assistance as "of medium importance", and 4 as "of no importance". It can be generally concluded that the promotional system is insufficient, while the question concerning directions of improvement of the promotional system produced the following answers:

Table 20

Item	No. of cases
1. More information	23
2. More financial aid	10
3. More financial incentives	5

(The answers cannot be summed up because the companies were giving more than one answer.)

3 companies did not give an answer to this question.

The postulate for more information was very often expressed in the form of stressing the need for a marketing research in depth, supplying information on potential markets and customers. There is also a demand for information on new technologies, and also on possibilities of transaction financing.

A possible role of international organizations. Co-operation with the UNIDO/INTIB system

Among the companies that answered the above question, 8 were ready to co-operate with international organizations of the UN family (UNDP, UNIDO). 8 companies expressed their wish to obtain information on prospective customers, new UN projects and markets where they could sell their technologies or commodities. 2 companies informed about their permanent co-operation with FAO and WHO. 2 companies did not see any role for international organizations. 2 companies expected information about new developments. 7 companies did not answer the question. A majority of the surveyed companies (22) expressed their readiness to co-operate with the Industrial and Technical Information Bank on an occasional basis.

3.5 Conclusions

Statistical investigations and analyses presented in this survey are based on the selected sample of 29 companies and are closely related to the character of questions in the questionnaire. Their general value is, therefore, as representative, as the surveyed sample is.

1. The main characteristics of the exporting organizations

1.1 A majority of the surveyed companies enjoys a long manufacturing, consulting or engineering experience. 1/5 of them were established before World War II, and nearly a half existed longer than 30 years. Their development ws connected mostly with deliveries onto the Yugoslav market, and their export activity was commenced, as a rule, only after achieving a considerable production and marketing experience at domestic market.

1.2 The marketing research, contacts with potential customers, advertising activities and formalities related to negotiating and concluding contracts are performed by specialized foreign trade organizations on behalf of a majority of the surveyed companies. The assistance of these organizations is vital for Yugoslav producers, especially when the producer is a small or a medium-sized company that does not have the necessary personnel or financial means at its disposal to organize its own sales network.

1.3 The activities of the surveyed companies were supported, to a considerable extent, by imported technologies. This refers both to manufacturing companies (more than 50 per cent) and to a half of consulting and engineering companies. It was proved that imported technologies in connection with the experience gained by the companies became a driving force of their development.

A major part of the companies did not introduce any changes in the purchased technologies. Sometimes, these changes were just negligible. This may testify about an insufficient performance of the companies' R and D services, or about an existence of deterrants of an economic character, or finally, about a lack of agreement of the licensor or patent holder of the purchased technology.

All surveyed R and D organizations and a half of the surveyed consulting and engineering companies based their development on internally generated technology which may indicate that their personnel is better qualified than that of manufacturing companies.

2. Basic characteristics of technology exports

2.1. One of the important considerations stimulating Yugoslav companies is a considerable accumulation of experience, know-how and a considerable number of qualified personnel ready to grant technical services. This was confirmed by the companies themselves. The possibilities of know-how and technology sales depend, of course, on the scale of their application and practical experience, commercial conditions offered to potential buyers, speed of acting and good references.

2.2. Another motive that can be included among the most important is the need to obtain financial means by the Yugoslav companies. These means collected in the transferable currency are designated for purchases of certain raw materials and components for production of commodities or specialized tools, instruments or equipment. It is the most secure source of import financing for Yugoslav companies in situations of strict import restrictions.

2.3. The traditionally good relations between Yugoslavia and other developing countries means a considerable assistance in the Yugoslav exports of technology. Developing countries are, as a rule, an important potential receiver of consulting and engineering services and of complete construction projects. However, their demand for licenses and sophisticated know-how in the fields of chemistry, mechanics and electronics is less distinct. Yugoslav joint venture companies abroad are established primarily in those countries.

2.4. Among factors limiting export activities, the following can be mentioned:

a. limited possibilities of entering markets where the competing companies have been active for a long time and have established their "brand name" and overall goodwill;

b. limited activities and competitiveness of Yugoslav companies resulting from:

- insufficient current information on export possibilities (marketing),
- numerous cases of limited prefinancing possibilities of various ventures in comparison to foreign competition,
- differences of promotional system in comparison to the system applied by competition.

3. Technology export and company development

As it results from the information presented in the previous chapters, exportation is not a basic form of activity in a majority of Yugoslav companies. A development of exports is, therefore, only one of several factors influencing the development of companies.

It should be concluded, nevertheless, that apart from concrete advantages in the form of freely convertable currency inflows, the export activity exerts an impact on the quality of production, development of research for modernization of applied technologies and an increase of experience in international bidding, international financing and in overall dealing with foreign customers.

4. The value of the existing promotion system

The value of assistance granted to Yugoslav companies should be considered insufficient in the present economic situation and the strong competition on all markets.

Two principal problems require streamlining. They are the information on potential customers and financial assistance to exporting companies and companies that have a good chance to commence technology exports. One gets the impression that an improvement along these lines may become essential for increasing exports of technology.

Final Remarks

It should be concluded that Yugoslav companies have alread gained sufficient experience to be able to play an increasingly important role among exporters of technology.

A further development of the Yugoslav exports of technology can be stimulated by an increased government activity aimed at an enlargement of assistance for exporting companies. There is still a vast field of improvement for R and D services performance in companies. They should combine their own experiences with those represented by purchased technologies to elaborate new technologies attractive to prospective customers.

The advantageous situation of Yugoslavia in trade with developing countries opens good chances of success in exports of technology.

An important role should be played by international organizations, including UNIDO, which should become a source of information on existing technologies for Yugoslav companies. On the other hand, the information on Yugoslav technologies available for transfer could be successfully utilized by the UNIDO/INTIB system.

Finally one should mention the effectiveness and the results of the questionnaire replies which lead to the following findings.

Written replies were received from 19 companies (all of whom were later interviewed and 10 companies indicated that they do export technology either in the form of patent or know-how licences or by way of consulting or engineering prices. Only two companies (RADE KONCAR and the Metallurgical Corporation HABAN BRUIC) indicated values of those exports (10.4 and 0.125 million respectively) with exports going to Africa and East European countries.

Other countries stressed ad hoc, sporadic exports of technology, which are confirmed in the present survey.

In view of the above results, it seems that more preparatory work is to be done in the future in Yugoslavia prior similar surveys are taken so that results will be more tangible.

ANNEX No. 1

QUESTIONNAIRE

On Technology Exports
From Yugoslavian Firms
1974-1989

PART I = General Information

1. Name of Organization _____

_____

_____

2. Postal Address _____

_____

_____

_____

3. Cable Address _____

Telex _____ Telephone _____

4. Name and Title of Head of Organization _____

_____

_____

5. Name and Title of Contact Persons:

_____

_____

_____

_____

_____

_____

_____

PART II = Basic Characteristic of Organization/Enterprise

6. Year of Establishment _____

7. Type of Ownership (majority-owned foreign subsidiary; majority-owned domestic corporation; public entity; private entity; R+D institution; others) Please underline as appropriate.

_____

_____

8. Product/Service/Range - Please Specify:

_____

_____

_____

_____

_____

_____

9. Overall Employment and Production Value according to Table 2:

Table 2: Employment (in number of employees) and production value (in US$ million)

	1974	1975	1976	1977	1978	1979	1980
Employment							
Value of Production							

10. Table 1: Export Performance in 1974-1980 in US$1,000

Country Of Destination	1974	1975	1976	1977	1978	1979	1980	1974-80 TOTAL
USA/Canada								
Western Europe								
Socialist Countries of Europe								
Latin America								
Africa								
Middle East								
Austra-lia/Japan								
Rest of Asia								
T O T A L								

11. General Profitability Performance:
(Low, Satisfactory, Good, Very Good)
Please underline as appropriate.

12. Organizational Development Strategy (Please specify in general terms regarding specialization, export orientation, etc.)

13. Sources of Technology Originally Exploited within the Organization

14. If imported, whether the organization introduced some changes in it: No, Minor, Significant, Radical. If possible give a short description.

15. Basic motives behind changes: Cost Savings, Market Needs, Consumer Reaction, Size of Market, Improved Performance, Non-Availability of Certain Materials, Skills, Etc., Others. Please specify.

16. Costs and difficulties in making improvements: Minor, Significant, High - Please specify.

17. R+D works within the organization: No, Minor, Significant - Please give a brief summary as to number of persons employed in R+D, investment ratio, number of patents registered.

PART III = Characteristic of Technology Exports

18. Motives for entering the technology export market:

(a) higher profits abroad;

(b) existence of excessive capacity;

(c) corporate policies;

(d) offer of government subsidy;

(e) need to circumvent tariff and quotas in export markets;

(f) exploit accummulated experience and know-how;

(g) threats to existing markets;

(h) others (if possible, please specify).

19. Nature of Technology Export:

(a) Table 3: Annual total value of technology exports in US$(1) and number of contracts(2) according to -

Specification	1974	1975	1976	1977	1978	1979	1980	1974-80
1. Patent License (1) (2)								
2. Know-How License (1) (2)								
3. Consulting and Engineering Serv (1) (2)								
4. Technical Assistance (1) (2)								
5. Composite Licenses (1) (2)								
6. Turn-key Plants (1) (2)								
7. Direct Foreign Investment (1) (2)								
8. Others (1) (2)								

(b) Table 4: Directions of exportations according to:

Country Of Destination	1974	1975	1976	1977	1978	1979	1980	1974-80 TOTAL
USA/Canada								
Western Europe								
Socialist Countries of Europe								
Latin America								
Africa								
Middle East								
Austra-lia/Japan								
Rest of Asia								
T O T A L								

(c) Sophistication of the export work in comparison to domestic: No Difference, Less Sophisticated, More Sophisticated (if possible, please give a short explanation of your opinion).

_____

_____

_____

_____

_____

(d) How much fresh technological effort was required to mount the export project: None, Minor Adaptations, Significant Changes in Existing Technology, Additional R+D Works (if possible, please specify in details).

(e) What was the nature of the exporter's advantage over its international competitors: Cost of Technology, Quality of Production, Scale, Political, Commercial or Cultural Links, Experience in Dealing with Foreign Buyers, etc., Others (please specify in details).

(f) What were the disadvantages vis-a-vis foreign competitors (in terms of cost, brand name, experience, etc.), please specify briefly.

(g) Presence of foreign collaboration (please specify the extent).

20. Nature of technology importer (Private Entity, State Owners/Enterprise, Government Institution, Etc.) please specify briefly.

21. Organization of export activity:

(a) How foreign markets were first explored (please specify):

(b) How information on potential customer was obtained (please specify):

(c) New bids were put in (please specify):

(d) How foreign collaborations were found (if any):

(e) How did collaborative arrangements with foreign firms work (please give a short description):

(f) How was financing arranged (please specify):

(g) What were the major handicaps?

PART IV = Technology Exports and Company Development

22. Indirect financial earnings associated with technology exports/provisions of complementary exports of capital and intermediate goods, occasional or continuous supply of management, technical expertise, subsidies from government and financial institutions, others (please underline as appropriate).

23. Feed-back of technology export to domestic technological activity: through additional adoptations, collaborations with foreign firms, etc. (please specify).

24. Perspectives of technology export in the future (please give a brief summary).

PART V = Technology Export and Promotion System

25. Did you receive any help in technology export project from:

(a) government promotion system - financial, human, etc.;

(b) private institutions;

(c) others (please give a brief summary)?

26. If so, what was the real value of the aid (Decisive, Important, Non-Important (if possible, give additional explanations)?

27. What would you suggest regarding the improvement of the promotional system: i. e., more information, financial aid, financial incentives, others (please specify your own ideas)?

28. What is the possible role of the international organizations: regional UN family, etc.?

29. Are you ready to co-operate with UNIDO/INTIB system:

(a) on a continuous basis;

(b) on occasional basis;

(c) others?

(please give your own suggestions, if possible)

/hmpc
25/5/81

ANNEX No. 2

List of Companies and Description of their Activity

Manufacturing Companies

1. Name of the company: AUTOMATIK

Postal address: Tosin Bunar 41

11080 Beograd - Zemun

Telex: 11257

Year of establishment: 1948

Description of activity:

Production of equipment for road and rail vehicles namely:

- windscreen wipers (brushes and arms)
- pneumatic wiper motors
- pneumatic activating mechanisms for bus, tram, railway coach doors
- direction indicators

The above products have been manufactured for more than 30 years. Wipers and pneumatic wiper motors are used by Yugoslav's biggest bus, truck and tractor producers (FAMOS, TAM, IKARUS, TAZ). AUTOMATIK offers the following kinds of technology:

- technical documentation of above products comprising design drawings, process documentation and production standards
- technical assistance comprising: organization of the production enterprise, market analysis, training of personnel, supervision of the production, planning and financing procedures.

AUTOMATIK technology allows the production of small and medium series of the following:

- wipers	1,000,000 pcs/p.a.
- pneumatic wiper motors	50,000 pcs/p.a.
- pneumatic door mechanisms	7,000 pcs/p.a.
- direction indicators	3,000 pcs/p.a.

2. Name of the company: BORAC
Industrija precizne mehanike, elektro-mehanike i metalnih proizvoda

Postal address: Svatozara Markovica 87
Beograd

Cable: BORAC

Year of establishment: 1947

Description of activity:

Production of:

- industrial manometers, vacuum gauges
- coffee express apparatus
- coffee grinders
- dish warmers
- watermeters
- water pressure valves

BORAC offers supply of detailed engineering of all types of industrial manometers, vacuum gauges of low, medium and high pressure types.

Design according to Yugoslav and DIN Standards. The company offers technological specifications, consulting in selection and purchase of the required manufacturing equipment. Technical assistance in marketing, investment studies as well as training of customer's personnel.

BORAC has experienced the technology of manometers and gauges production of optimal capacity about 100,000 pieces yearly. The same type of technology is available for watermeters production.

3. Name of the company: CHROMOS
SOUR Kemijski Kombinat

Postal address: Boskoviceva 33
41000 Zagreb

Telex: 21-358

Year of establishment: 1890

Description of activity:

Production of the following chemical products:

1. Paints and varnishes for all sorts of surfaces
2. Printing inks for all printing techniques and surfaces
3. Alkyd and unsaturated polyester resins
4. Synthetic resins based on phenol and furan
5. Flooring compounds (epoxy, polyurethane)
6. Sealing compounds and acidproof putties
7. Panels for thermal insulation (phenolic foam)
8. Adhesives for building industry
9. Pigment dispersions for painting plastics (polyethylene and polypropylene)

10. Coated abrasives
11. Polymer dispersions
12. Agricultural chemicals
13. Raw materials for detergents
14. Emulsifiers
15. Inorganic pigments
16. Stabilizers for plastic compounds
17. Perfume compositions for soap-detergent-cosmetic industry
18. Additives for foodstuff industry
19. Auxiliaries for textile, leather and paper industry
20. Antifoaming agents.

CHROMOS offers also:

Consulting services:

Preliminary investigations and studies of the justifiability of building new projects, reconstructions of the existing ones, investment programmes with feasibility studies, elaborating feasibility projects and technical documentation, construction plans, documentation, analysis of offers and proposals for the choice of the supplier of equipment and works, organization of the building site co-ordination of the partner's work, supervision of the construction.

Management:

Starting the plant and conducting the test-run, conducting the process and maintaining the plant, personnel training.

4. Name of the company: ELMA

Tovarna gospodinjskih aparatov

i elektromateriala

Postal address: Ljubljana - Crnuce

Telex: 31218

Year of establishment: 1948

Description of activity:

Manufacture of:

- three-phase squirrel-cage motors
- small electric motors for household appliances
- dry transformers
- householding equipment
- small electric apparatus

ELMA offers the following technologies:

- complete project documentation, design data for electric motors
- doucmentation of necessary tools and devices
- investment studies and documentation for construction of electric motors factory
- supervision during construction and start-up
- training of customer's personnel

The same scope of documentation and technical services can be offered for small electric motors with some more services namely:

- marketing
- selection of factory location
- equipment procurement

The recommended capacity of small electric motors factory is about 200,000 to 220,000 motors yearly, depending on market requirements.

The majority of ELMA products and technologies were developed in their Development Institute.

5. Name of the company: INDOS
Industrija transportnih in
hidravlicnih strojev

Postal address: Industrijska cesta 3,
61001 Ljubljana - Moste

Telex: 31563

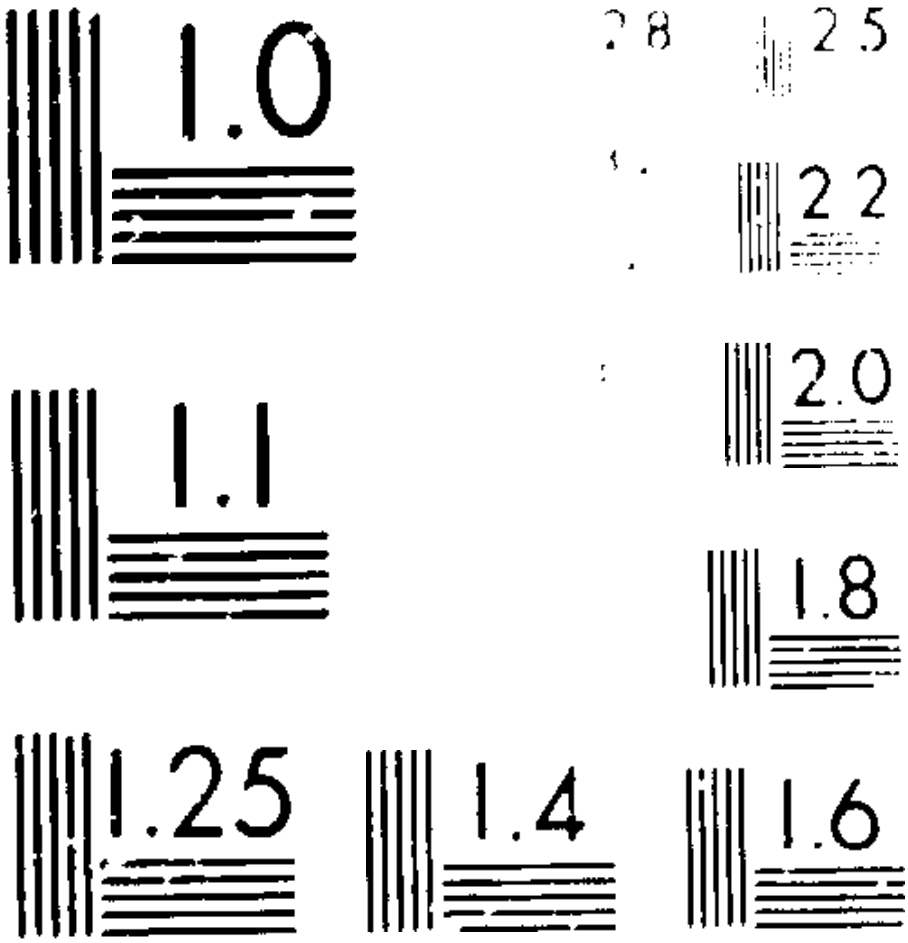
Year of establishment: 1948

Description of activity:

Manufacture of:

- electric fork-lift trucks with the bearing power of 600 kp, 1,000 kp, 1,200 kp, 1,500 kp, 2,000 kp and 2,500 kp
- Diesel fork-lift trucks, with the bearing power of 1,500 kp, 2,000 kp, 2,500 kp, 3,000 kp and 3,200 kp
- gasoline-gas driven fork-lift trucks with the bearing power of 1,500 kp.

The trucks are foreseen to operate in high (9 - 10 meters) storage houses.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INDOS offers the following documentation and services:

- construction documentation for all types of trucks
- all technological procedures practiced in this company (except for those of specialized manufacturers i.e. motors, tyres)
- consulting on purchase of machinery and equipment for above production, including instruments and control equipment
- training of customer's personnel
- consultations on marketing and management of the production enterprise.

The technology offered refers to the annual capacity of 1,500 fork-lift trucks with the lower degree of production automatization and of 3,000 to 4,000 trucks per year when the production is of higher automatization level.

INDOS has a good record of export results of above trucks.

6. Name of the company: JUB
Kemicna industrija

Postal address: 61262 Dol pri Ljubljani

Telex: 31580

Year of establishment: 1875

Description of activity:

Production of:

- paints and components for colouring interior and exterior surfaces
- dispersion roughcasts (acetate and acrylate)

- mastics for smoothing out of the room walls
- dispersion pastes of two types, acrylate paste for building thermoinsulation and acetate paste for pasting of cardboard wall-paper and wood.

JUB offers:

- entire technological documentation, inclusive of control methods
- assistance in training of personnel
- consulting on management

Recommended yearly capacity of production of the above products - 6,000 tons p.a. In 1979 JUB established small size production company (mixed capital) in Nigeria.

7. Name of the company: JEDINSTVO

Postal address: Samoborska 145
41090 Zagreb - Susegrad

Telex: 21134

Year of establishment: 1946

Description of activity:

Supply of equipment and technologies of food processing:

- tomato processing
- peas and green beans processing
- gherkin processing
- fruit juice manufacturing

Milk, bear, sugar, meat and fish processing plants using JEDINSTVO's own technologies and the following equipment produced by this company:

- evaporators
- heat exchangers
- drying equipment
- transport facilities
- centrifuges
- distillation columns
- fermentors
- crystalizers
- pumps
- vessels with agitators
- reactors
- filters and other special equipment units.

JEDINSTVO is the leading company of the Yugoslav food processing industry. On their export list (30 to 40 per cent of production) there are the following countries: Algeria, Cuba, Iran, Poland, Romania and the USSR as main customers and many other countries of Europe, Africa and Asia.

8. Name of the company: KARBON
Chemical Industry

Postal address: Vlaska 67
41000 Zagreb

Telex: 21273

Year of establishment: 1946

Description of activity:

- copy papers
- typewriting ribbons
- teleprinter rolls
- sealing wax
- drawing colours and paints
- writing chalks
- polymer dispersion resins, adhesives
- wall, wood and metal coatings
- leather finish colours

Part of KARBON production is exported to the socialist countries of Europe, Africa and the Middle East.

9. Name of the company: KRKA

Farmacevtika, kemija, kozmetika, zdravilisce

Postal address: 68000 Novo Mesto

Telex: 35713

Year of establishment: 1956

Description of activity:

Production of pharmaceutics:

- semi-synthetic penicilin antibiotics
- oxytetracyclin and bacitracin antibiotics

Manufacture of galenical preparations:

- hard galenic preparation (tablets, dragées capsules, granules)
- semi-hard galenical preparations (salves ointments, suppositories)
- liquid galenical preparations (syropus, solutions, injections)

KRKA produces also organotherapeutics and cosmetics.

The company offers consulting and engineering of the individual production lines for production of above products as well as technology for complete factory.

All necessary types of technical assistance are available.

In 1974 mixed capital production company was established in Kenya.

10. Name of the company: 3 MAJ

Brodogradiliste i tvornica dizel motora

Postal address: Bulevar Marksa i Engelsa 9

51000 Rijeka

Telex: 24137

Year of establishment: 1945

Description of activity:

Production of:

- cargo ships i.e. general cargo ships, dry bulk carriers, tankers, container ships, Ro-Ro ships. Sizes up to 1000,000 GRT
- floating cranes, pontoons, barges, floating hotels, tug boats, floating dredgers
- platforms for submarine oil and gas exploration
- diesel engines
- civil engineering constructions

3 MAJ offers the following technologies:

- design of above ships and equipment

- organization of production
- training of personnel
- supervision of construction or modernization of shipyards

for production of above ships and equipment

- assistance operation and management
- complete data processing services

3 MAJ has worldwide reputation as ships and other marine equipment exporter.

11. Name of the company: MEBLO

Industrija pohistva in notranje opreme

Postal address: Kromberk 45

65000 Nova Gorica

Telex: 34316

Year of establishment: 1948

Description of activity:

Production of:

- modern and style furniture
- upholstered furniture (armchairs, easy chairs, seating units)
- plastic furniture, planters, lamps and bathroom fittings
- chipboard and synthetic wadding
- timber and wooden products
- equipment of large projects.

MEBLO is ready to offer: design and process documentation including procedures, production cycles and tools construction. Consulting on

purchase of necessary machines and devices, organization of production, training of personnel, assistance in management. MEBLO is also ready to supply the individual elements of furniture. The basic capacities are: process line of 8,000 cbm or 13,500 seats of bedroom furniture yearly, 30 armchair sets per day or 6,000 to 7,000 pieces of cabinet type furniture yearly.

12. Name of the company: MURA

Tovarna oblacil in perila

Postal address: Ive Lola Ribara 2

69000 Murska Sobota

Telex: 35215

Year of establishment: 1946

Description of activity:

Production of:

- men's suits, men's overcoats, trousers, jackets and jeans suits
- women's dresses, skirts, trousers, coats and jeans ensembles
- men's and children's shirts and ladies blouses.

MURA offers the following technology:

- process of tailoring, sewing and ironing
- complete technological documentation including organization of production of individual items of their production programme
- assistance in selection of machines and devices for new and modernized factories
- assistance in purchase of equipment and erection of the factory
- training of personnei.

The recommended factory capacity is 840,000 sq.m. of processed material per year.

MURA is known as clothing supplier for export, mainly to the countries of Western Europe.

13. Name of the company: PRVOMAJSKA

Postal address: Zitnjak bb
41000 Zagreb

Telex: 21247

Year of establishment: 1936

Description of activity:

Production of:

- universal turning lathes
- automatic front turning lathes
- knee-type millers
- tool milling machines
- automatic and hand operated sharpening machines
- aggregate machines
- tool holders, accessories
- equipment for petrol and service stations
- reduction gears
- iron castings.

PRVOMAJSKA offers:

- complete construction documentation for products and accessories
- complete technical information including technological procedures, manufacturing time standards, documenation for tools and devices,

procedures of assembly

- complete projects of machine tools producing factories, or respective workshops
- consulting on selection of equipment
- organization of production
- training of customer's personnel.

PRVOMAJSKA supplied in 1972-73 technology for machine tools factory in Mexico.

14. Name of the company: RADE KONCAR

Postal address: Fallerovo setaliste 22
41001 Zagreb

Telexes: 21104, 21159

Year of establishment: 1945

Description of activity:

Design and construction of installations and complete plants of power generation and industry including complete engineering and supervision. RADE KONCAR's activities also cover manufacture of electric equipment, maintenance, repair, servicing and overhaul of equipment for production, distribution and consumption of electrical energy, such as rotating machinery, transformers, electric apparatus and devices, electric locomotives, household appliances, equipment for retail trade and catering industry, industrial electronica and measuring techniques.

Among the main foreign customers of RADE KONCAR, there are countries of Western Europe, socialist countries of Europe, Middle East and Africa.

15. Name of the company: SAVA
Industrija gumijevih usnjenih in
kemicnih izdelkov

Postal address: Skofjeloska 6
Kranj

Telex: 34547

Year of establishment: 1920

Description of activity:

Production of:

- car, tractor and bicycle tyres
- conveyor belts
- V-belts
- rubber profiles
- rubber lining of equipment
- synthetic leather
- polyvinylchloride

SAVA offers the following technologies:

- V-belt production technology consisting of rubber mixture preparation, rubber coating vulcanization, inspection, packing
- conveyor belts production technology
- technology of bicycle tyres production
- consulting comprising feasibility studies concerning the above production
- technical assistance, training of customer's personnel
- advisory services on selection of raw materials.

About ten per cent of SAVA production is exported mainly to West Europe.

16. Name of the company: SAVRIC

Radna organizacija za proizvodju i promet namjestajem i drvnim proizvodima

Postal address: Jikiceva 24

41001 Zagreb

Telex: 21655

Year of establishment: 1948

Description of activity:

Production of:

- cabinet type veneer furniture
- upholstery furniture
- solid type and sets of shelf type furniture
- chairs, armchairs

SAVRIC being a known Yugoslav furniture manufacturer is exporting 30 to 35 per cent of its production mainly to the USA, the USSR, Czechoslovakia and Hungary.

SAVRIC is ready to offer technical assistance to the prospective customer on preparation of furniture production.

17. Name of the company: SIPOREX

Postal address: Industrijska 15

52000 PULA

Telex: 25224

Year of establishment: 1962

Description of activity:

Production and mounting of gasconcrete, reinforced, unreinforced elements and sand lime bricks.

SIPOREX is ready to supply technology of production of the above items including:

- technological flow-sheets, prescriptions
- planning of production, normative balances
- facilities selection
- supervision services during construction and start up of the production
- training of key-staff

18. Name of the company: SLOVIN

Proizvodnja alkoholnih i bezalkoholnih pijac

Postal address: Frankopanska 18

61000 Ljubljana

Telex: 3134

Year of establishment: 1945

Description of activity:

Production of:

- soft beverages (vegetal extracts, carbonated drinks)
- fruit juices
- wines

SLOVIN is offering to the prospective customers licence and know-how of production of the above beverages. The technology of production is comprising the following items:

- recipes for drinks production
- standards for bottles and various seals
- technology of co-ordinated and preventive quality control
- advisory services in purchase of equipment
- market analysis, selection of factory location
- training of personnel

SLOVIN is exporting its products to Great Britain, West Germany and Japan.

19. Name of the company: TOMO VINKOVIC
Tvornica Traktora
i ljevaonica bjelovar

Postal address: Mataciceva 15
43000 Bjelovar

Telex: 23337

Year of establishment: 1953

Description of activity:

Production of:

- articulated tractors 13 - 22 KW
- tractor implements
- pig iron castings

During the recent years TOMO VINKOVIC has supplied their products to socialist countries of Europe and to Western Europe.

20. Name of the company: VULKAN

Tvornica dizalica i ljevaonica

Postal address: J.P. Kamova 103

51000 Rijeka

Telex: 24206

Year of establishment: 1929

Description of activity:

Description of ship deck equipment i.e.:

- capstans
- tow line winches
- loading winches
- outrigger winches
- fishing net winches
- devices for lifting decending gangways

VULKAN produces also overhead cranes and steel castings.

The company is ready to offer the following technology for winches production:

- complete construction drawings of individual types of winches, standards of manufacturing, drawings of tools and devices
- assistance in manufacture and supply of measuring instruments
- assistance in pre-investment studies and selection of machinery
- training of personnel

VULKAN co-operates with the following foreign companies:

- HATLAPA-UETERSEN, Hamburg, West Germany

- FRYDENBO-BERGEN, Norway and
- ATLAS-WERKE, Bremen, West Germany

21. Name of the company: ZDRAVLJE

Fabrika farmaceutskih i hemijskih proizvoda

Postal address: Vojkova bb

16000 Leskovac

Telex: 16625, 16650

Year of establishment: 1953

Description of activity:

Production of drugs:

- Solids: tablets, dragees, capsules, powders
- Liquids: ampulse, oral solutions, infusion solutions, aerosols, cremes.

Production of cosmetics: powders, lotions, shampoos, toothpastes, cremes.

Production of raw materials: dextran, HMTA-HR, extracts of herbs and flowers, ergotamine tartarate, lanatosodium A,B,C digitoxin.

Manufacture of plastic disposable syringes, metal tubes for pastes and aerosols.

ZDRAVIJE offers the complete technology of production of dextran being the substitute for blood plasma.

ZDRAVIJE is an important Yugoslav exporter of pharmaceutics mainly to the Socialist Countries of Europe.

Consulting and Engineering Companies

1. Name of the company: EMONA INZENIRING

   Postal address: Smartinska 130

   61000 Ljubljana

   Telex: 31205

   Year of establishment: 1961

   Description of activity:

   EMONA INZENIRING being the subsidiary of EMONA C.O.A.L. (Combined Organization of Associated Labour) is elaborating projects comprising master plans, design and engineering in the field of:

   - pig breeding and fattening farms
   - slaughter houses
   - dairy cows farms
   - beef cattle farms
   - poultry farms
   - supermarkets
   - refrigeration plants.

   The technologies offered by EMONA INZENIRING are elaborated and experienced within the EMONA company and are in many cases based on own patents. Among the foreign customers of EMONA INZENIRING there are the companies from Africa, Socialist Countries of Europe and from Middle East.

2. Name of the company: INA INZENJERING

Postal address: Proletarskih brigada 78

41001 Zagreb

Telex: 21223

Year of establishment: 1964

Description of activity:

INA INZENJERING is the member of INA Group (chemical and petrochemical industries) and is supplying the feasibility studies, process engineering, detailed engineering, commissioning and operation services for chemical and petrochemical plants. The company also provides training of customer's personnel and management services.

The following processes have been developed in INA's plants and refineries and are for prospective buyers:

Processes in oil and gas:

- lpg fractionation
- naphta and kerosene fractionation
- naphtenic base lube oil production
- motor gasoline in-line blending
- lube oil blending
- gas oil blending
- fuel oil blending
- batch asphalt blowing
- paraffin wax production
- lubricating grease production
- waste water treatment
- storage facilities for lpg and ammonia.

Processes in chemistry and petrochemistry:

- bleaching earth production
- "benural" high grade ruminants feed production
- carbon black wet peletisation
- phenol-formaldehyde resins
- polymerisation of stryrene-acrylonitrile in suspension
- self-extinguishing expandable polystirene
- expandable polystyrene processing
- thermoplastics injection molding
- rotomolding processing of thermo-plastics.

3. Name of the company: INDUSTROGRADNJA

Postal address: Savska 66

41000 Zagreb

Telex: 21448

Year of establishment: 1946

Description of activity:

INDUSTROGRADNJA is specialized in civil engineering including:

- feasibility studies
- design
- execution of construction works
- supervision services

The company performs:

- prefabricated concrete structures
- woodwork

- package projects of farms and hotels
- housing and silo projects.

INDUSTROGRADNJA possesses patents for silo sliding design, special window glass arrangements and deep well construction technology for mines.

The company is a significant exporter to the countries of Middle East (Iraq) and Socialist Countries with USSR as main partner in this group.

4. Name of the company: PKB AGROINZENJERING

Postal address: Padinska skela 11213
Beograd

Telex: 11457

Year of establishment: 1976

Description of activity:

The company being the subsidiary of PKB (POLJOPRIVREDNI KOMBINAT BEOGRAD) is specialized in agro-industrial consulting and engineering. PKB AGROINZENJERING carries out the following activities:

- feasibility studies
- design and engineering
- market research
- investigation works in hydrology, soil survey, mapping and geomechanics
- turnkey agaro-industrial projects
- landscape and town planning

- crop and livestock management
- studies for food processing plants and housing settlements
- training of personnel

The company has some successful export project in Mexico, Iraq, Angola, Peru, Iran, Egypt, Tanzania, Malta, Algeria and Venezuela.

The Research and Development Organizations

1. Name of the organization: IMUNOLOSKI ZAVOD

Postal address: Rokefelerova 2

Zagreb

Year of establishment: 1961

Description of activity:

- production of sera, vaccines and other biological preparations for human preventive and therapeutic use
- studies and examination of immunobiological substances
- provision of undergraduate and postgraduate eduction in immunology
- scientific investigations
- organization of international immunobiological symposia.

IMUNOLOSKI ZAVOD is continuously co-operating with the World Health Organization (WHO) which in 1971 designated IMUNOLOSKI ZAVOD as its Collaborating Centre for Reference and Research on Bacterial Vaccines and Immunization Programmes.

In 1973 IMUNOLOSKI ZAVOD was designated by WHO as its Collaborating Centre for Research and Reference Services for Immunological Biological Products.

2. Name of the organization: INSTITUT ZA KUKURUZ

Postal address: Zemun - Polje

11080 Beograd - Zemun

Telex: 12363

Year of establishment: 1946

Description of activity:

Investigations of complex measures for advancement of breeding, production and utilization of maize.

The Institute has developed by now 35 high-yielding maize hybrides being subject of exporation.

The Institute is organizing postgraduate training for domestic and foreign specialists in maize improvement with the following programme:

- contemporary maize seed production
- maize breeding and genetics
- modern maize grown systems
- maize physiology, technology and utilization.

In order to accelerate the maize selection the Institute possesses a "winter nursery" farm in Zambia.

The Institute is also ready to provide assistance in sunflower production.

INSTITUT ZA KUKURUZ successfully exports their licences to Socialist Countries of Europe, Western Europe, Middle East and other regions of the world.

The Institute has permanent contacts and co-operates with FAO.

3. Name of the organization: METALURSKI INSTITUT
HASAN BRKIC

Postal address: Matije Gupca 7
72000 Zenica

Telex: 43125

Year of establishment: 1961

Description of activity:

- research and development in iron and steel
- engineering and consulting services in smelting, rolling, metal processing and mining
- rendering of technical assistance and services.

Among the main foreign partners of HASAN BRKIC, there are countries of Western Europe, socialist countries of Europe and countries of Africa.

4. Name of the organization: RUDARSKI INSTITUT

Postal address: Batajnicki put 2
11080 Belgrad - Zemun

Telex: 11830

Year of establishment: 1960

Description of activity:

Research and development, engineering services on:

- underground and open pit exploitation of minerals
- mineral dressing

- safety and ventilation in mines
- thermotechnique
- mining desing
- computer data processing.

Having the positive results of its activity mainly in Yugoslavia, the Institut is ready to render consulting and engineering services and to supply management to the foreign customers particularly in developing countries.