PREFEASIBILITY STUDY ON
SETTING UP POWDER MILK MANUFACTURING UNIT IN NIGERIA

DEVELOPED BY

STARTUP BUSINESS FOUNDATION

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DISCLAIMER

ACKNOWLEDGMENT

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ABOUT THIS REPORT

This prefeasibility study is designed to provide potential and startups entrepreneurs' valuable information on setting up Powder Milk Manufacturing Unit in the food processing industry of Nigeria's market; aimed at encouraging and facilitating industrial activities across the country. It is our realization that industrialization is at the heart of economic development and that every effort has to be made to bring about industrial growth and encourage our people to be part of it.

Powder Milk manufacturing business shows over 80% local content in terms of availability of raw material, equipment and machinery, manpower and other requirements.

The key areas covered in this report include:

i) Technical and economic analysis of the production, marketing and profitability of the project.

ii) Recommendations in respect of procurement of equipments and associated problems.

iii) Recommendation on suitable agronomic management practices to ensure efficient running of the projects.

iv) Detailed financial analysis including project cash flows for the projects.

This prefeasibility report provides a comprehensive and detailed coverage of the above terms of reference and is designed to facilitate investment decisions.

The implementation of this project will also impact positively on the economy of the immediate community where the project is located. This is in terms of employment-direct and indirect, skilled and unskilled. Government also stands to benefit from internal revenue from taxation.

In view of the result of the analysis using some economic indicators as stated in the proposed project, it is hereby recommended that the project is viable.

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PART I

EXECUTIVE SUMMARY

This prefeasibility study is on setting up powder milk manufacturing unit in the most suitable and strategic location in Nigeria.

Milk powder offers the same nutritional value as regular milk, owing to which, it is used in sports nutrition products including nutrition bars and beverages. The increasing demand for these products, driven by westernization, has been catalyzing the milk powder market.

A large amount of milk powder is imported every year in Nigeria for households as dairy products which form an important component of the Nigerian dietary system. Milk, the principal raw material for milk powder, is available in Nigeria. There is presently no manufacturer of milk powder in Nigeria. The high volume of import indicates a high demand for milk powder.

The main raw material for production of milk powder is milk and is available in the country. Apart from this, the unit requires electricity & water, which are also available in Nigeria and high end technology that employs a spray drying method has been proposed for this plant.

The proposed production capacity is 52,000 kg of powder milk per month, which translates into 624,000 kg per year at 60% capacity utilization.

1.1 SUMMARY OF TOTAL PROJECT COST

S/N	DESCRIPTION	COST INCURRED	COST TO BE INCURRED	TOTAL
1	Land and building	-	480,000	480,000
2	Machinery & equipment	-	12,449,200	12,929,200
3	Utility equipment	-	2,900,000	2,900,000
4	Office equipment	-	470,000	470,000
5	Vehicle	-	5,400,000	10,800,000
	Total capital cost	-	**21,699,200**	**27,579,200**
6	Working capital	-	2,800,000	2,800,000
7	10% contingencies & preliminary expenses	-	2,449,920	3,037,920
	Total project cost	-	**26,949,120**	**33,417,120**

1.2 FINANCIAL ACCOUNTING RATIOS ANALYSIS

PERFORMANCE RATIOS AVERAGES

(a) Return on Sales =32%
(b) Return on Equity =253%
(c) Return on Investment =63%
(d) Positive NPV = ₦74,401,253
(e) IRR =47%
(f) ARR =64%
(g) Payback Period = 1 year and 10 months.

PART II
MARKET ANALYSIS

2.1 MARKET AREA ANALYSIS

Milk products are consumed country wide. There is a ready market for dairy products in Nigeria. The country has the potential to produce milk powder domestically as the major raw material, milk, is available in plenty especially in the northern part of Nigeria. Improvement of the supply chain system for collection of raw milk is essential for improving the cost effectiveness of the product. Milk collections centers can be established with understanding or an agreement with the farmers in the area for regular and standardized supply of milk.

The principal byproduct in milk powder manufacturing is butter & ghee and could be used for the production of other subsidiary products.

2.2 MARKET DEMAND ANALYSIS

The market demand can be divided into distinct groups of buyers who might require separate offerings in terms of product attributes such as pricing, promotion and distribution. Broadly speaking the milk powder market in Nigeria is primarily an urban phenomenon. It can be classified into;

1. Household consumers
2. Institutional buyers

Further classifications can be done – Household consumers can be broken down to high Income, Middle Income, Low income groups.

Similarly Institutional buyers can be split into the following groups like hotels & Restaurants, Hospitals, Armed forces, Factory canteens, Canteens in residential schools & college.

This is the act of choosing some of the segments identified from considerations of commercial attractiveness to the product. It may be worthwhile to address all three household consumer groups. Accordingly, the entrepreneur of enterprise can offer large packets for high income groups, economy packs for middle income groups and sachets for low income groups.

2.3 TARGETED MARKET ANALYSIS

The market for the product is readily available provided the products are meets the standard and quality of similar products at affordable prices. Each of the category product produced by the enterprise should be customer oriented, targeted at particular segment of the society.

Nevertheless, for the enterprise to create market niche, it needs an experience marketer or distributor that can navigate through the competition hurdles of already existing product to establish the product brand in the market.

PART III
TECHNICAL ANALYSIS

3.1 PRODUCT DESCRIPTION

Product Milk Powder is generally classified into the following categories WMP (Whole milk powder): It is obtained by removing water from pasteurized, homogenized whole milk through evaporation and spray drying processes. It possesses all the appealing qualities of milk and, in its dry form, is an important ingredient in the manufacture of a remarkable range of food products. The durability of milk powder makes it popular to the customer base.

By supplying proper quality of product the unit can ensure that their products are considered at par with imports. The units must brand their supplies with an appropriate logo printed on stickers.

3.2 SUITABLE LOCATION

The location of a plant is determined on the basis of proximity to raw materials, availability of infrastructure and distance to market outlets. The manufacturing unit for production of milk powder should be located in an area where animal milk is available in plenty. Considering the availability of milk in the northern parts of Nigeria and neighbouring countries such as Chad Republic, Niger etc, makes it an ideal location for the plant.

Although, the production of milk powder causes air and water pollution but this may be reduced up to a great extent by following the recommended measures.

3.3 SPECIFICATION AND QUALIITY STANDARD

The raw materials as well as the machines used in the production must meet quality norms so that the machines can operate at its best rating to reach its expected life's span. It is also important that the incoming milk collected from the farmers should be checked and tested such that appropriate quality standards are adhered to. With a streamlined and continuous supply of standardized raw material the costing would tend to stabilize.

3.4 PRODUCTION PROCESS

There are three acceptable technology areas defined by three different drying methods which are in vogue. These are a) Drum drying; b) Spray drying and c) Freeze drying Drum drying: It is a slightly old technology suitable for low volumes where the output comes out as flakes. In the drum-drying process, pureed raw ingredients are dried at relatively low temperatures over rotating, high-capacity drums that produce sheets of drum-dried product. This product is milled to a finished flake or powder form. Freeze drying is the latest technology but expensive and suitable for those products which can loose their properties

when they are heated. Spray drying: is a method of producing a dry powder from a liquid or slurry by rapidly drying with a hot gas. This is the preferred method of drying of many thermally-sensitive materials such as foods and pharmaceuticals.

3.5 RAW MATERIAL CONSUMPTION

The raw material required for production of milk powder would be unprocessed milk which could be directly procured from farmers.

3.6 PRODUCTION CAPACITY

The estimated production capacity is 52,000 kg of powder milk per month, which translates into 624,000 kg per year at 60% capacity utilization.

3.7 SOURCES OF FUNDS

The project can be funded through a number of sources which include but not limited to the following; Agric-Business, Small & Medium Scale Investment Scheme (AGSMEIS), Bank of Industry, Bank of Agriculture (BOA), Nigeria Export-Import (NEXIM) Bank, International Finance Corporation (IFC), grants etc., though the conditions and criteria for accessing the loans and grants varies.

PART IV
FINANCIAL ANALYSIS

Basically, the financial section of this prefeasibility study consists of three financial statements: Income statement, Balance sheet, Cash flow projection. This section determines whether or not the project is viable using some economic indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), and payback period as are detailed in the appendices below.

4.1 ASSUMPTIONS

1. Assuming that the project will last for the period of five years and the salvage value at the end of the project life ignored.
2. The Machineries, Equipments and Utility Equipment have uniform depreciation of 20%.
3. The installed capacity has estimated production capacity of 52,000 kg of powder milk per month, which translates into 624,000 kg per year at 60% capacity utilization.
4. The proposed capacity utilization are 60% in the first year of commercial production, 70%, 80% in the 2nd and 3rd year respectively and 90% in the 4th and 5th years.
5. Raw materials will be sourced locally and Market for the product is readily available.
6. Staff and labour cost will increase by 10% yearly.
7. Prices and unit costs are assumed unchanged in the five years of projection.
8. The valuation currency used is in Naira.

4.2 ACCOUNTING /FINANCIAL ANALYSIS

4.2.1 NET PROFIT

The projected Annual Trading Profit and Loss Account is proposed to make the following Net Profit after tax during the corresponding projected periods – all things being equal.

4.2.2 NET PRESENT VALUE (NPV)

NPV is one of the four methods of discounted cash flows techniques which state that money that is immediately available for use, has a greater value than same amount receivables in future date.

Using this method however, all net cash inflows will be discounted to present value using the estimated interest rate of 60% discount factor. At **12%** discount factor the project produced a positive **NPV NGN 74,401,253**

4.2.3 INTERNAL RATE OF RETURN (IRR)

This is the discount rate which gives zero NPV or the rate which equates the present value of cash inflows with present value of cash outflows of the project.

The cash flow of this project was discounted systematically until the NPV of the project finally become zero. The project produces the **IRR** of **47%.** Thus, the project accepted as being viable. This is because **IRR** is more than the cost of capital.

4.2.4 ACCOUNTING RATE OF RETURN (ARR)

ARR uses accounting information as revealed by financial statements (Income Statement) to measure profitability of the project under consideration. The forecast **ARR** of the project is 64%.

4.2.5 PROFITABILITY INDEX (PI)

This is the present value of future cash flows over the present value of cash outlays. The project PI further confirm the viability of the project , because as the rules of the accepting and rejecting hold, a project should be accepted if the PI is equal or greater than one (1). Consequently, the PI of this project is **1.72** and thus recommended as being viable to be accepted for financing.

APPENDIX I
TOTAL PROJECT COST

S/N	DESCRIPTION	QTY	UNIT COST	TOTAL
	LAND AND BUILDING			
1	Factory rentage		480,000	480,000
	Sub total		**480,000**	**480,000**
	MACHINERY & EQUIPMENT			
2	Auto mixer	1	4,000,000	4,000,000
3	Lactoscan	1	89,200	89,200
4	Packing machine	1	3,800,000	3,800,000
5	storage containers	2	480,000	960,000
6	Milk sampler	1	80,000	80,000
7	Milk reception unit	1	4,000,000	4,000,000
	Sub total		**12,449,200**	**12,929,200**
	UTILITY EQUIPMENT			
8	25KVA Perkins Generator	1	2.300,000	2,300,000
9	Industrial borehole with tanks	1	600,000	600,000
	Sub total		**2,900,000**	**2,900,000**
	OFFICE EQUIPMENT			
10	Laptop and printer	1	200,000	200,000
11	Office chairs and tables	set	150,000	150,000
12	Fittings	1	120,000	120,000
	Sub total		**470,000**	**470,000**
	VEHICLE			
12	Delivery van	2	5,400,000	10,800,000
	Sub total	**2**	**5,400,000**	**10,800,000**
	TOTAL CAPITAL COST		**21,699,200**	**27,579,200**
13	Working capital		2,800,000	2,800,000
14	10% contingencies		2,449,920	3,037,920
	Total project cost		**26,949,120**	**33,417,120**

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APPENDIX II
ESTIMATION OF WORKING CAPITAL REQUIREMENT

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Year of Commercial Operation	2 Months
% Capacity Utilization (Inventory)	60%
2 Months stock of raw material	1,210,000
7 Days stock of finished products	339,000
Work in Progress	972,000
Bank/ Cash (5% sales of the products)	279,000
Working capital	2,800,000

APPENDIX III
FINANCING PLAN

DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	8,417,120		8,417,120
Term loan from	-	25,000,000	25,000,000
Total project cost	8,417,120	25,000,000	33,417,120
% Contribution	33.5%	68.5%	100%

APPENDIX IV
TERM LOAN REPAYMENT SCHEDULE

LOAN AMOUNT: 25,000,000 (Twenty- Five Million Naira)
TYPE : ANY LOCAL AVAILABLE SME FUND
INTEREST RATE USED: 12%
REPAYMENT: 5 YEARS EQUAL INSTALLMENT (Annually)

YEAR	OPENING BALANCE	REPAYMENT	INTEREST DUE	TOTAL YEAR INTEREST
1	25,000,000	5,000,000	3,000,000	8,000,000
2	20,000,000	5,000,000	2,400,000	7,400,000
3	15,000,000	5,000,000	1,800,000	6,800,000
4	10,000,000	5,000,000	1,200,000	6,200,000
5	5,000,000	5,000,000	600,000	5,600,000
Total		25,000,000	9,000,000	34,000,000

APPENDIX V
FORECAST STAFFING SCHEDULE (1ST OPERATIONAL YEAR)
N'000

POSITION	No	Unit Scale	Scale/ Month	Scale / Year
DIRECT LABOUR				
Factory Manager	1	80	80	960
Operation Manager	1	70	70	840
Food Science Technologist	1	60	60	720
Unskilled labour	4	40	160	1,920
Sub total	**7**	**250**	**370**	**4,440**
INDIRECT LABOUR				
Accountant	1	50	50	600
Marketing Officer	2	50	100	1,200
Store Keeper	1	40	40	480
Driver	2	40	80	960
Sub total	**7**	**210**	**300**	**3,600**
Total	**13**	**460**	**670**	**6,600**

APPENDIX VI
ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE
N'000

ITEMS	INITIAL VALUE	DEPRECIATION
Machinery and Equipments	12,929,200	2,585,840
Utility Equipments	2,900,000	580,000
Vehicles	10,800,000	2,160,000
Office Equipments	470,000	94,000
TOTAL	**27,099,200**	**5,419,840**

APPENDIX VII
ESTIMATE OF ADMINISTRATIVE / OVERHEAD EXPENSES
N'000

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Selling and Distribution	1,440	1,512	1,584	1,663	1,663
Maintenance of machinery	960	1,008	1,056	1,109	1,109
Miscellaneous expenses	700	735	770	809	809
TOTAL	**3,100**	**3,255**	**3,410**	**3,581**	**3,581**

APPENDIX VIII
PRODUCTION AND OPERATING COSTS

Cost Item	Units	@/ day	Qty/ Day	Prod. cost/ day	Prod. Cost/ month	Prod. Cost/ year
Milk	Ltrs	0.48	20,000	9,600	249,600	2,995,200
Packaging materials	ctn	0.3	10	3	78	936
Sub-total					**249,678**	**2,996,136**

APPENDIX IX
ESTIMATION OF RAW MATERIAL/PRODUCTION COST AND SALES

Year of Commercial Production	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization	**60%**	**70%**	**80%**	**90%**	**90%**
1. Output					
Powder milk	20,000	22,000	24,000	26,000	26,000
Total output	**20,000**	**22,000**	**24,000**	**26,000**	**26,000**
2. Cost of Production					
	N'000	**N'000**	**N'000**	**N'000**	**N'000**
Milk @ N660/ Ltrs	13,200	14,520	15,840	17,160	17,160
Packaging materials N125/ carton	2,500	2,750	3,000	3,250	3,250
Total cost of production	**15,700**	**17,270**	**18,840**	**20,410**	**20,410**
3. SALES					
Powder milk @ N2,950/ crate	45,000	49,500	54,000	58,500	58,500
TOTAL SALES/ TURNOVER	**45,000**	**49,500**	**54,000**	**58,500**	**58,500**

APPENDIX X

FORECAST INCOME STATEMENT (PROFIT & LOSS ACCOUNT)

Year of commercial operation	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization	**60%**	**70%**	**80%**	**90%**	**90%**
1. SALES	**N'000**	**N'000**	**N'000**	**N'000**	**N'000**
Gross Sales	59,000	64,900	70,800	76,700	76,700
Value Added Tax (VAT)@ 5%	2,950	3,245	3,540	3,835	3,835
Net Revenue	**56,050**	**61,655**	**67,260**	**72,865**	**72,865**
2. OPERATION COST					
Cost of Raw materials consumed	15,700	17,270	18,840	20,410	20,410
Staff and labour	6,600	7,260	7,920	8,712	8,712
Admin. & Overhead Expenses	3,100	3,255	3,410	3,581	3,581
Depreciation	5,420	5,420	5,420	5,420	5,420
Total Operating Cost	**30,820**	**33,205**	**35,590**	**38,123**	**38,123**
3. OTHER COSTS					
Interest on Term Loan (12%)	3,000	2,400	1,800	1,200	600
Loan Repayment	5,000	5,000	5,000	5,000	5,000
Total (Other Costs)	38,820	40,605	42,390	44,323	43,723
Profit Before Tax	17,230	21,050	24,870	28,542	29,142
Tax (12%)	2,067.6	2,526	2,984.4	3,425.04	3,497.04
Profit after tax (NET PROFIT)	**15,162**	**18,524**	**21,886**	**25,117**	**25,645**
% Return on Sales	0.27	0.30	0.33	0.35	0.35
% Return on Equity	1.80	2.20	2.60	2.98	3.05
% Return on Investment	0.45	0.55	0.65	0.75	0.77

APPENDIX XI

FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV
	N'		N'
0	(33,417,120)	1	(33,417,120)
1	15,162,000	0.893	13539666
2	18,524,000	0.797	14763628
3	21,886,000	0.712	15582832
4	25,117,000	0.636	15974412
5	25,645,000	0.567	14540715
Total Profit	**106,334,000**		**74,401,253**
Average Profit	**21,266,800**		

Year	C/F	DF 60%	NPV
	N'		N'
0	**(33,417,120)**	**1**	**(33,417,120)**
1	15,162,000	0.625	9476250
2	18,524,000	0.3906	7235474.4
3	21,886,000	0.2441	5342372.6
4	25,117,000	0.1526	3832854.2
5	25,645,000	0.0954	2446533
Total Profit	**106,334,000**		**28,333,484**
Average Profit	**21,266,800**		

APPENDIX XII

FORECAST IRR AND ARR COMPUTATION

$$IRR = a + \frac{(A)}{A+B} * (b-a)$$

Where

a = 12%

b= 60%

A = 74,401,253

B= 28,333,484

$$9\% + \frac{74,401,253}{74,401,253 + 28,333,484} (60-12)$$

12%+ 38

47%

$$ARR = \frac{\text{Estimated Average Profit}}{\text{Estimated initial investment}} * 100$$

$$ARR = \frac{21,266,800}{33,417,120} * 100$$

64%

APPENDIX XIII
CASH FLOW PROJECTION

Year of Comm. Production	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization		60%	70%	80%	90%	90%
A) CASH RECEIPTS	**N'**	**N'**	**N'**	**N'**	**N'**	**N'**
Equity Capital	8,417,120	-	-	-	-	-
Term Loan	25,000,000	-	-	-	-	-
Gross Revenue	-	40,832,064	44,915,270	48,998,477	53,898,324	53,898,324
Total Receipts	**33,417,120**	**40,832,064**	**44,915,270**	**48,998,477**	**53,898,324**	**53,898,324**
B) CASH PAYMENTS						
Capital Payment						
Machinery & Equipments	12,929,200	-	-	-	-	-
Utility Equipment	2,900,000					
Office equipments	470,000					
Vehicle	10,800,000	-	-	-	-	-
TOTAL	**27,099,200**	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	5,420,000	5,420,000	5,420,000	5,420,000	5,420,000
Change in working capital	6,317,920	25,400,000	27,785,000	30,170,000	32,703,000	32,703,000
Sub total	**6,317,920**	**30,820,000**	**33,205,000**	**35,590,000**	**38,123,000**	**38,123,000**
(iii) Financial Expenses						
Repayment of Term Loan	-	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
Interest on Term Loan	-	3,000,000	2,400,000	1,800,000	1,200,000	600,000
Value Added Tax	-	2,950,000	3,245,000	3,540,000	3,835,000	3,835,000
Corporate Tax	-	2,067,600	2,526,000	2,984,400	3,425,040	3,497,040
Sub total	-	**13,017,600**	**13,171,000**	**13,324,400**	**13,460,040**	**12,932,040**
Total cash payment (ii)-(iii)	**6,317,920**	**17,802,400**	**20,034,000**	**22,265,600**	**24,662,960**	**25,190,960**
Net cash flow c/f	6,317,920	17,802,400	20,034,000	22,265,600	24,662,960	25,190,960

APPENDIX XIV
BALANCE SHEET PROJECTION

Year of comm. Operation	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
ASSETS	**N'000**	**N'000**	**N'000**	**N'000**	**N'000**	**N'000**
(i) Fixed assets						
Machinery and Equipments	12,929,200	-	-	-	-	-
Utility equipment	2,900,000					
Office Equipment	470,000					
Vehicle	10,800,000	-	-	-	-	-
Value at Acquisition	-	27,099,200	27,099,200	27,099,200	27,099,200	27,099,200
Less Cumulated Depreciation	-	5,419,840	10,839,680	16,259,520	21,679,360	27,099,200
Net fixed assets	**27,099,200**	**21,679,360**	**16,259,520**	**10,839,680**	**5,419,840**	**0**
(ii)Current Assets/ liability						
Stock of Raw Materials	2,800,000	22,438,336	41,150,569	48,440,301	55,118,646	59,627,419
Debtors /prepayment	-	6,453,000	8,098,000	10,308,000	12,139,000	14,653,000
Bank and Cash Balances	3,517,920	4,150,024	5,160,031	6,170,539	7,180,674	7,180,741
Creditor / accruals	-	(4,074,000)	(6,039,000)	(8,947,000)	(11,013,000)	(13,785,000)
Company Tax	-	(2,067,600)	(2,526,000)	(2,984,400)	(3,425,040)	(3,497,040)
Net current assets	**6,317,920**	**26,899,760**	**45,843,600**	**52,987,440**	**60,000,280**	**64,179,120**
TOTAL NET ASSETS	**33,417,120**	**48,579,120**	**62,103,120**	**63,827,120**	**65,420,120**	**64,179,120**
(ii) FINANCED BY						
Equity Capital	8,417,120	8,417,120	8,417,120	8,417,120	8,417,120	8,417,120
P&L	-	15,162,000	18,524,000	21,886,000	25,117,000	25,645,000
Retained Profit	-	-	15,162,000	18,524,000	21,886,000	25,117,000
SHAREHOLDERS FUND	**8,417,120**	**23,579,120**	**42,103,120**	**48,827,120**	**55,420,120**	**59,179,120**
Long Term Loan	25,000,000	25,000,000	20,000,000	15,000,000	10,000,000	5,000,000
TOTAL EQUITY & LIABILITY	**33,417,120**	**48,579,120**	**62,103,120**	**63,827,120**	**65,420,120**	**64,179,120**