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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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ESTABLISHMENT OF A DEVELOPMENT PLAN FOR THE PHARMACEUTICAL INDUSTRY

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ALGERIA

Technical report: Financial Analysis of the Pharmaceutical Industry Project in Algeria *

Prepared for the Government of the Democratic and People's Republic of Algeria by the United Nations Industrial Development Organization

Based on the work of Mr. E. Pérez,
industrial economist

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I. INVESTMENTS

The Pharmaceutical Industry project in Algeria contemplates the rationalization of the three existing plants (Biotic, El-Harrach and Pharmal) in the Algiers area, a new factory at Rouiba and four Modular Units (UM) to manufacture pharmaceutical products. In addition, the project includes a central maintenance shop, a veterinary products plant, a polyvalent pilot-plant for chemical synthesis with a laboratory for technology of Chemical Synthesis, a unit for large volume parenterals (LVP), an extension of the laboratory of pharmaceutical technology at El Harrach, a biotechnology laboratory and several housing units. The antibiotic complex at Médéa, which is almost completed, is not included in this analysis, but treated separately. (See Annex I).

The construction work of all the projects will extend over a period of sixteen years, starting in 1986. The overall fixed costs of the development of the Pharmaceutical Industry in Algeria is estimated at 2,654 million Algerian dinars.

The initial fixed investments are estimated at 1,936 million dinars (DA) of which 1,135 million DA will be in local currency and 801 million DA in foreign exchange (equivalent to 160.3 million US dollars). Investments to replace equipment are estimated at 450 million DA. Preliminary investments, which include training, technical know-how, preinvestment expenses, engineering, etc., are estimated at 268 million DA. Table I shows a summary of the total investments.

TABLE I - INVESTMENT SUMMARY

PROJECTS	Start-up Year	Investments		Total Investment
		Local Currency	Foreign Exch.	
		(000 DA)	(000 US$)	(000 A)
Factories				
Rationalization of three existing units	1988	17,242	2,542	29,952
Rouiba	1989	138,885	38,448	331,125
UM.I	1992	130,703	26,863	265,018
UM.II	1996	130,703	26,863	265,018
UM.III	2000	130,703	26,863	265,018
UM.IV	2004	130,703	26,863	265,018
Sub-total		678,939	148,442	1,421,149
Other Facilities				
Central Maintenance Shop	1988	2,590	250	3,840
Veterinary Products	1990	5,200	230	6,350
Lab. Extn. El Harrach	1991	15,000	160	15,800
Sterile Perfusions (LVP)	1993	16,000	4,800	40,000
Biotechnology Lab.	1995	40,000	350	41,750
Chem Syn. Pilot Plant with RD	1996	25,000	6,060	55,300
Housing		351,984	-	351,984
Sub-total		455,774	11,850	515,024
Preliminary Expenses		78,490	37,861	267,795
Replacement		220,000	46,000	450,000
Grand Total		1,433,203	244,153	2,653,968

The working capital will be built-up throughout the period to reflect the increase of production and sales. Inventory coverages are calculated at 90 days for raw materials, 30 days for work in process and 15 days for finished goods. Accounts receivable (debtors) are projected at 61 days outstanding. The build-up of the working capital is as follows:

(Million DA)

Year	Working capital		Year	Working Capital	
	Incr.	Cum.		Incr.	Cum.
1986	73	73	1997	36	824
1987	-	73	1998	64	888
1988	54	127	1999	56	944
1989	77	204	2000	113	1057
1990	71	275	2001	36	1093
1991	29	304	2002	63	1156
1992	174	478	2003	54	1210
1993	76	554	2004	113	1323
1994	67	621	2005	36	1359
1995	54	675	2006		
1996	113	778			

It is assumed that 85 per cent of the foreign exchange component of the capital requirements will be financed with the export credit facilities available to the equipment suppliers. The remaining 15 per cent will be financed with loans from foreign banks. Export credit facilities are to be amortized over a 6-year period within a 2-year grace period and an effective rate of interest of 9 % p.a. on the due balances. Foreign bank loans are to be amortized over a 6-year period with interest of 12 % on the due balances.

The local currency requirements are to be financed with funds borrowed from internal sources. Medium term loans allow a 5-year term for amortization, at 5 1|2 % p.a. interest, while long term loans allow a 10-year term for amortization at 2 1|2 % p.a. interest. Both medium and long-term loans ha e a 2-year grace period. We assume that equal annual installments are to be paid on full term of amortization of each loan.

II. SALES AND INCOME

Table 2 summarizes the expected production of pharmaceutical products to be manufactured by the plants as they go on stream and reach practical capacity (cruising rythm), operated in two shifts. The average sales price has been estimated at 4.26 DA per sales unit (UV) at all plants (1).

PRODUCTION OF PHARMACEUTICAL PRODUCTS

TABLE II

(Millions of Sales Units (UV)

Year	Production	Year	Production	Year	Production
1986	30	1993	223	2000	439
1987	37	1994	258	2001	452
1988	53	1995	280	2002	479
1989	86	1996	328	2003	501
1990	115	1997	341	2004	549
1991	126	1998	368	2005	562
1992	201	1999	391	2006	589

Sales are assumed to be equal to production, except for a progressive finished goods inventory built up, equivalent to 15 days. Finished goods inventories are projected to grow from 6 million DA in 1985 to 105 million DA by the year 2006.

Variable costs are estimated at 2.00 DA per UV (131.9 : 65.9). Fixed costs were calculated for each plant according to individual characteristics. Amortizations were calculated based on the investment schedules. New production facilities in Algeria enjoy a 5-year income tax holiday. Income tax rate is 60% of pretax net income. Table 3 is an estimated sales income summary for the three existing plants after rationalization plus the newly built four modular units and the "Rouiba" plant.

(1) based on the presently existing average ex factory unit prices at Biotic, El Harrach and Pharmal.

Sales and cost data for the investments grouped under Other Facilities in Table 1 are not available.

TABLE III - ESTIMATED INCOME FROM SALES (1)

(Millions of DA)

Year	Sales Revenue	Variable Costs	Fixed Costs	Amorti (2) zation	Income		
					Pre-tax	Exempt	Net
1986	128	60	38		29		12
1987	128	60	38	5	25		10
1988	223	106	38	15	64		26
1989	360	172	38	29	122		49
1990	485	230	85	75	95	29	55
1991	535	252	85	93	102	53	73
1992	842	402	133	100	207	104	145
1993	975	460	133	108	274	157	204
1994	1094	516	142	117	319	232	267
1995	1189	560	144	135	350	153	232
1996	1388	656	192	148	392	211	291
1997	1450	682	194	158	416	74	213
1998	1564	736	203	138	487	111	264
1999	1662	782	205	127	548	148	310
2000	1861	878	253	129	601	217	375
2001	1924	904	255	127	638	77	305
2002	2036	958	264	126	688	117	350
2003	2130	1002	266	135	727	156	389
2004	2330	1098	314	142	776	224	451
2005	2392	1124	316	145	807	78	376
2006	2505	1178	325	149	853	119	420

(1) Certain light variations in the sales income estimates have occured in some years, due to different interpretations of the products sold, resulting from the information sources. Such variations have not affected the final results.

(2) Amortization includes depreciation of fixed assets and amortization of preliminary expenses, such as training, technical know-how, etc.

III. INTERNAL RATE OF RETURN (IRR)

Internal Rate of Return (IRR) is the rate of return at which the discounted future cash flows equal the initial cash outlays. In other words, IRR is the discount rate at which the net present value of the cash flows equals zero. If the IRR is greater than the desired rate of return, the investment is financially attractive. The desired rate of return should cover the after-tax cost of borrowing the money plus a risk factor, depending upon the special circumstances of the project. The IRR for the entire project - a 2,654 million DA investment plus a 1,359 million DA working capital - is 16.05 per cent. Given the interest rates assumed for borrowing the funds required for the project and the low risk involved, an IRR of 16.05 per cent would make the investment financially attractive. The IRR for the major investments only, that is excluding the 515 million DA listed as "Other Facilities" in Table I, is 18.30 %.

If sales prices were to be increased by 10 %, from 4.26 DA to 4.69 DA per sales unit (UV) throughout the life of the project, the IRR would increase to 20.52 per cent. If sales prices were to be increased by 20 %, the IRR would reach 25.75 per cent.

IV. PAYBACK PERIOD

The Payback period for the project is long as a result of the slow nature of the investment. The first seven years of the project (1986 through 1992) show negative cash flows due to low production volumes, low sales, working capital build-up and high initial investments. The payback period for the entire project-including investments of 2,654 million DA and working capital of 1,359 million DA - is 12 years. If the working capital is not included in the calculation, the payback period is lowered to 8 years and 1 month. The payback period for the major investment only - excluding "Other Facilities" - is 10 years and 6 months, with working capital and 7 years and 7 months without working capital. If sales prices were to be increased by 10 % or 20 %, the payback period would go down to 9 years and 11 months and to 8 years and 7 months, respectively. Table IV shows the calculation for the IRR and payback period for the project.

TABLE IV CALCULATION OF THE INTERNAL RATE OF RETURN

(Millions of DA)

Year	After Tax Net Income	Amorti-zation	Residual vaives	Cash in flow	Invest-ments	Working Capital	Net Cash Flow
1986	12	1		13	17	73	- 77
1987	10	5		15	132	-	-117
1988	26	15		41	254	54	-267
1989	49	28		77	273	77	-273
1990	55	75		130	72	71	- 13
1991	73	93		166	181	29	- 44
1992	145	100		245	78	174	- 7
1993	204	108		312	71	76	165
1994	267	117		384	91	67	226
1995	232	135		367	209	54	104
1996	291	148		439	127	113	199
1997	213	158		371	239	36	96
1998	264	138		402	58	64	280
1999	310	127		437	191	56	190
2000	375	129		504	67	113	324
2001	305	127		432	179	36	217
2002	350	126		476	58	63	355
2003	389	135		524	191	54	279
2004	451	142		593	36	113	444
2005	376	145		521	126	36	359
2006	420	149	1812 *	2381	4	-	2377

Internal Rate of Return: 16.05 %

Payback period (with wkgcptl) 12 years

(w/out wkgcptl) 8 years and 1 month

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* Fixed Investment 453

Working Capital 1359

V. DIRECT BENEFITS FROM THE PROJECT

The demand for pharmaceutical products in Algeria is estimated to increase from 335 million sales units (UV) in 1986 to 1,403 million UV in the year 2006. The factories proposed in the project will produce increasing amounts of pharmaceuticals, from 30 million UV in 1986 to 579 million(1) in the year 2006. With the project, imports as a percent of total demand will fall from 91 % in 1986 to 50.2 % in the year 2006. Table 5 presents a year-to-year breakdown of the total demand and the sources of supply for pharmaceutical products.

The direct benefits from the project can be measured in two ways. First, the amount of foreign exchange saved as a result of not having to import the pharmaceuticals produced locally. And second, the direct value added by local manufacturing.

The average landed cost for imported pharmacenticals, excluding import duties, is 4.54 DA per UV. The average cost of imported inputs (excluding duties) i.e. raw materials, packaging, spare parts for maintenance, Research and Development, technical know-how to sustain local production is estimated at 1.42 DA per UV. To assess the amount of foreign exchange saved to Algeria because of the proposed project one must recognize the role of time - the fact that benefits in early years are more valuable than benefits in later years. We used a discounted rate of 10% to reflect the general preference of present over future benefits. Applying this rate to discount the foreign exchange savings from the project and converting the value in dinars to US dollars at the official rate of exchange of 5 dinars per dollar, we find that the present value of foreign exchange saved because of the project is of US$ 1,091.796 millions. Table 6 below show the basis for the calculation.

(1) excluding Médéa

TABLE V - ESTIMATED TOTAL DEMAND, NATIONAL PRODUCTION AND IMPORTS OF PHARMACEUTICALS

(Million UV)

Year	Total Demand(1)	National Production			Imports	Imports as % of Demand
		Projects	Medea	Total		
1986	335	30	-	30	305	91.04
1987	336	30	7	37	299	88.98
1988	401	45	53.04	98.04	302.96	75.55
1989	439	77	70.72	147.72	291.28	66.35
1990	481	104.8	98.17	202.97	278.03	57.80
1991	514	116.4	113.26	229.66	284.34	55.32
1992	576	191.4	119.48	310.88	265 12	46.03
1993	625	212.9	119.48	332.38	292.62	46.81
1994	678	247.9	119.48	367.38	310.62	45.
1995	735	270.0	119.48	389.48	345.52	47.00
1996	791	318.1	119.48	437.58	353.42	44.68
1997	850	331.1	119.48	450.58	399.42	46.99
1998	914	358.4	119.48	477.88	436.12	47.72
1999	974	380.5	119.48	499.98	474.02	48.66
2000	1037	428.5	119.48	547.98	489.02	47.15
2001	1104	441.6	119.48	561.08	542.92	49.18
2002	1165	468.9	119.48	588.38	576.62	49.49
2003	1229	491.0	119.48	610.48	618.52	50.32
2004	1297	539.1	119.48	658.58	638.42	49.22
2005	1356	552.1	119.48	671.58	684.42	50.47
2006	1403	579.0	119.48	698.48	704.52	50.21

(1) strong hypothesis

TABLE VI - FOREIGN EXCHANGE SAVINGS

(Millions of DA)

Year	Local Prod. with Project Millions UV (1)	Equivalent value of Imports	Cost of Imported Inputs	Foreign Exchange Invest. (2)	Foreign Exchange Savings
1986	30	136	43	8	85
1987	30	136	43	64	29
1988	53	241	75	123	43
1989	86	390	122	132	136
1990	115	522	163	35	324
1991	126	572	179	88	305
1992	202	917	287	38	592
1993	223	1012	317	34	661
1994	258	1171	366	44	761
1995	280	1271	398	87	786
1996	328	1489	466	61	962
1997	341	1548	484	109	955
1998	368	1671	523	28	1120
1999	391	1775	555	78	1142
2000	439	1993	623	32	1338
2001	452	2052	642	80	1330
2002	479	2175	680	28	1467
2003	501	2275	711	78	1486
2004	549	2492	780	17	1695
2005	562	2551	798	54	1699
2006	589	2674	836	2	1836
	6,402	29,063	9,091	1,220	18,752

The present value of foreign exchange savings, discounted at 10 % is 5,458.980 million DA, equivalent to US$1,091.796 million

(1) Total without Médéa antibiotics

(2) Foreign exchange component of the investment in dinars.

In addition, the project will generate direct value added from salaries, taxes, import duties, insurance premiums, interest payments and services purchased in Algeria. The cost information available does not permit to calculate the total direct value added by the project. However, a rough estimate, based on existing information for the Modular Unit, for the direct value added is that it approximates 20.5 % of sales revenue. That is 0.873 DA per UV, which discounted at 10 %, results in a present value of 1,644 million DA for the project. The project will also provide indirect benefits in the form of housing for the workers, but the benefit cannot be quantified from the information available.

The Government revenues could be affected by the project. Imports of finished pharmaceutical products are theoretically subject to a 10.52% (1) import duty. However, up to how import duties are usually waived through a demand for exoneration. Although part of the import duties on finished pharmaceuticals will be lost to the Government as a result of the imports substituted by local production, additional import duties will be paid on imported packaging materials required for local production of pharmaceuticals in Algeria. Finally, the Government will collect additional direct taxes on income generated by the project. The present value of additional direct taxes, discounted at 10 % is calculated at 940 million DA.

(1) Custom duties 3 % + taxes (TUGP) of 7.52 %

VI . SUMMARY

- The project is financially attractive since the Internal Rate of Return of 16.05 percent exceeds the cost of borrowing the capital required to finance the project. The risk factor involved is low.

- The payback period of the project is long- 12 years - due to the slow nature of the investment.

- The project will substitute imports of pharmaceutical products in Algeria. The share of imports as a percent of total demand will fall from 91 % in 1986 to 50.2 % in the year 2006.

- The present value of the foreign exchange savings from the project exceeds 1 billion US dollars.

- The present value of the direct value added by the project to the Algerian economy is estimated at 1,644 million DA.

- The project will provide indirect benefits in the form of housing to the workers, not readily quantifiable.

- The Government will lose part of the duties on imports of finished pharmaceutical products, bu it will increase its revenues from duties on imports of packaging materials.

- The present value of additional direct taxes generated by the project is calculated at 940 million DA.

Annex I

FINANCIAL ANALYSIS OF MEDEA

SALES AND INCOME

The antibiotic complex of Médéa is almost complete at a cost of 1,100 million DA. Sales revenues are projected to start at 146.2 million DA in 1988 and grow to 329.6 million DA by 1992. Variable costs are estimated at 22 % of sales revenue.

Médéa shows operating losses from 1988 through 1991. Therefore, the five-year tax holiday available for newly established industries in Algeria is of no value to Medea.

Starting in 1993 Medea shows moderate profits, which are reduced by a 60 % income tax rate. After tax net income is very low throughout the period.

Internal Rate of Return (IRR)

The Internal Rate of Return for Médéa is very low due to the high initial investment of 1,100 million DA and the two years without production before start-up in 1988. In addition, Médéa is expected to show operating losses during the first five years of operation and therefore, it will not be able to take advantage of the income tax holiday. The IRR for Médéa, assuming a 1,100 million DA investment in the year 1985, is 3.38 per cent. Given the current cost of money, a 3.38 percent IRR is not financially attractive. If sales prices were to be increased by 10 % or 20 %, the IRR would increase to 4.60 percent and 6.51 percent, respectively.

PAYBACK PERIOD

The payback period for Médéa is long. There are two years with zero cash flow be five start-up and the first year of operation shows a negative cash flow. Cash flows throughout the period are low. The payback for the period is 16 years and 2 months. If working capital is not included in the calculation, the payback is lowered to 14 years and 2 months.

Médéa - Estimated Sales and Income

(Millions of DA)

Year	Sales Revenue	Variable Costs (22 %)	Other Costs	Amorti-zation	Income	
					Pretax	Net
1988	146.2	32.2	83.3	181.4	- 150.7	- 150.7
1989	195.1	42.9	85.7	181.3	- 114.8	- 114.8
1990	270.8	59.6	97.8	181.4	- 68.0	- 68.0
1991	312.4	68.7	93.1	181.3	- 30.7	- 30.7
1992	329.6	72.5	92.0	178.1	- 13.0	- 13.0
1993	329.6	72.5	91.0	57.3	108.8	44
1994	329.6	72.5	90.0	57.3	109.8	44
1995	329.6	72.5	89.0	57.3	110.8	44
1996	329.6	72.5	88.0	24.6	144.5	58
1997	329.6	72.5	87.0	20.6	149.5	60
1998	329.6	72.5	86.0	41.2	129.9	52.0
1999	329.6	72.5	85.0	41.2	130.9	52.4
2000	329.6	72.5	84.0	41.2	131.9	52.8
2001	329.6	72.5	83.0	35.0	139.1	55.6
2002	329.6	72.5	82.0	13.0	162.1	64.8
2003	329.6	72.5	82.0	13.0	162.1	64.8
2004	329.6	72.5	82.0	13.0	162.1	64.8
2005	329.6	72.5	82.0	7.2	167.9	67.2
2006	329.6	72.5	82.0	-	175.1	70.0

Medea Calculation of the Internal Rate of Return

(Millions of DA)

Year	After Tax Net Income	Amorti-zation	Residual values	Cash in flow	Invest-ments	Working Capital	Net Cash Flow
1985				0	- 1,100(1)		- 1,100
1986				0			0
1987				0			0
1988	- 151	181		30		83	- 53
1989	- 115	181		66		28	38
1990	- 68	181		113		43	70
1991	- 31	181		150		23	127
1992	- 13	178		165		10	155
1993	44	57		101			101
1994	44	57		101			101
1995	44	57		101			101
1996	58	25		83			83
1997	60	21		81			81
1998	52	41		93			93
1999	52	41		93			93
2000	53	41		94			94
2001	56	35		91			91
2002	65	13		78			78
2003	65	13		78			78
2004	65	13		78			78
2005	67	7	187 (2)	261			261

Internal Rate of Return: 3.38 %

Payback Period (with wkg. capital) 16 years and 2 months

(w/out wkg. capital) 4 years and 2 months

(1) Total investment if 1,100 million DA assumed in year 1985

(2) Residual value of working capital