GAFI Economic Performance Sector

A Preliminary Feasibility Study on the Manufacturing of Plywood

Prepared by

Economic Performance Sector

Central Department of Feasibility Studies

General Department of Economic Feasibility Studies

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I. Project Basic Information:

Project Name:	Plywood factory
Project Land:	A surface area of 2,000 m^2 together with a built area of 1,200 m^2.
Project Location:	Sharqeyya Governorate (the 710 Feddan Project at 10th of Ramadan City) Gharbia Governorate Damietta Governorate
Available Act of Disposition:	Usufruct
Price per Square Meter	EGP 50/m^2 (an indicative price)
Project Economic Life Expectancy:	Five years
Project Products:	Plywood boards
Expected Workforce:	30 labourers and administrative staff
Expected Investment Costs:	EGP 12,618,000
Return on Investment (ROI):	35%
Payback Period (PBP)	32 months
Study Preparation Date:	June 2021

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II. A Background on the Business Activity in this Study:

- The furniture industry in Egypt is one of the most important economic sectors, due to the industry's contribution to providing thousands of direct and indirect jobs, in addition to its contribution to reducing imports and thus providing hard currency and making products available to the local market.
- The country has developed a strategy that aims to replace imports and strengthen its presence in the local market, while maintaining a presence in the current export markets. The strategy also aims to penetrate foreign markets including those in Africa and other countries, and diversify exports to both traditional and new markets.
- The recently launched strategy to support the furniture industry consists of a three-phase action plan that will be implemented in a period from two to ten years. The strategy's main objectives are eight as follows: (i) raising growth rates; (ii) replacing imports by local products; (iii) increasing exports from USD 350 million to USD 800 million; (iv) increasing the percentage of companies operating legally to 30%; increasing MSMEs share in production from 50% to more than 75%; increasing added value from 50% to 60%; and increasing direct and indirect job opportunities from 900,000 to 1,120,000.
- Damietta Furniture City is one of the most important national projects that Egypt is keen to support within the framework of the furniture industry. This city was established with the aim of developing the furniture industry and keeping pace with global competition. The city provides 100,000 temporary jobs and 30,000 permanent jobs.
- The wood industries sector, being one of the main sectors, gives Egypt a competitive advantage since it increases local manufacturing. However, there is an increase in imports to this sector met with a decline in exports therefrom.
- The goal of the project is to bridge the huge gap in demand for plywood in the local market that is covered by imports from many countries including without limitation Russia, China, Brazil, and Indonesia.
- Egypt exerts its best efforts to increase the manufacture and export of engineered wood of all kinds.

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III. Project Marketing Study:

1. Growth Drivers and Competitiveness:

- The number of establishments operating in the furniture sector in Egypt is 120,000, 82% of which depend mainly on natural wood, plywood, veneer, and engineered wood.
- The number of establishments operating in this field is few, which increases the demand for the product in the local market.
- The market size in the furniture sector is expected to increase from 2.3 to 4.7 billion dollars during the current year 2021.

2. SWOT Analysis:

- **Strengths:**
  - There is a steadily increasing demand on plywood.
  - The workforce can be employed locally with reasonable wages.
  - The project can generate high profits.
  - The local market has technical knowledge to make high-quality products efficiently.
- **Weaknesses:**
  - Since the local product does not meet the local market demand, no products are being exported abroad.
  - There is a lot of foreign components in the products, that is why its price is relatively high.
- **Opportunities:**
  - There is sufficient number of areas on which the factories could be constructed.
  - All project's main requirements including infrastructure, machinery, equipment, trained personnel, raw materials…etc. are available.
  - Plywood industry is represented at the Federation of Egyptian Industries (FEI) by the Chamber of Wood Working & Furniture Industries (CWWFI), the Egyptian Furniture Export Council (EFEC) as well as other entities that provide consultations, recommendations and exportation opportunities in this respect.
  - One of the strong points of the Egyptian furniture sector is that when it comes to exporting plywood there are no countries in the Middle East to compete with except for Turkey.
  - There is a large demand for plywood in the local market.

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- **Threats:**
  - Exports to the main markets such as the EU have been in decline. No new markets can be penetrated. Most exports are being made to the pan-Arab States.
  - There is a strong competition worldwide, given the low price ranges offered by countries such as China.

3. SWOT Analysis Results:

- It is clear from the previous analysis that strengths can be used in overcoming external threats; that there is great deal of opportunities in the market; and that weaknesses can be overcome by following modern scientific methods.

4. Field Marketing Study Results:

- **Demand Volume:**
  - The volume of imports of plywood in 2018 amounted to USD 237,215 constituting a total quantity of 268,252,307 cubic meters imported from Russia, China, Brazil, and Indonesia.
  - In 2018, global demand for plywood increased to 268,290,882 cubic meters, with a value of USD 19 billion.
- **Supply Volume:**
  - The local capacity to produce plywood locally was not available, so the state resorted to importing from abroad to meet the local demand.
- **Potential Competition:**
  - Appropriate competitive strategies can be applied based on the market trend and the needs of the country to which exports will be offered. A competitive strategy could be price-based or quality-based; i.e. products can made on a large-scale basis at a low cost and thus be exported at cheap prices, or they can be made with high-quality standards in order to satisfy unmet demand by a specific market segment.
- **Marketing Outlets:**
  - Furniture factories, domestic markets, markets abroad.

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IV. Project Legal Feasibility Study:

- Pursuant to the provisions of the Investment Law, wood industries is one of the business activities governed by said law. The state pays attention to and provides incentives encouraging such business.
- Accordingly, companies operating in such business activity can be incorporated in accordance the provisions of the Investment Law, the Companies Law, or the Trade Law, as the company owners so wish.
- Some legal requirements must be satisfied when it comes to obtaining licenses-to-operate from the competent authorities including:
  - The governorate in whose jurisdiction project site is located, as well as the local administrative units and offices affiliated to the governorate;
  - Licenses obtained from Industrial Development Authority (IDA) and;
  - The requirements of Civil Defense Authority.
- In the case of exporting, the project must obtain an import and export card specifying the nature and description of the products, or exports through an intermediary company that undertakes the export and customs release procedures on behalf of the project.

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V. Project Environmental Feasibility Study:

- Environmental feasibility studies are one the pillars of environment protection and maintenance. It is necessary for any institution and establishment to develop plans that target the ideal use of available materials and to dispose of the waste resulting from the production process in a safe and healthy manner without harming the surrounding environment.
- Falling within the Environmental Classification List (B), the factory in this study is subject to environmental impact assessment (EIA). Accordingly, it must comply with the environmental and health requirements. Particularly, it must:
  - *Dispose properly of the solid waste*; for example, sawdust should be suctioned through electric pumps connected to tubes above each machine and be collected in bags. Moreover, the contractor should transport the collected sawdust to the place where it can be disposed of permanently. Alternatively, sawdust may be used as input in by-products in other industries or be used as a source of fuel to generate heat and power.
  - *Handle properly hazardous waste*, such as chemicals, by collecting them and delivering them to an approved contractor for disposal in the places designated for that, while keeping a record of such hazardous waste in accordance with Article 33 of Law 4 of 1994 and making such record available for inspection.
  - *Install an efficient ventilation system and limit carbon emissions at the working environment*; the project must not exceed the carbon emission limits specified in Annex (VIII) of the Executive Regulations of Law 4 of 1994, all production operations must take place indoors, automation technology should be applied, exhaust fans and filters required reduce pollution at working and surrounding environment must be installed…etc.
  - *Follow general requirements related to preventing injury caused by noise*; the project must keep noise inside and outside working environment within the limits specified in Annex (VII) of the Executive Regulations of Law No. 4 of 1994.
  - Comply with the health and safety standards in compliance with the provisions of Annex (IX) of the Executive Regulations of Law No. 4 of 1994 in order to provide a working environment that would keep personnel and service providers safe from injury and would not cause deterioration in their health status.

The project is environmentally feasible, so long as the foregoing requirements are followed in order to prevent environmental damage caused by the project operations.

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VI. Project Social Feasibility Study:

- The social feasibility study aims to analyze the social benefits and costs of the various projects in order to select the projects that achieve the maximum social benefit. It is noted in this regard that the social feasibility study is concerned with additional aspects that were not addressed in any of the other feasibility studies, because it focuses on the social effects of the project, due to the project's contribution to achieving the economic and social goals of the community.
- Investment projects are one of the main pillars of the state's economic development process and a means to achieve the economic, social and development goals, eventually resulting in achieving high levels of well-being.
- The project helps in creating direct job opportunities manifested in the workforce to be employed to work for the project itself, and indirect jobs manifested in the supply chains that the project will deal with starting from raw materials needed for production until the final product being delivered to sale outlets and customers.
- The project helps in creating new 30 job opportunities.
- The project contributes to distributing income to low income social groups, as they will be part of the project personnel. Thus, the project reduces unemployment rate.
- The project helps in increasing the state's tax revenue, which ultimately benefits society.
- In case the project will export its products, this will contribute to increasing the State's foreign exchange earnings, thus bridging the balance of payments deficit.
- The project decreases unemployment rates especially that of the illiterate laborers group. Needed to work for the project, such laborers will receive an income securing them a decent life, and their work will empower them to be productive society members.
- The project contributes to increasing gross national income (GNP) and exports; decreasing imports; and gaining hard currency.
- In light of the aforementioned, the project is socially feasible.

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VII. Project Technical Feasibility Study:

- The technical study is the study of the technical and engineering elements necessary to start the project on the ground after studying the feasibility of setting up the project from the market side and ensuring the presence of demand for its products. The technical study of the project includes the location and surface area on which the project will be set up, as well as the buildings; the number of floors; the machinery; the production capacity; the equipment and other vehicles required for the factory. It also includes the expected final product, the functional structure of the project, the materials and supplies required for production, and the production stages that the product goes through, starting from the raw materials to the final product. The technical study of the project can be explained as follows:

1. **Project Location and Surface Area:** The project can be set up either in Sharqeyya governorate (specifically at the 710 Feddans Project at 10th of Ramadan City), or in Damietta or Gharbia governorates.
2. **Project Buildings**: The project includes buildings constructed on a surface area of 1,200 m^2. It comprises an administrative building, a factory, and a warehouse, each consisting of one floor.
3. **Final Product**: Plywood boards
4. **Required Workforce:**

Item	Number
Factory Manager	1
Financial and Administrative Manager	1
Quality Supervisor	1
Skilled Workers	20
Assistant Workers	5
Janitor	1
Security Guard	1
Total	**30**

5. **Required Machinery**:
   - Hydraulic heat press
   - Veneer clipper
   - Log lathes
   - Cranes

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- Drying ovens
- Wood-working machine
- Band saws
- Sanding machine
- Veneer stitching machine

6. **Raw Materials Required for Production Operations**:
   - Tree trunks
   - Glue
7. **Production Stages:**
   - Drying tree trunks
   - Cutting the trunks
   - Trunks peeling
   - Veneer clipping and stitching
   - Bonding of veneer by glue, heat and pressure
   - Plywood boards edge trimming
   - Surface sanding
8. **Production Capacity:** The project aims to produce 100,000 plywood board per annum.

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VIII. Project Financial Feasibility Study:

- Financial feasibility study is considered a tool that helps the investor in making decisions related to investment. To facilitate making such decisions, all costs related to investment and production must be clearly and accurately determined, taking into account that a project profitability depends on the volume and components of the investment and the production costs.

1. Financial Study Fundamentals and Hypotheses:
   - The data used in the study and the expected revenues based on the volume and the value of sales have been estimated according to results of the marketing study.
   - Investment spending values and other elements of costs and expenses have been estimated according to the results of the technical study.
   - The annual depreciation premium for buildings and machinery is estimated according to the results of the technical study, assuming that their sales value at the end of the period matches their book value.
   - It has to be considered that the estimated value of fixed assets mentioned in this study is related to a specific time period according to the prevailing circumstances at the time of preparing this study; and that this value may change if the circumstances change, the report time limit expires, or the economic environment undergoes changes in general.
   - Incorporation and pre-commencement expenditure have been assumed to have been fully depreciated during the first year of revenue as per the Egyptian Accounting Standards.
   - The estimated income statements have been prepared on the assumption that there is no fundamental change in the revenue values and the expected annual costs during the study period.
   - The annual cash flows are estimated using the indirect estimation method by making the necessary adjustments to the results of the estimated income statements for the years included in the study.
   - It is assumed in this study that all purchases include VAT.

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2. Annual Sales:

- Based on machinery production capacity as suggested in the technical study; assuming that all the project's products will have been sold during the first year of business and that all raw materials will have been used; and based on the results of the market study that recommended that the product price be as per the average price in the local market, the number of units to be produced, the price per unit, as well as the total annual revenues can be as follows:

#	Product	Sales/ Unit	Average Price	Total
1	Plywood boards	100,000	100	10,000,000
	Total	100,000		**10,000,000**

3. **Project Investment Cost:**

Investment costs mean all money spent on the project from the moment of serious thinking about its establishment until the end of the first operating cycle. Those costs are related to the construction period, which duration varies from one project to another; where the construction period can reach several years in some projects and can be a moment (zero) in others. Investment costs are divided up into capital and running costs. On the one hand, capital costs are those related to purchasing project site (in case the option of owning the land is available) as well as purchasing the machinery, equipment, vehicles, furnishings, furniture required for the project. It also encompasses other expenses and legal fees. On the other hand, running costs are defined as the costs necessary to complete the operation process until the production of the final product, passing through the successive stages of the product. These costs are divided up into fixed costs and variable costs, as well as direct costs intimately related to the product and indirect costs that are ancillary to the product such as, the administrative staff payroll. The running costs are also divided up into several elements, namely (the cost of materials, the cost of direct and indirect payroll, and other running costs), where the operating cycle is calculated on one operation per annum. Project investment costs are set below.

A. Capital Costs:

- *Project site*: the project is set up on a surface area of 2,000 m^2, possessed by way of usufruct at an indicate price of EGP 50/m2 per annum costing in total EGP 100,000 per annum.
- *Buildings, Constructions, Finishes, Infrastructure, and Utilities*: The cost of buildings, constructions, finishes, infrastructure, and utilities for a surface area of 1,200 m2 is estimated to be EGP 3,000/m2 constituting a total of EGP 3,600,000 and the foregoing is assumed to be completely depreciated after 20 years.

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- *Machinery and Equipment*: the cost of production line machinery is estimated at EGP 3,000,000 assuming that they will have been completely depreciated after 10 years.
- *Transportation trucks*: the project is assumed to nee two trucks costing EGP approximately 600,000 and will presumably be depreciated in five years.
- *Furniture, Furnishings and Stationery:* The cost of finishing the factory and the administrative building as well as providing them with furniture, furnishings and stationery is estimated at EGP 200,000 (depreciation period is 5 years).
- *Legal and Incorporation Fees*: The cost is estimated at EGP 500,000 assuming that such amount will be spent during the first year of business.

B. Running Costs:

- **Raw Materials Cost:** The cost is estimated at EGP 3,000,000.
- **Wages Cost:** They are set in the following table:

Job title	#	Monthly Salary per Individual	Total Monthly Salary	Annual Salary
Factory Manager	1	15,000	15,000	180,000
Financial and Administrative Manager	1	10,000	10,000	120,000
Quality Supervisor	1	5,000	5,000	60,000
Skilled Worker	20	4,000	80,000	960,000
Assistant Worker	5	2,500	12,500	150,000
Janitor	1	2,000	2,000	24,000
Security Guard	1	2,000	2,000	24,000
Total	30		126,500	1,518,000

- **Other Operating Costs**: lighting, engines, maintenance and repairs are estimated at EGP 50,000.
- **Marketing costs**: They are estimated at EGP 50,000
- **Annual depreciations:** They are estimated as follows:

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Item	Asset Value	Production Age	Depreciation Rate	Annual Depreciation Installment
Buildings, finishes and Infrastructure	3,600,000	20	5%	180,000
Machinery	3,000,000	10	10%	300,000
Trucks	600,000	5	20%	120,000
Finishes, furniture, furnishings and stationery	200,000	5	20%	40,000
Incorporation and License Fees	500,000	1	100%	500,000
Total	7,900,000			1,140,000

NB: Incorporation and license fees are presumed to be spent during the first year of business.

Based on the foregoing, the value of the investment cost is as follows:

Item	Cost per EGP
Buildings, finishes and infrastructure	3,600,000
Machinery	3,000,000
Trucks	600,000
Furniture, furnishings and stationery	200,000
Incorporation and license fees	500,000
Land annual usufruct fee	100,000
Raw materials	3,000,000
Wages	1,518,000
Marketing expenses	50,000
Other operating costs	50,000
Total	12,618,000

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4. **Project Investment Cost:**

A. Expected Income Statement for the First Five years of Business Activity:

An income statement is used to reflect the company's financial performance during a specific period of time by comparing revenues against costs. It is used to determine a company's profitability. The income statement here has been prepared presuming that sales and costs increase by 10% per annum.

Item	Year 1	Year 2	Year 3	Year 4	Year 5
Total Sales	10,000,000	11,000,000	12,100,000	13,310,000	14,641,000
Sales Cost					
Land Lease	100,000	100,000	100,000	100,000	100,000
Raw Materials	3,000,000	3,300,000	3,630,000	3,993,000	4,392,300
Payroll	1,518,000	1,669,800	1,836,780	2,020,458	2,222,504
Marketing Expense	50,000	55,000	60,500	66,550	73,205
Other Running Costs	50,000	55,000	60,500	66,550	73,205
Depreciation	1,140,000	640,000	640,000	640,000	640,000
Total Costs	5,858,000	5,819,800	6,327,780	6,886,558	7,501,214
Profit before Tax (PBT)	4,142,000	5,180,200	5,772,220	6,423,442	7,139,786
Tax 22.5%	931,950	1,165,545	1,298,750	1,445,274	1,606,452
Profit after Tax (PAT)	3,210,050	4,014,655	4,473,470	4,978,168	5,533,334

B. Expected Cash Flows Statement for the First Five years of Business Activity:

Cash Flows Statement is one of the most important statements that helps in identifying the financial status of the company, as it shows the financial impact for all activities carried out by the company during a specific period of time, along with identifying the nature of such impact in respect of whether the cash flow is coming into the company or getting out of the company. The project expected cash flows statement during the first 5 years can be shown as follows:

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Item	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Inflows	10,000,000	11,000,000	12,100,000	13,310,000	14,641,000
Cash Outflows					
Lease per Annum	100,000	100,000	100,000	100,000	100,000
Raw Materials	3,000,000	3,300,000	3,630,000	3,993,000	4,392,300
Payroll	1,518,000	1,669,800	1,836,780	2,020,458	2,222,504
Marketing Costs	50,000	55,000	60,500	66,550	73,205
Other Running Costs	50,000	55,000	60,500	66,550	73,205
Tax 22.5%	931,950	1,165,545	1,298,750	1,445,274	1,606,452
Total Cash Outflows	5,649,950	6,345,345	6,986,530	7,691,832	8,467,666
Total Cash Inflows	4,350,050	4,654,655	5,113,470	5,618,168	6,173,334

5. **Financial Indicators:**
   - Financial statements, financial indicators, and profitability ratios are among the most important tools used to assess the economic viability of projects. The assessment is made by calculating the project's net income and net cash inflows, as well as the net present value of money resulting from an increase in the inflation rate as per the prevailing interest rate.
   - Financial indicators are also used to make a comparison between the available investment options, to compare between the average return on investment and the payback period for each project separately.
   - Through the present study, the ability of the project to generate profits, the current value of the money at the end of the study period, ROI and PBP are to be explored as follows:

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a) **Average Gross Profit/ Net Profit**

Item	First Year	Second Year	Third Year	Fourth Year	Fifth Year	Average
Average Gross Profit	4,142,000	5,180,200	5,772,220	6,423,442	7,139,786	**5,731,530**
Average Net Profit	3,210,050	4,014,655	4,473,470	4,978,168	5,533,334	**4,441,935**

b) **Net Present Value of Cash Inflows**

The NPV is the difference between the present value of the cash inflows and the cash outflows. The positive NPV indicates that the expected profits achieved by a project or investment have exceeded the expected costs. In general, investing in a positive NPV is a profitable investment, while investing in a negative NPV leads to net losses. Accordingly, investments should be put into those projects having positive NPVs. Considering the project under study and the study period, the NPV of cash was calculated according to the average prevailing interest rate in the market at the time of preparing the study, which is approximately 10%.

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Year	Cash Flow	Discount Factor 10%	NPV
Year 1	4,350,050	0.909	3,954,195
Year 2	4,654,655	0.826	3,844,745
Year 3	5,113,470	0.751	3,840,216
Year 4	5,618,168	0.683	3,837,209
Year 5	6,173,334	0.621	3,833,640
Total	**25,909,677**		**19,310,006**
Investment Cost			**12,618,000**
NPV = (current value of cash inflows – investment cost)			**6,692,006**

c) **Return on Investment (ROI):**

It is used to compare several investment options. It expresses the percentage of increase or decrease in the investment during a specified period; the higher the percentage of ROI, the more favourable the investment. The average ROI to investment costs can be calculated as follows:

(Average annual net profit ÷ total investment costs) %

Year	Net Annual Profit	Annual ROI
Year 1	3,210,050	25%
Year 2	4,014,655	32%
Year 3	4,473,470	35%
Year 4	4,978,168	39%
Year 5	5,533,334	44%
Investment Costs	12,618,000	
average ROI		35%

d) **Payback Period:**

The payback period is the period during which the value of the total investment costs is recovered through the net cash profits from previous spending. To calculate the payback period, the cash outflow associated with the investment proposal must be estimated, as well as the expected annual net cash profits from the same proposal.

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The payback period is calculated in two steps. The first of which is to calculate the cash inflows during the first five years of the project until the break-even point. This is demonstrated as follows:

Year	0	1	2	3	4	5
Annual cash inflow	(12,618,000)	4,350,050	4,654,655	5,113,470	5,618,168	6,173,334
Cumulative cash flow	-	(8,267,950)	(3,613,295)	1,500,175	7,118,343	13,291,677

- **The second** step according to the below law is to identify the Payback Period (PBP) as follows:

PBP = the number of years of negative cash flows + the absolute value of last negative cumulative cash flow ÷ the cash inflow of the following year		
Number of Years of Negative Cash Flows	+	absolute value of last negative cumulative cash flow
		cash inflow of the following year
2	+	3,613,295
		5,113,470
2	+	0.71
PBP in months	=	32

Accordingly, the project financial feasibility study can be summarized into:

Average sales during the project	12,210,200
Average gross profit	5,731,530
Average net profit	4,441,935
Investment cost	12,618,000
Net present value (NPV)	6,692,006
Return on Investment (ROI)	35%
Payback period indicator in months	32

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IX: Conclusions and Recommendations:

Based on the foregoing:

- The project achieves an ROI of 35%.
- The estimated PBP is approximately 32 months.
- Accordingly, the project is feasible to be set up.

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