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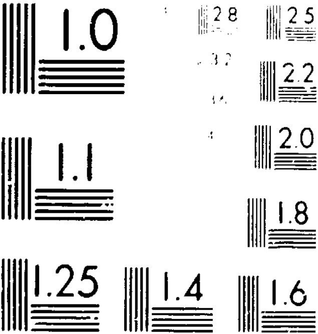
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United Nations Industrial Development Organization

Workshop on Selection of Technology for Assembly of Electronic and Electrical Products in Developing Countries

Utrecht, The Netherlands, 4 - 8 May 1981

FINDINGS OF WORKING GROUP III*

* This document has been reproduced without formal editing.

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I. Background and Introduction

This report was prepared by a Group of Experts as part of the role playing exercise which was carried out at the Workshop. The group examined a "Suppliers Technical Proposal for the Establishment of a TV Plant" which had been prepared for the Workshop. Discussions were held with representatives of the suppliers and a plant was selected by the group suitable for the country with export potential detailed in Appendix I. Their finding were presented to the Plenary Session of the Workshop and the following text was prepared as working document to support the verbal presentation.

II. Main findings

The country is a small/medium sized developing with good infrastructure in roads, power, water, telecommunications, sea and air transport and basic educational facilities. It is very limited for industrial experience, although it has some managerial and technical capability. Labour is easily available at low wages. There is a history of political and social tranquility.

OBJECTIVE

To establish in the country a viable facility to assemble electrical/ electronic products, namely TV sets.

AVAILABILITY OF MARKETS

There is a local market of 5 million persons and a neighbouring market of some 20 million persons of low purchasing power. There is also an easily accessible market of some 200 million with high purchasing power offering duty free entry to the country under a generalised system of preferences. A preliminary market survey indicates that at competitive price and quality up to 1 million sets per annum can be sold in the markets.

Product Characteristics

Products on sale in the market are a mix of black and white and colour TV sets, the former predominating in the local and neighbouring markets and the latter in the high purchasing power market.

Strategy

The strategy selected for achieving the objective is to negotiate with the supplier for delivery of such components, raw materials, process technology, product technology, technical assistance and other factors as are necessary to start up such an assembly facility and keep it operating successfully.

We were interested in negotiating only with those suppliers who could provide sets and also have the capability to assist us beyond the start-up with such other services as we need

Negotiations

We found a supplier receptive to our approach who made a proposal for the supply of kits for the assembly of black and white sets in quantities from 25 to 200,000. His proposal was based on two process technologies

(a) a current technology i.e. highly capital intensive, fully automated system requiring large investment and

(b) simplified technology i.e.low capital/labour ratio highly manual and less expensive system.

The advantage of the "current" system is that it is faster, more cost efficient at high volumes, provides a high quality standardised product.

On the other hand the "simplified" system is more flexible, requires a much lower investment and provides greater scope for "localising" parts of the process.

CHOICE OF TECHNOLOGY

After having the proposal carefully consideredby professional engineers and after discussions with the supplier, we opted for a hybrid of the two systems. We specified that the system incorporate the following characteristics, for reasons which shall be explained later.

a) The new system was to provide us with flexibility, low investment and labour intensive features of the simplified technology system and the standardisation of quality provided by certain aspects of the current technology system.

b) The system should facilitate the move from assembling black and white sets to the assembling of colour sets.

c) The system should permit not only the localisation of part of its processes but, and this was important, its machinery and tools should have a high degree of universality to accommodate the assembly of other electronic/electrical products if this was found necessary.

The reasons for our decisions might be clear but we will elaborate. In our country capital is in very short supply relative to labour. Our people have little experience with the operation and servicing of complex electro-mechanical systems but they learn fast. So we wanted a technology that would not overwhelm us initially but accommodated our growing competence. We shall start first by selling black and white sets in the local and neighbouring markets and in the lower segment of the larger market. In this way we shall gain experience in manufacturing as well as international marketing. At the appropriate time we shall wish to introduce colour into the high-volume market. Finally we feel that our lack of experience and the rapid changes taking place in the video field make it imperative that we have a fall-back position or product.

FEASIBILITY OF SIMPLIFIED TECHNOLOGY

In examining the proposal from the supplier we found that certain of his underlying assumptions did not hold in our circumstances and that the correction of these inaccuracies improved the value of the simplified technology system. For example, the supplier assumed the payment of duty on machinery and raw materials and that labour costs would be at the rate $2.50 US per hour. In this project we have obtained the concessions from government which means that there will be no duties payable for machinery or raw materials. The local wage rate is about one-half the wage rate projected by the supplier. The correcting of the above achieved two things. It reduced the cost of simplified technology products significantly and it improved the position of our company in a further negotiation with the supplier which we shall report on now.

JOINT VENTURE

We are in the advanced stages of negotiating a joint venture arrangement with the supplier for up to 50% share in equity in the company. We saw considerable advantages to a company from doing this and the reasons will become clear when you hear the concessions which we have stipulated.

1) The supplier will share the benefits of his research and development in televisions on a cotinuing basis but in parallel will assist in building up in our company an independent research and development capability as soon as practical.

2) Provide technical/managerial assistance beyond the start-up stage on a continuing basis at direct cost.

3) Will lend his considerable market expertise to the company in its efforts to penetrate high-powered market.

4) The company will pay the supplier no royalties or fees other than at the direct cost mentioned above but if this is not negotiable then will defer the payment of any royalties until the company becomes profitable.

5) Will permit the company freedom to purchase parts where available at low costs.

6) Bring to the attention of the company any innovation or improvement in technology which could enhance its competitive position in the market place.

From our side there were certain considerable advantages which our company could offer to the supplier which may be strengthened on negotiating position. Since our proposed facility was in consistence with the government's aims and objectives for economic development we were able to obtain from the government and offer to share with our overseas [illegible] the following benefits:

1) freedom from corporation tax for 10 years
2) duty-free importation machinery and raw materials
3) development loans for 15 years at 12% interest as opposed to 15% projected by the supplier and
4) a factory building on long-term rental at subsidised rates.

In addition labour rates were projected at one-seventh the cost in the supplier's brief and one-half the cost used by him in calculating the value of the simplified technology.

We were further able to reduce costs by eliminating the duty on raw materials and machinery included in his calculations and thereby not only making the product more competitive but enhancing the market abilities of this technology in developing countries whose economic circumstances include low wage labour.

We were also able to offer the supplier attractive improved return for his investment. The overseas partner was most impressed that we have been able to identify a number of high-quality key personnel in the management areas of production, material, financial and quality controls and engineering.

CONCLUSION

We are satisfied that we are on the way to the establishment of a successful enterprise. We would like once again to enumerate and set forth the elements which we considered critical along with the establishment of this facility:

1) the selection of appropriate technology which in economic terms tends towards accentuating postives and eliminating the negatives inherent in our industrial environment.

2) achieving continuing access to technology and management/technical assistance.

3) ensuring by critical examination that markets are available for our products.

4) producing a product that is competitive both in price and quality

5) ensuring that our product matches with the national objectives as expressed by the government so as to achieve government incentives and goodwill.

6) willingness and ability to negotiate a joint venture with our overseas partner on fair terms and in good faith.

U N I D O

INDUSTRIAL INVESTMENT PROFILE

GENERAL COUNTRY DATA

Surface area	: 98,484 sq km		
Population	: number (year)	: 37 mln (1978)	
	density	: 376 per sq km	
	growth rate/year	: 1.8 % (1970-1975)	
Climate	: temperate ; 4 seasons (cold dry winter ; hot humid summer)		
Language(s)	:		
Religion(s)	: Buddhist 47 %; Christian 22 %; Confucianist 17 %; Others 14 %.		
Capital city	:	Inhabitants	: 8 mln (1979)
Currency	: Won (W)	Exchange rate	: US $ 1 = W 582 (01.1980)

GENERAL ECONOMIC PROFILE

DISTRIBUTION OF GDP (bln W)

	1977	1978	1979
Consumption :	12,743	16,873	21,248
Investment :	4,645	7,138	10,597
Exports :	6,967	7,715	8,886
- Imports :	- 6,232	- 8,355	- 10,802
TOTAL GDP at current prices :	17,183	23,370	30,129
PER CAPITA GDP at current prices :	W 469,900	622,000	791,500
Average real growth rate :	10.3 %	11.6 %	7.1 %

SECTORAL ORIGIN OF GDP (%)

	1977	1978	1979
Agriculture :	25.6	21.2	20.4
Mining :	1.7	28.2	1.3
Manufacturing :	23.6		27.1
Others :	49.1	50.6	51.2

BALANCE OF PAYMENTS (mln US $)

	1977	1978	1979
Inflows :	13,461	17,735	20,060
- Outflows :	- 13,449	- 18,820	- 23,981
Net change in international reserves :	12	- 1,085	- 3,921

PREPARED AS A SERVICE OF THE INVESTMENT CO-OPERATIVE PROGRAMME BRANCH OF UNIDO

ON THE BASIS OF AVAILABLE INFORMATION.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ANNEX 1

EXPORTING COUNTRY - LARGE VOLUME

COMPARATIVE MANUFACTURING ADVANTAGES

Resources	- natural	: *fish, rice, minerals (tungsten, asbestos).*
	- labour	: *40 % active population ; plentiful skilled labour.*
	- financial	: *num. for. and dom. banks ; all types of credit available*
Infrastructure	- transport	: *4 seaports ; airports ; dense road network.*
	- energy	: *6,916 MW; 31,510 mln kWh; 3 oil refineries; 28,559 kl.*
	- development institutions	: *Economic Planning Board, Development Bank, 2 free export zones, 22 indus. estates.*
Inflation rate (year)		: *21.2 % (1979) ; unofficial 34 %.*
Main manufacturing branches (Summary of chapter III)		: *chemicals, textiles, machinery, electronics, food and beverages.*

FOREIGN INVESTMENT POLICY

Open to foreign investment (branches ; preferences)		: *foreign investment encouraged, particularly : large-scale complex projects, export-oriented projects, labour-intensive p., pr. using dom. resources. Preferences heavy ind., electron., chemicals.*
Allowed proportion of foreign capital		: *unlimited ; joint-ventures preferred.*
Investment incentives		
Legal	- investment code/law	: *1973 Foreign Capital Inducement Act.*
	- profit repatriation	: *guaranteed*
	- capital repatriation	: *authorized*
	- others	: *equal treatment of dom. and for. firms.*
Fiscal	- corporate income tax	: *20 - 40 %.*
	- other corporate taxes	: *mainly : 25 % tax/divid., interest, fees and royalties.*
	- tax holiday/reduction	: *exemption 5 yrs plus 3 yrs at 50 %.*
	- carry forward of losses	: *maximum 4 years.*
	- tariff reduction	: *duties exemption for capital goods.*
	- double taxation avoidance	: *treaties with 14 market economy countries.*
	- others	: *depreciation allowance.*
Financial	- borrowing incentives	: *favourable financial infrastructure.*
	- others	: *repatriation of dividends, capital, interests, royalties etc...*
Membership in international and regional economic organizations/institutions		: *United Nations, ESCAP, The World Bank, IMF, ADB, GATT, International Commercial Arbitration Association, ICSID.*

(Summary of chapters I and II)

-- printed 09.1980 / 500 copies --

I - GOVERNMENT ECONOMIC POLICY

Politico-economic system : *market economy country*

Membership in international and regional economic organizations/institutions : *United Nations, ESCAP, The World Bank, IMF, ADB, GATT, International Arbitration Association, ICSID, Colombo Plan, Bangkok Agreement.*

Monetary policy (convertibility and controls ; membership in currency unions) : *unitary floating exchange rate system. Government directly controls release of domestic credit, introduction of foreign commercial loans and foreign exchange transactions.*

		1977	1978	1979
Currency	Exchange rate : US $ 1.00 = W :	484	484	484
Foreign trade	Total imports (SITC 0-9) :	5,232.3	7,246.4	20,147.0
	Thereof manufactured goods (SITC 5-8) :	2,827.5	4,369.8	..
	mainly : *machinery and transport equipm.*	1,407.2	2,394.3	..
	Total exports (SITC 0-9) :	4,862.5	6,152.0	15,064.0
	Thereof manufactured goods (SITC 5-8) :	4,129.0	5,443.8	..
	mainly : *miscell.manufactured goods*	1,715.5	2,195.5	..
Foreign investment	Inflow of direct foreign investment :	35.2	72.0	99.0
	Thereof manufacturing sector :	..	..	..
National budget	Total expenditures (-) :	- 3,274.4	- 4,408.0	- 6,205.5 (p)
	Total receipts (+) :	2,958.4	4,107.7	5,199.0 (p)
	Balance (+ or -) :	- 316.0	- 300.3	- 1,006.5 (p)
	Public debt DOM :	496.9	609.8	..
	FOR :	1,695.9	2,118.3	..

(bln W)

Economic development : Economic activity centered on : *heavy and chemical industries, textiles, electronics*

Development strategy oriented towards : *industrialisation on the basis of comparative advantages*

Current nat dev. plan : duration : 5 years, from 1977 to 1981
Total plan budget *bln W 16,695* DOM : 92 % FOR : 8 %

II - REGULATIONS ON PRIVATE AND PUBLIC FOREIGN INVESTMENT

Object	Instruments	Content
Eligibility	*1973 Foreign Capital Inducement Act (FCIA). Working Rules for the Implementation of FCIA.*	*Fundamental policy : to encourage for.investm.,priority to export ind., those processing local raw materials, and light industries.* *Eligibility criteria : large scale complex projects including metals, machinery and electronics bringing capital, technology and managerial skill · export-oriented projects developing overseas markets ; projects using domestic resources.* *Foreign loans : authorized for the importation of means of payment, capital goods, raw materials or technology.*
Corporate status	*Commercial Code.*	*Type of corporation : joint-stock corp.most commonly used by for.investors ; partnership, limited partnership and limited company also admitted.* *Minimum amount of foreign investment US $ 200,000 (electronics and machine industries 100,000 ; export-oriented proj.using dom.raw materials 50,000).* *Foreign ownership : no legal limit, though joint-ventures preferred in which for.equity up to 50 %. Higher proportion allowed for a given period in projects which bring development assets to the country (market penetration, technology, confidential production methods, business operations or patent rights of multinationals).* *Local partners : must hold more than 50 % in projects purely labour-intensive, purely bonded processing, dependant on domestic resources for raw materials or oriented towards local market sales.*
Registration		*Application : for foreign investment, loan or technical inducement contract, authorisation introduced to the Economic Planning Board (EPB) : centralized " one-stop service " system grouping all the official authorities involved in the decision.* *Time span of decision : decision delivered on a 30-40 days' notice.*
Financial transfers		*Profit : unlimited transfer guaranteed ; reinvestment allowed up to original inv.amount.* *Capital : repatriation allowed after 2 years operation. Annual repatr.no more than 20 % of original investment.* *Loans (principal and interest) : transfer guaranteed.* *Technology (fees and royalties on licenses, consultancy, management) : transfer guarant.*
	Foreign Exchange Control Law.	*Convertibility : overseas transactions must be implemented in one of the 48 currencies designated by Min.of Comm.and Ind.Won parity is fixed against the SDR since Feb 1980.* *Control : only for maintaining favourable bal.of payment and local currency stability.*
Technology transfers	*Patent Law.*	*Protection of industrial property : within borders of Korea. Not signatory to any of the international conventions.* *Licensing agreements : no specific limitations on their content ; priority given to agreements for export and machine-tool industries.* *Patents : granted for a 12 year period not renewable.* *Trademarks : registered with Patent Bureau of Ministry of Commerce and Industry, they are protected by law for 10 years and renewable for another 10 year period.*

II - REGULATIONS ON PRIVATE AND PUBLIC FOREIGN INVESTMENT (continued)

Object	Instruments	Content
Labour	Labour Standards Law. Labour Union Law. Labour Dispute Settlement Law	Wages : no fixed minimum though a minimum living standard must be guaranteed. Working hours : basic 8/day and 48/week up to 60/week (or more if approved in advance by Office of Labour Affairs). Overtime pay plus 50 %. Time off 1/8 hour/day and 1/6 day/week. Legal holidays 9 days/year. Period of closure 60 % minimum pay. Social benefits : paid vacation 1 day/month or 8 day/year. Post-natal time off 60 days. Annual physical examination. Severance pay 1 month/year employed. Industrial accident or death costs supported by employer plus 60 % wages during idle time or one thousand days of wages in case of death. Labour disputes : under Governmental mediation in foreign invested firms. Foreign labour : no explicit limitation.
Taxation	Corporation Tax Law and Enforcement Decree 1977.	Corporate taxes : Income tax : 20-40 %(assets valuation methods, depreciation rates and methods, obsolescence allowance, deduction of reserves, carry-forw. of losses fixed by law) Property tax : land, houses, vessels 0.3 - 5 %. Property acquisition tax : 1 % (2 % in Seoul and Busan). Loans and technology : 25 % of interest or royalties.
	Custom Law.	Customs duties : 5 - 150 % of CIF value. Tariff quota system only for the protection of domestic producers. Personal taxes : Salaries : foreign employees 8 to 70 %(over US $ 100,000/year). Dividends : 25 %. Other taxes : These are of minor importance : stamp duties etc...
Incentives	FCIL Tax Exemption and Tax Reduction Law	Legal : General treatment : equal treatment for Korean and foreign investors or enterpr. Fiscal : Corporate taxes : 5 year exemption, 50 % reduction following 3 years on : income tax, property tax, property acquisition tax and technology inc. tax. Exemption of taxes on approved foreign loans and of import duties on capital goods. Personal taxes : 5 year exemption on salaries and dividends collected plus 50 % reduction following 3 years on dividends. Double taxation agreements : with Belgium, Canada, Denmark, FR Germany, Japan, the Netherlands, Thailand, UK, USA, France, Finland, Switzerland, Singapore, Morocco. Financial : repatriation guaranteed for dividends, capital, interests, royalties etc... Favourable financial infrastructure.
	Law for the Establishment of Free Export Zones.	Others : free export zones and industrial estates in which plant sites available at low prices, administrative procedure simplified, and various support and services provided. Investment protection agreements : ..
Environment	Environment Preservation Law 1977.	Implementation on a case-by-case basis.

III - COMPARATIVE ADVANTAGES OF THE MANUFACTURING SECTOR

Natural resources endowment : *fish, rice, 50 kinds of minerals (tungsten, asbestos, anthracite, silver, gold).*

Labour resources : Active population : *40* %(manufacturing *22.4* %;agriculture *38.4* %).Un/underemployment *3.2* %
Available skills : (% of active population - ISCO classification)
0&1 technical: *3.2* %; 2 admin.: *0.8* %; 3 clerical: *7.4* %; 4 commerc.: *12* %; 7&9 manual: *35* %
Working hours/week: *48 (plus overtime)* Annual holidays: *20* days
Average worker earn. by hour (H), day (D), week (W) or month (M) in manufacturing : *163,453 W/M*

Financial resources : *All types of credit available.One Central Bank, 5 commercial banks, 10 provincial banks, 6 specialised banks, 17 foreign banks, 30 foreign bank branches.* *(1979)*

Market orientation/potential : *market geared towards exports ; local buying power limited.*

Infrastructure : Transport : railways : *5,780* km normal gauge - Seaports : *4 large ones*
roads : *12,097* km hard surface - Airports :
Telecommunications : *2.3 mln(79)* tel. lines - *3,685 (79)* telex lines
Energy : electr. : capacity *6,916* 1,000 kW - production *31,510 (1978)* mln kWh
oil : reserves *-* mln m.t. - production *-* 1,000 m.t.
refining capacity *28,500* 1,000 m.t.
nat. gas : reserves *-* bln c.m. - production *-* mln c.m.
Development institutions : *Economic Planning Board, Development Bank, 2 free export zones 22 industrial estates.*

Cost of living :

	1977	1978	1979
Consumer price index : (base 1975 = 100) :	127.0	145.3	177.8
Wholesale price ind. : (base 1975 = 100) :	122.2	136.5	162.2
Inflation rate :	10.3 %	14.3 %	21.2 %

unofficial 34 %

Structure of manufacturing sector : *(1977)*

Branch - ISIC class.	number of establishments	gross investm. bln W	employment 1,000	salaries bln W	output value bln W	value added bln W
31 food and beverage	4,131	109.0	169.2	138.1	2,432.0	1,068.0
32 textile	7,491	316.2	657.8	404.6	3,244.2	1,095.0
33 wood	2,168	15.2	70.4	50.9	490.5	138.2
34 paper	2,008	46.2	84.6	75.6	578.9	232.5
35 chemicals	2,383	192.0	238.4	210.3	3,425.6	1,026.7
36 mineral products	1,745	109.2	77.7	63.8	619.9	291.6
37 basic metals	664	187.4	71.0	79.3	1,187.0	326.0
38 machinery	5,155	344.6	468.7	394.3	3,216.0	1,312.4
39 others	981	15.8	81.1	43.6	244.4	105.2