PREFEASIBILITY STUDY ON

SETTING UP PENCILS MANUFACTURING UNIT OF IN NIGERIA

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DISCLAIMER

ACKNOWLEDGMENT

Startup Business Foundation is thankful to all organizations and individuals who have helped in several ways in preparation of this prefeasibility study.

We also wish to extend our gratitude to all those who reviewed the content and provided valuable inputs for improving the quality, coherence, and content presentation of this prefeasibility study.

ABOUT THIS REPORT

This prefeasibility study is designed to provide potential and startups entrepreneurs' valuable information on setting up pencil production business in the manufacturing 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.

The pencil production business shows over 50% 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.

TABLE OF CONTENT

APPENIDIES

PART I

EXECUTIVE SUMMARY

This particular prefeasibility study is on setting up pencil manufacturing unit in the most suitable and viable location in any part of Nigeria.

A pencil is a writing implement or art medium constructed of a narrow, solid pigment core inside a protective casing. The case provides an external scaffold to protect the structural integrity of the core, and also prevents the pigment from accidentally staining the hand during use. Pencils are widely used in the country in fields like education, carpentry, and artillery work among others, hence creating a big demand for them.

The location of the factory is should be based on accessibility of the raw materials, basic infrastructure and nearness to market.

The estimated capacity is at 6,000 dozens of pencils per day which translate to 1,872,000 dozens per annum working 312 day annually. Nevertheless, the investment can be scaled up or down based on the capital outlay for the project.

SUMMARY OF TOTAL PROJECT COST

	DESCRIPTION	COST TO BE INCURRED	COST TO BE INCURRED	TOTAL
1	Land & building	-	400,000	400,000
2	Machinery & equipments	-	2,275,000	3,075,000
3	Utility equipment	-	200,000	200,000
4	Office equipment	-	150,000	150,000
5	Vehicle	-	2,200,000	2,200,000
	TOTAL CAPITAL COST	-	**5,225,000**	**6,025,000**
6	Working capital	-	1,400,000	1,400,000
7	10% Contingencies & preliminary expenses	-	742,500	742,500
	Total project cost	-	**7,367,500**	**8,167,500**

1.2 FINANCIAL ACCOUNTING RATIOS ANALYSIS

PERFORMANCE RATIOS AVERAGES

(a) Return on Sales =20%
(b) Return on Equity = 1,552%
(c) Return on Investment =412%
(d) Positive NPV = ₦118,682,283
(e) IRR =47%
(f) ARR =412%
(g) Payback Period = 9 months

PART II
MARKET ANALYSIS

2.1 INTRODUCTION

Pencils are widely used in the country in almost all fields such as Education, Carpentry and Artillery among others; hence creating a big demand for them.

There is a variety of HB, B, 2B, 3B, 4B, 5B, 6B, 7B, 8B, 9B, and 10B. Writing, drawing, sketching, coloring, and shading is the basic applications of the wooden pencil.

2.2 MARKET AREA ANALYSIS

Most pencil cores are made of graphite mixed with a clay binder which leaves grey or black marks that can be easily erased. Graphite pencils are used for both writing and drawing and result in durable markings: though writing is easily removable with an eraser, it is otherwise resistant to moisture, most chemicals, ultra violet radiation, and natural aging. Other types of pencil core are less widely used, such as charcoal pencils, which are mainly used by artists for drawing and sketching.

The market for writing instruments in Nigeria is estimated at 1200 to 2100 million pieces a year. The total market for writing instruments is estimated at over $2.4bn (N734.4bn) in value and is growing at around 8 to 10% annually. There is a growing demand of polymer pencil in the market. The products find application in schools, colleges, government offices, commercial establishments, NGOs and miscellaneous activities.

2.3 DEMAND AND SUPPLY ANALYSIS

Even in this digital age, pencils are the loyal companions of many school children, writers, and artists alike. It is estimated that about 15 to 20billion pencils are used annually. Most pencils have a graphite or charcoal core encased in wood.

The demand for pencils is mainly associated with student population of the country. Education sector is given high priority by the government and a number of schools are opened in various parts of the country, including in the remote rural areas. Enhancement of quality and access at all levels of the education system is the major objective during the GTP period. With the expansion of education facilities and increase in the enrollment rate of the population the demand for pencils will grow substantially.

2.4 TARGET MARKET ANALYSIS

The targeted market should be major distributors and local market traders that deal on educational materials in different markets in Nigeria. The success of this project is apparently hinged on the ability of the enterprise to capture the market that meets the projected daily sales of the products. Therefore, the enterprise should develop strategic marketing plan to create market niche and recognized brand name in the market.

PART III
TECHNICAL ANALYSIS

3.1 PRODUCT DESCRIPTION

A pencil is a writing implement or art medium constructed of a narrow, solid pigment core inside a protective casing which prevents the core from being broken and /or from leaving marks on the user's hand during use.

Pencils create marks by physical abrasion, leaving behind a trail of solid core material that adheres to a sheet of paper or other surface. They are distinct from pens, which instead disperse a trail of liquid or get link that stains the light colour of the paper.

3.2 LOCATION ANALYSIS

The industrial location of the plant for the production of pencil can be setup in any part of the country with consideration to proximity of the raw materials, cheap labour and access to market.

3.3 PRODUCTION CAPACITY

The installed production capacity is estimated at 6,000 dozens of pencils per day which translate to 1,872,000 dozens per annum working 312 day annually. This assumed to be at 60% capacity utilization.

3.4 RAW MATERIALS

The most important ingredient in a pencil is the graphite, which most people continue to call lead, which is a method of combining graphite with clay and wax or other chemicals. The cedar usually arrives at the factory already dried, stained, and waxed to prevent warping. The basic raw material which is graphite is readily available in some states in Nigeria with large deposit in Kaduna, Ebonyi etc.

3.5 PROCESS & TECHNOLOGY

Modern pencils are made industrially by mixing finely ground graphite and clay powders, adding water, forming long spaghetti-like strings, and firing them in a kiln. The resulting strings are dipped in oil or molten wax, which seeps into the tiny holes of the material, resulting in smoother writing.

A juniper or incense-cedar plank with several long parallel grooves is cut to fashion a "slat," and the graphite/clay strings are inserted into the grooves. Another grooved plank is glued on top, and the whole assembly is then cut into individual pencils, which are then varnished or painted. Afterwards people can then add personal things like pencil grips and eraser toppers & Labels.

The equipments may be imported from China & India.

3.5 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, 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 10%.
3. The estimated capacity is at 6,000 dozens of pencils per day which translate to 1,872,000 dozens per annum working 312 day annually, 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 5% yearly.
7. Prices and unit costs are assumed unchanged in the five years of projection.
8. The valuation currency used is 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 118,682,283**

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 412%

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

	DESCRIPTION	QTY	Unit price	Total
	LAND & BUILDING			
1	Factory rentage	1	400,000	400,000
	Sub total	**1**	**400,000**	**400,000**
	MACHINERY & EQUIPMENTS			
2	Power Saw	1	250,000	250,000
3	Grover	1	125,000	125,000
4	Eraser Tipping Machine	1	400,000	400,000
5	Ferrule	1	600,000	600,000
6	Painting Machine	1	500,000	500,000
7	Shaping Machine	3	400,000	1,200,000
8	**Sub total**		**2,275,000**	**3,075,000**
	UTILITY EQUIPMENT			
10	Generator		200,000	200,000
	Sub total		**200,000**	**200,000**
	OFFICE EQUIPMENT			
11	Furniture & fittings	1	150,000	150,000
	Sub total	**2**	**150,000**	**150,000**
	VEHICLE			
12	Delivery van		2,200,000	2,200,000
	Sub total		**2,200,000**	**2,200,000**
	TOTAL CAPITAL COST		**5,225,000**	**6,025,000**
9	Working capital		1,400,000	1,400,000
10	10% Contingencies & preliminary expenses		742,500	742,500
	Total project cost		**7,367,500**	8,167,500

APPENDIX II
ESTIMATION OF WORKING CAPITAL REQUIREMENT

N'000

Year of Commercial Operation	2 weeks	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization (Inventory)	**60%**	**70%**	**80%**	**90%**	**90%**
1 week stock of raw material	800	8,194	11,713	15,530	15,530
1 Day stock of finished products	400	3,443	4,887	5,376	5,376
Work in Progress	200	1,071	1,098	1,169	1,169
Bank/ Cash (5% sales of the products)	-	2,287	2,516	2,768	2,768
Working capital	**1,400**	**11,248**	**13,192**	**15,419**	**15,419**

APPENDIX III
FINANCING PLAN

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DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	2,167,500	-	2,167,500
Term loan from	-	6,000,000	2,000,000
Total project cost	**2,167,500**	**6,000,000**	**8,167,500**
% Contribution	**15%**	**75%**	**100%**

APPENDIX IV
TERM LOAN REPAYMENT SCHEDULE

LOAN AMOUNT: 6,000,000 (Six Million Naira Only)
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	6,000,000	1,200,000	720,000	1,920,000
2	4,800,000	1,200,000	576,000	1,776,000
3	3,600,000	1,200,000	432,000	1,632,000
4	2,400,000	1,200,000	288,000	1,488,000
5	1,200,000	1,200,000	144,000	1,344,000
Total		**6,000,000**	**2,160,000**	**8,160,000**

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

POSITION	No	Unit Scale	Scale/ Month	Scale / Year
DIRECT LABOUR				
Factory Manager	1	60	60	720
Unskilled labour	4	30	120	1,440
Sub total	**5**	**90**	**120**	**2,160**
INDIRECT LABOUR				
Accounts/ Admin	1	50	50	600
Marketing Officer	2	40	80	960
Driver	1	40	40	480
Sub total	**4**	**130**	**170**	**2,040**
Total on staff (1st year)	**10**	**220**	**290**	**4,200**

APPENDIX VI
ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE
N'

ITEMS	INITIAL VALUE	DEPRECIATION (20%)
Machinery & equipment	2,275,000	455,000
Utility Equipment	200,000	40,000
Office Equipments	150,000	30,000
Vehicle	2,200,000	440,000
TOTAL	**4,825,000**	**965,000**

APPENDIX VII
ESTIMATION OF ADMINISTRATIVE / OVERHEAD EXPENSES
N'

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Selling and Distribution	1,328,400	1,394,820	1,461,240	1,534,302	1,534,302
Repairs and maintenance	226,800	238,140	249,480	261,954	261,954
Diesel / Fuel	2,904,400	2,999,620	3,094,840	3,199,582	3,199,582
Staff enumeration	900,000	945,000	990,000	1,039,500	1,039,500
TOTAL	**5,359,600**	**5,577,580**	**5,795,560**	**6,035,338**	**6,035,338**

APPENDIX VIII
ESTIMATION OF PRODUCTION AND OPERATION COSTS

Item		Units	@ N	Qty/ day	Pdn Cost/ day	Pdn cost/ mth	Prod. Cost/ Year
Direct Costs							
Cedar		Ft	600	500	300,000	7,800,000	93,600,000
Graphite		Kgs	300	60	18,000	468,000	5,616,000
Sub total			**900**		**318,000**	**8,268,000**	**99,216,000**

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					
Pencil (grms)	1,872,000	2,059,200	2,246,400	2,471,040	2,471,040
Total output	**1,872,000**	**2,059,200**	**2,246,400**	**2,471,040**	**2,471,040**
2. Cost of Production	**N'**	**N'**	**N'**	**N'**	**N'**
Pencil @N53	99,216,000	109,137,600	119,059,200	130,965,120	130,965,120
Total cost of production	**99,216,000**	**109,137,600**	**119,059,200**	**130,965,120**	**130,965,120**
3. SALES					
Pencil @N80	149,760,000	164,736,000	179,712,000	197,683,200	197,683,200
TOTAL SALES/ TURNOVER	**149,760,000**	**164,736,000**	**179,712,000**	**197,683,200**	**197,683,200**

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'**	**N'**	**N'**	**N'**	**N'**
Gross Sales	149,760,000	164,736,000	179,712,000	197,683,200	197,683,200
VAT @ 5%	7,488,000	8,236,800	8,985,600	9,884,160	9,884,160
Net Revenue	**142,272,000**	**156,499,200**	**170,726,400**	**187,799,040**	**187,799,040**
2. OPERATION COST					
Cost of Raw materials consumed	99,216,000	109,137,600	119,059,200	130,965,120	130,965,120
Staff and labour	4,200,000	4,410,000	4,620,000	4,851,000	4,851,000
Admin. & Overhead Expenses	5,359,600	5,577,580	5,795,560	6,035,338	6,035,338
Depreciation	965,000	965,000	965,000	965,000	965,000
Total Operating Cost	**109,740,600**	**120,090,180**	**130,439,760**	**142,816,458**	**142,816,458**
3. OTHER COSTS					
Interest on Term Loan (12%)	720,000	576,000	432,000	288,000	144,000
Loan Repayment	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Total (Other Costs)	**111,660,600**	**121,866,180**	**132,071,760**	**144,304,458**	**144,160,458**
Profit Before Tax	30,611,400	34,633,020	38,654,640	43,494,582	43,638,582
Corporate Tax @ 12%	3,673,368	4,155,962	4,638,557	5,219,350	5,236,630
Profit after tax (NET PROFIT)	**26,938,032**	**30,477,058**	**34,016,083**	**38,275,232**	**38,401,952**
% Return on Sales	0.18	0.19	0.20	0.21	0.21
% Return on Equity	12.4	14.1	15.7	17.7	17.7
% Return on Investment	3.3	3.7	4.2	4.7	4.7

APPENDIX XI

FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV
	N'		N'
0	(8,167,500)	1	(8,167,500)
1	26,938,032	0.893	24,055,662.58
2	30,477,058	0.797	24,290,215.23
3	34,016,083	0.712	24,219,451.1
4	38,275,232	0.636	24,343,047.55
5	38,401,952	0.567	21,773,906.78
Total Profit	**168,108,357**		**118,682,283**
Average Profit	**33,621,671.4**		

Year	C/F	DF 60%	NPV
	N'		N'
0	(8,167,500)	1	(8,167,500)
1	26,938,032	0.625	16,836,270
2	30,477,058	0.3906	11,904,338.85
3	34,016,083	0.2441	8,303,325.86
4	38,275,232	0.1526	5,840,800.403
5	38,401,952	0.0954	3,663,546.221
Total Profit	**168,108,357**		**46,548,281**
Average Profit	**33,621,671.4**		

APPENDIX XII

FORECAST IRR AND ARR COMPUTATION

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

Where

a = 12%

b= 60%

A = 118,682,283

B= 46,548,281

$$12\% + \frac{118,682,283}{118,682,283 + 46,548,281} (60-12)$$

12% + 34.5

47%

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

$$ARR = \frac{33,621,671.4}{8,167,500} * 100$$

412%

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'000**	**N'000**	**N'000**	**N'000**	**N'000**	**N'000**
Equity Capital	45,850	-	-	-	-	-
Term Loan	90,000	-	-	-	-	-
Gross Revenue	-	284,700	332,150	379,600	427,050	427,050
Total Receipts	**135,850**	**284,700**	**332,150**	**379,600**	**427,050**	**427,050**
B) CASH PAYMENTS						
Capital Payment						
Land and Building	23,000	-	-	-	-	-
Machinery and Equipments	56,247	-	-	-	-	-
Auxiliary Equipments	6,270	-	-	-	-	-
Utility Equipments	13,500					
Vehicles	20,000	-	-	-	-	-
Office Equipments	1,500	-	-	-	-	-
TOTAL	**118,367**	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	11,837	11,837	11,837	11,837	11,837
Change in working capital	10,000	10,000	11,248	13,192	15,419	15,419
Sub total	**10,000**	**21,837**	**23,085**	**25,029**	**27,256**	**27,256**
(iii) Financial Expenses						
Repayment of Term Loan	-	90,000	72,000	54,000	36,000	18,000
Interest on Term Loan	-	10,800	8,640	6,480	4,320	2,160
Value Added Tax	-	14,235	16,607	18,980	21,352	21,352
Corporate Tax	-	26,270	33,378	40,464	47,843	48,491
Education Tax	-	1,751	2,225	2,698	3,190	32,33
Sub total	-	**143,056**	**132,850**	**122,622**	**112,705**	**90,003**
Total cash payment (ii)-(iii)	**10,000**	**121,219**	**109,765**	**97,593**	**85,449**	**62,747**
Net cash flow c/f	10,000	121,219	109,765	97,593	85,449	62,747

APPENDIX XIII
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						
Land and Building	23,000	-	-	-	-	-
Machinery and Equipments	56,247	-	-	-	-	-
Auxiliary Equipments	6,270	-	-	-	-	-
Utility Equipments	13,500					
Vehicles	20,000	-	-	-	-	-
Office Equipments	1,500	-	-	-	-	-
Value at Acquisition	118,367	118,367	118,367	118,367	118,367	118,367
Less Cumulated Depreciation	-	11,837	23,674	35,511	59,185	59,185
Net fixed assets	**118,367**	**106,530**	**94,693**	**82,856**	**59,182**	**59,182**
(ii)Current Assets/ liability						
Stock of Raw Materials	10,000	110,713	138,954	141,793	143,466	166,480
Debtors /prepayment		6,453	7,098	8,308	9,139	10,653
Bank and Cash Balances	7,483	150,024	160,031	170,539	180,674	180,741
Creditor / accruals	-	(9,074)	(11,039)	(13,947)	(18,013)	(22,785)
Company Tax	-	(26,270)	(33,378)	(40,464)	(47,843)	(48,491)
Education Tax	-	(1,751)	(2,225)	(2,698)	(3,190)	(32,33)
Net current assets	**17,483**	**88,865**	**158,359**	**184,369**	**222,829**	**223,023**
TOTAL NET ASSETS	**135,850**	**195,395**	**253,052**	**267,225**	**282,011**	**282,205**
(ii) FINANCED BY						
Equity Capital	45,850	45,850	45,850	45,850	45,850	45,850
P&L	-	59,545	75,657	91,718	108,443	109,912
Retained Profit	-	-	59,545	75,657	91,718	108,443
SHAREHOLDERS FUND	**45,850**	**105,395**	**181,052**	**213,225**	**246,011**	**264,205**
Long Term Loan	90,000	90,000	72,000	54,000	36,000	18,000
TOTAL EQUITY & LIABILITY	**135,850**	**195,395**	**253,052**	**267,225**	**282,011**	**282,205**