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## ANALYSIS OF THE REALITY OF CHEMICAL INDUSTRIES IN IRAQ FOR THE PERIOD 1980-2018

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### ABSTRACT

The chemical industries have an important strategic role that contributes to the promotion and progress of the industry and contributes to the support of the national economy. The study aims to identify the concept and importance of chemical industries and their effective role in the national economy in terms of studying the indicators of this important industrial branches by focusing on the indicators of the number of facilities, the number of workers, workers' wages and added value by studying these indicators for each of the governorates of Iraq and to identify the extent of development or the decline of chemical industries in the Iraqi economy and its location among other industrial branches, as well as identifying trends in the endemicity of this industrial branch and its position among other industrial branches.

### Keywords

Economy, Raw Materials, Local Products, Petrochemical.

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### Introduction

The industrial sector is one of the most important economic sectors that support the economic structure of any country and contribute to advancing the wheel of economic progress. The industrial sector has contributed to the promotion and development of the Iraqi economy in some periods, especially the chemical industries, which are of great importance, and the importance of chemical industries in Iraq is highlighted through what is available in Iraq of great potentials in terms of raw materials and human energies, as Iraq have many important resources that contribute to the establishment and development of this industrial branch, including the large spatial extension that allows the establishment of large industrial facilities as well as Iraq's geographical location as well as the presence of the necessary natural resources such as phosphate and sulfur ores, and Iraq's possession of a huge wealth of oil and large reserves of natural gas, all

of these factors are working on the establishment and development of this industrial branch.

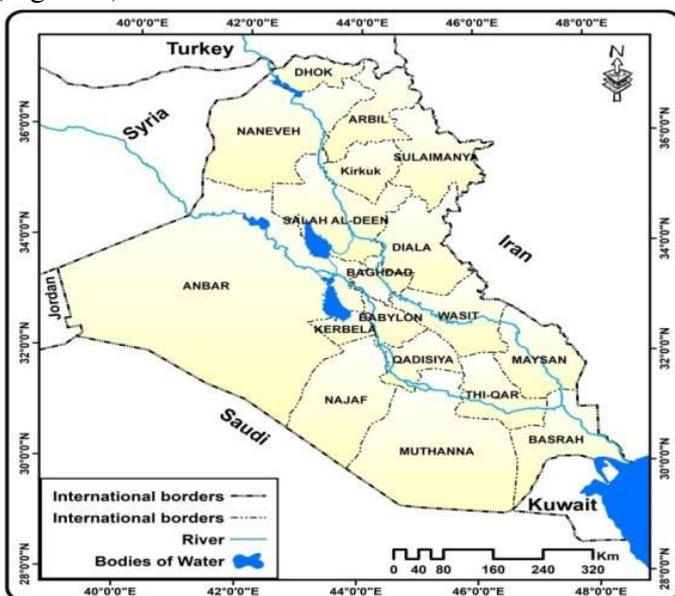
**Study problem:** Iraq has many chemical industries that were distributed within its different regions for economic and development considerations, but these industries, since the nineties of the last century, faced great challenges due to the economic blockade and their problems worsened after 2003.

**Study hypothesis:** Iraq has many development potentials that have contributed to the localization of many chemical industries and played a major positive role in its economy, the country's security, political and economic conditions contributed to the exacerbation of the problems of these industries especially after 2003.

**Study objective:** The study aims to identify the reality of chemical industries in Iraq by identifying the most prominent indicators of this industrial branch and its geographical distribution according to governorates.

**Study Methodology:** The study relied on combining the theoretical and analytical framework that relies on data and indicators related to the subject of the study.

**Study Limits:** The study is represented by the political Limits of Iraq, which extends between latitudes (5-29 and 22-37) north and longitudes (45-38 and 45-48) east, as Iraq is located in the southwest of Asia and the northeast of the Arab world, it is bordered to the north by Turkey and to the east by Iran, and to the west by Syria, Jordan and Saudi Arabia, and the Arabian Gulf, Kuwait and Saudi Arabia to the south, as shown in the (Figure 1).



**Figure 1.** Limits of studied area - geographical location of Iraq

Source: Ministry of Water Resources, General Authority of Survey, Iraq's administrative map, scale 1:1000000 of the 2015.

**Study structure:** The research was divided into four sections. The first section dealt with the concept of chemical industries and their importance, and the second section dealt with the importance of chemical industries at the level of the total industrial sector in Iraq, while the third section dealt with analyzing the importance of chemical industries according to the governorates of Iraq, and the fourth section dealt with the analysis of trends in the endemicity of chemical industries in Iraq, down to conclusions and recommendations.

## The Concept of Chemical Industries and their Importance

Chemical industries are defined as the process of converting raw materials into new products using various chemical processes such as distillation or thermal cracking. These processes consist of a total of separate chemical elements that contribute to the formation of intermediate or final products (i), and from this point, the importance of chemical industries can be determined as follows (ii):

1. It is considered one of the most advanced industries, in addition to being one of the basic industries that enter as a raw material in many industrial activities, as its raw materials are available in large quantities and of little value, especially since most of the raw materials involved in chemical industries are found in nature in terms of their dependence on atmospheric air, such as industry of natural and industrial gases.
2. The chemical industries work to provide the requirements of the industrial sector of various raw materials and chemicals, in addition to providing the local market needs of industrial products.
3. The chemical industries contribute to supporting the national economy by providing foreign currency, especially the provision of some local products instead of importing them.
4. It works to provide job opportunities, as it contributes to attracting manpower, especially skilled ones, and works to raise the level of skilled workers by opening training centers and rehabilitating manpower which increasing the productivity of workers and thus increases their standard of living.
5. Contribute to promoting the industrial development process by stimulating economic growth rates. They are also centers for attracting advanced industrial technology.

## Analysis of the Chemical Industries Importance at the Level of the Total Industrial Sector in Iraq

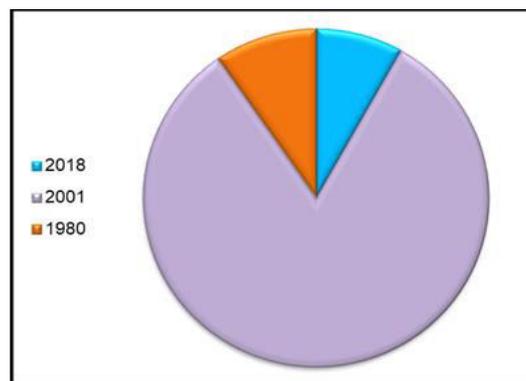
The analysis here depends on the study of the total industrial sector in Iraq to determine the importance of the chemical industries, as well as to identify the weight of other manufacturing industries in Iraq by studying the indicators of the number of facilities and workers and determining the extent of the development and decline of each industrial branch and the status of the chemical industry among other branches of the manufacturing industry (Tables 1 and 2). By analyzing the indicator of the number of facilities according to Table 1 it becomes clear the size of

the decline in the numbers and percentage of the total industrial sector in Iraq, where it reached its highest percentage in 1980 (11.20%) to decrease to 9.53% in 2018 (Figure 2). The reason of this decline is due to the security events that Iraq witnessed, especially after the Iraqi-Iranian war, through the Gulf war and the imposition of the economic embargo on Iraq until 2003 and the security and economic events that led to the suspension of many industrial projects.

**Table 1.** The rate of relative importance of chemical industry facilities for the years (1980-2001-2018)

| Indications           | 1980 | %     | 2001 | %     | 2018 | %    |
|-----------------------|------|-------|------|-------|------|------|
| No. of establishments | 165  | 11.20 | 73   | 10.96 | 59   | 9.53 |
| TOTAL                 | 1473 | 100   | 666  | 100   | 619  | 100  |

Source: Researcher depend on Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).



**Figure 2.** Average of relative importance of facilities in the chemical industry for the years (1980-2001-2018)

Source: Researcher depends on Table (1)

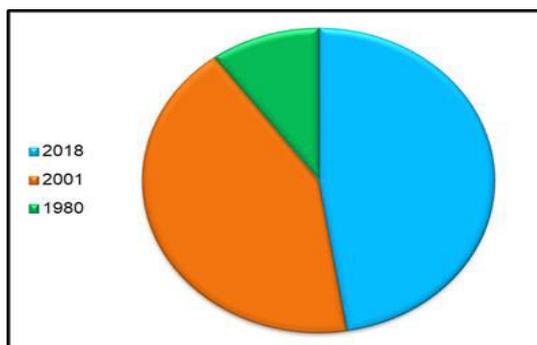
**Table 2.** The rate of relative importance of workers in the chemical industry for the years (1980-2001-2018)

| Indications       | 1980   | %    | 2001   | %     | 2018   | %     |
|-------------------|--------|------|--------|-------|--------|-------|
| No. of employ yes | 11084  | 6.18 | 34637  | 26.16 | 33593  | 29.14 |
| TOTAL             | 179341 | 100  | 132362 | 100   | 115281 | 100   |

Source: Researcher depends on Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).

It is evident through the analysis of the number of workers indicator that the percentage of this indicator has increased significantly and reaching to 6.24% of the total industrial sector, rising to

26.16% and then reaching its highest percentage in 2018 (29.14%) of the total industrial sector (Figure 3)



**Figure 3.** Average of relative importance of workers in the chemical industry for the years (1980-2001-2018)

Source: Researcher depends on Table (2)

**Analysis of the Importance of Chemical Industries According to the Governorates of Iraq for the Period 1980-2018**

which it witnessed development and decline that included all parts of the industry in Iraq, including the chemical industries, as this was linked with political, security and economic events.

The experience of industry in Iraq has gone through many different stages of time through

**Table 3.** Geographical distribution of chemical industry facilities according to governorates for the period 1996-2018

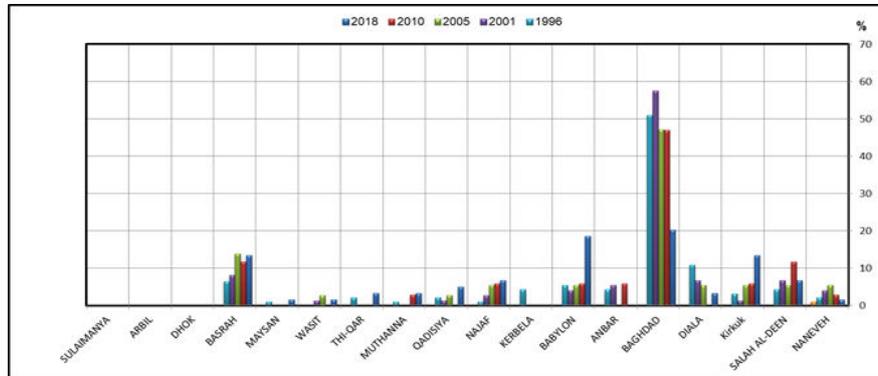
| Indications   | 1996 |       | 2001 |       | 2005 |       | 2010 |       | 2018 |       |
|---------------|------|-------|------|-------|------|-------|------|-------|------|-------|
|               |      | %     |      | %     |      | %     |      | %     |      | %     |
| NANEVEH       | 2    | 2.17  | 3    | 4.10  | 2    | 5.55  | 1    | 2.94  | 1    | 1.69  |
| SALAH AL-DEEN | 4    | 4.34  | 5    | 6.84  | 2    | 5.55  | 4    | 11.76 | 4    | 6.77  |
| Kirkuk        | 3    | 3.26  | 1    | 1.36  | 2    | 5.55  | 2    | 5.88  | 8    | 13.55 |
| DIALA         | 10   | 10.86 | 5    | 6.84  | 2    | 5.55  | =    | =     | 2    | 3.38  |
| BAGHDAD       | 47   | 51.08 | 42   | 57.53 | 17   | 47.22 | 16   | 47.05 | 12   | 20.33 |
| ANBAR         | 4    | 4.34  | 4    | 5.50  | =    | =     | 2    | 5.88  | =    | =     |
| BABYLON       | 5    | 5.43  | 3    | 4.10  | 2    | 5.55  | 2    | 5.88  | 11   | 18.64 |
| KARBELA       | 4    | 4.34  | =    | =     | =    | =     | =    | =     | =    | =     |
| NAJAF         | 1    | 1.08  | 2    | 2.73  | 2    | 5.55  | 2    | 5.88  | 4    | 6.77  |
| QADISIYA      | 2    | 2.17  | 1    | 1.36  | 1    | 2.77  | =    | =     | 3    | 5.08  |
| MUTHANNA      | 1    | 1.08  | =    | =     | =    | =     | 1    | 2.94  | 2    | 3.38  |
| THI-QAR       | 2    | 2.17  | =    | =     | =    | =     | =    | =     | 2    | 3.38  |
| WASIT         | =    | =     | 1    | 1.36  | 1    | 2.77  | =    | =     | 1    | 1.69  |
| MAYSAN        | 1    | 1.08  | =    | =     | =    | =     | =    | =     | 1    | 1.69  |
| BASRAH        | 6    | 6.52  | 6    | 8.21  | 5    | 13.88 | 4    | 11.76 | 8    | 13.55 |
| DHOK          | =    | =     | =    | =     | =    | =     | =    | =     | =    | =     |
| ARBIL         | =    | =     | =    | =     | =    | =     | =    | =     | =    | =     |
| SULAIMANYA    | =    | =     | =    | =     | =    | =     | =    | =     | =    | =     |
| TOTAL         | 92   | 100   | 73   | 100   | 36   | 100   | 34   | 100   | 59   | 100   |

Source: Researcher depend on Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).

- Ehab LMA 2012. Industrial Development in Anbar Governorate, A Study in

Industrial Geography, MSc. Thesis, College of Arts, University of Anbar, p. 169.

- Data Unavailable of Dohuk, Erbil and Sulaymaniyah governorates for 1980.



**Figure 4.** The relative importance of the chemical industries branch facilities according to the governorates  
 Source: Researcher depends on the Table (3) by analyzing Table (3)

It is clear that there is a concentration of the facilities of this industrial branch in Baghdad, in a proportion that exceeds the other governorates, where Baghdad acquired nearly half of the total facilities of this industrial branch (Figure 3), Basra governorate comes in second place, then Salah al-Din governorate, where these governorates

constituted the largest proportion of the total of this industrial branch with a limited spatial spread to the rest of the governorates in varying proportions, and the rest of the governorates had only a limited number of industrial facilities and with poor time periods.

**Table 4.** The geographical distribution of workers in the chemical industries by governorates for the period 1980-2018

| Indications   | 1980 |      | 1996 |      | 2001 |      | 2005 |      | 2010 |      | 2018 |       |
|---------------|------|------|------|------|------|------|------|------|------|------|------|-------|
|               |      | %    |      | %    |      | %    |      | %    |      | %    |      | %     |
| NANEVEH       | 53   | 0.50 | 43   | 0.19 | 299  | 0.86 | 16   | 0.04 | 2412 | 4.20 | 63   | 0.18  |
| SALAH AL-DEEN | 1761 | 15.9 | 6075 | 27.0 | 9387 | 27.1 | 5094 | 13.3 | 1308 | 22.7 | 2937 | 8.74  |
| Kirkuk        | 962  | 8.70 | 1240 | 5.52 | 1322 | 3.81 | 1935 | 5.05 | 3790 | 6.60 | 4051 | 12.05 |
| DIALA         | 89   | 0.80 | 95   | 0.42 | 39   | 0.11 | 11   | 0.02 | -    | =    | 52   | 0.15  |
| BAGHDAD       | 4166 | 37.6 | 3563 | 15.9 | 4499 | 13   | 5020 | 13.1 | 1121 | 19.5 | 1181 | 35.1  |
| ANBAR         | 121  | 1.10 | 2963 | 13.2 | 3444 | 9.94 | -    | -    | 3962 | 6.90 | -    | -     |
| BABYLON       | 35   | 0.30 | 85   | 0.37 | 1299 | 3.75 | 2092 | 5.46 | 2269 | 3.94 | 2083 | 6.06  |
| KERBELA       | =    | =    | 56   | 0.24 | -    | =    | -    | -    | -    | =    | -    | -     |
| NAJAF         | 17   | 0.20 | 20   | 0.08 | 2248 | 6.50 | 3263 | 8.52 | 2896 | 5.03 | 1066 | 3.17  |
| QADISIYA      | =    | =    | 50   | 0.22 | 1222 | 3.52 | 1535 | 4.01 | -    | =    | 112  | 0.33  |
| MUTHANNA      | =    | =    | 13   | 0.05 | =    | =    | -    | -    | 7    | 0.01 | 61   | 0.18  |
| THI-QAR       | 9    | 0.10 | 137  | 0.61 | =    | =    | -    | -    | -    | =    | 1345 | 4.00  |
| WASIT         | =    | =    | =    | =    | 82   | 0.23 | 82   | 0.21 | -    | =    | 5    | 0.01  |
| MAYSAN        | =    | =    | 36   | 0.16 | -    | =    | -    | -    | -    | =    | 634  | 1.88  |
| BASRAH        | 3835 | 34.6 | 8059 | 35.9 | 1079 | 31.1 | 1921 | 50.2 | 1784 | 31.0 | 9415 | 28.0  |
| DHOK          | 5    | 0.04 | =    | =    | =    | =    | =    | =    | =    | =    | =    | =     |

|                |           |      |           |     |           |     |           |     |           |     |           |     |
|----------------|-----------|------|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|
| ARBIL          | 10        | 0.10 | =         | =   | =         | =   | =         | =   | =         | =   | =         | =   |
| SULAIMANY<br>A | 21        | 0.20 | =         | =   | =         | =   | =         | =   | =         | =   | =         | =   |
| TOTAL          | 1108<br>4 | 100  | 2243<br>5 | 100 | 3463<br>7 | 100 | 3825<br>9 | 100 | 5747<br>7 | 100 | 3359<br>3 | 100 |

Source: Researcher depend on Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).

- Ehab LMA 2012. Industrial Development in Anbar Governorate, A Study in Industrial Geography, MSc. Thesis, College of Arts, University of Anbar, p. 169.
- Al-Hadithi HMA 1988. Patterns and policies of industrial Location in Iraq 1960-1985". Ph.D. Thesis, Central School of Planning and statistics in Warsaw, p. 264.
- Data Unavailable of Dohuk, Erbil and Sulaymaniyah governorates for 1980.

Kirkuk) (Table 4 and Figure 5), where these governorates constituted the largest proportion of the total workers during the study period. The concentration of workers in these governorates reached nearly (80%) of the total workers in this industrial branch, and the security events that the country went through and the suspension of many facilities from work contributed to decline the number of workers, especially in Salah al-Dingovernorate, the percentage of workers concentration in this governorate (22.75%) in 2010 to decline to (8.74%) in 2018, while the workers in this industrial branch were distributed among the rest of the governorates in limited proportions.

As for the geographical distribution of the total workers, it is clear that the workers in this industrial branch are concentrated in four governorates (Basra, Baghdad, Salah al-Din and

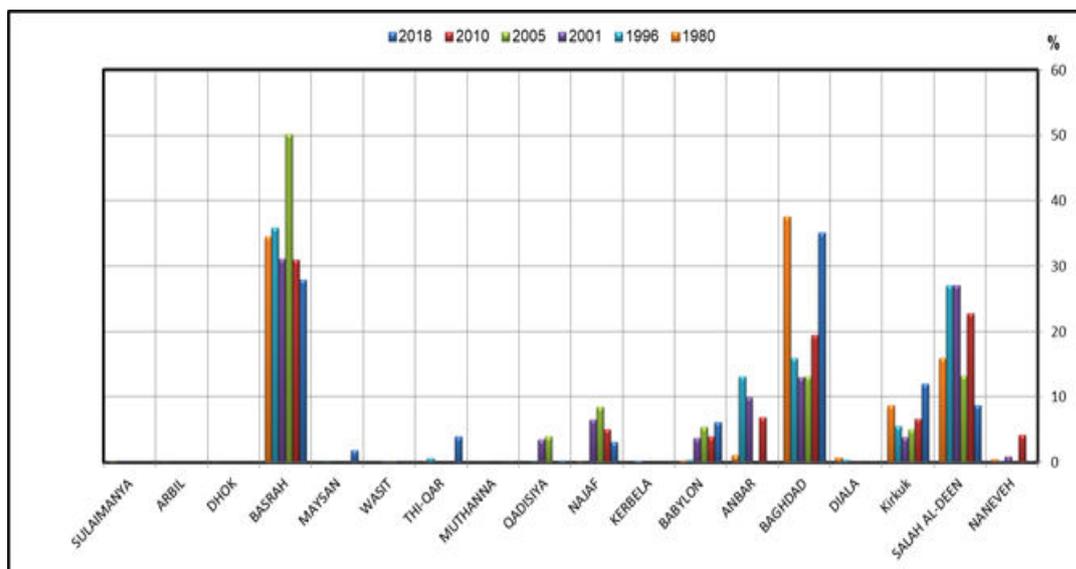


Figure 5. The relative importance of workers in the chemical industries branch according to the governorates

Source: Researcher depends on the Table (4)

**Industrial Endemicity Trends of the Chemical Industries Branch in Iraq for the Period**

**(1980-2018)**

The analysis here is based on the study of the main indicators of the manufacturing branch in Iraq, which are the number of facilities, workers, workers' wages, added value for the period 1980 to 2018, the aim of this to know the trends of endemicity of the chemical industries in Iraq to show the extent of the development or decline of this industrial branch. By analyzing these indicators according to Table (5) the following is noted:

1. The highest percentage of the number of facilities indicator for this industrial branch was

19.68% in 1985, while the lowest percentage was 4.96% in 2013.

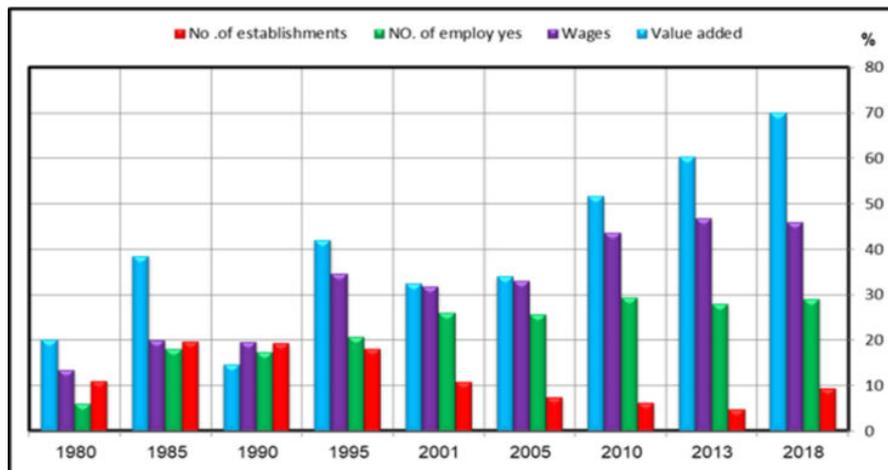
2. In terms of the number of workers indicator, the highest percentage was 29.50% in 2010, while the lowest percentage was 6.18% in 1980. By analyzing the number of facilities and workers indicators, it is clear that the number of facilities of this industrial branch has declined, as the number of facilities reached 165 industrial facilities in 1980 and the decline continued to reach 59 facilities in 2018 (Figure 6).

**Table 5.** Analysis of the total indicators of the chemical industries branch in Iraq for the period 1980-2018

|                             | 1980      | 1985      | 1990       | 1995     | 2001      | 2005      | 2010   | 2013   | 2018   | Materiality rate |
|-----------------------------|-----------|-----------|------------|----------|-----------|-----------|--------|--------|--------|------------------|
| No. of establishments       | 165       | 160       | 153        | 91       | 73        | 36        | 34     | 33     | 59     |                  |
| (%)                         | 11.20     | 19.68     | 19.39      | 18.16    | 10.96     | 7.57      | 6.42   | 4.96   | 9.53   | 11.98            |
| NO. of employes             | 11084     | 32028     | 27788      | 23248    | 34637     | 38259     | 57477  | 45045  | 33638  |                  |
| (%)                         | 6.18      | 18.12     | 17.54      | 20.84    | 26.16     | 25.74     | 29.50  | 28     | 29.16  | 22.36            |
| Wages                       | 27426620  | 37267055  | 20619525   | 3100840  | 12808010  | 23542     | 44071  | 74894  | 58975  |                  |
| (%)                         | 13.60     | 20.06     | 19.76      | 34.71    | 31.92     | 33.17     | 43.63  | 46.80  | 45.96  | 32.17            |
| Value added                 | 197450    | 261756652 | 166056898  | 7894842  | 38389556  | 40340     | 84888  | 183507 | 189907 |                  |
| (%)                         | 20.35     | 38.68     | 14.88      | 42.08    | 32.67     | 34.12     | 51.74  | 60.43  | 70.21  | 40.57            |
| Materiality rate            | 12.83     | 24.13     | 17.89      | 28.94    | 25.42     | 25.15     | 32.82  | 35.04  | 38.71  | 26.80            |
| Total no. of establishments | 1473      | 813       | 789        | 501      | 666       | 475       | 529    | 664    | 619    | -                |
| Total no. of employees      | 179341    | 176719    | 158390     | 111541   | 132362    | 148593    | 194837 | 160832 | 115326 | -                |
| Total wages                 | 201605838 | 185724531 | 104334868  | 8932445  | 40113373  | 70973     | 101009 | 160010 | 128313 | -                |
| Total added value           | 970256    | 676594309 | 1115414921 | 18759963 | 117476639 | 118202.44 | 164045 | 303640 | 270465 | -                |

Source: Researcher depend on Republic of Iraq, Ministry of Planning, Central Statistical Organization,

Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).



**Figure 6.** Average of relative importance of the chemical industries branch for the period 1980-2018  
Source: Researcher depends on the Table (5)

In terms of workers, the highest number was in 2010 (57477 workers), due to the relative stability that Iraq witnessed in that year in terms of economic and security conditions. However, after 2014, as a result of the deterioration of the security situation, which led to the destruction and suspension of many of the facilities of this industrial branch, especially Anbar, Nineveh and Salah al-Din the governorates, which negatively affected on the number of workers which reached 33638 workers in 2018.

3. The highest percentage of total workers' wages in 2013 was 46.80%, while the lowest percentage was 13.60% in 1980; this shows the increase in the workers' wages indicator for the study period.

4. As for the added value indicator, the highest percentage was 70.21% in 2018, while the lowest was 14.88% in 1990.

5. In terms of the relative importance rate, the highest percentage was 38.71% in 2018, while the lowest percentage was 12.83% in 1980.

It is evident from the analysis of the industrial branch indicators and the extraction of the relative importance rate according to the above indicators that the percentages of this industrial branch increased and its development, especially in terms of workers' wages and added value, with the clear decline in the number of facilities of this industrial branch and the decrease in the number of workers.

## Conclusions

This industrial branch was concentrated in four governorates (Basra, Salah al-Din, Baghdad and Kirkuk). The number of facilities in this industrial branch significantly declined, the number of industrial facilities was 165 in 1980 to decline to 59 in 2018. Also, the security, political and economic events played a role in the decline of this industrial branch. The study recommends the necessity of restarting the stalled facilities, introducing advanced industrial technology, rehabilitating and training manpower, as well as supporting local products and reducing dependence on the importer products.

## Margins

United Nations, Economic and Social Affairs 2009. International Standard Industrial Classification of All Economic Activities. 4<sup>th</sup>Edn., United Nations Press, New York, p. 131.

(<sup>1</sup>) Al-Atiwi MHQ 2017. Chemical Industries in Basra Governorate and its Economic Dimensions, Study in Industrial Geography, PhD Thesis, College of Education, University of Basra, pp. 11-12.

## References

[1] Ehab LMA 2012. *Industrial Development*

*in Anbar Governorate, A Study in Industrial Geography*, MSc. Thesis, College of Arts, University of Anbar, p. 169.

- [2] Republic of Iraq, Ministry of Planning, Central Statistical Organization, Directorate of Industrial Statistics, results of the annual industrial census for large industrial facilities in Iraq for the period 1980-2018, electronic calculator data (unpublished).
- [3] AL-Hadithi HMA 1988. *Patterns and policies of industrial Location in Iraq 1960-1985*. Unpublished Ph.D. Thesis, Central school of Planning and statistics in Warsaw, p 264.