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ASPECTS OF DEVELOPING THE PHARMACEUTICAL INDUSTRY IN BRAZIL, ~~Background Paper~~

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ASPECTS OF DEVELOPING THE PHARMACEUTICAL INDUSTRY IN BRAZIL

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P R E F A C E

A substantial part of the success of modern medicine depends from its continuous adding arsenal of drugs and medicaments. These drugs are supplied to a large extent by the research efforts of the pharmaceutical industry.

Early this century, a great deal of synthetic drugs and fine chemicals were produced in Europe. Shortage of supplies during World War I furnished the thrust for the establishment of a chemical and pharmaceutical industry in the western hemisphere. Although presently there is a sophisticated industry in many European countries the American pharmaceutical industry, in the opinion of some connoiseurs, has assumed a world leadership in the discovery and development of new drugs.

The medicaments supplied by the industry has been an important element in the outstanding progress in medicine in the past fifty years. Life expectancy at birth has been increasing steadily particularly in developed countries. An improved quality of life with an expectation of less of man's adult life in sickness or in pain suffering has been a positive economic impact produced by the discovery of new drugs.

The development of antiinfective drugs has diminished the rates of death from many infectious diseases. Antibiotic therapy accomplished a 90 percent decline in the death rate from acute rheumatic fever. The use of antimicrobial agents following hemolytic straptococcal infection reduced the relapsing rate of rheumatic fever from 50 percent to 2 percent.

Outstanding changes have accurred in the incidence, early diagnosis and treatment of tuberculosis producing a dramatic decline in mortality. Modern medicaments such as streptomycin, PAS, isonyazid, ethambutol and rifampicin must be given an important part of the credit.

The development of a consistent contraceptive therapy has turned family planning feasible. Ataractics and drugs that affect the central nervous system have contributed to the rehabilitation of mental patients to normal activities. Vaccination against syphilis is in progress; first successful immunization against human malaria in experimental monkeys has been achieved. Promising research for treatment of hepatitis B through chemotherapy is under study. A pneumonia vaccine with long lasting protection is already available. To produce a vaccine against any parasitic disease should not be impossible. An understanding of the molecular basis of diseases will come out.

Plant screening oriented toward the discovery of new medicaments from vegetal origin and a consistent researoh program of drugs from the sea must be encouraged.

The research arms of the pharmaceutical houses are the primary source of new drugs. As an instrument for progress it ought to be found a strategy to provide the use of sophisticated technology to developing countries.

1. General Background Dossier

Brazil, the fourth largest country in the world has a population (1977) of 113.2 million inhabitants geographically distributed as follows: north 4%, northeast 29%, southeast 42%, south 19% and midwest 6%. Population distribution by age brackets is:

0 - 15	15 - 30	30 - 40	Over 40
42.4%	26.7%	11.6%	19.3%

The economically active population (1977) is estimated in 37.4 million; year growth of labor force (1968 - 1977) 3.3%. Gross national product (1977) is US$ 160.8 billion; per capita (1977) US$ 1,421. Present minimum wage computed at the official rate of exchange of July 1978 is US$ 85. Perhaps the income of 60 - 70 % of the population is around the minimum wage level.

If the present growth of population rate per annum is maintained during the next two decades Brazilian population will attain 255 million by the year 2000.

The inflationary trend, a traditional ailment of the Brazilian economy during the past twenty five years maintained an inflation rate per annum of 25 - 46 percent during the last quinquenium. The country's dependency on the importation of 82 percent of its petroleum requirements has mostly contributed to erode its economy lately.

2. The Pharmaceutical Industry

Formulation of medicaments and production of basic drugs is carried out by 489 laboratories. Eighty one percent laboratories are owned by nationals although they only share 27 percent of total annual billings versus 73 percent shared by foreigh industry. Thirty percent of foreign companies is owned by European investors while forty three percent hold American ownership.

Reliable information concerning the amount of the total investment of the pharmaceutical industry within the country is not available at present. It could be estimated, nevertheless, that overall figure must be well above US$ 1,000.0 million.

Most of large manufacturing plants and the majority of the industry of fermentation are located in greater São Paulo the largest industrial and manufacturing center of Brazil. A small number of factories are established in

the city of Rio de Janeiro where the first plant to produce gentamicin outside the United States was innaugurated in July 1978. Two large plants producing basic drugs are located in Resende, half way between Rio de Janeiro and São Paulo. Two extraction plants producing pilocarpine and rutin are in operation in the northeast while a small plant producing mostly ampicillin derivatives is located in the state of Rio Grande do Sul.

During the past two decades many national laboratories have been acquired by foreign companies. (See Table I). By past experience it has been learned that in most instances the acquisition of local laboratories has been made possible after nationals have offered to sell their factories to foreign investors. In very few occasions there have been established private joint ventures some of which still continue to exist. These circumstances led to the situation that has been defined as denationalization of the pharmaceutical industry. Transfer of ownership from nationals to foreigners has offered an advantage to both parties: it provided an easier market penetration to the latter and produced substantial economic benefits to the former.

It is opportune to remark that transfer of ownership from nationals to foreign enterprises does not only occur in developing countries. It has been observed recently that the United States is unfolding some preocupation of losing the cream of its technology due to the fact that European and Far East corporations are acquiring interest in small although highly sophisticated companies particularly in the field of electronics and in computer science.

3. Imports and Exports

Production of raw materials in the pharmaceutical industry has been increasing steadily lately, therefore, imports made by private industry,- intermediates to a large extent,- dropped by 12 percent in 1976 as compared to 1975 while exports,- mainly antibiotics and tuberculostatics,- increased by 13 percent. (See Table II). Imports and exports of the pharmaceutical industry during the year 1976 represented 1.42 percent and 0.50 percent respectively of total country importations.

It is appropriate to observe that in spite of the fact that processes to produce drugs and medicaments are not patentable, multinationals have been expanding their production facilities lately by adding new drugs and medicaments to the list of items produced within the country. It could be postulated that the country is reasonably self-sufficient for its requirements

of basic medicaments used in the treatment of a number of usual health conditions.

4. Price and Cost Structure

General observations on this caption warrants the analysis of three different occurrences:

a. Price of the finished product to the consumer and its socio-economic impact.
b. Cost of formulating operations
c. Production cost of therapeutically active substances

Price to the consumer of all medicaments is under strict government control as it is in most countries. Although it has been claimed that the cost of acquisition of medicaments is high, very little could be done in this respect in as much as all prices are officially approved. During the years 1970 - 1976 the prices of medicaments increased 225 percent while the cost of living increased by 368 percent. Major items weighing in the cost of living were housing, foods, clothing, home necessities and appliances and public services. The price of medicaments to the public is an equivalent of the formulator price added by 38 percent as profit margin to the retailer. Table III shows general guidelines in breaking down the cost of formulating a medicament.

Any attempts to verify the cost structure of an active substance would be like digging on the top secret of the pharmaceutical industry. Nothing has been publicly disclosed so far and in all probability it never will. Through personal experience it has been possible to obtain "in situ" in several countries some sort of confidential information on cost data that is outlined in the paragraphs that follow.

A national plant producing 6-APA from penicillin G in order to obtain six different forms of ampicillin disclosed the following cost breakdown:

	%
Raw material	60 - 70
Processing (Mainly solid carbon dioxide, liquid nitrogen and ice)	20
Development and process control	9.75
Labor	1.00
Power	0.25

The information that follows was obtained from a large multinational plant producing one single type of antibiotic with a production capacity of 15.0 MT/yr.

	%
Raw materials (90% of local origin, 10% imported)	35 - 40
Power and services	15
Labor	15
Depreciation, taxes, insurance	30 - 35

A multinational small plant producing steroids unveiled a tentative breakdown of its production cost as follows:

	%
Vegetal raw material	70
Solvents and chemicals (Mainly caustic soda, heptane and hydrochloric acid)	13
Labor and power (Mostly power)	17

The examples shown above are of a relative value. Systems used in cost accounting are always flexible while distribution of expenses, allocations, miscellaneous charges and the like are mostly oriented to management convenience. In other instances many distortions have been observed in antibiotics pricing (the active substance) when it was verified that billing prices from manufacturers to formulators were below production cost, a circumstance hardly acceptable. This exemplifies the complexity of costing and pricing at different levels. Gathering of cost information data on basic drugs at international level fairly justifies a full time effort.

5. Quality Control

Transnationals and national formulation laboratories as well and manufacturing plants producing active substances are fully equipped with control laboratories whose sophistication depends on their financial resources. Government centers have little or no facilities neither to verify the quality of formulations nor the standard of purity of active substances. There are no indications that this situation could change in the near future. It might be feasible, nevertheless, to establish a close bond between public health and the private pharmaceutical industry.

6. Size and Market Development Patterns

Total sales of the pharmaceutical industry during 1977 amounted to US$ 1,366,875 thousand with a year growth increase of 8.51 percent as compared to 1976. Table IV describes the development of the pharmaceutical market for the period 1972 - 1977. Sales of the ten largest companies are summarized in Table V amounted to US$ 355,985 thousand representing 26.04 percent of total market sales. In computing sales in local currency to dollars it has been used the rate of cruzeiros 13.99/US$.
33.0 percent of total sales is concentrated in nine categories of products outlined on Table VI.
Net profit achievement of the industry (1976) was 3.02 percent of total sales. Twenty largest laboratories concentrate 37 percent of total sales. Per capita consumption of medicaments in Brazil has increased from US$ 10.71 in 1975 to US$ 13.66 during 1977. Consumption of medicaments in twenty selected countries is outlined on Table VII.

7. Profit Remittances

During the quinquenium 1972 - 1976 total profit remittances of the pharmaceutical industry amounted to US$ 44,196,399 or 0.96% of total sales of US$ 4,599,293,739. During the year 1976 the industry total remittances were US$ 13,439,567. This amount included not only profits but also royalties and charges for technical assistance representing 1.07 percent of total sales.

8. Extension of Health Care to the Population

Medical care to all Brazilians on payroll or under retirement is chanelled through the INPS (some sort of a combined social security and medicare). It has been conjectured that medical services provided by this agency are not of optimum quality.
Lately it has been organized and sponsored by the government a Central of Medicaments (CEME) an agency that formulates a number of medicaments or purchase drugs from laboratories for free distribution through hospitals, social security and the like.
CEME total purchases of medicaments in 1977 amounted to US$ 513,978. Government laboratories furnished US$ 273,481 (53 %); private industry provided US$ 229,807 (45 %) while miscellaneous suppliers furnished US$ 10,690 (2%).

Cost of private medical care in Brazil is unusually expensive. Cost of medicaments in absolute terms could be defined as reasonable though not so much if the average income of the consumer is taken into account. Private physician consultation fees and ancillary services are prohibitive as well as hospitalization and specialized medical treatment. Its cost is probably twice as high as in any developed country and therefore represents a heavy burden to the middle class of Brazil. In the household expenditures of this bracket of the family budget, the cost of acquisition of medicaments is almost insignificant as compared to the physicians professional fees. Perhaps an official watchful attitude in this direction would be helpful. It has been postulated by others that any income earned by physicians beyond reasonable annual emoluments should be returned to the public through medical education and research.

9. The Options in the Acquisition of Technology

Technology has been defined as an economic unit like working capital or labor. The access to appropriate technology is a barrier to the establishment of production plants providing therapeutically active substances for the medicaments' requirements in developing countries.

As long as an international system of patent protection exists, an open acquisition of technology appears unfeasible. Access to technology perhaps does not depend entirely on the reluctancy of multinationals to transfer technologies to developing countries. It should be considered a matter of prices and conditions.

Price is commonly determined on the basis of negotiating power. In small developing countries negotiations are mostly between government and the owners of technology.

Guidelines ruling the type of market,- its size is relative to its negotiating power, pricing, availability of information, and the like,- restrain the marketing of technology. The recipient of technology must have an appropriate background in order to be in position to know, untangle, compare and negotiate the acquisition of foreign knowledge or foreign technology. It often occurs, nevertheless, that the developing country receiving the technology negotiates weakly and grants excessive concesions in the initial discussions due to inadequate information on other agreements, lacking of ability of official representatives for negotiations, or shortage of capital or foreign reserves.

Developing countries, frequently lacking a basic technical infra-structure, are compelled to buy knowhow from a world technically experienced. Until developing countries master an acquired technology or till they are able to copy foreign technologies, they will continue their dependency from technology sellers and, therefore, will hold a weak position to negotiate. Groups of national investors in developing countries could collectively establish joint ventures in order to make the acquisition of technology more attractive to the sellers. The acquisition of technology for a small country alone oping country alone could become not only unworkable but perhaps uneconomical.

TABLE I

OWNERSHIP TRANSFERRED TO FOREIGN COMPANIES 1957 - 1976

Year	Brazilian	Multinational	National status
1957	Laborterapica	Bristol	American
	Pravaz	Recordati	European
1959	Sanitas	Leo	European
1960	Moura Brasil	Merrell	American
	Endochimica	Mead Johnson	American
1961	Novotherapica	Bracco	European
1962	Myrtonil	Imuno	European
1963	Torres	Silva Araujo-Roussel	European
1965	Exactus	Midy	European
	Schering S. A.	Schering Corporation	American
1967	Sintetico	Searle	American
	Cyrillo Mothe (Wadel)	Robins	American
	Lafi	U. S. Vitamin Revlon	American
1968	Laboran	Syntex	American
1969	Procienx	Byk	European
	Haemo Derivados	Hoechst	European
1970	Hormoquimico Biologico	Rorer	American
1971	Yatropan	Recofarma	European
	Usafarma	I C N	American
1972	Kerato-Lok	Allergan	American
	Quimiofarma	Boehringer	European
	Mauricio Villela	Beecham	European
	Instituto Pinheiros	Syntex	American
1973	Enila Lutecia	Smith-Kline & French	American
	Labonobel	Ferrer	European
	Cissa	Alcon	American
1974	Quimioterapico	Mundifarma	American
	SCIL	C.S.C. International	American
	Panquimica	Emusa	European
	Pelosi	Ulriach	European
1975	Vemaco	Eaton	American
1976	Baldassarri-Alciati	Mediprod	European

Source: ABIFARMA

TABLE II

IMPORTS - (US$ FOB)

Industry	1975	1976
Raw materials for the pharmaceutical industry	167,732,890	147,293,707
Raw materials for the chemopharmaceutical industry	19,080,968	7,966,902
Finished products	16,167,111	13,559,965
Subtotal	202,980,969	168,820,572
Government		
Raw materials	1,126,142	363,689
Finished products	8,467,275	1,561,333
Subtotal	9,593,417	1,925,022
GRAND TOTAL	212,574,386	170,745,596
% of overall country imports	1.75%	1,42%

EXPORTS - (US$ FOB)

Industry	1975	1976
Raw materials for the pharmaceutical industry	39,967,903	56,350,403
Raw materials for the chemopharmaceutical industry	1,583,613	591,115
Finished products	4,567,700	3,346,857
Subtotal	46,119,216	60,288,375
Government		
Raw materials	-	-
Finished products	2,334	-
Subtotal	2,334	-
GRAND TOTAL	46,121,550	60,288,375
% of overall country exports	0.46%	0.50%

Source: CACEX

TABLE III

COST STRUCTURE OF FORMULATIONS

	%
Raw material and packaging material	20 – 23
Personnel Salaries, vacations, year-end bonus, allocations for severance pay and social security, uniforms, meal payments, training, travelling.	24 – 27
Miscellaneous cost Rent of buildings and equipment, trucks and cars, general maintenance, utilities, office supplies, freight, insurance, bonus payments, depreciation, bad debts, mail charges, services rendered to third parties.	14 – 16
Propaganda Samples, literature, advertising in medical magazines, displays, mail pouch.	5 – 6
Cost of sales Losses on production batches, packing, labelling.	11
Taxes and miscellaneous deductions Income tax, federal, state and property taxes, trade discounts, returned merchandise.	16
NET PROFIT	5 – 6
PRICE TO THE RETAILER	100
PRICE TO THE CONSUMER	138

Source: ABIFARMA

TABLE IV

GROWTH OF THE PHARMACEUTICAL MARKET

1972 - 1977

Year	US$ (000)	% Year growth	% Inflation
1972	574,821	-	15.7
1973	750,276	30.52	15.5
1974	894,131	19.17	34.5
1975	1,120,181	25.28	29.4
1976	1,259,884	12.47	46.3
1977	1,366,875	8.51	38.8

TABLE V

TEN LARGEST PHARMACEUTICAL COMPANIES

1977

Pharmaceutical company	US$ (000) Year sales	% Share of market
Roche	50,007,147	3.65
Schering	39,818,227	2.92
Johnson & Johnson	36,174,910	2.64
Bristol	35,031,736	2.56
Merrell	34,649,035	2.53
Sydney Ross	33,970,621	2.48
Hoechst	33,131,451	2.42
Ache	31,365,475	2.29
Fontoura-Wyeth	30,966,976	2.26
Bayer	30,874,124	2.25

Source: ABIFARMA Boletim de Mercado. (Sales were computed at the rate of cruzeiros 13.99 / dollar.

TABLE VI

CONCENTRATION OF DEMAND IN NINE GROUPS OF PRODUCTS

1977

	US$ (000) Year sales	% Total market
Antibiotics	153,147	11.20
Vitamins	70,196	5.10
Cough sedatives	15,170	1.10
Antispasmodics and anticholinergics	40,511	2.90
Sex hormones	38,775	2.80
Analgesics	37,791	2.70
Anti-inflamatory and anti-rheumatic	33,352	2.40
Cholagogues	28,996	2.10
Psycholeptics	32,572	2.40
		32.7

Source: I M S. Market share related to ABIFARMA recorded sales.

TABLE VII

PER-CAPITA CONSUMPTION OF MEDICAMENTS

1977

Country	US $
1. France	58.87
2. Fed. Rep. of Germany	58.86
3. Switzerland	57.03
4. Sweden	52.44
5. Belgium	51.46
6. Japan	48.67
7. Spain	41.28
8. Italy	39.42
9. Argentina	37.32
10. United States of America	36.28
11. Australia	33.33
12. Holland	30.91
13. Canada	30.07
14. Venezuela	26.69
15. United Kingdom	21.46
16. South Korea	13.83
17. Brazil	13.66
18. Mexico	13.40
19. Iran	12.11
20. India	0.94

Source: I M S.

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