

# Pre-Feasibility Study to Establish a Gemstones Factory



2017



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## 1. Executive summary

Based on economical importance of mining projects which providing many advantages such as creating work opportunites and exporting to the international markets, as a result the exploitation of gemstones by extracting and manufacturing to be presented to many uses such as: decoration and other several uses, which is economically feasible based on the importance of these ores and its structural, chemical and industrial composition.

The gemstones are occurs in large amount at Tafilah governorate which placed in southern of Kingdom, it classified as feasible economical ores mineral, since these ore are available in good quantities, building a factory of gemstones products will generate high benefits to project owner.

The economic indicators of the project are shown in the following table:

**Table1 :Economic Indicators**

Indicator	
Total Investment Requirement (JD)	1,182,559
Internal Rate of Return (IRR)	%34.98
Pay-Back Period (year)	3
Net present value (JD)	2,517,241
Job Opportunities provided by the	13
Annual Revenue Projections (10 years)	31,869,584
Total Operating Expenses (10 years)	25,766,559
Net Profit (10 years)	3,306,516

## 2. Key Highlight of Jordan

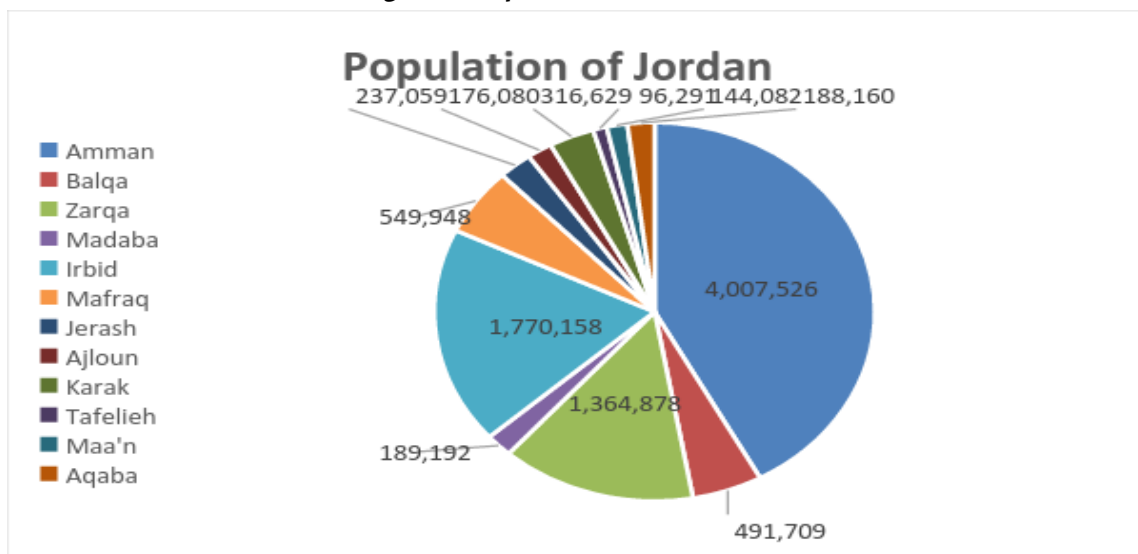
Jordan Hashemite Kingdom area is 89342 Kilometers with a population exceed 9.8 Millions distributed among 12 Governorates. Jordan is bounded by Saudi Arabia, Iraq, Syria and Palestine from the South, East, North and west respectively. Jordan climate is mostly arid desert with rainy season between November to April Months.

Jordan is a free market economy, ranked as the fifth freest economy in the MENA region in the Index of Economic Freedom. Its free market economy enjoys strong partnerships amongst its neighboring country as well as Europe and the USA. Jordan is a signatory of several bilateral and multilateral trade agreements such as (Free Trade Agreement with the US and the EU, a Free Trade Agreement with the EFTA states, an FTA with Singapore, A member of the Greater Arab Free Trade Agreement (GAFTA) and a signatory of the Aghadir Agreement. Looking at the range of countries these agreements cover and facilitate trade between, one is confident to say that Jordan has business gateways and partnerships across the globe.

### Population Overview

Based on the latest surveys done by Department of Statistics (DOS) in 2017, total number of population has reached around 9.814.995 with an increase rate of 2.88% from 2016 year, figure below summarizes the population distribution among the kingdom governorates.

Figure 1: Population of Jordan



Department of Statistics (DOS), 2015

Moreover, and based on the latest survey conducted by (DOS) which related to population nationality distribution over the governorates, it was found that total Non-Jordanian residents constitutes around 30% of the total population. Half of these are Syrians (1.3 Million) concentrated mainly in Amman Capital (436 Thousand) then Irbid (343 Thousand), Mafraq at 208 Thousand and Zarqa at 175 Thousand.

Jordan prides itself in its youthful population with 35% of ages below 15 years old and only 4% with ages above 65 years old. Table below summarizes population distribution of Jordanians according to Age Group:

**Table2 :Population Distribution according to Age Group**

Age Group	% Population	Males	Females
Years 14-0	35.04%	19.2%	18.2%
Years 64-15	61.02%	30.7%	28.6%
More than 65 Years	3.94%	1.6%	1.6%

Department of Statistics (DOS), 2015

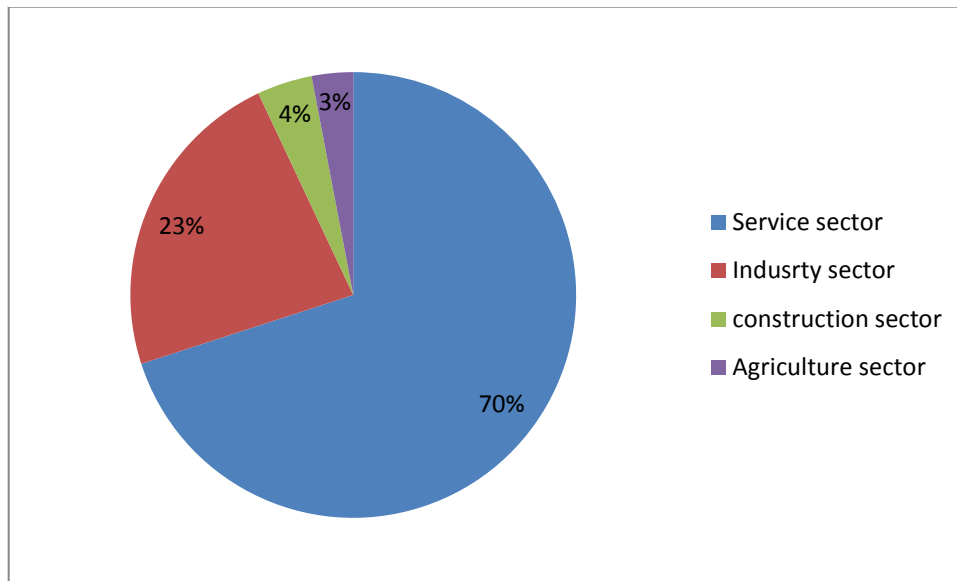
### Overview of Jordan Economy

Classified as an upper middle economy by the World Bank and as a country of High Human Development by the UNDP, Jordan is an important financial power in the Middle East. Its small market witnessed growth in the last two decades since King Abdullah II accessed the throne. Jordan's GNI per capita has increased in the last four years due to the basket of economic reforms that were enacted in the recent decade such as (the new Income Tax Law, Public Private Partnership Law and Investment Law). These laws aim to encourage the participation of the private sector in the Kingdom's economic development and provide an enabling legislative environment for current and new investment opportunities.

**The Jordanian economy is overwhelmingly services oriented and its contribution in the GDP is 68.1%. The contribution of the industrial sector is 22.4%, the construction sector is 4.2% and the agricultural sector is 2.9%. These contributions are aimed to increase to (27.4%), (5.8%) and (3.4%) respectively and that of the service sector is due to decrease according to Jordan 2025 vision.**



**Figure 2: Sectors Contribution to Jordan's Economy**



Jordan's exports include variety of textiles, potassium, phosphates, fertilizers, vegetables and pharmaceutical products. While it's main imports are crude and refined petroleum. Distinguished by its strategic location, on the crossroads between Asia, Africa and Europe with strong connections to the Levant and the GCC, Jordan has a regional market of interest that represents US\$3.8 trillion market and comprising 380 million consumers.

Jordan infrastructure ranks comparatively well (38th out of 148 comparable economies), with an extensive 8000 KM road network connecting Jordan domestically and externally The new Queen Alia International Airport and the Port of Aqaba are the major gateways to the international market. In addition to some mega projects such as the Red- Dead Sea Canal and the national railway network that will be developed to position Jordan as a hub for regional commerce.

Jordan banking system is quite sophisticated, resilient and in compliance with international standards, making it very attractive and trustworthy to investors. This is reflected in the fact that 50% of equity in licensed banks in Jordan is held by non-Jordanians, and non residents' deposits in Jordanian banks witnessed a steady growth of 19.2%.

Moreover, realizing the value of MSMEs to drive economic growth, the government has developed the national Strategy for the encouragement of entrepreneurship and the development of micro small and medium sized enterprises for 2015-2019. This shows the commitment of the Jordan government to enhance the private sector development and leveraging the country's strong human capital.

Jordan prides itself in its youthful population. It's the country most valuable capital. A tech savvy well educated and trained workforce attracts a lot of investors to Jordan. More than 20.4% of Jordan's GDP is dedicated to the education and capacity building for the labor force, this has resulted in securing a 91% literacy rate and enabled Jordanians to be among most hired and qualified middle-eastern workforce.

Such solid, diverse and resilient characteristics of the Jordanian economy and investment scene position Jordan as a competitive investment destination

### **Major Economic Indicators**

- **GDP Growth**

The Jordanian economy slowed and reached 2.4 percent in 2015 compared to growth rate of 3.1 in 2014 and similar to MENA growth rates.

The growth also slowed for trade, restaurants and hotels; manufacturing; transport; and electricity and water. Meanwhile, finance, insurance, and business services advanced at a faster pace.

- **Inflation rate**

Inflation rate decreased to 0.9 in 2015 after 2% decline in the previous year. Inflation Rate in Jordan averaged 3.1 percent from 2011 until 2015.

- **Unemployment**

The unemployment rate in Jordan was recorded at 13 percent in 2015, comparing to 11.9 percent a year earlier. This increase due to the current instability in the labor market structure as well as high competition from low cost foreign labors especially from Syria.

- **External Sector**

A number of risks manifested in 2015, the closure of land trade routes with Syria and Iraq and the deepening instability in the region adversely impacted many external sector indicators such as trade, tourism and direct Investment.

Moreover, loans disbursements increased by JD 545.3 million, due to the use of the International and Arab Monetary Funds (IMF and AMF) credit facilities. As an outcome of these developments, the overall balance of the balance of payments registered a surplus of JD 328.7 million in 2015, compared with a surplus of JD 1,550.7 million in 2014.

Further, net international investment position (IIP) witnessed an increase in the Kingdom's net obligations to abroad; to reach JD 24,357.5 million, compared to a net obligation of JD 22,578.8 million at the end of 2014 as a result of the increase in the stock of external financial assets and liabilities of all resident economic sectors to reach JD 18,657.9 million and JD 43,015.5 million; respectively.

External Debt in Jordan increased to 9390.50 JOD Million in 2015 from 8030.10 JOD Million in 2014. External Debt in Jordan averaged 5433.67 JOD Million from 1988 until 2015, reaching an all time high of 9390.50 JOD Million in 2015 and a record low of 3640.20 JOD Million in 2008.

### Investment Climate in Jordan

Investment in Jordan is considered as one of the vital sources to boost the economy considering that Jordan's economy is among the smallest in the Middle East, with insufficient supplies of water, oil, and other natural resources, underlying the government's heavy reliance on foreign assistance.

The country's location, supported by myriad free trade agreements (FTAs) offering access to 1.5bn consumers, enables the kingdom to be a strategic trade route to many of its neighboring countries and regions.

Jordan aspires to create a competitive investment destination capitalizing on its many advantages mentioned above. The government focused its efforts to implement significant advances in structural and legal reform. These efforts are represented in the new Investment Law of 2014, the tax law, in addition to other endeavors related to providing greater access to credit for MSMEs, and by providing greater investment incentives to specific priority sectors identified by the new Investment law and the Jordan 2025 vision.

Furthermore, in its endeavor to enhance the business environment, several geographically industrial states were created across the kingdom. These range in type to include (industrial estates, free zones and special economic zones). Under the new Investment Law, these zones are given a number of incentives that include a tax rate of 0% on exports, sales tax, import duties, social service tax, dividends tax and a 5% income tax from all economic and manufacturing activities undertaken in the development zones. As for the investments in Free Zones, they enjoy Exemptions from customs duties, income tax exemptions and exemptions from land and building taxes among others. Both development and free zones also enjoy facilitations regarding visa and residency permits for investors and workers in addition to Repatriation of capital and profits in a convertible currency. Such estates have succeeded in attracting relatively large amounts of FDI to Jordan.

### Key National Investment Priorities:

Jordan Investment commission worked on taking a leading role in the application of government policies to promote and attract domestic and foreign investments and create an investment environment that stimulates economic performance through investment promotion strategy launched in 2016

#### Jordan investment commission aims to:

- Regulating the special provisions governing Development Zones and Free Zones in the Kingdom and developing them placing them in service of the national economy as well as monitoring their functioning.
- Developing plan and programs to stimulate domestic and foreign investments.
- Establishing trade centers and organizing exhibitions as well as opening markets and organizing trade missions in order to promote national products, in addition to marketing and development of national exports and encouraging investment.
- Taking appropriate decisions related to private or public institutions to improve Investors' confidence in Jordan's investment environment.

### 3. Market analysis

#### Description of the project

The gemstones: are the different types of polymerization minerals composite of two or more elements, consisting mainly of silica with some metallic impurities, the gems type are differ based on the constituent material and silica, commonly found in silt volcanic areas, such as gravel eruptions, especially in alluvial regions.

The composition of each gem differs from the other in terms of conditions and components and the type of overlapping impurities during the main construction process, the crystalline crosslinked system is the main factor of most major gemstones which are similar among those stones. What distinguishes a stone from the other is the elements overlap during the rapid crystalline formation, which repeats the primary polymerization at the center, and the varying degree of colors depending on the degree of transparency

producing from several factors such as type of minerals that enter an impurity to silicon type and therefore the large and diverse number of gems It formed, and should be noted that all types of gemstone is composed of two elements and more, but the diamond is omnidirectional configuration of one element is a carbon.

Some of the gemstones are formed in the bulk of the earth with different depths, and maybe compined with another elements or in native such as yaqoot, zomorrod and diamond that sometimes is formed in depth 160 m approximetaly, is flow with lava and earthquakes. But the another type is formed in the bottom of sea such as coral and peral that is considered of the most beautiful and expensive gemstones in the past such as pearl of gulf that gaint good international standing. In addition, the plant kingdom provides the yellow beautiful Kahraman.

The mineralogy is one of the earth science that focused on the chemistry, crystal structure and the properties of natural minerals. There are some studies in mineralogy including the origin and mineral formation, mineral classification, geological distribution and it uses.

The mineralogy specialized in studying the homogenous materials that occurred in the nature formed by it such as diamod and gold as known as minerals. Which contributed in culture renaissance, where found in the mark of ancient egyption (since 5000 years) it allocated us for the gold mines, where extected these minerals from veins. In east desert at Egypt more than 40 mines that extracted from it the gold which the jewelery are made from. They used the hematite for painted their tombs, and they extracted the copper from green and blue copper minerals, the ancient egyption investigate in the deserts about the gemstones which are attractive mminerals ( as the green likes: Zumurod, malakaite, gurooz, and plabeers).

From that date the muineral contribute in culture growth, where each age is known as mineral name, such as steel era, copper era, as our times known as nuclear era.

## Gemology

The crystals is homogenous structure has achemical structure where formed by natural conditions, under pressure and appropriate temperature, where boarderd flat surfaces called crystal faces reflect the internal atomic. Where the crystal is classified according to their surfaces:

- Crystal without surfaces
- Crystal with semi surfaces
- Crystals with full surfaces

### Properties of the crystals:

**Surfaces of the crystal:** the flat external surfaces which determine the crystal shape

**Crystal edges:** intersection between more than two crystal faces

**Corners:** intersection more than two crystal faces

**Crystal structure:** group of similar and equalized crystal surfaces in shapes and area, the crystal structure is divided into:

1. Closed crystal: formed from single crystals.
2. Opened crystal: formed from multi crystal structure.

**Symmetric of crystal:** it's a process that produce a group of similar surfaces in same place that one crystal where rotated full cycle, the repetition happen for any phenomena exist on the crystal such as edges and corners.

### Elements of crystal symmetric:

1. Symmetric plane: it cross the center of the crystal and cut it into two equal and similar halves
2. Symmetric axis: it's a line if the crystal rotate around it full cycle without displacement to repeat the crystal position for many times that take a same type and position, and determining the degree of symmetric, these axes are: binary, triple, quaternary and hexa.
3. Symmetric center: is a point inside the crystal characterized by if movement from it in two equal opposite sides the same phenomena occurred.

**Crystals factions:** according to symmetrical degree and dimentions the crystals classified into: cubic, tetracline, monocline, tricline and hexa.

### Gemstones properties

To now adays no standared specification for gemstone was issued and agreed upon, so the consumed countries in Europe and north of America were setup a special specifications to be applied on the producing countries.

### Common properties for gemstone

Calcine stone: there are many experiments for assesment the calcine stone as gemstones based on international specifications:

**Specific gravity:** it's very high for dark stones and in general if the specific gravity of rock is low it means the porosity for this rock very high and its ability to sound wave conductivity is low and the resistivity for freezing is low, according to the American specifications the gemstones are classified as shown in table 3 below:

**Table3 :The American specification of the gemstones**

Type of density	Density (ton/m <sup>3</sup> )
Low	2.16-1.76
Medium	2.56-2.16
High	2.56

Natural resources authority American Specifications.

1. Porosity: is known as the ratio between void volume and total volume, it must be very low.( few parts of hundreds)
2. Surface hardness: this properity is resisting surface scratches, where the iron powder is used for surfaces polishing it refers to hardness of rock surface.
3. Decoration factor: ability of rock to polishing and for comparing polishing degree between rocks and it use a scale of including of 10 numbers ranging (0-9) according to degree of polishing.
4. Freezing resistance: rock resistance to freezing and melting where as the high resistance for porous of rock, water absorpotion ratio is low and the voice speed is high.

### The gemstone selection choice according to the industrial specifications:

- The type of clay deposits
- Type of gem
- Look appearance
- Homogeneity
- Type of sediment: fractures, erosion, weathering, reserve and cover.

#### Types of gemstones:

1. Agate: is dark, impurite and noncrystalline mineral with red color, sometimes it's yellow, green, blue and gray. It is type of quartz known as Alyoshp.
2. The Yemeni agate: it is a semi transparent mineral it composite chemically from silica include iron impurities, the structure of these impurities appear the agate with different color such as red, yellow and brown. The red agate is the famous type of Yemeni agate.
3. Amethyst: light or dark purple color and it is a transparent mineral.
4. Fayrouz: it has a blue green or gray green color and sometimes converts to light green, it's rarely found in crystalline structure. Composed from aluminum phosphate which contains copper water.
5. Topaz: is known as yellow ruby and it a transparent mineral with gold yellow color, it crystal composed inside the voids of granite and shest rocks.
6. Yazourd: it a semi gemstone and dark with blue color, extracted from Iran. Chemically composed aluminum, sodium silicate mixed with iron and sulphur.
7. The Silver: white color and precious mineral it used for jewelry and midicine and in currency.
8. The gold: is very aprecious metal, soft and light yellow color use in Jewelry, it characterized by low corrosion and softinity and is the most chemical element dense.
9. Red ruby: types: Rose, vinous, Rubis Spinnelle, Rubicelle, Chorandum Rubi and Amethyst Oriental.  
its properties:
  - Red colored with different degree
  - Factor of break: 1.7606 to 1.7687
  - Hardness: 9
  - Hexan crystal structure
  - Specific gravity: 3.989 to 4.000

Its cutting all stones as diamond, can't bu cutted with any thing unless the diamod.

#### The project aims

- Exploitation of Jordanian mineral ores
- Establish a factory to manufacture gems to be economicall exploited.
- Encouraging investors to enter into gemstones industry
- Increase exporting products of the Jordanian minerals



- Generate new jobs opportunities for qualified Jordanian labor

### Suggested service

The usage:

- The gemstones contain some of radiation which is useful for human body such as eyes and brain.
- For jewelry and uses.

### Targeted Segments

The jewelry shops such as:

- Imseh
- Sakkejha
- Damas
- Deva
- International for jewelry
- Other jewelry shops

### Market analysis

The gemstones deposits exist in Jordan particularly in the southern part of the country (specifically in Wadi Araba area and south of Aqaba), will be appointed a technical group specialized in prospecting of gemstones. The annual Jordanian import of gemstones is about 5kg according to the Jordanian customs reports to be used in the jewelry industry.

### Competitors analysis

There are many associations interested in gemstones prospecting and forming to be used in many jewelry industries such as:

- Dana association.
- Alqadeseyah associations.

### Price analysis and pricing policy

Due to the small size of imports of gemstones, the establishment of a factory for gemstones using modern technology with an annual production of 400kg of Malakite gem by polishing and shaving to produce

different types will have a market value to provides the local markets, three different sizes will be produced:

**Table 4:price analysis**

Size (cm)	% percentage	Production (kg/year)	Price (JD)
3-5	40	160	5000
1-3	35	140	7000
Less than 1	25	100	10,000
<b>Sum.</b>	<b>100</b>	<b>400</b>	<b>---</b>

#### Market Share

Since there is no specialized factories in gems production is exist in the local market, the establishment of gems will be feasible to fulfill the local market requirements. In addition to export, as well as the possibility of import different types of gemstones to be manufactured and marketed in the local markets.

## Expected Revenues

The following table shows the expected revenues of the project during the years:(2027-2018)

**Table 5:Expected Revenues**

Revenues	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
The price of a kilogram of size 3 - 5 cm	5000	5150	5305	5464	5628	5796	5970	6149	6334	6524
The price of a kilogram of size 1 - 3 cm	7000	7210	7426	7649	7879	8115	8358	8609	8867	9133
The price of a kilogram of size less than 1 cm	10000	10300	10609	10927	11255	11593	11941	12299	12668	13048
Revenue size of 3 - 5 cm	800000	824000	848720	874182	900407	927419	955242	983899	1013416	1043819
Revenue volume of 1 - 3 cm	980000	1009400	1039682	1070872	1102999	1136089	1170171	1205276	1241435	1278678
Revenue of less than 1 cm	1000000	1030000	1060900	1092727	1125509	1159274	1194052	1229874	1266770	1304773
<b>Revenues</b>	<b>2780000</b>	<b>2863400</b>	<b>2949302</b>	<b>3037781</b>	<b>3128914</b>	<b>3222782</b>	<b>3319465</b>	<b>3419049</b>	<b>3521621</b>	<b>3627269</b>

#### 4. Technical analysis

##### Human resources required

**Table 6: Project human resources requirements**

Position	Number
Indirect human resource	
Project manager	1
Technical cutter	2
Accountant	1
Labor	2
Driver	2
Security guard	2
Cleaner man	1
Polisher technician	1
Receptionist	1
Total	13
Total summation	13

### Location analysis

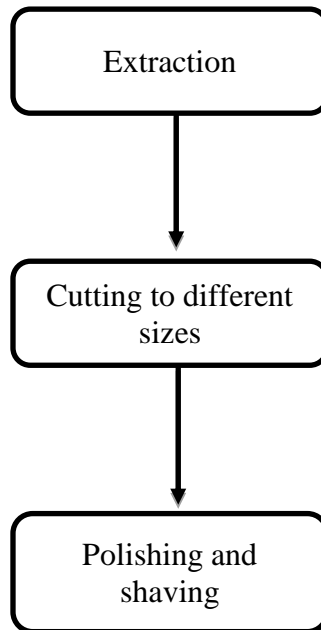
The gems ores deposite is exists in Tafilah governorate particularly in Wadi Araba region, in addition the copper and manganese deposits locations ore shown as well:

Figure 3: The gemstones deposites – energy and minerals regulatory commission



### The production process description

The extraction is simple presented by manual methods depending on previous geologic studies for these ores extended, then the cutting process of gemstones to different sizes based on its industrial use, after that the polishing process will be applied according to desired specifications required, the flowchart below shows the production process:



### Technical requirement analysis

#### Land and construction works:

Since the gemstone deposits occur in Tafilah governorate, it will be collected from different locations by manual method based on the previous geological studies regarding the extension and spread of these ores, so there is no limited location for the extraction but the collection will be carried out from different locations.

The factory will be built at Dana area, a land with an area 5 dunums will be purchased, the price of one dunum is 15,000 JD, the table 4 below shows the construction works required for the project:

**Table 7 :the construction works**

Construction works	Area (m <sup>2</sup> )
Building works	600
Hunger building	200

## Equipments and machines

The following table shows the equipments and machines required for the project :

**Table 8: The equipments and machines**

Machine	Number
Big cutter machine	1
Small cutter machine	2
Microscope	1
Balance	2
X-Ray device	1
Polish machine	2
Pick up	2
Total	7

## Furnitures

The following furnitures are required for the project:

Office furnitures (computers, tables and chaires, carpet, meeting requierments), the estimated cost 10,000JD.

## 5. Financial Analysis

The Financial Part illustrates all the assumptions which were used when we have developed the study including project expenses related to capital expenditures, operating expenses ( Fixed and Variable costs) followed by illustrating project revenues.

### Assumptions

Assumptions

Calculation Assumptions:

- The weighted average cost of capital used in the study is 10.75% as it was calculated considering risk free and debt Interest rates as well as Market risk premiums to consider alternative opportunity costs for investor.

- Project working capital has been estimated and added to project cash outflows at the beginning of the project and annual increase in working capital has been also estimated and added to the operating expenses then net working capital has been added to total cash inflows at the end of project lifetime.
- The time span for the financial study is 10 years starting from 2018, where annual increase rates have been estimated as per the tables below:

**Table 9: General Assumptions**

General Information	
All Financial Numbers (Currency)	Jordan Dinars
Financial Study Time Span (Years)	10
Expected Project First Operating Year	2018
Last Year in the Financial Study	2027

**Table 10: Currency Exchange Rates**

Exchange Rates	Jordan Dinars
American Dollar	0.708
Euro	0.760

**Table 11: Project working times**

Project working times	
Number of weeks/Year	52
Working Days/Week	7
Number of days / Year	300

**Table 12: Annual Growth Rates Assumptions**

Annual Growth Rates	Average
Annual Population Growth Rate	2.20%
Annual Sales Price Increase Rate (1)	3.00%
Annual Expenses Increase Rate (2)	3.00%
Annual Increase Rate in Employees Salaries (4)	4.1%

(1) and (2) Source: Inflation Rates, Central Bank of Jordan



(3) Source: Social Security

**Table 13: Assumptions of expenses**

Assumptions of expenses	
Expenses of raw materials of income (food and drink)	65.00%
Service benefit expenses from revenues	5.0%
Maintenance expenses from revenues	2.50%
Consumer expenses from revenues	1.00%
Insurance expenses from the value of assets	0.75%
Marketing expenses of revenue	0.25%

**Table 14: Income Tax Assumptions**

Income Tax Assumptions	Value
(1) Average Income Tax in Jordan	20%
(2) Income Tax Deduction	0.50
Income Tax after Deduction	20%
(3) Compulsary Reserve Percentage	10%
Other Assumptions	Value
(1) Annual Monthly Salaries have been calculated after multiplying monthly salaries by:	16

**Table 15: Risk Premium**

Risk Premium	
(1) Risk Free Rate of Return	6.50%
(2) Return to Debt Maturity	9.48%
(3) Market Risk Premium	10.12%
Income Tax Rate	5.00%
(4) Beta	1
Growth Rate	4.00%

(1) Source :Damodaran's Country Default Spreads and Risk Premiums Report

(2) Source :Central Bank of Jordan

(3) Source :Damodaran's Country Default Spreads and Risk Premiums Report

(4) Source :Damodoran Beta By Sector, , pages.stern.nyu.edu

**Table 16: Weighted Average Cost of Capital**

Weighted Average Cost of Capital	
Average Return on Risk Free Investment	%6.50
Return to Debt Maturity	%9.48
Market Risk Premium	%10.12
Income Tax Rate	%20
Bets	0.89
Equity	473,024
Loans Value	709,535
Loans	
Cost of Borrowing before Tax	%9.48
Cost of Borrowing After Tax	%7.58
Loans Value	709,535
Loans Percentage	%60
Equity	
Cost of Equity	%15.5
Equity Value	473,024
Equity Percentage	%40
Gross	
Project Value	1,182,559
Project Percentage	%100

### Capital Expenditures

The estimated cost of the project is 1,182,559 JD and it covers land costs, construction works, machinery and equipment, furniture, pre-operating expenses, working capital and vehicle requirement. The following tables summarize the details of these expenses:

**Table 17: Construction Work Capital Expenditure**

Description	Cost (JOD per Squared Meters)	Area (Squared Meters)	Gross Cost/ JD
<b>Building Construction</b>	200	600	120,000
<b>Hanger Works</b>	100		20,000
<b>Other Works</b>			14,000

<b>Total</b>	<b>154,000</b>
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**Table 18: Machines and equipment Capital Expenditure**

Description	Number	Unit Cost / JD	Gross Cost/ JD
Big cutter machine	1	40,000	40,000
Small cutter machine	2	25,000	50,000
Microscope	1	10,000	10,000
Balance	2	1,000	2,000
X-Ray device	1	75,000	75,000
Polish machine	2	10,000	20,000
<b>Total</b>			<b>197,000</b>

**Table 19: Furniture Capital Expenditure**

Furniture	No.	Unit Cost / JD	Gross Cost/ JD
Furniture	1	-	10,000
<b>Total</b>			<b>10,000</b>

**Table 20: Transportation and Vehicles Capex**

Transportation and Vehicles	No	Unit Cost/JOD	Total Cost/JOD
Pick up	2	23,000	46,000
<b>Total</b>			<b>400,000</b>

**Table 21: Pre Operating Expenses**

Pre-operating expenses	Estimated cost (JD)
Governmental fees	500
Transportation	750
Marketing	500
Training	750
<b>Total</b>	<b>2,500</b>

The initial working capital reflects the project's amounts needed to cover all the expenses during operation until the project starts generating income, the following table shows the components of the initial working capital:

**Table 22: Working Capital**

Working Capital	No. of Months	%	Estimated Cost (JD)
Operating expenses	3	%25	561,908
General and administrative expenses	3	%25	4,669
Marketing expenses	3	%25	1,738
Indirect Salaries	3	%25	22,240
<b>Total</b>			<b>590,554</b>

**Table 23: Expenses Summary**

Capital expenditure summary	Cost (JD)	Contingency	Cost (JD)	%
Land	75,000	10%	82,500	%7.0
Construction works	154,000	10%	169,400	%14.3
Machinery & Equipment	197,000	10%	216,700	%18.3
Furniture	10,000	10%	11,000	%0.9
Vehicles	46,000	10%	50,600	%4.3
Pre-Operating Expenses	2,500	10%	2,750	%0.2
Working capital	590,554	10%	649,609	%54.9
<b>Total (JD)</b>	<b>1,075,054</b>		<b>1,182,559</b>	<b>100%</b>

### Source of funding

The financing structure of the project consists of loans and Equity. The investment cost of this project is estimated at (1,182,559) JD, where 60% of the project will be financed through loans (709,535 ) JD, and the remaining (40%) through (Equity) with (473,024) JD. The following table summarizes the general structure of the required financing:

**Table 24: Sources of Funding**

Funding Sources	Amount	Percentage
Equity	473,024	%40
Loans	709,535	%60
<b>Total</b>	<b>1,182,559</b>	<b>%100</b>
Use of Fund:	Value	Ratio
Capital Expenditures	530,200	%44.83
Pre-Operating Expenses	2,750	%0.23
Working Capital	649,609	%54.93
<b>Total</b>	<b>1,182,559</b>	<b>%100.00</b>

### Operating Expenses

The following table summarizes the expected operating expenses for the proposed project (2018-2027):

**Table 25: Operating Expenses**

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Raw Materials and Packaging from Revenues	1,807,000	1,861,210	1,917,046	1,974,558	2,033,794	2,094,808	2,157,652	2,222,382	2,289,054	2,357,725
Utilities from Revenues	139,000	143,170	147,465	151,889	156,446	161,139	165,973	170,952	176,081	181,363
Maintenance from Revenues	69,500	71,585	73,733	75,945	78,223	80,570	82,987	85,476	88,041	90,682
Disposables from Revenues	27,800	28,634	29,493	30,378	31,289	32,228	33,195	34,190	35,216	36,273
Others	204,330	210,460	216,774	223,277	229,975	236,874	243,981	251,300	258,839	266,604
<b>Total</b>	<b>2,247,630</b>	<b>2,315,059</b>	<b>2,384,511</b>	<b>2,456,046</b>	<b>2,529,727</b>	<b>2,605,619</b>	<b>2,683,788</b>	<b>2,764,301</b>	<b>2,847,230</b>	<b>2,932,647</b>

### General and Administrative Expenses

The following table summarizes the expected general and administrative expenses for the proposed project (2018-2027):

**Table 26: General and Administrative Expenses**

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Telecom	2,000	2,060	2,122	2,185	2,251	2,319	2,388	2,460	2,534	2,610

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Hospitality	1,200	1,236	1,273	1,311	1,351	1,391	1,433	1,476	1,520	1,566
Staionary and Printing	1,200	1,236	1,273	1,311	1,351	1,391	1,433	1,476	1,520	1,566
Transportaton	3,600	3,708	3,819	3,934	4,052	4,173	4,299	4,428	4,560	4,697
Renting	0	0	0	0	0	0	0	0	0	0
Training	5,000	5,150	5,305	5,464	5,628	5,796	5,970	6,149	6,334	6,524
Insurance	3,977	4,096	4,219	4,345	4,476	4,610	4,748	4,891	5,037	5,188
Miscellaneous	1,698	1,749	1,801	1,855	1,911	1,968	2,027	2,088	2,151	2,215
<b>Total</b>	<b>18,674</b>	<b>19,234</b>	<b>19,811</b>	<b>20,406</b>	<b>21,018</b>	<b>21,648</b>	<b>22,298</b>	<b>22,967</b>	<b>23,656</b>	<b>24,366</b>

### Marketing Expenses

The Following table shows the marketing expenses for the proposed project :

**Table 27:Marketing Expense**

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Marketing Expenses	<b>6,950</b>	<b>7,159</b>	<b>7,373</b>	<b>7,594</b>	<b>7,822</b>	<b>8,057</b>	<b>8,299</b>	<b>8,548</b>	<b>8,804</b>	<b>9,068</b>

### Human Resources

The total annual salaries and monthly wages has been estimated on 16 months for the purpose of considering annual increments on salaries as well as payments related to social security and health insurance,... etc.

The following table summarizes the expected annual salaries and wages, considering annual increment on salaries as per the income statement:

**Table 28: Expected Salaries and Wges (2027-2018)**

Job Title	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Indirect Employees</b>										
Project manager	1,500	1,562	1,626	1,692	1,762	1,834	1,909	1,987	2,069	2,154
Technical cutter	350	364	379	395	411	428	445	464	483	502
Accounter	400	416	433	451	470	489	509	530	552	574
Labor	350	364	379	395	411	428	445	464	483	502
Driver	380	396	412	429	446	465	484	503	524	546
Security guard	300	312	325	338	352	367	382	397	414	431
Cleaner man	250	260	271	282	294	306	318	331	345	359
Polisher man	350	364	379	395	411	428	445	464	483	502
Reception	300	312	325	338	352	367	382	397	414	431

**Table 29: Annual Salaries**

Job Title	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Indirect Employees</b>										



Job Title	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Project manager	24,000	24,984	26,008	27,075	28,185	29,340	30,543	31,796	33,099	34,456
Technical cutter	11,200	11,659	12,137	12,635	13,153	13,692	14,254	14,838	15,446	16,080
Accounter	6,400	6,662	6,936	7,220	7,516	7,824	8,145	8,479	8,826	9,188
Labor	11,200	11,659	12,137	12,635	13,153	13,692	14,254	14,838	15,446	16,080
Driver	12,160	12,659	13,178	13,718	14,280	14,866	15,475	16,110	16,770	17,458
Security guard	9,600	9,994	10,403	10,830	11,274	11,736	12,217	12,718	13,240	13,782
Cleaner man	4,000	4,164	4,335	4,512	4,697	4,890	5,091	5,299	5,517	5,743
Polisher man	5,600	5,830	6,069	6,317	6,576	6,846	7,127	7,419	7,723	8,040
Reception	4,800	4,997	5,202	5,415	5,637	5,868	6,109	6,359	6,620	6,891
<b>Total Indirect Salaries</b>	<b>88,960</b>	<b>92,607</b>	<b>96,404</b>	<b>100,357</b>	<b>104,471</b>	<b>108,755</b>	<b>113,214</b>	<b>117,856</b>	<b>122,688</b>	<b>127,718</b>
<b>Total</b>	<b>88,960</b>	<b>92,607</b>	<b>96,404</b>	<b>100,357</b>	<b>104,471</b>	<b>108,755</b>	<b>113,214</b>	<b>117,856</b>	<b>122,688</b>	<b>127,718</b>

## Depreciations

The following tables illustrate cost of Capex and Depreciation rates:

Table 30: Capex and Depreciation Expenses

Capex Cost and Annual Depreciation Rates	Cost (JOD)	Depreciation Rate	Annual Additions
Land	82,500	%0.0	%0.0
Construction Works	169,400	%5.0	%0.0
Machineries	216,700	%10.0	%2.0

Furniture	11,000	%10.0	%5.0
Vehicles	50,600	%10.0	%0.0
Total	530,200		

**Table 31: Depreciations and Additions on Construction Works**

Capex, Annual Additions and	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Fixed Assets	530,200	535,084	540,082	545,198	550,434	555,793	561,280	566,898	572,651	578,541
Total Depreciation Expenses	36,300	36,788	37,288	37,800	38,323	38,859	39,408	39,970	40,545	41,134
Total Accumulated Depreciation	36,300	73,088	110,377	148,176	186,500	225,359	264,767	304,737	345,282	386,416
Total Additions	0	4,884	4,998	5,115	5,236	5,360	5,487	5,618	5,752	5,891
Total Net Book Values	493,900	461,996	429,706	397,021	363,934	330,434	296,513	262,161	227,369	192,125

### Loan

The table below summarizes all details related to the loan such as annual installments and payment methods for the remaining amount of the loan for each year of the project to 2020.

**Table 32: Loan Details**

Loan Value	535,709
Annual Interest Rate	9.48%

Loans Period	5
Grace Period	0
Loan Starts at year:	2018
Annual Payment	184,694
Number of Payments	5

Year	Annual Payment	Interest	Capital	Loan Remaining Value
2018				709,535
2019	184,694	67,264	117,430	592,106
2020	184,694	56,132	128,562	463,543
2021	184,694	43,944	140,750	322,794
2022	184,694	30,601	154,093	168,701
2023	184,694	15,993	168,701	0

### Income Statement

Basen on financial information and analysis of the financial expenses of the project, the estimated income statement for the years (2018-2027) will be as shown in the following table:

Table 33: Income Statement

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenues										

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Sales Revenues	2,780,00	2,863,40	2,949,30	3,037,78	3,128,91	3,222,78	3,319,46	3,419,04	3,521,62	3,627,26
Gross Operating Revenues	2,780,00	2,863,40	2,949,30	3,037,78	3,128,91	3,222,78	3,319,46	3,419,04	3,521,62	3,627,26
Operating Expenses	2,247,63	2,315,05	2,384,51	2,456,04	2,529,72	2,605,61	2,683,78	2,764,30	2,847,23	2,932,64
Gross Operating Profit	532,370	548,341	564,791	581,735	599,187	617,163	635,678	654,748	674,390	694,622
<i>Gross Profit Percentage</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>	<i>%19</i>
Salaries and Benefits (Indirect Staff)	-88,960	-92,607	-96,404	-100,357	-104,471	-108,755	-113,214	-117,856	-122,688	-127,718
General and Administrative Expenses	-18,674	-19,234	-19,811	-20,406	-21,018	-21,648	-22,298	-22,967	-23,656	-24,366
Marketing Expenses	-6,950	-7,159	-7,373	-7,594	-7,822	-8,057	-8,299	-8,548	-8,804	-9,068
Pre Operating Expenses	-2,750									
Gross Indirect Expenses	-117,334	-119,000	-123,589	-128,357	-133,312	-138,460	-143,810	-149,370	-155,147	-161,151
Income before Interest, Depreciation	415,036	429,341	441,202	453,378	465,875	478,703	491,867	505,378	519,243	533,471
Fixed Assets Depreciations	-36,300	-36,788	-37,288	-37,800	-38,323	-38,859	-39,408	-39,970	-40,545	-41,134
Income before Tax and Interests	378,736	392,552	403,914	415,578	427,552	439,843	452,459	465,408	478,698	492,337
Bank Interests	-67,264	-56,132	-43,944	-30,601	-15,993	-0	-0	-0	-0	-0
Income Before Tax	311,472	336,421	359,970	384,977	411,559	439,843	452,459	465,408	478,698	492,337
Income Tax	-62,294	-67,284	-71,994	-76,995	-82,312	-87,969	-90,492	-93,082	-95,740	-98,467
Net Profit	249,178	269,137	287,976	307,982	329,247	351,875	361,967	372,327	382,958	393,869
<i>Net Profit Percentage</i>	<i>%9</i>	<i>%9</i>	<i>%10</i>	<i>%10</i>	<i>%11</i>	<i>%11</i>	<i>%11</i>	<i>%11</i>	<i>%11</i>	<i>%11</i>
Compulsory Reserves	-24,918	-26,914	-28,798	-30,798	-32,925	-35,187	-36,197	-37,233	-38,296	-39,387
Retained Earnings	224,260	466,483	725,661	1,002,84	1,299,16	1,615,85	1,941,62	2,276,71	2,621,38	2,975,86

### Expected Cashflows Statement

The table below summarizes project cashflows statement, where net cash flows are positive during all years as below:

Table 34: Expected Cashflows

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Cash Inflows from Operating Activities</b>										
Net Profit	249,178	269,137	287,976	307,982	329,247	351,875	361,967	372,327	382,958	393,869
Bank Interests	67,264	56,132	43,944	30,601	15,993	0	0	0	0	0
Depreciation	36,300	36,788	37,288	37,800	38,323	38,859	39,408	39,970	40,545	41,134
Total Operating Cashflows before Additions to Working Capital	352,741	362,057	369,208	376,383	383,564	390,734	401,375	412,296	423,503	435,003
Inventory (Increase/Decrease)	-150,583	-4,518	-4,653	-4,793	-4,936	-5,084	-5,237	-5,394	-5,556	-5,723
Accounts Receivables (Increase/Decrease)	73,438	2,203	2,269	2,337	2,407	2,480	2,554	2,631	2,710	2,791
Working Capital (Increase/Decrease)	-77,145	-2,314	-2,384	-2,455	-2,529	-2,605	-2,683	-2,763	-2,846	-2,932
Net Cashflows from Operating Activities	275,596	359,742	366,825	373,927	381,035	388,129	398,692	409,533	420,657	432,072
<b>Cashflows from Investments Activities</b>										
Fixed Assets (Procurement)	-530,200	-4,884	-4,998	-5,115	-5,236	-5,360	-5,487	-5,618	-5,752	-5,891
Net Cashflows from Investments Activities	-530,200	-4,884	-4,998	-5,115	-5,236	-5,360	-5,487	-5,618	-5,752	-5,891
<b>Cashflows from Financing Activities</b>										

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Capital	473,024									
Loan Amortization	-117,430	-128,562	-140,750	-154,093	-168,701	0	0	0	0	0
Bank Interest Rate	-67,264	-56,132	-43,944	-30,601	-15,993	-0	-0	-0	-0	-0
Loans	709,535	0	0	0	0	0	0	0	0	0
Net Cashflows from Financing Activities	997,865	-184,694	-184,694	-184,694	-184,694	0	0	0	0	0
Net (Increase/Decrease) in Cash	743,262	170,165	177,133	184,118	191,105	382,769	393,205	403,915	414,905	426,181
Cashflows at the Beginning of Period	0	743,262	913,426	1,090,559	1,274,677	1,465,782	1,848,551	2,241,757	2,645,672	3,060,577
Cashflows at the End of Period	743,262	913,426	1,090,559	1,274,677	1,465,782	1,848,551	2,241,757	2,645,672	3,060,577	3,486,758

### Expected Balance Sheet

The balance sheet is one of the main statements which the project depends on, as it reflects the financial position of the entity and is usually estimated on the last day of the financial year.

All financial information and analysis of the project shall be the estimated for the years (2018-2027) as shown in the table below:

**Table 35:Expected Balance Sheet**

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Assets</b>										
<b>Current Assets</b>										
Cash	743,262	913,426	1,090,559	1,274,677	1,465,782	1,848,551	2,241,757	2,645,672	3,060,577	3,486,758
Inventory	150,583	155,101	159,754	164,546	169,483	174,567	179,804	185,199	190,754	196,477

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total current Assets	893,845	1,068,527	1,250,313	1,439,224	1,635,265	2,023,119	2,421,561	2,830,870	3,251,331	3,683,235
Non Current Assets										
Fixed Assets (net)	493,900	461,996	429,706	397,021	363,934	330,434	296,513	262,161	227,369	192,125
Total Non Current Assets	493,900	461,996	429,706	397,021	363,934	330,434	296,513	262,161	227,369	192,125
Total Assets	1,387,745	1,530,523	1,680,018	1,836,245	1,999,199	2,353,553	2,718,074	3,093,032	3,478,700	3,875,360
Liabilities										
Current Liabilities	73,438	75,641	77,911	80,248	82,655	85,135	87,689	90,320	93,029	95,820
Remaining amount of Loan	128,562	140,750	154,093	168,701	0-	0-	0-	0-	0-	0
Total current Liabilities	202,000	216,391	232,004	248,949	82,655	85,135	87,689	90,320	93,029	95,820
Non Current Liabilities										
Long Terms Loans	463,543	322,794	168,701	0	0	0	0	0	0	0
Total Long Term Liabilities	463,543	322,794	168,701	0	0	0	0	0	0	0
Total Liabilities	665,544	539,185	400,704	248,949	82,655	85,135	87,689	90,320	93,029	95,820

Description	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Owners Equity</b>										
Shareholders Contributions	473,024	473,024	473,024	473,024	473,024	473,024	473,024	473,024	473,024	473,024
Statutory Reseve	24,918	51,831	80,629	111,427	144,352	179,539	215,736	252,969	291,265	330,652
Retained Profits	224,260	466,483	725,661	1,002,845	1,299,168	1,615,855	1,941,626	2,276,719	2,621,382	2,975,864
<b>Total Equity</b>	<b>722,201</b>	<b>991,338</b>	<b>1,279,314</b>	<b>1,587,296</b>	<b>1,916,543</b>	<b>2,268,418</b>	<b>2,630,385</b>	<b>3,002,712</b>	<b>3,385,670</b>	<b>3,779,539</b>
<b>Total Liabilities and Equity</b>	<b>1,387,745</b>	<b>1,530,523</b>	<b>1,680,018</b>	<b>1,836,245</b>	<b>1,999,199</b>	<b>2,353,553</b>	<b>2,718,074</b>	<b>3,093,032</b>	<b>3,478,700</b>	<b>3,875,360</b>

### Feasibility Indicators

There is more than one method to calculate the discounted cash flow statement. However, in this study, WACC was used to calculate the discounted cash flows and net investment value. The Company's financing structure is based on equity and loans, therefore the discounted rate should be adjusted according to WACC based on the following assumptions, the following table illustrates the net expected free cash flow of the project:

**Table 36:Free Net Cash flows Table**

Net Cashflows	Before Operating	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Final Value
Net Free Cashflows	-1,182,559	278,346	354,858	361,826	368,812	375,799	382,769	393,205	403,915	414,905	426,181	6,563,311



Discount												
Factor	1.00	0.74	0.66	0.60	0.54	0.49	0.44	0.40	0.36	0.33	0.29	0.29
Net Present												
Value for	-1,182,559	204,889	235,847	217,130	199,834	183,850	169,079	156,825	145,456	134,906	125,119	1,926,865
Cash Flows												

### Payback Period

Table below illustrates payback period for the project, as it is one of the indicators which investors care about before taking the investment decision as they need to know when the project will return the invested amount of money. Payback period definition is the total required period so that the project generates total money equal to the total invested capital expenditure, as investor is always looking to return the full invested amount of money at the earliest possible.

Table 37: Payback Period

Payback	Before Operating	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Net Free	-1,182,559	278,346	354,858	361,826	368,812	375,799	382,769	393,205	403,915	414,905	426,181
Project	1,182,559	904,212	549,354	187,528	-181,284	-557,083	-939,852	-1,333,058	-1,736,973	-2,151,877	-2,578,058
Payback	3	1	1	1	0	0	0	0	0	0	0

Table 38: Financial Analysis Results

Description	Value
Weighted Average Cost of Capital (WACC)	%10.75
Net Present Value for Cashflows	2,517,241

Payback Period	3
Internal Rate of Return	%34.98

### Sensitivity Analysis

Sensitivity analysis is conducted to investigate the effects of changes in significant inputs of the financial analysis. This includes the declined in revenues, changes in total investment costs, and increase in operating costs with 10%, which indicate that the project is feasible.

The following table shows that the project will be feasible if the revenues declined with 10% or the operating costs increase by 10%.

**Table 39: Sensitivity Analysis**

Sensitivity Analysis	Internal Rate of Return	Payback Period	WACC
Original Scenario	%34.98	3	10.75%
Revenues declined by 10%	%32.91	3	10.75%
Operating Expenses Increased by 10%	%18.24	7	10.75%

### Conclusions and Recommendations

Based on the profitability analysis and considering that project internal rate of return is higher than WACC, it is concluded that the project is feasible as the net present value for the project is positive 2,517,241 Jordan Dinars considering that the project provides 6 Job Opportunities for the governorate residents.