


**ANALYZING AND EVALUATING ECONOMIC INDICATORS AND OCCUPATIONAL SAFETY TO RAISE PERFORMANCE EFFICIENCY IN INDUSTRIAL COMPANY: APPLIED RESEARCH IN THE BABYLON CEMENT FACTORY**

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ARTICLE INFO	ABSTRACT
<p><b>Article history:</b></p> <p><b>Received</b> 14 November 2022</p> <p><b>Accepted</b> 16 January 2023</p>	<p><b>Purpose:</b> Using appropriate indicators to evaluate the efficiency of the economic performance and its ability to achieve its basic and planned goals, and the ability to make optimal use of productive capacities, available economic and human resources, in order to achieve profits.</p>
<p><b>Keywords:</b></p> <p>Criterion; Economic Evaluation; Efficient Performance.</p>	<p><b>Theoretical framework:</b> The cement industry in Iraq is considered one of the important industries for its role in the economic and development process, Therefore, those in charge of that industry should strive to find adequate and appropriate methods to develop production in quantity and quality to achieve the principle of self-sufficiency, one of the most important of these methods is the subject of evaluating the efficiency of the economic performance of existing projects for Take appropriate decisions that lead to achieving national economic development.</p>
	<p><b>Design/methodology/approach:</b> Babel Cement Factory suffers from the existence of deviations represented in the decrease in the amount of kiln production, the high production costs and the failure to reach the planned production capacities.</p>
	<p><b>Findings:</b> The economic evaluation criteria of the plant indicate that the year 2018 is better than the year 2017, and the reason is the increase in the amount of oil well cement production for the year 2018. The factory was supplied with quantities of clinker prepared from the Kufa Cement Factory, and this measure helped cover 12% of the salaries and wages value for the year 2018.</p>
	<p><b>Research, Practical &amp; Social implications:</b> The processes of analyzing and evaluating economic factors contribute to improving the performance of companies by focusing on critical factors, developing and adopting them according to the requirements of the labor market and fulfilling the local need for the company's products using advanced environmentally friendly production equipment, as well as contributing to providing a healthy environment for employees and the surrounding communities.</p>
	<p><b>Originality/value:</b> The results indicate the need to pay attention to modern technical developments and to use equipment with high productivity and a quality level that meets the requirements of the local need in construction and reconstruction, and to reduce the potential environmental impacts.</p>
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**ANALISANDO E AVALIANDO INDICADORES ECONÔMICOS E DE SEGURANÇA DO  
TRABALHO PARA AUMENTAR A EFICIÊNCIA DO DESEMPENHO EM EMPRESA INDUSTRIAL:  
PESQUISA APLICADA NA FÁBRICA DE CIMENTO BABYLON**

**RESUMO**

**Objetivo:** Utilizar indicadores adequados para avaliar a eficiência do desempenho econômico e sua capacidade de atingir seus objetivos básicos e planejados, bem como a capacidade de otimizar as capacidades produtivas, os recursos econômicos e humanos disponíveis, a fim de obter lucros.

**Referencial teórico:** A indústria de cimento no Iraque é considerada uma das indústrias importantes por seu papel no processo econômico e de desenvolvimento, portanto, os responsáveis por essa indústria devem se esforçar para encontrar métodos adequados e apropriados para desenvolver a produção em quantidade e qualidade para atingir o princípio da auto-suficiência, um dos mais importantes desses métodos é o tema da avaliação da eficiência do desempenho econômico dos projetos existentes para tomar decisões adequadas que levem ao alcance do desenvolvimento econômico nacional.

**Desenho/metodologia/abordagem:** A Fábrica de Cimento Babel sofre com a existência de desvios representados na diminuição da quantidade de produção dos fornos, nos elevados custos de produção e no não alcance das capacidades de produção planejadas.

**Resultados:** Os critérios de avaliação econômica da planta indicam que o ano de 2018 é melhor que o ano de 2017, e o motivo é o aumento da quantidade de produção de cimento de poço de petróleo para o ano de 2018. A fábrica foi abastecida com quantidades de clínquer preparado a partir do Kufa Fábrica de Cimento, tendo esta medida contribuído para cobrir 12% do valor das remunerações e vencimentos do ano de 2018.

**Pesquisa, implicações práticas e sociais:** Os processos de análise e avaliação dos fatores econômicos contribuem para melhorar o desempenho das empresas, focando nos fatores críticos, desenvolvendo-os e adotando-os de acordo com as exigências do mercado de trabalho e atendendo à necessidade local dos produtos da empresa, utilizando equipamentos de produção avançados e ecologicamente corretos, como além de contribuir para proporcionar um ambiente saudável aos colaboradores e às comunidades do entorno.

**Originalidade/valor:** Os resultados indicam a necessidade de estar atento aos modernos desenvolvimentos técnicos e de utilizar equipamentos com alta produtividade e nível de qualidade que atendam às exigências da necessidade local em construção e reconstrução, e reduzir os potenciais impactos ambientais.

**Palavras-chave:** Critério, Avaliação Econômica, Desempenho Eficiente.

**ANALIZANDO Y EVALUANDO INDICADORES ECONÓMICOS Y DE SEGURIDAD  
OCUPACIONAL PARA ELEVAR LA EFICIENCIA DEL DESEMPEÑO EN LA EMPRESA  
INDUSTRIAL: INVESTIGACIÓN APLICADA EN LA FÁBRICA DE CEMENTO BABILONIA**

**RESUMEN**

**Propósito:** Utilizar indicadores adecuados para evaluar la eficiencia del desempeño económico y su capacidad para lograr sus objetivos básicos y planificados, y la capacidad de hacer un uso óptimo de las capacidades productivas, los recursos económicos y humanos disponibles, con el fin de lograr utilidades.

**Metodología:** La Fábrica de Cementos Babel adolece de la existencia de desviaciones representadas en la disminución de la cantidad de producción del horno, los altos costos de producción y el no alcanzar las capacidades productivas planificadas.

**Conclusiones:** Los criterios de evaluación económica de la planta indican que el año 2018 es mejor que el año 2017, y la razón es el incremento en la cantidad de producción de cemento de pozo petrolero para el año 2018. La fábrica se abasteció con cantidades de clínquer preparado a partir de la Fábrica de Cemento Kufa, y esta medida ayudó a cubrir el 12% del valor de los sueldos y salarios del año 2018.

**Implicaciones de la Investigación:** Los procesos de análisis y evaluación de factores económicos contribuyen a mejorar el desempeño de las empresas enfocándose en factores críticos, desarrollándolos y adoptándolos de acuerdo con los requerimientos del mercado laboral y satisfaciendo la necesidad local de los productos de la empresa utilizando tecnologías ambientales avanzadas. equipos de producción amigables, además de contribuir a brindar un ambiente saludable para los empleados y las comunidades aledañas.

**Palabras clave:** Criterio, Evaluación Económica, Desempeño Eficiente.

## INTRODUCTION

The industrial sector is one of the pillars necessary for the economic development of any country, and the manufacturing sector is an important sector in particular because it reduces dependence on oil and its derivatives, which helps to diversify sources of national income as well as its contribution to meeting society's needs of necessary goods and services without resorting to importing them from countries Other, The cement industry in Iraq is considered one of the important and major industries for its important role in the economic and development process (Al-tae & Flayyih, 2022). Due to its connection with the housing and public and private sector, which is witnessing tremendous development in recent years as a result of going to reconstruction projects and resolving the housing crisis to meet the necessary needs of society, Therefore, those in charge of that industry should strive to find adequate and appropriate methods to develop production in quality and as to achieve the principle of self-sufficiency and the possibility of exporting to other countries and get rid of external competition, and one of the most important of these methods is the subject of evaluating the efficiency of the economic performance of existing projects in order to make good practical decisions that Leading to the status of the current or future project and the best choice among competing projects for economic resources.

Based on this, the researcher tried during the period of evaluating the efficiency of the economic performance of the Babel Cement Factory, which is one of the factories of the Southern General Cement Company affiliated to the Ministry of Industry and Minerals, and to select indicators and standards appropriate to the laboratory in terms of location, size, activity and objectives, as well as clarifying the ability and ability of the company to reach to achieve these Objectives are balanced in order to achieve national economic development.

### Objective of the work or research problem

The research problem can be discussed by asking the following questions:

- a. What are the reasons for the decrease in the quantity of production after 2003?
- b. Has the designed or planned capacity for previous years been reached?
- c. Is there a perception among the company's managers about the importance of evaluating the performance efficiency of employees and their occupational safety and ensuring that they do not contract occupational diseases?

## Justification

The Justification of the research stems from the important of the cement industry as it is a fundamental pillar in building the country's economic development, as well as the existence of a lack of optimal use of the economic resources available in the factory despite the fact that it produces cement in its two types of normal and resistant, as well as cement oil wells of class G and B.

## LITERATURE REVIEW

The indicator is described as an indication of an idea of the level of performance and activity that you specify as indicators of production, productivity and value added. As for the criterion, it represents the performance, effort, or final outcome that is preferred to be achieved for each unit under its available conditions and capabilities (Al-Waili, 2003). The Office of Financial Supervision in Iraq also defined them as the standard: a basis set for measurement and comparison, for a prescription as a basis or a model for what should be. As for the index, it is a group of indicators that indicate the activity that you measure or evaluate its performance (SAEED et al., 2022).

The ideal standard it is the goal that is reached when optimum conditions for production are available, and the normal and expected standard: which can be done under real conditions of production (Drummond, 2005).

Study of Robbins & Coulter, (1999). They see the Efficiency means the process of comparison between production, the current situation, and what can be produced and achieved, by using the same resources, such as financial resources, efforts, time, etc. Weakness and the investigation of its causes in order to consolidate the positive aspects and remove the negative aspects. Miller & Dess, (1996); Ameer & Raed, (2019) They indicated to the process of making a decision in the percentage or amount of achievement that the employee makes and providing this employee with information with the aim of making an adjustment or improvement in his performance.” Thus, performance indicates the organization’s ability to achieve its long-term goals of survival, adaptation and growth.

Study of (Al-Issawi, 2005) indicated to the performance evaluation process is closely related to the subject of the evaluation as a result of its connection with the objectives and areas of the activities of that project, which always requires the necessity to choose the appropriate criteria that are consistent with the objectives of the project and its available capabilities and in a manner consistent with the nature of the activity practiced by that project and according to

the system in which it operates. Largely about the quality and quantity of data and information available.

Study of (Makawi, 2016) found the Cement dust affects those exposed to it for long periods because it contains free silica, which leads to Incidence of silicosis (silicosis). especially in factories that produce acid- resistant cement. as such Exposure to cement dust leads to skin diseases, allergies and gastric ulcers, in addition to operating Factories without dust precipitators, or in the event that these precipitators operate at a low efficiency, which leads to a negative impact on vision In the surrounding areas and on radio and television broadcasts.

## **MATERIAL AND METHODOLOGY**

The sample is Babel Cement Factory (year 2017, and 2018). So, The research aims to achieve the following objectives:

- a. Using appropriate indicators to evaluate the efficiency of the economic performance by studying the economic reality of the factory.
- b. The possibility of changing these economic indicators during the study period and showing the extent of their success.
- c. Determining its ability to achieve its basic and planned goals, and the ability to make optimal use of productive capacities, available economic and human resources, in order to achieve profits.

### **Research hypothesis**

*H1: The internal capabilities and external conditions of Babel Cement Factory help in optimizing the available economic resources and available productive forces in a way that enables them to overcome the problems and deviations in performance.*

## **RESULTS AND DISCUSSION**

### **Analysis of the Economic Indicators for the Period (2017-2018)**

#### **Costs**

Costs are one of the main indicators of production efficiency and an important element in setting product prices and then the level of profits. Costs can be divided as follows (Taqah et al., 2009):

### Salaries and Wages

Wages and salaries of workers in Babel Cement Factory for the period (2017-2018). The following table shows:

TABLE 1: Wages and salaries of workers

Year	Total salaries and wages(JD)	% Annual change
2017	6, 605, 625, 985	.....
2018	6, 161, 048, 441	7, 215

Source: Prepared by the authors (2022).

It is clear that total salaries and wages decreased from 2017 to 2018 by (444, 577, 544) million Iraqi dinars, and the reason is due to the movement of owners as a result of referring affiliates to retirement and granting long vacations (five years) and reducing the rewards granted to employees.

### Commodity supplies

The main raw materials involved in production, aid, fuel, oils, and tools include packaging materials, personnel equipment, stationery, water and electricity, and this can be explained in the following table:

TABLE 2: Commodity supplies

Paragraph	Year 2017	Year 2018	Amount of Change (JD)
Fuels and oils	1, 447, 219, 522	1, 263, 780, 310	183, 439, 212
Water and electricity	487, 221, 038	465, 150, 000	22, 071, 038
Raw materials raw materials	1, 150, 232, 007	881, 443, 193	268, 788, 814
Backup tools	431, 414, 080	477, 862, 415	-46, 448, 335
Packaging	216, 937, 695	221, 267, 581	-4, 329, 886
Personnel supplies	3, 216, 527	2, 877, 239	339, 288
Total summation	3, 736, 240, 869	3, 312, 380, 738	423, 860, 131

Source: Prepared by the authors (2022).

### Service supplies

It includes maintenance services for buildings, machinery, transportation, tools, furniture, research services, consulting, advertising, printing, hospitality, transportation, dispatch and communication. These requirements can be shown in the table below:



TABLE 3: Service supplies

Paragraph	Year 2017	Year 2018	Amount of Change (JD)
Maintenance Services	109419, 500	101, 368, 000	8, 051, 500
Advertising, printing and hospitality	700, 000	7, 772, 500	_ 7, 072, 500
Transfer, dispatch and communications	57, 167, 500	58, 425, 500	_ 1258000
Leasing fixed assets	215, 223, 896	169, 251, 000	45, 972, 896
Miscellaneous service expenses	36, 875, 418	42126427	_ 5, 251, 009
total summation	419, 386, 314	378, 943, 427	40442887

Source: Prepared by the authors (2022).

## Depreciation

Depreciation a reduction in the value of an asset with the passage of time, due in particular to wear and tear, and the cost of depreciation of fixed assets in the factory can be shown through the two tables below (Raymond, 2002).

TABLE 4: Cost of depreciation of fixed assets (2017)

Paragraph	Year 2017
The disappearance of buildings, constructions and roads	3, 086, 000
The disappearance of machines and equipment	257, 802, 772
The disappearance of the means of transport and transmission	20, 644, 000
The extinction of the number and templates	12, 655, 000
The disappearance of furniture, appliances and offices	13, 801, 000
Total extinction	307, 988, 772

Source: Prepared by the authors (2022).

TABLE 5: Cost of depreciation of fixed assets (2018)

Paragraph	Year 2018
The disappearance of buildings, constructions and roads	3, 086, 000
The disappearance of machines and equipment	255, 907, 728
The disappearance of the means of transport and transmission	17, 743, 000
The extinction of the number and templates	12, 937, 000
The disappearance of furniture, appliances and offices	13, 733, 000
Total extinction	303, 406, 728

Source: Prepared by the authors (2022).

## Revenue

Revenue is defined as the sum of what the production unit gets as a price for the quantity it sells, and it is the product of multiplying the quantity sold by the unit price, that is, it is the total financial flows of the productive unit. The following table shows the value of the incoming revenues of the factory and according to the type of prepared cement (Mankiw, 2020).

TABLE 6: value of the incoming revenues

Year	The quantity of normal and resistant cement (ton)	The monetary value	The amount of cement for oil wells B (ton)	The monetary value	The amount of cement from oil wells G (ton)	The monetary value	The total quantity cut tons	Total revenues (dinar)
2017	39729	2974344792	1950	292500000	150	41250000	41829	3308094792
%	% 95		% 4.6		% 0.4		% 100	
2018	22811	1624825950	5400	810000000	11665	2315650000	39876	4750475950
%	%57		%13.5		%29.4		% 100	

Source: Prepared by the authors (2022).

### Analysis of the relative importance of cost items to total costs

For the purpose of identifying the relative importance of the three cost items: wages, salaries, commodity requirements and service requirements, which represent the value of production costs in addition to the value of depreciations, according to the following table:

TABLE 7: Represent the value of production costs

Year	Total salaries and wages	total commodity requirements	total service supplies	total discharges	total costs
2017	6, 605, 625, 985	3, 736, 240, 869	419386314	307, 988, 772	11, 069, 241, 940
%	%59.6	%33.7	%3.7	%3	
2018	6, 161, 048, 441	3, 312, 380, 738	378943427	303, 406, 728	10, 155, 779, 330
%	%60.6	%32.6	%3.7	%3.1	
Total	12, 766, 674, 430	7, 048, 621, 607	798329741	611395500	21, 225, 021, 280
%	%60	%33.2	%3.7	%3.1	

Source: Prepared by the authors (2022).

Through the table, it becomes clear that the value of salaries and wages comes first in terms of their contribution to total costs, as the percentage of their contribution during 2017 reached (59.8%) and the percentage increased for 2018 to (60%) despite the decrease in the value of salaries and wages for the year 2017 and the reason is the decrease in the production of bakeries. (Clinker) and thus the decrease in the value of commodity supplies, and through the table it is also evident that the proportion of commodity requirements for the year 2017 reached (33.7%) and decreased in 2018 to (32.6%). which is evidence of the decrease in the use of raw materials and energy in 2018.

The high percentage of salaries and wages in relation to the total costs is a not good indicator for the productive factories, and this high percentage comes from two sides: the first aspect is the presence of a number of ineffective employees in the production process and the



second side is the lack of production of furnaces relative to the number of employees working in the factory, and this will be clarified, Through economic evaluation criteria.

**Analysis of the relative importance of revenue items to total costs**

It is estimated that oil companies in Iraq have consumed atypical cement, i.e. oil wells cement, at a rate of (100-200) thousand tons annually, at costs that may reach (50) million dollars, and this type of cement was imported from abroad in amounts amounting to (50) million dollars annually.

Through the table, we show the relative importance of the revenue of each type of cement to the total revenues for the year 2017 and 2018 and its reflection on the average selling price per ton of cement produced in the factory, as shown below:

TABLE 8: Relative importance of revenue items(a).

Year	Revenue of normal and resistant cement	B Cement revenue Oil	well cement revenue G	Total revenue
2017	2974344792	292, 500, 000	41, 250, 000	3308094792
%	%90	%8.8	%1.2	%100
2018	1624825950	810, 000, 000	2, 315, 650, 000	4750475950
%	%34	%17	%49	%100

Source: Prepared by the authors (2022).

It is noticed from the above table that the percentage of the factory’s revenues for the year 2017 from the production of resistant cement and regular cement is the highest percentage, reaching 90%, while in 2018 the percentage of the factory’s production of resistant and regular cement decreased to 34%, and the percentage of oil well cement production increased to 66% compared to Production in 2017, and this in turn led to an increase in the total revenue of the plant for the year 2018 from 2017 by (1, 442, 381, 158) billion Iraqi dinars for the year 2017, and this big difference in revenue due to the increased production of oil wells cement, which indicates a big difference in the selling price of one ton of cement as Shown in the table below:

TABLE 9: Average selling price per ton(b)

Year	Cement resistant	regular cement	Oil wells Cement B	Oil wells Cement G	Average selling price per ton
2017	78864	55000	150000	275000	79086
2018	82500	57000	150000	198512	119131

Source: Prepared by the authors (2022).

It is noted from the table that the prices of oil wells cement are more than double the prices of resistant and ordinary cement, and this led to an increase in revenues for the year 2018 compared to the year 2017, despite the high quantities of production of resistant and regular cement for the year 2017, but this high percentage in production caused an increase in costs Production, because the selling price of normal and resistant cement is less than the production costs per ton of cement, which generates a negative impact on the plant and thus leads to a loss of the plant.

Note that the average selling price per ton produced in the factory for the year 2018 is higher than the year 2017 despite the fact that the production of The factory for the year 2017 was higher than the year 2018, which led to an increase in the average selling price per ton, which is the sale of oil well cement products in quantities higher than the year 2017, according to the table below that shows the annual loss of the factory:

TABLE 10: Annual loss of the factory

Year	Total Revenue	Total Costs	Annual Profits
2017	3,308,094,792	11,069,241,940	-7,761,147,148
2018	4,750,475,950	10,155,779,330	-5,405,303,380

Source: Prepared by the authors (2022).

It is noted from the above table that the plant did not achieve any profits during the years 2017 and 2018, with a large variation in the total annual revenues for the year 2017 and 2018, which in turn led to a large variation in the amount of the annual loss to the plant in addition to the plant's production of large quantities of oil well cement, which contributed to Loss reduction for the year 2018, and for the purpose of identifying deviations and treating them in the laboratory, the economic evaluation criteria of the laboratory must be analyzed.

### **Analysis of the production capacity standards of the factory for the period (2017-2018)**

The standards for the production capacities of the furnaces are shown in the table below:

TABLE 11: production capacity standards of the furnaces

Production capacity	measuring unit	2017	2018
Design capacity	Ton	192000	192000
Planned energy	Ton	58000	58000
Actual production capacity	Ton	49784	29278
Available energy	Ton	96000	96000

Source: Prepared by the authors (2022).

It is clear from the table that the actual production capacity of producing kilns (clinker) is very low, especially in 2018, due to the aging of machines and plant equipment and the end of their life span.

**Standards for the production capacities of mills, shown in the table below:**

TABLE 12: production capacities of mills

Production capacity	measuring unit	2017	2018
Design capacity	Ton	198000	198000
Planned energy	Ton	33000	60000
Actual production capacity	Ton	43292	56941
Available energy	Ton	178000	178000

Source: Prepared by the authors (2022).

We note from the above table that the total production of mills for the year 2017 amounted to (43292) tons, which is less than the quantity of clinker production available in the factory, which amounted to (49784) tons. This means that the efficiency of the mills is not good, while the amount of production of mills for the year 2018 reached (56941) Tons, which is a higher quantity than the kiln production for the year 2018, as the kiln production for the year 2017 was (29278) tons, with a difference of (27, 663) tons, and this difference was compensated for by the Kufa cement plant (tanker clinker).

**Partial Capacity Standards**

It is the energy by which the relationship between the outputs of the production process, i.e (Evans, 1993). Total production, is measured, and between each element of production and its used requirements, and it includes:

**Worker productivity shown in the following table:**

TABLE 13: Worker productivity

Year	Production quantity(ton)	Number of employees	Worker productivity (ton)
2017	43929.87	428	102
2018	56926.6	422	135

Source: Prepared by the authors (2022).

The above table shows the productivity of the worker, in 2017 the productivity of the worker reached (102) tons per worker, and in 2018 the worker productivity reached (135) tons / worker, due to the high amount of production, and this increase is not the real production of

furnaces, but rather the reason is that the factory uses Quantities of clinker imported from Kufa cement plant to fill the shortfall in production.

**Wage productivity shown in the following table:**

TABLE 14: Wage productivity

Year	Value of production	value of salaries and wages	wage productivity
2017	3, 308, 094, 792	6, 605, 625, 985	0.5
2018	4, 750, 475, 950	6, 161, 048, 441	0.77

Source: Prepared by the authors (2022).

It turns out that the wage productivity in 2017 amounted to (0.5) Iraqi dinars each monetary unit equal to (0.5) of the monetary unit of production, and this means that the wage costs are so high that the difference is about 50%, and the wage productivity in 2018 reached (0.77) Iraqi dinars, which is a better rate than in 2017, and the reason is due to the production of a quantity of cement from oil wells.

**Productivity of raw materials shown in the following table :**

TABLE 15: Productivity of raw materials

Year	Value of production	Value of raw materials	Productivity of raw materials
2017	3, 308, 094, 792	1, 150, 232, 007	2.87
2018	4, 750, 475, 950	881, 443, 193	5.38

Source: Prepared by the authors (2022).

For the purpose of measuring the productivity of raw materials, the value of production was divided by the value of the raw materials used in the production process, and as the table shows, the productivity of raw materials for the year 2017 amounted to (2.87) dinars, meaning that every dinar spent on raw materials achieved (2.87) dinars, but in 2018 It increased by (5.38) dinars, meaning that every dinar spent on raw materials achieved (5.38) dinars, and it is considered the highest value the plant reached, and the reason is due to the production of oil wells cement and its high prices compared to the prices of salt-resistant cement and regular cement.

### Capital productivity

It is the indicator that expresses the extent of the contribution of the fixed capital value to the achievement of the production value of the plant (Ratnasingam et al., 2017). (Sauian et al., 2013). and to calculate this criterion we need the value of production and capital for the years (2017-2018) and the following table shows that:

TABLE 16: Capital productivity

Year	Value of production	capital	productivity of capital
2017	3, 308, 094, 792	171373000	21.9
2018	4, 750, 475, 950	171373000	45.9

Source: Prepared by the authors (2022).

The productivity of the capital reached (21.9) Iraqi dinars, which means that every dinar spent on the production process achieves (21.9) dinars, and the value of capital productivity in 2018 increased to (45.9) Iraqi dinars, and the reason is due to the production of oil wells cement and the sale of the product at a higher amount The cost of production is high, which is due to the high productivity of capital.

### Productivity of machinery and equipment

This indicator is calculated by dividing the value of production by the value of machinery and equipment (Zakaria et al., 2014) , as in the table below:

TABLE 17: Productivity of machinery and equipment

Year	Value of production	The value of machinery and equipment	Productivity of machinery and equipment
2017	3, 308, 094, 792	7, 311, 780, 215	0.45
2018	4, 750, 475, 950	7, 311, 780, 215	0.65

Source: Prepared by the authors (2022).

We note that the value of machinery and equipment for the year 2017 is very low, and the productivity of machinery and equipment has increased for the year 2018, and this indicates the exploitation of machinery and equipment to achieve a higher production value than in 2017, especially cement and packaging mills, and this was positively reflected in the sales of cement (preparation) for the year 2018 of what It resulted in higher production value.

### Standard of one dinar yield

This criterion clarifies the percentage of the return of the monetary unit spent as costs in the production process in achieving the corresponding revenue from the production process (Hamdan et al., 2018). To calculate the yield of one dinar standard, we need the value of the total revenues and the value of the total costs, as in the table below:

TABLE 18: Standard of one dinar yield

Year	total revenues	total costs	productivity of the dinar
2017	3, 308, 094, 792	11, 069, 241, 940	0.29
2018	4, 750, 475, 950	10, 155, 779, 330	0.46

Source: Prepared by the authors (2022).

The table shows that the return of the dinar for the year 2017 amounted to (0.29) Iraqi dinars, and in 2018, the return value of one dinar was (0.46) Iraqi dinars, and this productivity is considered very low and the reason is the increase in salaries and wages costs and the lack of productivity.

As for the increase in the dinar's revenues for the year 2018 compared to 2017, it is due to the large increase in revenues due to the increase in oil well cement prices and the production of a higher quantity than in 2018, with the prices of raw materials, fuel and electric power remaining constant, which made it achieve this higher return.

### Gross value added criterion

This indicator expresses the productive value that is generated through the production process in the plant (wages + rent + interest + net profits + depreciations) (Ghada, 2018). and as shown in the table below (Abass, 2022):

TABLE 19: Gross value added criterion

Year	Value of production	Value of production inputs	added value
2017	3, 308, 094, 792	4155627183	_ 847532391
2018	4, 750, 475, 950	3, 691324165	1, 059, 151, 785

Source: Prepared by the authors (2022).

The table shows that the added value for the year 2017 amounted to (847532391) billion Iraqi dinars, while the added value for the year 2018 amounted to approximately (1, 059, 151, 785) one billion Iraqi dinars, and the reason for the failure of the plant to achieve an added value for the year 2017 is the high costs of production and the low price of selling one ton of resistant and regular cement. As for the year 2018, higher quantities of cement were produced



from oil wells, and the selling price of one ton of this cement is higher than the cement production costs, and therefore it achieved an added value for the year 2018.

### **Manufacture grade standard**

This indicator expresses the contribution of the factory to generating national income, To calculate this criterion, we need the gross value added and the value of production for the years:

TABLE 20: Gross value added criterion

Year	Value of production	Total value added	Degree of industrialization
2017	3, 308, 094, 792	847532391	25%
2018	4, 750, 475, 950	1, 059, 151, 785	22.2%

Source: Prepared by the authors (2022).

The table shows that the year 2017 did not achieve any contribution to the income of the national economy due to the high costs of production, and in 2018, a rate of 22.2% was achieved due to the increase in the value of production.

### **Net added value**

To calculate this standard, we need the total added value and the value of extinction premiums for the years 2017 and 2018, as shown in the table below:

TABLE 21: Net added value

Year	gross value added	incidences	net added value
2017	847532391	307, 988, 772	539, 543, 619
2018	1, 059, 151, 785	303406728	755, 745, 057

Source: Prepared by the authors (2022).

Through the above table, we note that the net added value for the year 2017 amounted to (539, 543, 619-) and this amount cannot be covered by the factory to cover salaries and wages, but in 2018, the added value covers 12% of the value of salaries and wages only.

What is currently followed in the cost accounts of the Babylon Cement Factory is that the value of salaries and wages is covered by 40% of the plant's revenues and 60% is covered by the state or company, and 40% of the service requirements are covered from the factory's revenues, and 60% is covered by the company. The value of salaries, wages and value added according to the table below :

TABLE 22: The value of salaries, wages and value added

Year	Total salaries and wages 40%	commodity requirements, Equipment for workers.	Total service requirements 40%	Depreciations 40%	Total costs
2017	2, 642, 250, 394	3, 734, 310, 953	397, 261, 063	123195508	6, 897, 017, 918
2018	2, 464, 419, 376	3, 310, 654, 395	353, 667, 570	121362691	6, 250, 104, 032

Source: Prepared by the authors (2022).

By subtracting the total costs from the total factory revenues for the years 2017 and 2018, the annual profits are as shown in the table below:

TABLE 23: Annual profits

Year	Total Revenue	Total Costs	Annual Profit
2017	3, 308, 094, 792	6, 897, 017, 918	_ 3, 588, 923, 126
2018	4, 750, 475, 950	6, 250, 104, 032	_ 1, 499, 628, 082

Source: Prepared by the authors (2022).

Through the above table, we note that the value of the loss for the year 2017 is very high, while the value of the loss for the year 2018 amounted to (1, 499, 628, 082) billion Iraqi dinars, i.e. a difference of (2, 089, 295, 044) Iraqi dinars in 2017, and this big difference between 2017 and 2018 is due to production Higher quantities of oil well cement in 2018 compared to 2017 with the stability of commodity input prices for 2017 and 2018.

## CONCLUSION

The Babylon Cement Factory operates in a traditional production method or method, with a large consumption of machinery and equipment, which causes loud noises that weaken the workers' attention and lead to work injuries. This means that the economic feasibility of the factory is difficult to achieve in light of the establishment of modern factories in the nearby cities. In light of the current productivity of the plant, which is 26% for the factory's design capacity for the year 2017 and 15% for the year 2018, this productivity corresponds to the increase in the number of workers, which led to an increase in the percentage of salaries and wages costs in relation to the total costs, reaching 60%.

The rate of idle energy in the plant is (76%) for the year 2017, while this percentage has increased to (85%) for the year 2018 that this increase is due to the lack of electrical energy for the plant because the plant does not have its own power station, so the network is relied upon. National to operate the plant. The factory's production of another type of cement in addition to the production of salt-resistant cement and regular cement, as it was produced during the year

2017 with the production of cement from oil wells, and this led to a significant increase in the plant's revenues, especially in 2018.

The plant's production of this type of cement will increase revenues and in return the costs must be reduced to the maximum extent so that the plant can cover all costs without relying on the state. The economic evaluation criteria of the plant indicate that the year 2018 is better than the year 2017, and the reason is the increase in the amount of oil well cement production for the year 2018. The factory was supplied with quantities of clinker prepared from the Kufa Cement Factory, and this measure helped cover 12% of the salaries and wages value for the year 2018.

### Limitations of the study

The study found determinants that affect the nature of the laboratory activity, which can be mentioned as follows:

1. The necessity of fully rehabilitating the cement mills, and that the plant depends on the clinker prepared from the Kufa cement plant, and the plant's production will be higher than that of oil wells cement.
2. Paying attention to research and development, because this will help the plant management to increase production and improve its quality through developing local technology and improving production means.
3. Working to keep pace with the rapid technological developments in the industry in order to achieve competitiveness, whether at the practical level or at the external level.
4. The necessity of working to provide electrical energy by working to find an electrical station for the plant, as the cement industry is one of the industries that require 24-hour work without stopping.
5. Reducing workers from daily wage earners, focusing on workers and employees, and working to increase their skills and experience through continuous follow-up and allocating training periods.
6. Switching to the use of natural gas to reduce gas emissions due to the large consumption of machinery and equipment, thus reducing sources of pollution and maintaining the safety of workers and the surrounding environment.

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