PREFEASIBILITY STUDY
ON SETTING UP COLOURED WAX CRAYONS MANUFACTURING IN NIGERIA

DEVELOPED BY

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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 coloured wax crayon business in the education material 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 coloured wax crayon 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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APPENIDIES

PART I

1.0 EXECUTIVE SUMMARY

This prefeasibility study is setting up production facility for coloured wax crayon in suitable part of Nigeria.

The product is widely used as educational aid for drawings and sketches pupils and students of different grades in both public and private institutions.

Coloured wax crayons are in great demand now, especially with current policy reforms in the education sector. They are also used by artists, although they can be used by professionals, especially in business presentations, etc.

A plant for making coloured wax crayons can be set up anywhere and does not require much in terms of expertise. This makes the project suitable for both rural and urban areas of the country.

For the purpose of this investment profile, the installed capacity is projected at 59,998 boxes annually at 60% capacity utilization, working 312 days yearly.

1.1 SUMMARY OF TOTAL PROJECT COST

S/N	DESCRIPTION	COST INCURRED	COST TO BE INCURRED	TOTAL
	Land & building	-	120,000	120,000
	Machinery & equipment	-	848,800	1,088,000
	Utility equipment	-	150,000	150,000
	Office equipment	-	50,000	50,000
	Total Cost of capital	-	**1,168,800**	**1,408,000**
13	Working capital	-	400,000	400,000
14	10% Contingencies & preliminary expenses	-	191,380	191,380
	Total project cost	-	**1,750,800**	**2,000,000**

1.3 FINANCIAL ACCOUNTING RATIOS ANALYSIS

PERFORMANCE RATIOS AVERAGES

(a) Return on Sales =14%

(c) Return on Investment =84%

(d) Positive NPV = ₦5,923,103

(e) IRR =47%

(f) ARR =84%

(g) Payback Period = 1 year and 4 months

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PART II
MARKET ANALYSIS

2.1 INTRODUCTION

With the growing education base both in urban and rural areas, the use of coloured wax crayons have shot up in the last few years. Therefore, there is ready market and for this, educational institutions including nurseries, vocational colleges like Art academies, should be targeted. Supply should also be made to bookshops and other stationery shops

2.2 MARKET AREA ANALYSIS

According to research from Statista, the gross enrollment rate in elementary schools in Nigeria stood at 68.3 percent. The North-Western states registered the highest figures, with 70.3 percent for males and 71.1 percent for females. Similarly, investment in education has been recognized as one of the viable and profound areas of business opportunities most especially in Africa and Nigeria in particular.

The coloured crayon wax market is made up of small scale producer scattered all over the country without any established brands in the market. Therefore, the market is open and attractive to any entrepreneur because of the increasing market demand of the product.

2.3 INDUSTRY GROWTH POTENTIAL

Nigeria Stationery market holds tremendous reciprocated growth potential owing to increasing number of schools and offices, improved standard of living as well as a shift in focus from inexpensive to premium quality products on account of the rapidly burgeoning economy is some of the crucial factors which would drive the demand for stationery products in Nigeria in recent times.

According to this research, the Stationery Market is expected to register a high CAGR of 11.7% during 2018-2024. Similarly, Crayons and pencil colors dominated the Nigerian art stationery market in 2017 in revenue terms, as these products are primarily used by the school-going population of the country.

2.4 TARGET MARKET ANALYSIS

The potential entrepreneur or enterprise should identify with educational institutions, markets, groceries shops etc. In most cases, institutions prefers customized crayon with their brand logos and imprints embedded on the products as a way of to advertize their institutions to the public.

Similarly, the potential investor should also seek for distributors or vendors who can make bulk purchases on a regular basis. This is paramount because meeting the sales target is a key to the success of the business.

PART III
TECHNICAL ANALYSIS

3.1 PRODUCT DESCRIPTION

The project involves the commercial production, distribution and marketing of crayons in different academic institutions. Given the ever increasing population and literacy level in the country, the product demand is high. As an object of academic instrument and learning aid, every pupil is expected to learn how to paint and colour design using crayon. This therefore makes it an important object in most nursery and primary schools. The product is also used by artists.

3.2 PROJECT LOCATION

This is a micro enterprise project which could be sited any part of the Nigeria both rural and urban areas provided that there is access to raw materials and market for the finished products.

3.3 RAW MATERIAL

Crayons are made from paraffin, a waxy substance derived from wood, coal, or petroleum. They are made of paraffin mixed with various chemical pigments. Because paraffin will not mix with water or water mixtures, the pigments are in powdered form, although they may have been made from a water mix and then dried.

3.4 PRODUCTION CAPACITY

For the purpose of this prefeasibility study, the production capacity is projected with daily capacity of 192.3 boxes which translates to 59,998 boxes annually, at 60% capacity utilization.

3.5 PRODUCTION PROCESS

The process consists of melting wax with the appropriate dye/ pigment. Filler is added to the melted wax and cast in required shapes and sizes. Finally, the crayons are wrapped and packed in cardboard boxes. The envisaged plant would have a minimum capacity of 192.3 boxes (1 gross per box) per day. This is on the basis of 312 working days in a year and single 8-hour daily work shifts.

3.6 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), International Finance Corporation (IFC), Bank of Industry (BOI), 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. Production costs assumed are for 312 days per year with daily capacity of 192.3 boxes which translates to 59,998 boxes 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 10% 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 5,923,103**

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 84%**.**

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 PRICE	AMOUNT
	LAND & BUILDING			
1	Renting of office space	1	120,000	120,000
	Sub total	**1**	**120,000**	**120,000**
	MACHINERY & EQUIPMENT			
2	Mixer	1	480,000	480,000
3	Packing &Sealing machine	2	1,600	3,200
4	Mould	2	32,800	65,600
5	Boilers/ Melting machine	2	204,800	409,600
6	Compressor /cooler	1	129,600	129,600
	Sub total		**848,800**	**1,088,000**
	UTILITY EQUIPMENT			
8	Generating set	1	150,000	150,000
	Sub total		**150,000**	**150,000**
	OFFICE EQUIPMENT			
9	Furniture & fittings	set	50,000	50,000
	Sub total		**50,000**	**50,000**
	Total Cost of capital		**1,168,800**	**1,408,000**
10	Working capital		400,000	400,000
11	10% Contingencies & preliminary expenses		191,380	191,380
	Total project cost		**1,750,800**	**2,000,000**

APPENDIX II
ESTIMATION OF WORKING CAPITAL REQUIREMENT

N'

Year of Commercial Operation	**2 weeks**
% Capacity Utilization (Inventory)	**60%**
1 week stock of raw material	350,000
1 Day stock of finished products	100,000
Work in Progress	-
Bank/ Cash (5% sales of the products)	-
Working capital	**400,000**

APPENDIX III
FINANCING PLAN

DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	-		-
Term loan from	-	2,000,000	2,000,000
Total project cost	**-**	**2,000,000**	**2,000,000**
% Contribution	**0%**	**100%**	**100%**

APPENDIX IV
TERM LOAN REPAYMENT SCHEDULE

LOAN AMOUNT: 2,000,000 (Two 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	2,000,000	400,000	240,000	640,000
2	1,600,000	400,000	192,000	592,000
3	1,200,000	400,000	144,000	544,000
4	800,000	400,000	96,000	496,000
5	400,000	400,000	48,000	448,000
Total		**2,000,000**	**720,000**	**2,720,000**

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

POSITION	No	Unit Scale	Scale/ Month	Scale / Year
DIRECT LABOUR				
Factory Manager/ Admin	1	50	50	600,000
Unskilled labour	3	30	90	1,080,000
Sub total	**4**	**80**	**140**	**1,680,000**
Total				**1,680,000**

APPENDIX VI
ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE
N'

ITEMS	INITIAL VALUE	DEPRECIATION (20%)
Machinery & equipment	1,088,000	217600
Utility Equipments	150,000	30000
Office equipment	50,000	10000
TOTAL	**1,288,000**	**257,600**

APPENDIX VII
ESTIMATE OF ADMINISTRATIVE / OVERHEAD EXPENSES
N'

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Utilities (Electricity & Diesel)	140,000	148,000	198,000	212,800	212,800
Publicity & advert	80,000	98,000	116,000	137,600	137,600
Miscellaneous	100,000	120,000	140,000	160,000	160,000
TOTAL	**320,000**	**366,000**	**444,000**	**510,400**	**510,400**

APPENDIX VIII
ESTIMATION OF PRODUCTION AND OPERATION COST

Cost Item	Units	@ N	Qty/ day	Pdn. cost/ day	Pdn. cost/mth	Pdn cost/ yr
Direct Costs						
Paraffin	ltrs	390	0.5	187.2	4,800	58,500
Wax	kgs	900	16	14,427	375,000	4,501,200
Dyes	pkts/kgs	990	0.1	97.5	2,535	30,420
Packaging material	pkts/kgs	450	9.62	4,329	112,554	1,350,648
Sub-total		**2,730**		**19,040.7**	**494,889**	**5,940,768**

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					
Crayon wax	30,893.2	33,983	37,072	40,779	40,779
Total output	**30,893.2**	**33,983**	**37,072**	**40,779**	**40,779**
2. Cost of Production	N'000	N'000	N'000	N'000	N'000
Crayon @ N192.3/ box	5,940,762.36	6,534,930.9	7,128,945.6	7,841,801.7	7,841,801.7
Total cost of production	**5,940,762.36**	**6,534,930.9**	**7,128,945.6**	**7,841,801.7**	**7,841,801.7**
3. SALES					
Crayon boxes @ N350/ pack	10,812,620	11,894,050	12,975,200	14,272,650	14,272,650
TOTAL SALES/ TURNOVER	**10,812,620**	**11,894,050**	**12,975,200**	**14,272,650**	**14,272,650**

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	10,812,620	11,894,050	12,975,200	14,272,650	14,272,650
VAT @ 5%	540,631	594,702.5	648,760	713,632.5	713,632.5
Net Revenue	**10,271,989**	**11,299,347**	**12,326,440**	**13,559,017**	**13,559,017**
2. **OPERATION COST**					
Cost of Raw materials consumed	5,940,762	6,534,930	7,128,945	7,841,801	7,841,801
Staff and labour	1,680,000	1,848,000	2,016,000	2,217,600	2,217,600
Admin. & Overhead Expenses	320,000	366,000	444,000	510,400	510,400
Depreciation	257,600	257,600	257,600	257,600	257,600
Total Operating Cost	**8,198,362**	**9,006,531**	**9,846,546**	**10,827,402**	**10,827,402**
3. **OTHER COSTS**					
Interest on Term Loan (12%)	240,000	192,000	144,000	96,000	48,000
Loan Repayment	400,000	400,000	400,000	400,000	400,000
Total (Other Costs)	**8,838,362**	**9,598,531**	**10,390,546**	**11,323,402**	**11,275,402**
Profit Before Tax	1,433,627	1,700,817	1,935,894	2,235,616	2,283,616
Corporate Tax (12%)	172,035.24	204,097.98	232,307.28	268,273.86	274,033.86
Profit after tax (NET PROFIT)	**1,261,592**	**1,496,719**	**1,703,587**	**1,967,342**	**2,009,582**
% Return on Sales	0.122818644	0.132460621	0.138205899	0.14509471	0.14820998
% Return on Equity	-	-	-	-	-
% Return on Investment	0.63079588	0.74835926	0.85179336	0.98367082	1.00479082

APPENDIX XI
FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV
	N'		N'
0	(2,000,000)	1	(2,000,000)
1	1,261,592	0.893	1,126,601
2	1,496,719	0.797	1,192,885
3	1,703,587	0.712	1,212,954
4	1,967,342	0.636	1,251,229
5	2,009,582	0.567	1,139,433
Total Profit	**8,438,822**		**5,923,103**
Average Profit	**1687764.4**		

Year	C/F	DF 60%	NPV
	N'		N'
0	(2,000,000)	1	(2,000,000)
1	1,261,592	0.625	788,495
2	1,496,719	0.3906	584,618
3	1,703,587	0.2441	415,846
4	1,967,342	0.1526	300,216
5	2,009,582	0.0954	191,714
Total Profit	**8,438,822**		**2,280,890**
Average Profit	**1,687,764.4**		

APPENDIX XII
FORECAST IRR AND ARR COMPUTATION

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

Where

a = 12%

b= 60%

A = 5,923,103

B= 2,280,890

$$12\% + \frac{5,923,103}{5,923,103 + 2,280,890} (60-12)$$

12% + 34.7

47%

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

$$ARR = \frac{1,687,764.4 * 100}{2,000,000}$$

84%

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'**
Term Loan	2,000,000	-	-	-	-	-
Gross Revenue		10,271,989	11,299,347	12,326,440	13,559,017	13,559,017
Total Receipts	**2,000,000**	**10,271,989**	**11,299,347**	**12,326,440**	**13,559,017**	**13,559,017**
B) CASH PAYMENTS						
Capital Payment						
Machinery & Equipments	1,088,000	-	-	-	-	-
Utility Equipment	150,000	-	-	-	-	-
Office equipments	50,000	-	-	-	-	-
TOTAL	**1,288,000**	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	257,600	257,600	257,600	257,600	257,600
Change in working capital	712,000	7,940,762	8,748,931	9,588,946	10,569,802	10,569,802
Sub total	**712,000**	**8,198,362**	**9,006,531**	**9,846,546**	**10,827,402**	**10,827,402**
(iii) Financial Expenses						
Repayment of Term Loan	-	400,000	400,000	400,000	400,000	400,000
Interest on Term Loan	-	240,000	192,000	144,000	96,000	48,000
Value Added Tax	-	540,631	594,702.5	648,760	713,632.5	713,632.5
Corporate Tax	-	172,035.24	204,097.98	232,307.28	268,273.86	274,033.86
Sub total	-	**1,352,666**	**1,390,800**	**1,425,067**	**1,477,906**	**1,435,666**
Total cash payment (ii)-(iii)	**712,000**	**6,845,696**	**7,615,731**	**8,421,479**	**9,349,496**	**9,391,736**
Net cash flow c/f	712,000	6,845,696	7,615,731	8,421,479	9,349,496	9,391,736

APPENDIX XIV
BALANCE SHEET PROJECTION

Year of comm. Operation	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
ASSETS	N'	N'	N'	N'	N'	N'
(i) Fixed assets						
Machinery and Equipments	1,088,000	-	-	-	-	-
Utility equipment	150,000	-	-	-	-	-
Office Equipment	50,000	-	-	-	-	-
Value at Acquisition		1,288,000	1,288,000	1,288,000	1,288,000	1,288,000
Less Cumulated Depreciation	-	257,600	515,200	772,800	1,030,400	1,288,000
Net fixed assets	**1,288,000**	**1,030,400**	**772,800**	**515,200**	**257,600**	**0**
(ii)Current Assets/ liability						
Stock of Raw Materials	400,000	4,695,086	6,851,219	8,336,608	9,475,009	10,959,898
Debtors /prepayment	-	1,453,000	2,098,000	3,308,000	4,139,000	5,653,000
Bank and Cash Balances	312,000	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	-	(3,992,918)	(4,484,739)	(4,983,041)	(5,568,354)	(5,631,715)
Net current assets	**712,000**	**2,231,192**	**3,585,511**	**3,885,106**	**4,213,329**	**4,376,924**
TOTAL NET ASSETS	**2,000,000**	**3,261,592**	**4,358,311**	**4,400,306**	**4,470,929**	**4,376,924**
(ii) FINANCED BY						
Equity Capital	-	-	-	-	-	-
P&L	-	1,261,592	1,496,719	1,703,587	1,967,342	2,009,582
Retained Profit	-	-	1,261,592	1,496,719	1,703,587	1,967,342
SHAREHOLDERS FUND	**-**	**1,261,592**	**2,758,311**	**3,200,306**	**3,670,929**	**3,976,924**
Long Term Loan	2,000,000	2,000,000	1,600,000	1,200,000	800,000	400,000
TOTAL EQUITY & LIABILITY	**2,000,000**	**3,261,592**	**4,358,311**	**4,400,306**	**4,470,929**	**4,376,924**