DEPARTMENT OF ECONOMICS AND FINANCE **CHAIR : INDUSTRIAL ECONOMIC**

POTASH INDUSTRY IN THE HASHEMITE KINGDOM OF JORDAN

SUPER VISOR

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Introduction

The industry sector is a very important financial resource in the Kingdom of Jordan, and it has a direct impact on the Jordanian economy, since it contributes in increasing local production, relying on revenues from industrial products, which are sold in the local market and exported , The different industrial activities Such as (food industry, plastic industry, metallurgical industry, and other) are all interconnected .

Investment in the Jordanian industrial sector was able to achieve profits worth 450 million JOD in the 2014. The Investment Promotion Law contributed in increasing the investment share in the Jordanian market; also the industrial sector is one of the sectors that contribute in providing job opportunities for it's ability to attract employment permanently.

The mineral industry is considered one of the most important types of industries in Jordan, so the manufacture of phosphates and potash is considered one of the most important types of mineral industries, which is the main exports in the Jordanian economy, and it has a large share of external financial revenues pie, in addition to the previous minerals. The mineral industry manufactures many other minerals, such as: raw salt, refined salt, copper, gypsum, and others in Jordan.

The mineral industry could be defined as the industry that is specialized in extracting minerals and mineral reserves, in order to use it in multiple industries. The mining sector includes many companies around the world that operate with large revenues, and typical activities in this sector include extracting, trading in and investing in minerals which is increasing rapidly. Minerals market grows depending on demand as industrial uses increase with economic activity.

The sediments of different raw minerals are concentrated in specific geological environments, they are not evenly distributed throughout the world, and transportation costs mainly affect the competitiveness of minerals. The European Union, Japan and the United States also rely on semi-manufactured products and raw materials mineral to meet their needs. The developing Asian countries that depend on the Pacific coasts are heavily dependent on imported minerals. China currently has the largest mineral industry in the world, accounting for 12% of the total global mineral trade, except for coal.

The mineral industry is related to pre-treatment of minerals and producing of metal products. The main end uses for metallurgical products are cars, machinery, household appliances, electrical equipment, construction, furniture, and containers.

Mining and metal works are the two main branches of the mechanical and metallurgical industries sector: it constitutes 82 percent of exports, 94 percent of investment, 91 percent of production, and 82.6 percent of the workforce.

The mining and metallurgical sector is an essential link in the manufacturing chain, through its role as provider and supplier of a number of markets (especially construction, energy, transport and agriculture), and therefore it will certainly benefit from the expected growth of these markets, encouraged by strategies at the national level.

Chapter One: Potash as a Concept and Content.

1.1 Introduction

Potash is the main ingredient in most fertilizers, and it contains a mixture of phosphate, nitrogen and potassium. The Hashemite Kingdom of Jordan is considered one of the most important Arab countries that owns mineral wealth, the most important of which is potash. This mineral will be discussed extensively in this chapter.

The first chapter of this paper (1.2) includes the scientific definition of potash as mineral, and will be focused in section (1.3) on knowing its types in terms of name, chemical name and scientific formula for each name, and it is very important to know how it is extracted in section (1.4) with its different stages, section (1.5) The fields of its multiple uses that make it one of the most important exports of the Kingdom of Jordan to the rest of the world, section (1.6) Knowing other countries that export this important mineral, as potash is a rich and versatile mineral in all agricultural, domestic and chemical fields.

1.2 Potash Definition

Potash is a salt extracted from some plants ash and it is a pure potassium carbonate (K2CO3) form. Potash is a mineral in the earth's crust. It has been used since ancient times in the manufacture of glass, soap, and compost.

The term has become somewhat vague due to replacing fertilizers with cheaper potassium salts, such as potassium chloride (KCl or K2O), which is now sometimes called the same common name. In addition, the potassium hydroxide (KOH) is commonly known as caustic potash, which gives additional confusion.

Potash is the main ingredient in most fertilizers, and it contains a mixture of phosphate, nitrogen and potassium. The term "potash" refers to minerals rich in potassium used in agriculture. The potassium contained in these salts is known as "regulator" because it can affect more than sixty systems of enzymes that control crop quality. More than 90 million tons of potash is extracted worldwide every year for industrial purposes.

1.3 Potash Types:

Potash in English language derives its name from potassium. There are many chemical compounds that contain potassium and the word potash is used in its traditional names.

Table 1.1 reports the compounds of potash

Table 1.1 Chemical compounds (5) wikipedia.org Website

Name	Chemical name	Formula
Potash fertilizer	Potassium oxide	K2O
Caustic potash	Potassium hydroxide	KOH
Potash carbonate, tartar salts	Potassium carbonate	K2CO3
Potash chlorate	Potassium chlorate	KClO3
Potash chloride	Potassium chloride	KCl
Potash nitrate or Peter salt	Potassium nitrate	KNO3
Potash sulfate	Potassium sulfate	K2SO4
Potash permanganate	Potassium permanganate	KMnO4

1.4 Potash Extraction Process:

All potash deposits are originated from the evaporation of salt water that occurred millions of years ago, whether sea or continental salt, and these deposits are usually buried deep in the ground. Potash ores are rich in clay, sodium chloride, and potassium chloride, among other salts.

Potash ores are obtained by conventional mining. Mining methods include evaporation and dissolved mining, using the method of evaporation, miners pump hot water into dissolved ores and then pump them up the surface where it is concentrated through evaporation by solar energy. Miners then add amino reagents to the evaporated or mineral-rich solution covering potassium chloride.

Here are the most important stages of potash extraction:

The stage of crude extraction, which includes the following stages:

- The solution of potash salts is pumped into special pools to form saline deposits.
- The density of the solution is increased in special pools and then its concentration is adjusted.
- The Carnallite deposits precipitated from the brine are collected from the bottom of the basins, and then transferred to the refinery.

Treatment stage

Hot filtration includes the following stages:

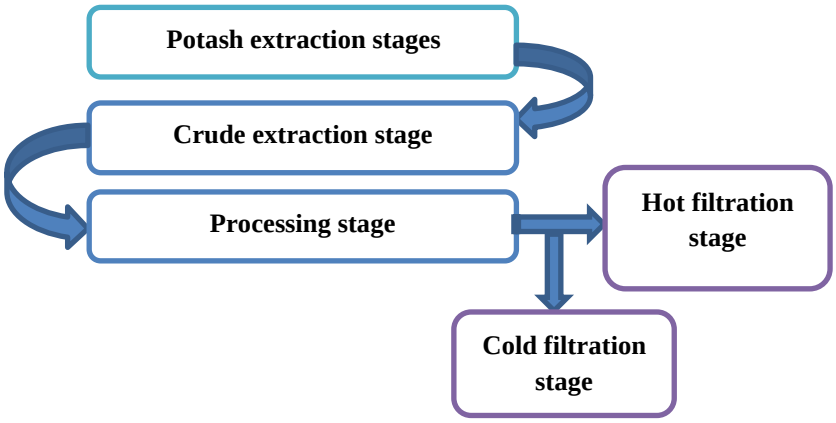
- Carnalite treatment: The carnalite is processed to produce a substance called selenite which is a cake-like substance.
- Treatment of sulphonates: sulphonates are cleaned, and then hot brine is used to filter potassium chloride (KCl).
- Crystallization: The hot brine is cooled successively in a six-stage vacuum crystallization system; the potassium chloride temperature decreases and crystallizes.
- Dehydration: Dehydration is carried out using centrifuges.
- Drying: completely dry the product out of the water.
- Inspection: The product is inspected to standard and accurate specifications, adding an anti-caking agent.
- Dust removal: These are highly efficient filtration units that reduce environmental impact and loss of potash in dust form.

Cold filtration: the process is completed at ambient temperature and therefore requires less energy and includes the following stages:

- Receiving carnalite: In this process, the carnalite is deposited.
- Flotation: Sodium chloride is floated and pumped to the waste area, and the remaining mixture is collected in centrifuges, then the good carnalite is transferred to the cold crystallization stage.

- Crystallization: coarse carnalite and fine carnalite are decomposed in a two-stage crystallization system in the presence of water. Potassium chloride crystals are formed in the crystallization, and the wet mixture is emptied to remove large particles of carnalite and sodium chloride.
- Cold filtration: in order to remove the magnesium chloride mixture from the product, a two-stage centrifuge is used to complete the process.
- Drying: It is dried by dryer, so the moisture level does not exceed 0.1% then it is cooled.

Figure 1.1 Potash Extraction Process



1.5 Potash uses.

Potash is mainly used as fertilizer

More than 95% of potash is used in agriculture as fertilizer. Fertilizers are provider for up to 60% of the food supply on the planet. Potassium is one of the phytonutrients and main crops used as fertilizer since the dune of time. Potassium is the seventh most abundant compound in the soil that makes more than 2.6% of the Earth's crust.

Potash is essential for planting because it improves yields, resists diseases, enhances texture, color, nutrient value and taste. Soil nutrients should be replenished every year; therefore, potash is usually added to soil with potassium deficiency. Some crops that benefit from potash include vegetables, fruits, corn, cotton, palm oil, soybeans, sugar cane, wheat etc...

Potash other uses

Unlike its use as fertilizer, potassium chloride is crucial in many industrialized countries as it is used in melting ice and snow, recycling aluminum, and electroplating. Potash can be used as a water purifier and in the treatment of hypokalemia.

Potassium carbonate is also used in textiles production, photographic chemicals, fire extinguishers and animal supplements. Potash is combined with silica sand to form a water glass, also known as potassium silicate. Water glass is used in arc welding electrodes. Potassium hydroxide is used in soap manufacturing and industrial water treatment

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1.6 Potash Top Producing Countries

Nowadays, potash is extracted in twelve countries; Canada, Russia, Belarus, China, Jordan and others. Canada is the largest potash producer with reserves in Saskatchewan holding more than 90% of the country's production and half of the world's total supply.

More than 100 countries import potash. The largest importers of potash in the world are India (8 million tons), Brazil (8 million tons) and China (11 million tons). Potash use in agriculture is expected to increase to more than 37.8 million tons by 2022.

“OAPEC: Jordan is one of the largest phosphates and potash producers in the world”

A report of the Organization of Arab Petroleum Exporting Countries, OAPEC, said that Jordan is one of the largest producers and exporters of phosphate, potash and chemical fertilizers worldwide.

Chapter Two: The Economic Impact of the Potash Industry in Jordan

2.1 Introduction

Jordan has an excellent geographical location due to proximity to potash consumption centers in the Arab, Asian, African, European and other countries that are considered the natural market for Arab potash. In addition, potash consumption in these regions is constantly increasing to improve its agricultural production. The annual Arab Potash Company's production of potash is estimated at more than two and a half million JOD. Thus, the project will be able to achieve an annual profit of no less than 10% of the working capital. This percentage will be increased in the future by producing other chemicals.

The Arab Potash Company is among the most important potash companies, it is working on the implementation of future plans that focus on investment in expanding the company's asset base in its factories in southern Jordan where allocations were made in the estimated budget for future capital projects totaling about one billion US dollars to be completed on over the coming years. Among the most important of these projects is the expansion of potash production in the northern region to raise production capacity by 140 thousand tons annually at a cost of 130 million JOD, and the company has set aside allocations for technical studies in the seafront area and the southern expansions area in Gore Fifa, where preliminary studies indicate the possibility of increasing production by one million tons annually if these projects are economically feasible. And the company was able to obtain the concession in the seafront area.

Jamal Al-Sarayrah, Chairman of the Board of Directors, said that the future view of global potash markets indicates growth in global demand for potash but the additional quantities that are expected to enter the market in the coming years must be taken, but Jordan's strategic location and its proximity to developing markets will enable the Jordanian potash industry To benefit from the expected growth in those promising markets. In this regard, Al-Sarayrah clarified that the current focus is on expanding potash production and derivative industries, especially specialized fertilizers, such as potassium nitrate.

A city in Jordan called "Potash City" must be mentioned here which is a small city near the southeastern shore of the Dead Sea. It is located near salt mining facilities in the Arab Potash Company.

We will discuss in this chapter the potash production and its impact on Jordanian trade balance, we will get to know the largest potash producer in Jordan "Arab Potash Company", the total demand and supply on this commodity and the effect of price fluctuations on the economy. In addition to statistics of profits and production over time, its impact on Jordanian economy and the outlook for the company.

2.2 The impact of the potash industry on the trade balance

The trade balance is an important economic indicator for being one of the inputs of countries GDP. Its value lies in the analysis of its components and not in its absolute value, for this it is necessary to know the quality of each of its components and its structure, i.e. the ratio of raw materials, semi-manufactured or manufactured materials to total imports or exports.

The trade balance forms part of the current account and includes transactions such as income from net international investment as well as international aid. If the current account has a surplus, the country's net international assets will increase in return. Likewise, the deficit reduces net international assets.

The trade balance is identical to the difference between a country's production and its domestic demand (the difference between the exported goods and imported goods, this does not include the money re-spent on foreign shares, and it does not constitute a factor in importing goods for production to the local market).

Jordan's exports of potash increased more than twice for the first eight months of 2019 compared to the same period last year- according to official data- exports increased due to the increase in potash prices to double and the rise in the quantities exported by 0.3 percent, exports destined to India, Malaysia and China accounted for two thirds of the total Jordan's exports of potash, which led to a noticeable increase in Jordanian GDP.

The Chairman of the Board of Directors of the company, Jamal Al-Sarayrah, recently announced in a press conference that the company's profits during the first nine months of the same year amounted to 121 million JOD, which amounted to 89 million JOD in the same period last year, expected that the company will supply the public treasury with 112 million JOD as Treasury profits and mining fees.

The report revealed that the value of total exports during the first nine months of 2019 amounted to 4355.9 million JOD, an increase of 8.1% compared to the same period in 2018, and the value of national exports during the first nine months of 2019 amounted to 3686.6 million JOD which represent an increase of 7.8% compared to the same period in 2018, the value of the re-exports reached 669.3 million JOD during the first nine months of 2019, an increase of 9.4% compared to the same period in 2018.

As for imports, the value amounted to 10099.0 million JOD during 2019, a decrease of 5.3% compared to the same period in 2018. Thus, the trade balance deficit which represents the difference between the value of imports and the value of total exports has reached 5743.1 million JOD. Thus the deficit has decreased during the first nine months of 2019 by 13.4% compared to the same period in 2018.

The percentage of total exports of imports coverage reached 43.1% during 2019, while the coverage rate was 37.8% compared to the same period in 2018 an increase of 5.3 percentage points, and in terms of commodity composition of the most important exported goods during the first nine months of 2019 the value of National exports of crude potash increased by 14.4% and fertilizers by 9.1%.

As for the most prominent foreign trade partners, the value of national exports to the countries of the Greater Arab Free Trade Area increased by 1.8%, including Saudi Arabia by 6.3% , the countries of the North American Free Trade Agreement by 11.5%, including the United States of America by 11.0% and non-Arab Asian countries By 7.5%, including China by 115.5%, the European Union by 11.1% including the Netherlands by 5.6%. As for imports and the value of imports from Asian non-Arab countries rose by 6.4%, including China by 11.6%, while the value of importer decreased from the countries of the Greater Arab Free Trade Area by 5.3% including Saudi Arabia by 2.8%, the countries of the North American Free Trade Agreement by 6.4% including the United States of America by 6.5%, European Union by 9.4% and Germany by 6.2%.

The world’s consumption of potash is on rise because of agricultural production boost to provide food for the world's population which is multiplying at a rate of more than one hundred thousand people per day. The increase in potash consumption is estimated at seven percent annually continuously and regularly. Last year, the world consumed more than 12 million tons of potash chloride.

Table 2.1 A comparison between the first nine months of 2019 and the same period in 2018

Format of comparison	First nine months of 2019	First nine months of 2018
The company’s profits	121 million JD	89 million JD
Total exports	4355.9 million JD	Less by 8.1%
Value of the national exports	3686.6 million JD	Less by 7.8%
Value of the re-export reached	669.3 million JD	Less by 9.4 %
Value of import	10099 million JD	Greater by 5.3 %
The trade balance	5743.1 million JD	Less by 13.4%
Total export of import coverage rate	43.1%	37.8%

(the table was done manually by the researcher) Arab Potash Website

2.3 Arab Potash Company

The Arab Potash Company was established in 1956 in the Hashemite Kingdom of Jordan as a joint Arab project that operates under a concession from the Jordanian government that gives it an exclusive right to extract manufacture and market minerals from the Dead Sea until 2058. In addition to the company's activities in extracting and manufacturing potash salts, the company also invests in many manufacturing and complementary industries related to salts and Dead Sea minerals, including potassium nitrate, bromine and other derivatives. The Arab Potash Company is the eighth largest potash producer in the world by volume of production and the only potash product in the Arab world.

Jordan started investing the resources of the Dead Sea; the most important of which is potash in 1953 when the Jordanian government asked the administration of the American fourth point to conduct economic and technical studies to extract potash. A group of Arab and foreign experts carried out these studies and submitted the results of a detailed report to the government in Amman in 1954, recommending that the project must be brought into being. After that, the efforts succeeded until the Potash Project in 1957 came out to the international and Arab levels. The Arab countries agreed to adopt this big project and cooperate in achieving it. The Arab Potash Company was established with Arab countries contribution with amount of one million JOD to cover the costs of study and establishment.

Jamal Al-Sarayrah, Chairman of the Board of Directors, pointed out the important role that the Arab Potash Company plays in the national economy by providing the Kingdom’s treasury with returns, fees and taxes, as the total taxes, mining fees and dividends that have been achieved on the company have been paid to the treasury of the Hashemite Kingdom of Jordan in 2018 around (71) million JOD, and this number is expected to grow by (58%) to reach (112) million dinars, as the company is one of the largest contributor in

supplying foreign currency reserves in the Kingdom in 2019 as the company and its subsidiaries and affiliates have supplied currency stocks Foreigners in the Kingdom, about (900) USD as of September 30, 2019.

The company is focusing in its plans and financial budgets for the coming years on expanding production so that future expansions are horizontal and vertical through the expansion of potash production in addition to other derived fertilizers through several projects. Al-Sarayrah pointed out that work is underway to expand production by 140 thousand tons annually through the Dam project No. 19, and the company is currently conducting feasibility studies for the expansion project in the Gore Fifa region south of the Dead Sea which will result in an increase in production by about (500) thousand Tons, and the company is working in cooperation with the Ministry of Energy and Mineral Resources to assess potash stocks in the seafront area by funding technical studies that were recently referred.

2.3.1 The Global Scenario

Growth in the global economy continued during 2018 but at a slower rate than the previous year, while growth in emerging economies came somewhat better compared to developed countries. However, there is a vow of an expected slowdown during 2019 as fears increased that the slowdown in the growth of the Chinese economy, the government closure in the United States and the imposition of customs duties on several countries will lead to a decline in growth in the global economy.

The World Fertilizer Association still expects growth in the use of fertilizers but under different conditions and patterns where the environmental files and the optimal uses of fertilizers will have an important role in determining the types and quantities used.

The demand for potassium fertilizers is expected to increase for reasons related to the environment in addition to the need to create the required balance in fertilizers inside the soil where this growth is expected to reach about 2% or the equivalent of 1.3 million tons of potash annually.

2.3.2 Potash demand

Demand is defined as the confirmed desire of the consumer to purchase a product and to enhance the purchasing power of institutions in order to obtain a certain amount of goods when it reaches a price during a specific period of time.

One of the most important factors affecting consumption in the hypothesis of demand per capita income the availability of alternatives for the goods required by consumers and their supplements, in addition to that the effective market size greatly affects this. And the distribution of income among members of society plays a role in that, demographic composition, seasonal factors and future forecasts within a given situation.

Law of demand is a law that states that the quantity of demand is inversely related to the price (when all other factors are equal). That is, when the price of the commodity increases, the quantity demanded of it decreases, and when the price decreases the demand increases. One of the other pillars is the demand curve which is the relationship between the price and the required quantity. One of the things that help in the

formation of the law is the presence of several sellers and buyers at the same time which enables the seller and the buyer to process the purchase and thus the emergence of the law.

The law of demand is represented by the following formula:

Qd=a- (b)P

Abbreviations represent:

Qd = quantity demand .

P= Price of the good

a = all factors affecting price other than price

b = slope of the demand curve

Potash (demand) shipments and global order

2014-2018

Growth in global shipments continued with a slight increase from the previous year "2017" by about 1.4%, which set a historical record in line with expectations of an increase of one million tons annually in global consumption.

Potash prices continued to give sufficient return to farmers for use to increase the value of the crop, and thus the growth in employment was real growth unlike the value of potash in agriculture.

In Asia, despite the constraints to increasing potash consumption including low palm oil prices which is used to grow about (3.5) million tons of potash annually. And despite the fertilizer support system in India that encourages nitrogen fertilizers on potash the level of demand and shipments has maintained its rates.

In terms of demand and shipments growth, Egypt and Morocco have emerged which increased the capacity to manufacture complex fertilizers and thus the import of potash as consumption increased relatively in West and East Africa with improved tools of promotion.

Brazil remains at the forefront of countries in which potash imports and consumption have increased, which exceeded (11) million tons despite economy challenges and strikes of transport sector there.

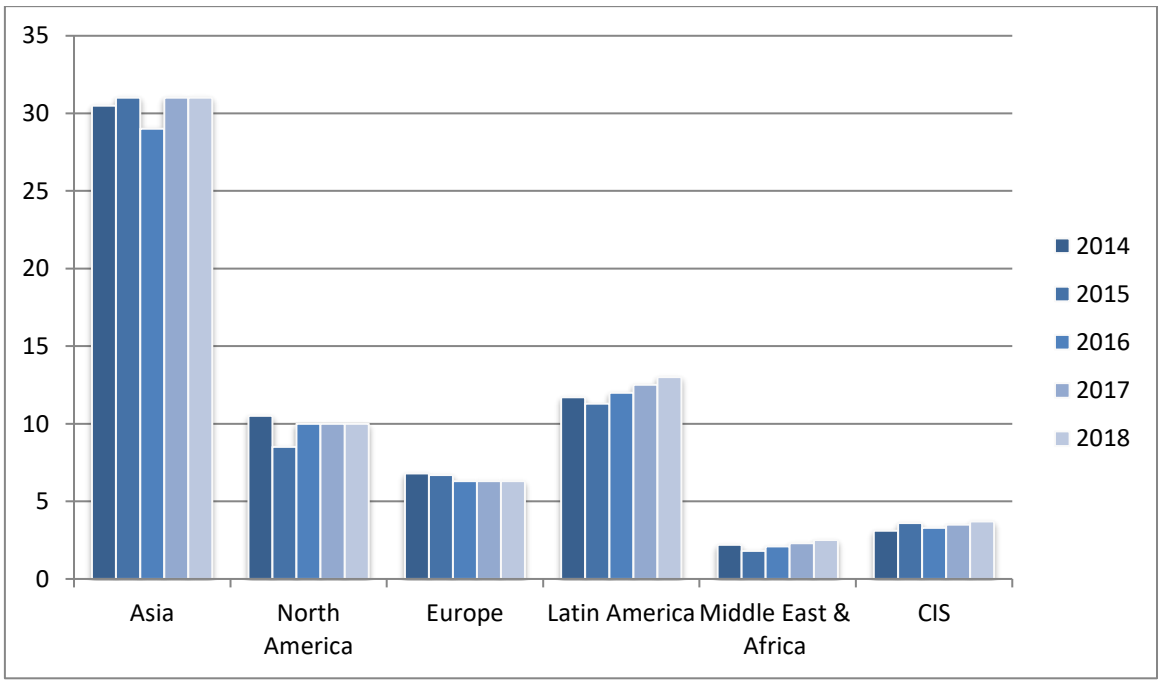
Table 2.2 Potash demand and shipments (million ton).

2014-2018

	2014	2015	2016	2017	2018
Asia	30.5	31	29	31	**31**
North America	10.5	8.5	10	10	**10**
Europe	6.8	6.7	6.3	6.3	**6.3**
Latin America	11.7	11.3	12	12.5	**13**
Middle East & Africa	2.2	1.8	2.1	2.3	**2.5**
Commonwealth of Independent States	3.1	3.6	3.3	3.5	**3.7**
Total	64.8	62.9	62.7	65.6	**66.5**

Arab Potash Company annual report for 2018

Figure 2.1 Potash demand and shipments (million ton) 2014 – 2018



(This diagram was done manually by the researcher)

Arab Potash Company annual report for 2018

2.3.3 Prices

2018 was a known year for price raising that rose monthly about (360) USD per ton especially in Brazil and some other countries.

In Europe, the price fell a little after mid-year for Euro decline with the increase in demand and limited supply the producers' determination to raise prices.

Regarding the Arab Potash Company, the monthly average prices increased about (27) dollars on average compared to the selling prices at the beginning of the year.

2.3.4 Potash Supply "production"

It is the quantities produced of a commodity which is offered by producers in the market for the purpose of buying or selling at a certain price and during a specific period of time.

The law of supply is a basic principle of economic theory which states that an increase in the price increases the quantity supplied while maintaining the stability of other factors. In other words, there is a direct relationship between price and quantity: the quantities respond in the same direction as price changes. This means that producers are willing to offer more products for sale on the market at higher prices by increasing production as a way to increase profits.

This relationship is represented by the following formula:

$Qs = c + (d)P$

Abbreviations represent:

Qs= Quantity supplied.

P= Price of offered goods

Dr. Maan Al-Nsour the CEO of the Arab Company explained that the strategic plan that was built in 2019 in light of the data of supply-demand in the global potash market which is currently suffering from a relatively large increase in supply which resulted in many international producers reducing production quantities. They have and made many closings as reflected in the decrease in selling prices in the real time and contractual markets, and therefore the company pre-planned the case of excess supply in the potash market by diversifying the products and enhancing the added value through additional processing that would add value to the material potash rather than selling it as a raw material, so that it is a guarantee to have a sufficient flexibility in the company's plants to produce varieties of fertilizer which is characterized by high demand. One example of this is the success of the Arab company in increasing sales by entering new markets like the Brazilian market which is the most important new one through a shipment of red granular potash that took place last September of 2019. The Brazilian market is considered one of the largest immediate high-yielding markets that makes representing red granular potash production a success story in the company. As the company succeeded through its engineering teams to amend the production lines in order to be able to produce the red granulated potash required in the Brazilian market, it must be the company's success of modifications of the production lines not just with a record speed, but rather it is intended for production of red granular

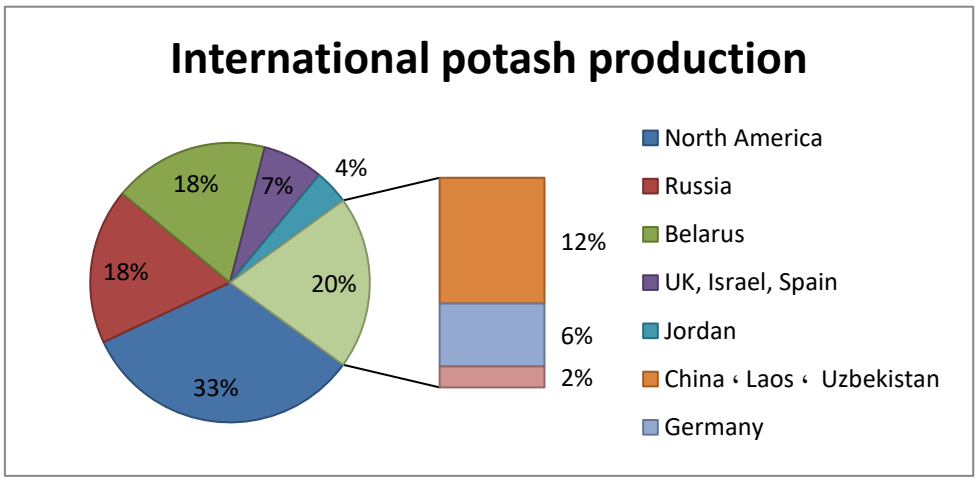
potash with technical specifications that exceed the traditional producers of this type of fertilizer. It is worth noting that the company is in the final stages of agreeing with importers in Brazil about a second shipment of red granular potash before the end of the current year.

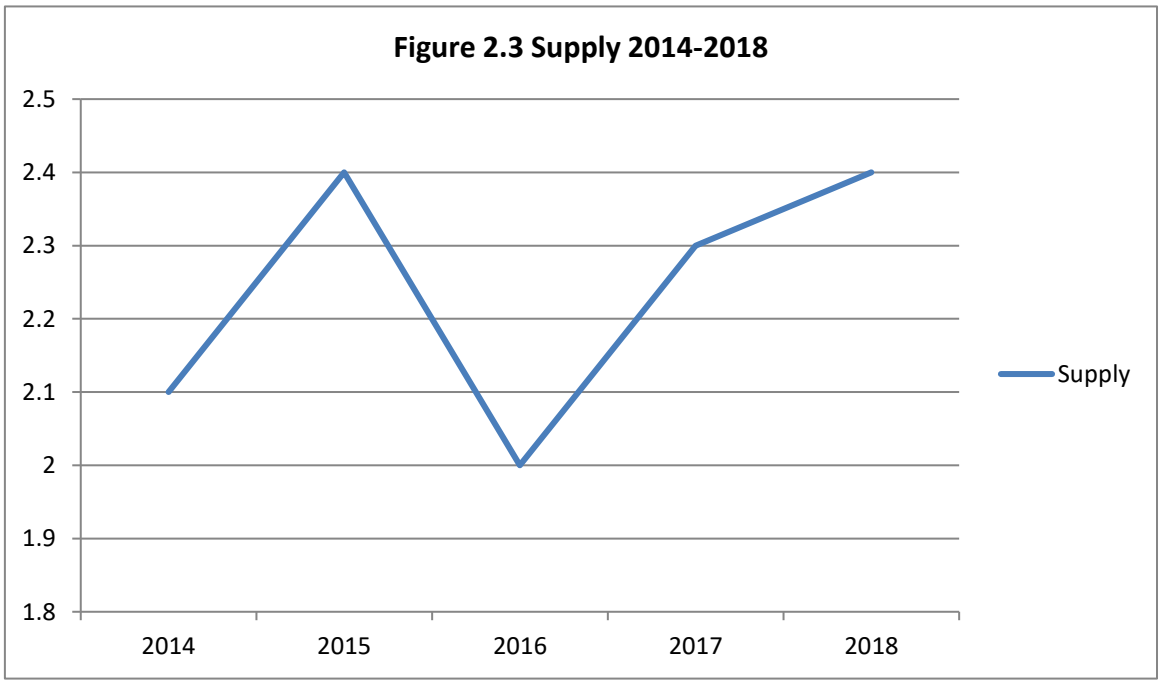
The production capacity of all potash producers reached 84 million in 2018/2019.

Regarding the total production capacity in the world, that is estimated at (84) million tons, it is still higher than expected demand but actual production will not exceed from actual demand and is expected to be in line with the growth in demand.

Figure 2.2 International potash production

Arab Potash Company annual report for 2018





(This diagram was done manually by the researcher) **Arab Potash Company annual report for 2018**

2.3.5 Developments in Regional and Local Markets

This sector witnessed a growth in consumption due to the increased production capacity of compound fertilizers and potash sulfate fertilizer, as there were three factories in Saudi Arabia, four in Egypt, one in Jordan, and that in addition to the compound fertilizer unit in Aqaba of the Jordanian-Japanese company.

The consumption of potash used in drilling wells decreased to minimum during the previous three years; in 2018, it constituted 10% of the total sales of Arab Potash Company of what is sold in this region, and in conjunction with the emergence of competitors.

The Arab Potash Company sales in the local and regional markets reached (539) thousand tons, which is a historical record amount that represents 22% of the total sales and is expected to increase in the future with the expansion of factories producing compound fertilizers and others that depend on potash as a raw material.

2.3.6 Affiliated and allied companies

Affiliated companies

- Arab Fertilizers & chemicals industries ltd KEMAPCO
- Numeira Mixed Salts & Mud Company Ltd

Allied companies

- Jordan Bromine Company
- Nippon Jordan Fertilizer Company
- Jordan Industrial Ports Company
- Jordan Al-Safi Salt Company (liquidation)

2.3.7 Market Structure

The market structure is divided into four types: the market of complete competition, the market of monopolistic competition, the market of oligopoly and the market of complete monopoly.

The most important characteristic of the complete monopoly market is the presence of one product (institution) which specializes in selling a product (commodity) in which it is distinguished from other producers which have freedom in price discrimination and the state places restrictions on entering this market.

The Arab Potash Company is a public joint stock company and the only company that manufactures potash in Jordan and exports it to the rest of world but despite the absence of government restrictions to enter the potash market, it is considered a complete monopoly (according to the researcher's paper and conclusion) which slopes the demand curve. It has a top to bottom and a negative slope, and the marginal revenue curve (MR) is derived from it as well and it too slopes from top to bottom with a negative slope and its value is less than the demand curve with increasing prices.

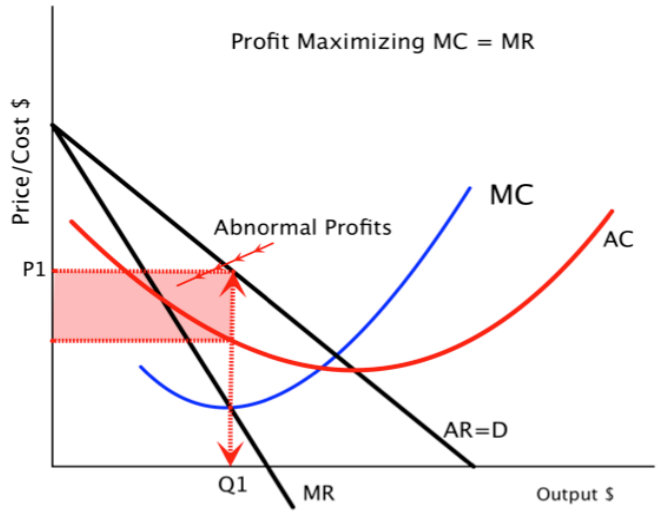
Although the company belongs to the market of complete monopoly to set prices, it follows a pricing policy that depends on the global demand and supply of potash. Thus the quantity produced of potash to maximize profits is determined when the marginal revenue curve and marginal cost curve intersected, i.e.

when both values are equal together (MR = MC), and the selling price is determined from the demand curve at the same point.

Marginal revenue (MR) is known as the additional revenue that a company may earn if it sells one additional unit of output. The marginal cost (MC) is the change in the total cost due to a change in the quantity produced in one additional unit.

In the figure, the marginal cost curve (MC) slopes from top to bottom and to the right reaching as low as possible. Then, heading from bottom to top and to the right. That is, the marginal cost decreases during production in the first stages and then reaches its minimum, then begins to increase significantly in the subsequent stages of the production process.

Figure 2.4 Product balance , the equilibrium in the market .



2.4 Industrial Impact on Gross Domestic Product

Gross Domestic Product (GDP) is an economic indicator that measures the monetary value of total goods and services that were produced within the boundaries of a geographical region (for example, a country) during a specific time period (for example, a year or half a year). The gross domestic product is not an indicator of social welfare or of gross wealth, but it is denoted by the (GDP).

GDP measures the total market goods and services, i.e. destined for sale in addition to some non-market service products that governments provide free of charge, such as education, health, security, and defense which were produced within the boundaries of a specific geographical area within a specified time period

The industrial sector achieved a real growth of 2.0% during the year 2017 that represent an increase of about 1.1 percentage points compared to the growth achieved during 2016 contributing by about 0.41 percentage points of the total real economic growth in Jordan of about 2.0 % during 2017. Thus the industrial sector is the largest economic sector contributing to this growth which indicates the importance of the local industry as a capable strategic sector of facing the conditions and advancing economic development in the Kingdom, despite all internal and external challenges that impede its path and limit the multiplication of its contribution to grow and grow Economic.

The leadership of the industrial sector for economic growth came as a result of the realization of the extractive industries sector which reached approximately (13%) contributing to this by approximately 0.19 percentage points of the total economic growth. As each of the manufacturing sector; electricity and water registered a growth of (1%) and (2.5%), respectively, with a share of approximately (17) and (0.06) points of the total economic growth, respectively.

The decline in the growth rates after the year 2011 during which it achieved a growth rate of 5.2% which indicates the repercussions of political events in the region especially in Syria that took place during 2015 which affected exports and hence industrial production leading to a reduction in growth rates to around 1.1% during 2012.

In terms of industrial production at current prices, the sector achieved during 2017 growth of about (3.9%) registering a clear increase of about (0.63) percentage points compared to the growth achieved during 2016 bringing the total industrial output at current prices to about (6,031.6) million JOD compared to about (5,804.4) million JOD during 2016. This brings the proportion of the industrial sector's contribution to the gross domestic product to approximately (24%) during 2017.

This growth came as a result of all sub-sectors registering positive growth during 2017,such as electricity, water, and manufacturing industries sectors that achieved growth of (5.3%) and (4.1%), respectively and the extractive industries sector achieved a growth rate of (1.4%).

It should be noted here that the extractive industries sector has registered real growth at constant prices which reached approximately (13%) that indicates growth in this sector which came at the level of quantities accompanied by low prices and what was confirmed by the low index of extractive industries prices including its increased by 11.6%, while the index of extractive industries increased by 13.4% during 2017.

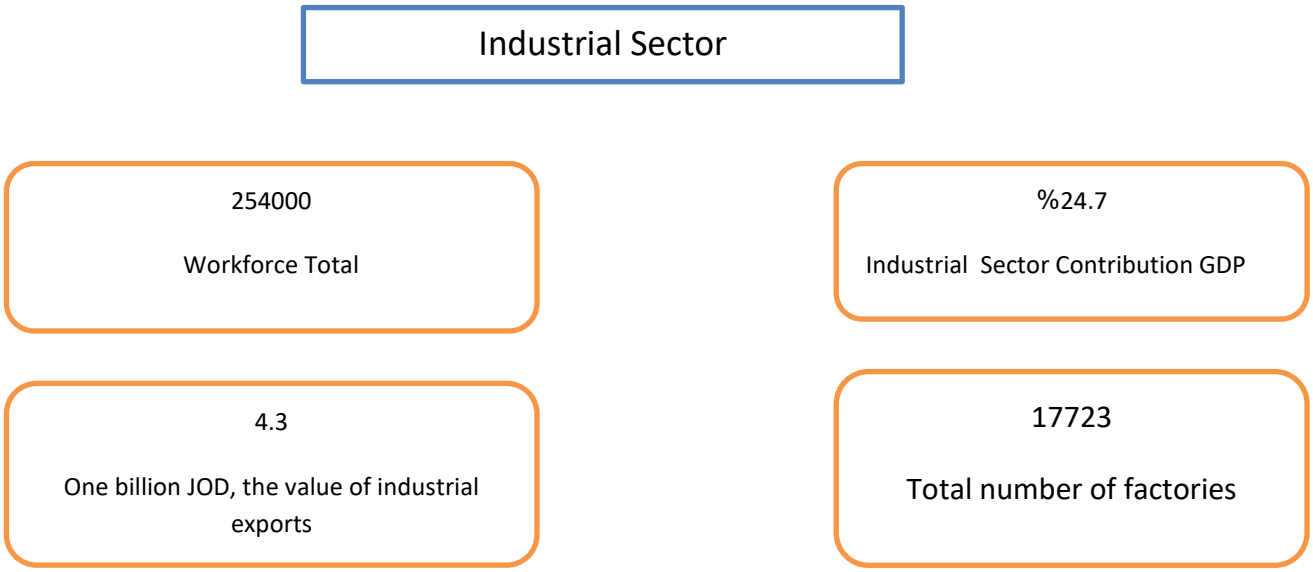
The mining sector results came as an indicator of the improvement in global demand for phosphate and potash products in 2017 while its global prices remained affected by the sharp decline reached during the year 2016.

As a result of these developments, the contribution of the industrial sector to the gross domestic product reached approximately (24%), and the contribution of each of the sub-sectors was as follows:

- Extractive industries, 2.6%.
- Manufacturing industries, 18.2%.
- Electricity and water, 3.2%.

Potash as an extracted mineral is part of the extractive industries and part of manufacturing industries where it is converted into different types of fertilizers. Due to, the paucity of data on the subject of potash, the industrial impact on the gross domestic product in general is considered.

Figure 2.5 Industrial sector is based on it on 3/2/2020.



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2.5 Marketing and sales of Arab Potash Company

The company's sales in 2018 reached a new record of (44.2) million tons to make the sales a recorded growth rate of 4.3% from the previous year with a consistent increase of the global demand growth in general.

It is worth noting that the potash sales contracts to both China and India which were signed in 2018 made a fundamental different in terms of quantity from previous contracts. The shipment of the quantities was continued to the end of June, 2019. It should also be noted that the increase in the company's sales to regional and local markets is an indication of the company's focus on these developing markets that work on increasing, improving and building a larger absorptive capacity for fertilizers.

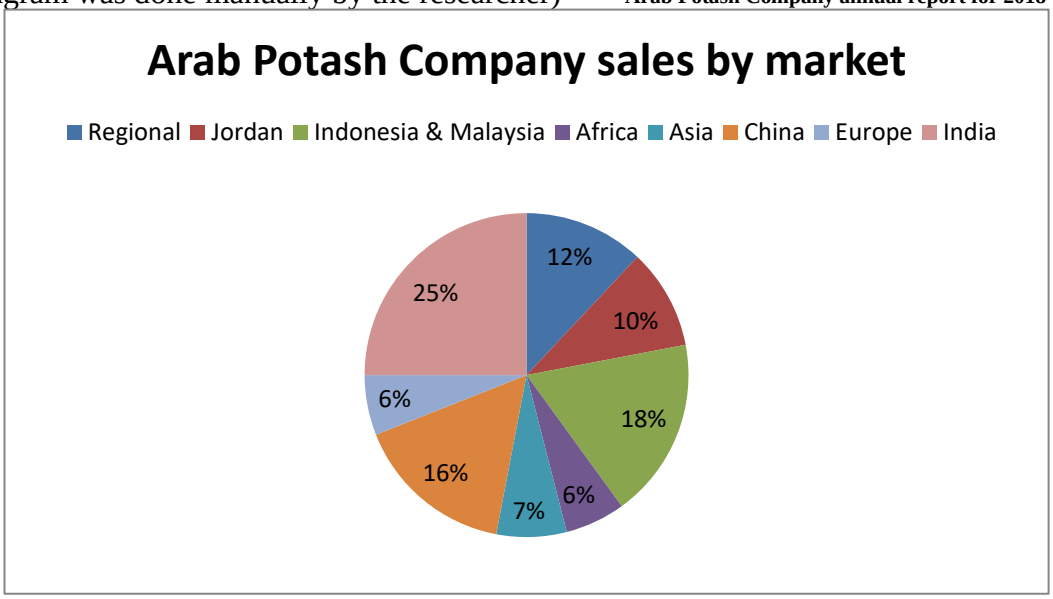
The company's sales to the first ten countries amounted to about 89% of the total sales but it was considered about 1% less than the previous year. The share of the top ten companies decreased to 74% of the total compared to 79% in the previous year mainly due to the decrease in sales to China.

Sales also increased to Egypt in line with the increase in the production capacity of potash sulfate there which was expected to continue during 2019. The quantities supplied to the potash sulfate fertilizer manufacturing sector witnessed a growth of 56% to the previous year. As those factories were in Egypt, Saudi Arabia and Jordan, The Arab Potash Company's sales of potash for non-fertilizer uses amounted to about 147 thousand metric tons, representing about 6% of the company's total sales. The largest proportion of sales was Bromine Jordan and major oil drilling services companies in Middle East and industrial customers in Asia.

Sales of granulated potash were increased by 62% during the same year to reach 216 thousand tons recording about 8.8% of the total sales. Most of this quantity was sold in African and European markets whose combined sales reached about (300) thousand tons with an increase of (200) thousand tons from the previous year which reflects the growth in demand in the African oil sector.

Figure 2.6 Arab Potash Company sales by market.

(This diagram was done manually by the researcher) **Arab Potash Company annual report for 2018**



Factors Affecting Potash Sales

These factors included price fluctuations in global markets and a slowdown in the global economy which could lead to a decrease in demand for potash and its price. Since potash is generally used as an agricultural fertilizer any changes that may occur regarding agricultural sector, such as a decrease in the quantities produced or weather factors such as droughts and floods or any other factors that may compel farmers to reduce agricultural activity and thus reduce their use of fertilizers.

The most important factors are the following:

First: Local legislation and laws such as changes that may occur to tax or customs laws, to legislation that may affect the company's business, activity, rights that may affect licenses and licenses submitted to the company or related to its business.

Second: Governmental policies and legislations from the importing countries in terms of their support to the agricultural sector which may affect the amount of agricultural crops and thus sales of fertilizer products.

Third, the high prices of electricity and water scarcity, as the process of extracting and producing potash require large amounts of energy and water. Therefore, the Arab Potash Company is constantly looking for less expensive sources for elements.

Fourth: Reliance on sea freight, the company relies mainly on the port of Aqaba for loading and shipping potash.

Fifth: Labor and policy issues, the possibility of labor strikes in the company's facilities and public departments due to the instability of economic, political and social conditions in the region which may affect commercial and investment operations.

Sixth: The collapse of the major navigational dams. In recent years, the decline of the Dead Sea water level has led to the phenomenon of regressive drilling and some of the company's main dams are affected by this phenomenon.

Seventh: Exposure to natural disasters, Ghor Al Safi area is considered where the Arab Potash Company factories are located of areas prone to earthquakes and floods.

2.6 The Achievements of the Company During the Fiscal Year (2014-2018)

- Sales: The largest sales volume achieved in the company's history reached (439.2) million tons of potash.
- Production: The company managed to reach the largest production number in its history which is (436.2) million tons of potash.
- Operating profit: The non-consolidated profits of Arab Potash Company grew by 143%.

The Chairman of the Board of Directors of the Arab Potash Company (Jamal Al Sarayrah) pointed out "Arab Potash" and its subsidiaries and allied are among the largest shareholders in supplying Jordan with foreign currency reserves, as the total of 1.1 billion USD during 2019 with increase of 15% from 2018.

The company achieved a net profit in 2019 amounting to about (152) million JOD, after withholding tax, allocations and mining fees compared to (125) million JOD in 2018with increase of 22%, as the company witnessed a significant improvement in the cost of production due to the decrease in the cost of Ton production at 10%.

Thanks to its marketing efforts, the company managed during 2019 to enter new markets in Brazil. This effort will be continued to enter other promising markets such as the Australian market.

Also, it is important to note that "Arab Potash" achieved in 2019 a record which is the highest in its history in potash production that amounted to (20486) million tons, which contributed to reducing the share of tons produced from fixed costs.

The policies of the executive management in balancing costs to increase production quantities that coupled with the increase in the global potash sale price have doubled the profitability of selling of ton of potash from what it was in 2018. And this was an evident on the level of operational profit (production and sale of potash) that grew by 78 % in 2019 to reach (139) million JOD where the company's success in controlling production costs played a pivotal role in this regard.

Table 2.3 Financial Achievements.

Details	2014	2015	2016	2017	2018
Potash Production (million ton)	2.09	2.36	2.00	2.32	2.44
Potash Sales (million ton)	2.24	2.19	2.03	2.36	2.44
Unified Sales Revenue	535,465	527,527	369,651	423,277	487,727
Potash Sales Revenue	475,051	472,885	322,265	364,332	427,156
Gross Profit	140,507	213,413	65,635	104,755	166,697

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2.7 Potash's Contribution to the Jordanian Economy in 2020

Fertilizer prices are closely related to the general trends of the global markets and the growth of its economy especially the major ones such as: the economy of the United States of America, the European Union, China, Brazil and India. There was a great impact of the factors that ravaged the global economy during the past years. Examples include trade wars and finally the spread of Coronavirus in China and other countries. These factors lead to potash weak demand and this is noticeable during the first months of 2020 as this has created great price pressures on this substance.

It should be noted here that the factors of fertilizer demand are mainly related to population growth, improvement in people's income levels and a reflection on food consumption patterns. Consequently, the basics of the economic analysis of the potash industry in the medium and long term are still promising despite the passing through of the economic cycles up and down where a recovery in demand is expected. We hope it will be followed by an improvement in prices to enable the company to maximize the returns associated with future projects.

Arab Potash Company Board of Directors decided to initiate the payment of Jordanian treasury dues from income tax for 2019 amounting to 32.5 million JOD ($ 45.8 million) before its due date.(26)

This act to support cash flow of the Jordanian treasury in light of the current economic conditions and exceptional situation as a result of the implementation of activation of Defense Law in Jordan in order to combat novel Coronavirus, scientifically named "Covid-19". The income tax incurred by Arab Potash Company 2019 amounted to 53 million JOD which the company paid in full before its due date.

The company also paid all the amounts owed by it as mining fees for 2019 which totaled 25 million JOD before the due date.

Al-Sarayrah stressed the support of "Potash" for all government efforts to combat the spread of Corona virus "Covid-19" and reduce its negative effects on various economic, health and social sectors.

Potash donated an additional 20 million JOD to the "Himat Watan" fund which is the fund dedicated to economic damages due to Coronavirus, that raise the company's total contributions to the fund and to the Ministry of Health and other initiatives account for 25 million JOD.

2.8 The Company's Future Plan

Arab Potash Company seeks to develop a future plan in order to maintain the continuity of the company’s work to the optimum production position that achieves balance with global demand and thus achieving the maximum benefit for the company's shareholders. The company is working on projects that increase production through the company's main products and derivative industries in addition to raising the level of public safety.

The Chairman of the Board (Jamal Al-Sarayrah) revealed the tendency to establish a company entirely owned by Potash to implement expansion projects in the production of derivative industries where a complex of chemicals and fertilizers will be established in the Dead Sea region in two phases with a guarantee of 280 million USD. Al-Sarayrah also stated that the potash has prepared a ten-year strategic plan that is considered as a road map for the coming years. Its items centered on strengthening the main elements of operations responsible for the company's current production, and expanding production quantities through two major projects being prepared in north of the concession area as well as in south of the concession area and to diversify the products through the production of red granular potash (which started in 2019) along with the expansion of the derivative industries.

Conclusion

The Arab Potash Company is one of the most important public shareholding companies in Jordan that is interested in the potash industry with local and international markets to make Jordan a competing country in this industry with other countries. It constitutes an investment source and an important resource for this gross domestic product and national income in the Jordanian economy in annual notice way. With time the company's goals have changed due to the withdrawal of some shareholders from it despite profits and revenues that are increasing annually in a clear way. The most important goals are establishing a company entirely owned by potash to expand the production of derivative industries.

The Potash Company has scored great achievements during the past years that were the result of efforts to increase the quantities of production, discover new markets with meaningful returns and control production expenses in an effective manner. This clearly indicates the high level of technical and administrative professionalism that enabled the company to face challenges which led to the rewarding achievement returns that are not only for the shareholders, but also its impact has exceeded the returns to its employees and local communities surrounding production centers with a positive economic and social effects. Even though the projects that Potash Company establishes are linked with foreign companies labor is 100% Jordanian in addition to some foreign experts.

The company achieved profits of about six hundred million JOD and continued to expand and distribute profits on shareholders in spite of global competition during the last five years. It was able to prove regional and global presence by providing a model for all those who want to invest in the mining sector and other Jordanian sectors for being an attractive and product investment climate, which is confirmed by the Canadian strategic partner. The Canadian investment in potash sector in Jordan is one of the most important and most successful investments for the Canadian Company. This company is going through a new stage that indicates a positive stage towards achieving the goals that flow into the macro economy of Jordan. Projects that will be undertaken by the company have a high added value to Potash to enable it to access new undiscovered markets.

The Potash Company is moving in steady and confident steps towards the future within the framework of the ambitious strategic plan laid out by the management and the company's leadership led by Chairman of the Board Jamal Al-Sarayrah and CEO Maan Al-Nsour with accumulated experience to ease difficult situations to achieve the company competitive framework as a leader company in research, development and production.

During potash topic investigate, the researcher faced many challenges such as limited and scarce data regarding the subject, the availability of data with a time dimension from the present time, in addition to the existence of political obstacles on the potash as it has issues related to political corruption which posed a threat to the researcher in the event of deep research and the spread of Coronavirus at the present time led to the difficulty of field research, going to libraries to borrow books and expand more in research. In addition, to the

limited scientific and field research specialized in the field of potash forced the researcher to do manual work such as printing and designing the attributes and tables. In spite of these challenges, the researcher has the ability to diligently expand the topic of research and the ability to analyze it as stated in its content.

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