



# THE VALUE ADDED FOR THE MANUFACTURING OF POTATO CHIPS AND THE FACTORS AFFECTING THEM WITHIN THE VALUE CHAIN OF POTATO CROP FOR THE SPRING SEASON OF 2018

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## Abstract

The food industry in Iraq is characterized by the small size of its production units and its reliance on relatively cheap costs, where the intensity of labor used both skilled and unskilled, Food manufacturing contributes to the development and support of the agricultural sector through the investment of agricultural products in industries with added value to the country's economy. This study was for one of the series of the value chain loops, namely the potato chips manufacturing loop within the value chain of the potato crop in order to estimate the value added and some economic indicators and the calculation of the costs, returns and profits obtained by the actors in the potato chips manufacturing loop. The development of global consumption of potato crop as food has increased its importance in generating value added for each loop of the value chain loops, beginning with the initial processing of production inputs until reaching the final consumer and to identify the most important problems and obstacles experienced by this loop. The average total cost was estimated at (3,446.517) dinars/ kg, with variable costs amounting to (2,833.942) dinars / kg. The fixed costs amounted to (612.576) dinars/ kg. The relative importance of both variable and fixed costs of the total cost was (17.774%) and (82.226%) respectively. The cost of potato purchases was the highest and amounted its Percent (41.947%) of the total cost. And the average revenue achieved (4,105.959) dinars / kg, while the average profits achieved in this loop was (659.442) dinars / kg and the study found that the average value added of this loop amounted to about (1,272.017) dinars / kg. The average net value added amounted to (1,174.647) dinars / kg. The study showed that the imports had a negative impact on the locally produced product and the high costs of manufacturing potato chips locally, which is reflected negatively on the value added and profits generated from manufacturing locally. The study recommended the need to move towards policies that support the national industries by providing appropriate lending and stimulating the private sector, overcoming all the obstacles facing them and government investment in the field of agricultural processing and provide the moral support.

**Key words:** Value Chain, Manufacturing Loop, Value Added, Potato Chips.

## Introduction

Potato chips industry is one of the most important and widespread food industries. Fao estimates that more than two-thirds of the quantity of potatoes produced by the world in 2005 about (320 million tons) were consumed by people as food. The global consumption of potatoes as food Gradually was transformed from fresh potatoes to processed value-added potato products. One of the key items is fried potato chips, which are considered to be the most important foods in many countries for along time (FAO, 2008). The basic concept of the value chain

is to add the greatest possible value at the lowest possible cost and to measure the contribution of value added to each part of the chain (Macmillan and Tampoe, 2000). The manufacturing loop is one of the important value chain loops in many agricultural crops and food processing is one of the fastest growing and increasing industries due to the steady increase in population, the multiplicity of consumer desires and the diversity of their needs for processed food products (Journal of Science and Technology, 2008). Agricultural manufacturing in general and food manufacturing in particular have a pivotal and essential role in the agricultural and food production of

the world by making maximum use of that production by processing, preserving and providing it to the consumer, who is either suffering from scarcity in this production sometimes or unexploited abundance other times, where the food needs and necessities of consumers are varies (Halabo *et al.*, 2008). A comprehensive definition of food processing science can be formulated as a science that examines the nature, structure, properties, images, methods of consumption, circulation and means of food preservation, as well as studying the changes that occur during food preparation and preservation. The primary objective of food manufacturing and preservation is to maintain food quality, nutritional value and safety from the time of harvest until the time of consumption. This requires controlling the factors that lead to food corruption and making the conditions inside these foods unsuitable for the activity of the causes of corruption. Thus, it can prolong the period of validity of food consumption so that it can be found in non-season and throughout the year. Potato chips also contain potassium, calcium, iron, magnesium, vitamin B6 and thiamine and the exact values of these contents vary widely depending on the type of slice. Potato chips are made from certain types of potato called industrial potatoes. These varieties are characterized by the desired manufacturing specifications, high dry matter and excellent productivity. The varieties that fit the chip industry are Desirre, Hermes, Challenger, Arnova and others. Potato is the main ingredient in the manufacture of chips, as well as other important ingredients such as oil, salt, flavors and other essential ingredients in the process of making potato chips. This study is one of the loop of series of value chains for the potato crop for its importance to the players in the value chain for this crop, including the producers of the varieties potato manufactured that are suitable for the manufacture of potato chips, as well as the manufacturers. It also highlights the importance of economic decision makers in determining the economic feasibility of these industrial projects and their contribution to increasing value added for the agricultural sector in the country and its importance is also highlighted to the agricultural policy makers who are able to develop agricultural processing and overcome the difficulties and obstacles that accompany them. The problem of the study is that there is a decline in the food industry in Iraq, including the potato chip industry and the low contribution to the agricultural GDP of the country, due to poor effectiveness of factors that raise the value added to the food processing sector. The study aimed to estimate the value added and some economic indicators and calculate the costs, returns and profits obtained by the actors in the manufacturing loop within the value chain of the potato crop, through estimation the variable and

fixed cost items required by the potato chips industry and to calculate some economic indicators such as revenues and profits, estimation the total added value and share of the production unit, the net value added, the proportion of the value added to the value of production, the proportion of profits to the added value, the ratio of the degree of industrialization, the productivity of a worker of the added value and productivity dinar from the wages and also and identify the most important problems and obstacles which the potato chips manufacturing loop has suffered from and stand on them to find solutions to this problem and to develop policies to overcome these obstacles. The study assumes that the value added of potato chips manufacturing is low due to higher manufacturing costs, poor manufacturing and financing of these projects.

### **Data Sources**

The study relied on the preliminary data obtained through the questionnaire prepared for this purpose. Data were collected from the sample of the study consisting of six factories for the manufacture of potato chips through personal interviews with their owners and employees.

### **Materials and Methods**

The study was based on the estimation of some economic indicators that are important in the study of one of the loops of the value chains for the potato crop, that is the manufacturing loop, through the calculation of the revenue and profit index and estimate the value added gross Including the net value added and other indicators for this loop.

### **Objectives of food manufacturing:**

Food preservation and manufacturing operations help achieve many of the most important objectives (Halabo *et al.*, 2010):

1. The purpose of food manufacturing to benefit from the surplus production in a particular season by keeping this surplus both on its original image or in another form manufactured and therefore the possibility of the presence of the product continuously throughout the year.
2. It also aims to increase the shelf life of food for consumption, by conserving it in various conservation methods by which the occurrence of microbial or enzymatic activity on food and chemical reactions can be stopped or reduced, thus increasing the time available for distribution, sale and storage.
3. Works to improve the quality of food to allow the supply of human nutrients necessary to maintain health.
4. Changing the form of some foods, which leads to the possibility of other manufacturing processes, such as

in the case of grinding the grain and converted to flour and thus the production of different products for bakeries and that the raw materials can not be consumed until after manufacturing such as pickled olives and some products can only be obtained through Food manufacturing processes such as sugar from reed or beets, as well as various oils from oilseeds, potato chips and others.

5. Create jobs and areas of investment profitable especially that the field of food manufacturing is optimal for small projects that young people and graduates can invest with the support of the State and the concerned bodies, which represents a solution to a large part of the problem of unemployment.

### **Value added concept**

One of the central points or concepts in value chain analysis is value added. In a broad sense, this concept applies not only to value chain analysis, but to any analytical work in the area of economic growth and development. Value added refers to the creation of wealth, the contribution of a particular production process or a particular chain to economic growth (FAO, 2006). Adding value is the process of changing or converting a product from its original state to a more valuable one. Many raw commodities have intrinsic value in their original state. Market forces have increased opportunities for product differentiation and value added for raw goods because of (Coltrain *et al.*, 2000):

1. Increase consumer requirements regarding health, nutrition and comfort.
2. Efforts by food processors to improve their productivity.
3. Technological developments that enable producers to produce what consumers and manufacturers want.

(Nichols and Goodwin) noted that value added in general is “what the organization adds to raw materials that you buy”, as (Nayga, Nichols and Jones) have pointed out, in this way food manufacturing with value added are done when the company buys and processes raw commodities and adds some ingredients to them and turns them into commodities ready for consumption. The company may add value through multiple methods, including “changes in genetics, processing, diversification” and “increasing consumer attractiveness to agricultural goods” (Salin *et al.*, 2002).

### **Value Added Definition**

Value added is defined as a measure of the wealth created in an economic system through the production process, which is net of the resources consumed in the process. Therefore, value added can be considered as

the result of the production process which is not limited to self-preservation, but actually generate new wealth. A country’s GDP is in fact a gross value-added measure and its value per capita is taken as a primitive measure of economic development (FAO, 2013). Value added can be defined as a trade term that refers to activities that add value by taking the expectations and interests of the public into consideration (Macoubrie and Harrison, 2013). The broad definition of value added is the addition of economic value to a product by changing its present place, time and characteristics to the most preferred characteristics of the market (Coltrain *et al.*, 2000). Value added is also defined as the value of outputs minus input value (Banga, 2013). It is also known as the market value of the goods and services produced by the enterprise minus the value of goods and services that have been acquired by conversion from other institutions. These represent the new values added by human resources to the cost of production resources, as a result of the exploitation of available resources (Al- Mahayawi, 2006). Value added can be defined as all added values at each stage of production and commodity trading or when performing services. It is also known as the difference between the value of the produced commodity and the value of the materials used in its production. In the case of the final product, it is the difference between the cost and the sale price.

### **Value added and net value added criteria**

This criterion is one of the most important criteria used in project evaluation. The added value achieved represents the increase in the national income generated by the projects from the production activity. The more the value added of the project, the greater the contribution of the project to the creation and increase of the national income. The value added standard is built on the basis of the equation of the difference between the value of production and the value of the requirements of this production (Amara, 2018).

Value added = Production value - Requirements value

Parker also pointed out that gross value added can be expressed as equal to sales minus purchases of goods and services, while net value added is equal to total value added minus depreciation (Parker, 1984).

Net value added = Gross value added - Depreciation

Other important criteria used in data analysis are identified in turn when discussing the results.

## **Results and Discussion**

### **Estimation of the production costs of the potato chips manufacturing loop**

Cost items are estimated through the cost standard, which includes several cost measures of different types or denominations. Costs can be divided into fixed costs and variable costs. Fixed costs are those costs that do not change by changing the amount of output produced. Variable costs are those costs that vary with the change quantity of outputs produced. The total fixed and variable costs are equal to the total costs. In order to select the optimal quantity of production, the product should define the cost of the typical production unit and the cost of producing one additional statistical unit for the total value divided by the quantity of output. (Variable cost divided by output quantity) and variable average cost (variable

cost divided by quantity of output) (Mankiw and Hakes, 2012). The production costs of the potato chip manufacturing loop for the springly season of 2018 include both variable and fixed costs, as shown in table 1, Which shows the relative importance of those costs.

• Variable costs: The variable costs of the potato chip manufacturing loop include:

1. The cost of the quantities purchased from the potato: The production of one ton of potato chips using (3.140) tons of raw potatoes almost and the cost of purchase (151) tons of raw potatoes for the sample about (69,350,000) dinars and per ton by (460,463.576) dinars/ton and per kilogram is about (460.464) dinars/kg. The

**Table 1:** The relative importance of variable costs and fixed and total costs for the loop of the manufacturing of potato chips for the spring season of 2018.

Relative importance of total costs %	Relative importance of costs %	The cost of producing one kg of potato chips in dinars	The cost of producing one ton of potato chips in dinars	Cost of the sample in dinars	Costs of the potato chips manufacturing loop	Sequence	Type of costs	Quantity of production sold	Quantity of potatoes purchased
41.947	51.014	1,445.71	1,445,710.48	69,530,000	Costs of quantities purchased from potatoes	1	Variable costs	48,094 kg	151,000kg
1.502	1.827	51.774	51,773.61	2,490,000	Transportation costs and unloading of the purchased quantity	2			
11.232	13.66	387.127	387,127.29	18,618,500	Costs of quantities of edible oil and additives	3			
0.317	0.386	10.937	10,936.92	526,000	Energy costs (electricity) and (water)	4			
18.435	22.42	635.36	635,359.92	30,557,000	Fuel and oil costs used	5			
2.344	2.85	80.779	80,779.31	3,885,000	Maintenance costs	6			
1.148	1.396	39.56	39,560.03	1,902,600	Costs of sale bags and trademarks	7			
2.431	2.957	83.794	83,794.24	4,030,000	Costs of damaged quantities of processed potatoes	8			
2.87	3.49	98.9	98,900.07	4,756,500	The cost of transferring the product to the market during the month	9			
82.226	100%	2,833.94	2,833,941.86	136,295,600	Total		Fixed costs		
10.105	56.854	348.276	348,276.29	16,750,000	Permanent labor costs	1			
3.228	18.159	111.24	111,240.49	5,350,000	Monthly rental costs	2			
2.825	15.895	97.37	97,370.08	4,682,916.66	Depreciation costs *	3			
1.616	9.091	55.689	55,688.69	2,678,291.67	Interest on capital	4			
17.774	100%	612.576	612,575.55	29,461,208.33	Total		Total gross costs		
100%	-	3,446.52	3,446,517.41	165,756,808.33					

Source: from Prepared by the researcher by Depending on the questionnaire; \* Depreciations were calculated in the straight line method as in the following equation:  $Di = (OC - SV) / L$ ; where Di = represents the Depreciation for the year i; OC = The original cost of the purchased commodity; SV = Selling value after depreciation for the period L; L = Term of use in years.

cost of producing one ton of potato chips required a quantity of raw potatoes. It cost a raw potato with a purchase value of (1,445,710.484) dinars/ton, with a purchase value of (1,445.710) dinars/kg and the cost of purchasing the crop ranked first in terms of the relative importance of the variable costs with (51.014%). Also ranked first in terms of the relative importance of total costs with (41.947%).

2. The cost of transportation, loading and unloading of the purchased quantity: The cost of transporting, loading and unloading raw potatoes from the wholesale market to potato chips manufacturing factory for the quantity purchased for the sample as a whole was estimated at (151) tons towards (2,490,000) dinars and per ton by (16,490.066) dinars per ton and per kilogram is (16.490) dinars/kg, while the cost of producing one ton of chips was about (51,773.610) dinars / ton. The cost of producing one kilo of chips was (51.774) dinars/kg and transport and unloading costs ranked seventh in terms of relative importance of variable costs reaching rate (1.827%) and was ranked eleventh in terms of the relative importance of total costs by (1.502%).

3. Costs of quantities of edible oil and additives: The cost of quantities of edible oil and additives at the sample level was (18,618,500) dinars and cost to produce one ton of chips was (387,127.292) dinars /ton and cost to produce one kilogram of them by (387.127) dinars /kg. The cost of edible oil and additives was ranked third in terms of the relative importance of variable costs (13.660%), while the relative importance of total costs also came in third place (11.232%).

4. Energy costs (electricity) and (water): The energy costs (electricity and water) of the sample was (526,000) dinars and the cost of producing one ton of potato chips was (10,936.915) dinars/ton and the cost to produce one kilogram of them was (10.937) dinars/kg. Energy costs ranked ninth in terms of relative importance of variable costs (0.386%). In terms of relative importance of total costs, it came in 13<sup>th</sup> place with (0.317%).

5. The cost of fuel and oil used: The cost of the sample as a whole was estimated at (30,557,000) dinars and the production of one ton of chips was cost (635,359.920) dinars/ton and its cost to produce a kilogram of them was (635.360) dinars/kg. Fuel and oil costs ranked second in terms of the relative importance of variable costs (22.420%). In terms of the relative importance of total costs, it also came second with (18.435%).

6. Maintenance costs: The maintenance costs of the sample were (3,885,000) dinars and the cost of producing one ton of chips was (80,779.307) dinars/ton and the cost

of producing one kilogram of them was (80.779) dinars/kg. Maintenance was ranked sixth in terms of the relative importance of variable costs and (2.850%). In terms of relative importance of total costs, it came in ninth place with (2.344%).

7. Costs of bags of sale and trademarks: The costs of bags sold by the manufacturers were at the sample level by (1,902,600) dinars and cost to mobilize one ton of chips was (39,560,028) dinars/ton and cost to mobilize one kilogram of it was by (39.560) dinars/kg and the cost of bags of sales ranked eighth in terms of relative importance of variable costs, which amounted to (1.396%), came in 12<sup>th</sup> place in terms of the relative importance of total costs and (1.148%).

8. Costs of damaged quantities of manufacturing potatoes: The costs of the quantities damaged in amounts that are not sold because of their lack of marketability as a result of defects due to manufacturing and add to the costs borne by the manufacturers and it can be estimated by multiplying the damage rate of potato manufactured by the average retail prices. The cost of the damaged quantities of potato chips at the sample level as a whole was (4,030,000) dinars and the cost per ton of production was (83,794.236) dinars/ ton and the cost per kilogram was (83.794) dinars/ kg. The cost of damaged quantities ranked fifth in terms of relative importance of variable costs and it was (2.957%) and ranked eighth in terms of relative importance of total costs (2.431%).

9. The cost of transferring the product to the market during the month: The cost of the sample was (4,756,000) dinars. The cost of transporting one ton of chips during the month was (98,900.071) dinars/ ton and the cost of transporting one kilogram of it was (98.900) dinars/ kg. The cost of transporting the product was ranked fourth in terms of relative importance of variable costs with (3.490%). In terms of the relative importance of total costs, it came in sixth place with (2.870%).

• Fixed costs: The fixed costs of the potato chips manufacturing loop included the following items:

1. Permanent labor costs: The cost of permanent work for one month was at the sample level by (16,750,000) dinars and the cost of producing one ton of chips was (348,276,292) dinars/ ton and the cost of producing one kilogram of them was (348.276) dinars/kg. Permanent labor costs ranked first in terms of relative importance of variable cost with (56.854%) and ranked fourth in terms of the relative importance of total costs (10.105%).

2. Monthly rental costs: The monthly rental costs of the sample were (5,350,000) dinars and the cost of

**Table 2:** Revenues, Costs, Profits that Achieved and their Averages for the sample Potato Chips Manufacturing loop for the Spring season of 2018.

Average per kilogram in dinars	Average per ton in dinars	The value for the dinner manufacturing loop sample	The paragraphs for the potato chip manufacturing loop	Sequence	Quantity of production sold	Quantity of potatoes purchased
4,105.96	4,105,959.16	197,472,000	Revenue	1	48,094 kg	151,000 kg
2,833.94	2,833,941.86	136,295,600	Variable costs	2		
612.576	612,575.55	29,461,208.33	Fixed costs	3		
3,446.52	3,446,517.41	165,756,808.33	Total costs	4		
659.442	659,441.75	31,715,191.67	Profits	5		

Source: from Prepared by the researcher by Depending on the questionnaire.

producing one ton of chips was (111,240.487) dinars /ton and the cost of producing one kilogram of them was (111.240) dinars/kg. Rental costs ranked second in terms of the relative importance of fixed costs with (18.159%). In terms of the relative importance of total costs, they came in fifth place with (3.228%).

3. Depreciation costs: It was found that the unit costs of the sample amounted to (4,682,916.660) dinars and the cost of producing one ton of chips was (97,370.081) dinars/ton and the cost of producing one kilogram of them was (97.370) dinars/kg. The costs of Depreciation ranked third in terms of the relative importance of fixed costs with (15.895%). In terms of the relative importance of the total costs, it came in seventh place with (2.825%).

4. The interest on the capital: the interest on the capital of the sample as a whole was (2,678,291.666) dinars. The interest for the production of one ton of chips was (55,688.686) dinars /ton. The interest for producing a kilogram of chips was (55.689) dinars/kg. The interest on capital ranked fourth in terms of the relative importance of fixed costs with (9.091%). In terms of relative importance of total costs, it came in tenth place with (1.616%).

- The total costs of the manufacturing loop: include the variable and fixed costs. Table 1 shows that the total variable costs of the manufacturing loop sample were (136,295,000) dinars and per ton of produced chips (2,833,941.864) dinars/ton and per kilogram about (2,833.942) dinars/kg. The variable costs ranked first in terms of the relative importance of the total costs of the manufacturing loop (82.226%). The costs of the quantities purchased from the potato were the highest percentage of these costs, As for the fixed costs, the total amount for the sample level were (29,461,208.326) dinars. And per ton of manufacturing chips was about (612,575.546) dinars/ton, whereas the per kilogram (612.576) dinars/kg and it ranked second in terms of the relative importance of the total costs for manufacturing loop with (17.774%), showed that Permanent labor costs are the highest of these costs, while The total costs are the sum of the

variable and fixed costs and it amounted for the sample as a whole (165,756,808.326) dinars. The amount per ton of the produced chips was about (3,446,517.410) dinars/ton and per kilogram was about (3,446.517) dinars/kg.

### Revenues and Profits of the Potato Chips Manufacturing loop

Producers of potato chips earn revenues by selling their produce on the market. These sales represent the revenue they receive from selling their quantities at a certain price. Total revenue (TR) is the amount received by the seller for a good or service. The total revenue is simply the commodity price (P) multiplied by the quantity of the commodity sold (Q) (Sexton, 2016). The average revenue (AR) is the yield per unit of output. Is obtained by dividing TR by the quantity sold (Q), (Das & Basu, 2010). Table 2 shows that the revenues of the manufacturers at the sample level of potato chips manufacturers were (197,472,000) dinars and the average revenue per ton potato chips were (4,105,959.163) dinars /ton. It was also found that the amount of revenue per kilogram was (4,105.959) dinars /kg. After deducting the total costs incurred by the manufacturers as a result of the process of manufacturing potato chips we get the profits achieved by the manufacturers and the results showed the profits achieved at the sample level were (31,715,191.674) dinars and as it turns out that the amount of profit per ton of sold chips was (659,441.753) dinars/ton, while the profit per kilogram sold was (659.442) dinars /kg.

### Gross and net added value and some statistical indicators of potato chips manufacturing loop

Value added refers to the added value created during a particular stage of production. The value added means the contribution of the elements of production to an increase in the value of a particular product. For the production of a commodity, the elements of production serve a certain service, where the unit price of this commodity increases in proportion to the cost of the commodity. This is illustrated by the concept of value added through the process of making potato chips where

**Table 3:** Shows the gross added value and the net and their average and some statistical indicators of the sample of the potato chips manufacturing loop for the spring season of 2018.

Average per kilogram in dinars	Average per ton in dinars	The value for the dinner manufacturing loop sample	The paragraphs for the potato chip manufacturing loop	Sequence	Quantity of production sold	Quantity of potatoes purchased
1,272.017	1,272,017.299	61,176,400.000	The Gross added value in dinars	1	48,094 kg	151,000 kg
1,174.647	1,174,647.219	56,493,483.340	The net added value in dinars	2		
1,007.718	1,007,718.045	-	Average gross value added	3		
0.310	0.310	0.310	Ratio of value added to production value	4		
0.518	0.518	0.518	Ratio Profits to Value added	5		
% 69.020	% 69.020	% 69.020	Manufacturing degree %	6		
35.334	35,333.814	1,699,344.444	Worker Productivity from the value added	7		
11.789	11.789	11.789	The productivity of dinar from wages	8		

Source: from Prepared by the researcher by Depending on the questionnaire.

a change has been made in the form of raw potatoes through the manufacturing process and we will clarify in table 3 the total value, net and average value and some statistical indicators of the sample of the potato chips manufacturing for the spring season of 2018. It was found that the total value added at the level of the sample of the chips manufacturing loop was (61,176,400) dinars. The value added per ton of chips was (1,272,017.299) dinars / ton. It also represents the share of the unit of production of value added in ton. As for the value added per kilogram it was (1,272.017) dinars/kg, where the share of production unit of value added was calculated as follows:

$$\text{Share of production unit of value added} = \frac{\text{Value added}}{\text{Quantity of production}}$$

While the net added value of the sample was (56,493,483.340) dinars and the amount per ton was (1,174,647.219) dinars/ton. The amount per kilogram of potato chips was about (1,174.647) dinars/kg, where the net value added was derived by subtracting depreciations from gross value added. The table also shows that the average gross value added per ton was (1,007,718.045) dinars/ ton per kilogram with (1,007,718) dinars/kg, calculated as follows:

Average gross value added = average net profit + average labor costs

The table also shows the percentage of value added to the value of production, which shows the importance of the added value from the value of the production of potato chips, where the higher the percentage, the good level of productivity (Al-Karkhi, 2014) and it was calculated according to the following formula:

$$\text{Ratio of value added to production value} = \frac{\text{Value added}}{\text{Production Value}}$$

And the amount at the level of the sample and one ton and kilogram limits (0.310). The ratio of profits to

value added, which refers to the importance of profits as one of the elements of value added of the total value added achieved by economic unit (Al-Karkhi, 2014) and calculated according to the following formula:

$$\text{Profit of value ratio} = \frac{\text{Revenue}}{\text{Value added}}$$

It was estimated at the sample, ton and kilogram level about (0.518). The percentage of the contribution of the total value of the inputs as a percentage of the total value of the production or the so-called “manufacturing grade %” was extracted as in the following equation:

$$\text{Manufacturing grade \%} = \frac{\text{Value of production requirements}}{\text{Value of Production}} \times 100$$

It was estimated at the sample, ton and kilogram level about (69.020%). This criterion reflects the degree to which the economic unit is in manufacturing the materials used in production and shows that the ratio is rather high, which indicates a low degree of industrialization (Ministry of Planning-CSO, 2017). The table also shows the productivity of the worker of value added, calculated as follows:

$$\text{Labor productivity} = \frac{\text{Value added}}{\text{Number of Employees}}$$

It was estimated at the sample level (1,699,344.444) dinars/ worker and estimated per ton about (35,333.814) dinars/worker, while the amount per kilogram (35.334) dinars/worker, where it can compare the value added of the project and the productivity of labor at the level of the national economy and this Comparison reflect whether the project contributes to national productivity increase or not (Al-Issawi, 2013). As for the productivity of the dinar of wages, which are calculated as follows: (Ministry of Planning-CSO, 2017).

$$\text{Dinar Productivity of wages} = \frac{\text{Value production}}{\text{Value of wages}}$$

It was estimated at the sample level, one ton and one kilogram about (11.789) dinars per dinar spent on wages, thus achieving high productivity of wages, which indicates that the coefficient of the studied sample has the efficiency of using the work element.

### **The most important problems and obstacles of potato chips manufacturing loop**

Like the other loops of the value chain of the potato crop, the potato chips manufacturing loop suffers from a number of problems that impede the work of the manufacturers and affect the previous and the following loops and we will summarize the most important problems and obstacles as revealed by the questionnaire forms of this loop as follows:

1. The most important problems experienced by the actors in the potato chips manufacturing loop is the rise in production costs, starting with the rise in the prices of raw materials (potatoes), as well as the rise in the prices of auxiliary initial materials in the production process such as oils and flavors added passing energy sources and marketing costs of packaging, Storage and distribution, in addition to the high wages of workers, especially workers with experience and competence in this area and the high monthly rents and all these costs represent a great burden on manufacturers and thus reflected on the loops that preceded it and also the loop that followed, that is the consumption loop.

2. Most of the factories of chips manufacturing are not licensed of health because of the lack of health conditions and occupational safety and this is due to the lack of material potential for the development of their industries and the many restrictions and obstacles placed in front of them when applying for health permits to enable them to practice this industry, most of whom confirmed that they had inherited it from their parents ancestors for years ago and they confirmed that many of them are not authorized by the competent health authorities and practice the profession in disguise from those bodies and stressed that the administrative corruption rampant in those departments prevented them from obtaining those licenses to practice the profession, although they meet the requirements of safety Health and professional.

3. The weakness of the possibility of investors in the establishment of sophisticated factories that depend on mechanical work primarily because of increase the cost of purchase and need to power, or generators that require the provision of fuel, in addition to the need for large areas to install.

4. The increase in prices of locally produced potato chips and its inability to compete with imported products

for higher production costs.

5. It is known that there are too many varieties of potatoes, but there are varieties of the so - called industrial varieties are involved in many industries, including the manufacture of potato chips and other used in the manufacture of fingers of potatoes and other varieties used in the extraction of starch and others each according to the composition and nature of dry matter that is made up, as well as other varieties in restaurants and they are of potatoes, which are characterized by a large size to prepare a so-called comber and there is a problem in providing the appropriate category for each industry, including varieties suitable for the potato chips industry, because of the few farmers who produce such varieties and the existence of many difficulties to contract with farmers to produce specific types with a certain specifications to meet the needs of the industry.

6. Potato chips industry is similar to that of any other domestic industry with competitors, whether local competitors or competitors from abroad, where there are factors affecting in this case, including the number of competitors and the magnitude of their work and share of the commercial market of this commodity and pricing methods for their products in terms of distribution of the product to the market, Packaging, brands, sizes and flavors that suit all tastes, all of which have a direct impact on the local product.

7. The high cost of loading, unloading and transporting raw potatoes due to the distance from the wholesale markets to the manufacturing factories and the accompanying stops at the checkpoints on the roads and this delay is reflected on the cost of transport, as well as the increase in transport fees during the process of distributing the product to the market where manufactured products Mostly packed in bags weighing between (500 - 2500) gm, where these bags take more space when transported, leading to a decrease in quantities transferred from them and this is reflected in one way or another on the cost of marketing.

8. The product can not be kept for long periods of time, as is the case in products imported from it, for not using of preservatives in its industry, which can prolong the product life for long periods, which requires the disposal of their products within a short period.

9. The weakness of the national food industries of this private sector, on the one hand and on the other the absence of government support.

### **Conclusions**

Based on the results that have been reached, we can conclude the following:

1. All chips manufacturing factories within the sample were small in size and non-developed traditional factories and heavily dependent on the labor force to perform the tasks of conversion and additions, flipping, drying, sorting, packaging and others, which is why the proportion of labor costs to fixed costs, amounting to (10.105%) of the total costs.

2. The variable costs borne by the manufacturers of potato chips represent a high ratio of the total costs, where the ratio of its contribution amounted about (82.226%) from the total costs because of the high contribution ratio of quantities costs purchased from potatoes, where the amounted their ratio contribution about (41.947%) from the total costs, while fixed costs were low compared to variable costs, where the amounted their ratio contribution about (17.774%) from total costs.

3. It was found that the production of a kilogram of potato chips required a quantity of raw potatoes estimated at an average of about (3.140) kg. The average revenue per kilogram of potato chips was estimated at about (4,105.959) dinars/kg. The sample achieved an estimated gain of (659.442) dinars/kg, varies from one factory to another according to its efficiency in management, manufacturing and distribution, the quantity of its production, the price at which it is sold and the amount of expenses it has spent on this production.

4. The average gross value added per kilogram of manufactured chips was about (1,272.017) dinars/kg, while the industrialization grade was about (69.020%), indicating a low degree of manufacturing.

5. Most of the potato chips factories don't have health license by the competent authorities for the lack of health conditions and occupational safety, because of the lack of material potential to develop their industries and the many restrictions and obstacles placed in front of them when applying for health permits to enable them to practice the profession.

6. Effect of the imported product of potato chips on the local product significantly, for several reasons, including the number of competitors and the magnitude of their work and share in the commercial market of this commodity and methods of pricing for their products and way of the product reaching the market in terms of packaging, brands, sizes and flavors of the product through information that had been collected showed that the consumer preference for imported potato chips was about (78.85%), because they were widely distributed and in large quantities and cheaper prices compared to locally produced ones, as well as for the reasons mentioned above, while the ratio people who prefer the local product

where about (21.15%), which is low and represent consumers who prefer consumption of preservative-free chips and that may lead to health problems.

## Recommendations

The study recommends the following:

1. Encouraging potato growers to cultivate varieties such as (Desirre, Hermes, Challenger, Arnova), which have the desired manufacturing specifications, high dry matter and excellent productivity to produce potato Chips and the need for manufacturers to contract with potato farmers to show their need for potatoes and the varieties required for their industries for the purpose of preparing to provide their demands and cultivation of sufficient space.

2. Providing soft loans to owners of factories for the purpose of developing their industries, through the introduction of modern machines and equipment that increase production efficiency and increase it in less time and effort and the industry can enjoy the cleanliness and speed of performance.

3. Facilitating the granting of the license to practice the profession and the health approvals by the competent authorities after meeting all the necessary health and preventive conditions and accounting for those who do not have these conditions in their factories to maintain the health of consumers when eating processed foods.

4. The food industries in the country, especially at this stage, should be based on three main orientations:

- (a) The creation of food industries that benefit from agricultural surpluses by encouraging farmers to increase the types of agricultural crops that enter as raw materials for food industry activities.
- (b) To improve the value added of agricultural commodities by converting them industrially.
- (c) It should be based on the policy of replacing imported industrial food commodities with locally produced alternatives.

5. Encouraging investors, especially graduates of the College of Agriculture, Food Industries department and Higher degree holders and urge to enter factories area for the production of potato-manufacturing food such as potato chips, frozen potato fingers, potato flour and starch and other industries that use potatoes as a staple in their products, so that the industry has a direct impact on the promotion of other industries associated with these industries, through the provision of material and logistical support and provide an appropriate investment environment.

6. The need to care for the health of the consumer

through the attention to foods manufactured locally as well as imported through the activation of the role of regulatory and health in the local markets and border crossings and the examination of all processed foods and indicate the validity of human consumption or not.

### References

- Al-Issawi, Kazem Jassim (2013). *Economic Feasibility Studies and Project Evaluation: Theoretical and Applied Analysis*, Dar Al- Manaheg Publishing & Distribution, Amman, Jordan. 235-236.
- Al-Karkhi, Majid Jaafar (2014). *Evaluation of Performance in Economical Units Using Financial Ratios*, First Edition, Dar Al-Manaheg Publishing and Distribution, Amman, Jordan. 129.
- Amara, Rania Mahmoud Abdulaziz (2018). *Principles of Economics*, First Edition, Center for Arabic Studies for Publishing and Distribution, Cairo, Egypt. 316.
- Al-Mahayawi, Qassim Nayef Alwan (2006). *Quality Management in Services Concepts, Operations & Applications*, Dar Al Shorouk Publishing & Distribution, Amman, Jordan. 376.
- Banga, Rashmi (2013). *Measure Value in Global Value Chain, Regional Value Chains*, Unit for Economic Cooperation and Integration among Developing Countries (ECIDC), PP4.
- Coltrain, David., Barton David and Boland Michael (2000). *Value Added: Opportunities and Strategies*, Arthur Capper Cooperative Center, Department of Agricultural Economics, Cooperative Extension Service, Kansas State University, 4-5.
- Das, Abhijit and Basu, Kalyan (2010). *S. Chand's ICSE Economic Application Book II For Class X*, published by S. chand and company pvt. Ltd, New Delhi, India. 76.
- FAO (Food and Agricultural Organization) (2006). *Commodity Chain Analysis. On-line Resource Materials for Policy Making. Analytical Tools: Financial Analysis*. FAO, Rome, Italy. 3. [www.fao.org/docs/up/easypol/331/CCA\\_044EN.pdf](http://www.fao.org/docs/up/easypol/331/CCA_044EN.pdf).
- FAO (2008). *International Year of the Potato*, <http://www.fao.org/potato-2008/en/potato/utilization.html>
- FAO (Food and Agricultural Organization) (2013). *Value Chain Analysis for Policy: Making Methodological Guidelines and country cases for a Quantitative Approach*, Rome, Italy. 166.
- Halabo, Saad Ahmed Saad and Bakhit, Mahmoud Ali Ahmed (2010). *Encyclopedia of Food Processing*, Part I, Academic Library, Dokki - Giza, Egypt, 11.
- Halabo, Saad Ahmed Saad, Badi, Adel Zaki Mohammed and Bakhit, Mahmoud Ali Ahmed (2008). *Food Industry Technology, Food Conservation and Processing*, Second Edition, Academic Library, Cairo, Egypt. 13
- Journal of Science and Technology (2008). *Food Industries*, Part I, Issue 87, Riyadh, Saudi Arabia. 4.
- Parker, Robert Henry (1984). *Top of Form Bottom of Form Macmillan Dictionary of Accounting*, First Published by Macmillan Press LTD, Basingstoke and London, United Kingdom. 177.
- Macmillan, Hugh and Tampoe, Mahen (2000). "Strategic Management" By Oxford University Press Inc. 118.
- Macoubrie, Jane and Harrison, Courtney (2013). *The Value-Added Research Dissemination Framework, (OPRE) the Office of Planning, Research and Evaluation report*, 5.
- Mankiw, N. Gregory and R. Hakes, David (2012). *Study Guide Principles of Macroeconomics*, Sixth Edition, South-Western, Cengage Learning Academic Resource Center, South western United States, 201.
- Ministry of Planning - Central Statistical Organization, Agricultural Statistic Directorate (2017). *Statistics of large industrial installations for the year 2017*, Baghdad, Iraq. 2.
- Salin, Victoria., A. Atkins, Juan and Salame, Omar (2002). *Value Added in Food Manufacturing and Retailing: A Ratio Analysis of Major U.S. States*, *Journal of Food Distribution Research.*, 136.
- Sexton, Robert L. (2016). *Exploring Macroeconomics*, seventh edition, Cengage Learning, Boston, United States of America, 163.