# Locational Analysis of the Saudi Manufacturing Sector

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ABSTRACT. The main objective of this paper is to apply the Economic Base Theory to the manufacturing sector in Saudi Arabia. This paper analyzes and describes the distribution and spatial concentration of Saudi industries among different regions in the country. Three important issues are considered in this study:

1- The distribution of Saudi industries and the achievement of optimal allocation of available resources.

2- The distribution of industrial investment and its relation to regional differences.

3- The comparison of different regions in terms of industrial structure and different industries in terms of spatial distribution.

The statistical analysis shows that the top three Saudi regions in number of factories, capital financing, and employment are Riyadh, Makkah, and the Eastern region, whereas, the last one is the Northern region. Among the main conclusions of this study is that Riyadh region is the main exporter in the Kingdom of some products such as textile and leather, and the main importer of others such as food and beverages. Moreover, the empirical results indicate that one-third of internal trade in Saudi Arabia passes through Riyadh, one-quarter through the Eastern region and one-fifth through Makkah. Finally, the study shows the necessity of redistributing industrial investments among Saudi regions more equitably.

## I. Introduction

A major contribution to the literature of regional economic analysis was provided by the German economist Alfred Weber (1909) when he published his book "Theory of the Location of Industry"[1]. Among the main issues related to this theory are the

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(1) The publication of this book, which was translated into English in 1929, is considered the birth of industrial location theory. For more details see {**Hoare**, 1983, p. 69}.

questions of how to find the optimum location for an industry, what industries and how much of each is expected to exist or develop in a given region, and what is the optimal spatial distribution of industries among different regions within a system.

This study is an application of the Economic Base Theory to the Saudi manufacturing sector in an attempt to analyze and describe the spatial concentration and distribution of Saudi industries among different regions in the country. Moreover, the study is intended to provide an answer to the following questions. First, how the Saudi industries are distributed between different regions in the country and whether this distribution is optimal or not? Second, did the distribution of industrial investment lead to regional differences? Third, how to compare the Saudi different regions in terms of industrial structure, and different industries in terms of spatial distribution?

The paper is set up as follows: A brief discussion of the Economic Base Theory and some related measures such as the location quotient, the economic base multiplier, the concentration index and the linkage coefficient are provided in section 2. Section 3 gives a detailed description of the Saudi manufacturing sector. Section 4 analyzes the statistical results. The paper concludes in section 5 with  summary and assessment of the findings.

## II. Theory and Methodology

Economic Base Theory is considered as a unique economic theory in the field of regional economics. The idea underlined is that a region's economic activities can be divided into two sectors: basic and non-basic activities. The identification of the activities that constitute the base is one of the primary practical problems involved on the Economic Base Theory. Among the approaches that are used to classify activities is the Location Quotient (LQ) approach, which serves as an important measure for the localization of economic activities in different regions. In discussing the LQ approach it will be assumed that manufacturing employment constitutes the basic activity and all other employments constitute the non-basic activity.

### 2.1 The Location Quotient Approach

The LQ is a statistical approach developed as a mean of identifying an area's basic sector. It is defined as the ratio between the percentage of an area's total employment in specific industry and the percentage of national employment in the same industry. In symbols, it is written as:

$$Lq_{ir} = \frac{E_{ir}/E_r}{E_{in}/E_n} \qquad (1)$$

L $q_{ir}$  = The location coefficient of industry (i) in region (r).

$E_{ir}$    = Employment of region (r) in industry (i).

$E_r$     = Total employment of region (r).

$E_{in}$    = National employment in industry (i).

$E_n$     = Total national employment.

The numerator of equation (1) shows the share of the region (r)'s employment in

industry (i), while the denominator shows the share of national employment in industry (i).

Another way to define the (Lq) is the ratio between the percentage of an industry employment in a specific region divided by the percentage of national employment in the same region. This could be written as:

$$Lq_{ir} = \frac{E_{ir}/E_{in}}{E_r/E_n} \qquad (2)$$

Generally, if the location quotient is greater than one ($Lq_{ir} > 1$), then the assumption is that industry (i) is satisfying non-local demand, that is the region is exporting the output of industry (i). In order to find how much of industry (i) 's output satisfying non-local demand, we assume that region (r) consumes the same share of industry (i) 's output as the nation does. Therefore we get:

$$B_{ir} = E_{ir} - E_r\left(\frac{E_{in}}{E_n}\right) \qquad (3)$$

where ($B_{ir}$) reflects the fraction of the industry (i) 's output that satisfies non-local demand. The first term of the right-hand side shows the region employment in industry (i), while the second term shows an estimated region employment in industry (i) that satisfies local demand. Using simple algebra, expression (3) could be rewritten as follows:

$$B_{ir} = \left[1 - \frac{1}{Lq_{ir}}\right]E_{ir} \qquad (4)$$

$$or \qquad B_{ir} = \left[\frac{E_{ir}}{E_r} - \frac{E_{in}}{E_n}\right]E_r \qquad (5)$$

$$or \qquad B_{ir} = \left[\frac{E_{ir}}{E_{in}} - \frac{E_r}{E_n}\right]E_{in} \qquad (6)$$

Clearly, equation (4) gives an important relationship between ($Lq_{ir}$) and ($B_{ir}$). When $[Lq_{ir} > 1]$ then ($B_{ir}$) is positive, and this means industry (i) is satisfying non-local demand. In other words, it is exporting the output of ($B_{ir}$) workers. When $[Lq_{ir} \leq 1]$, then ($B_{ir}$) is zero or negative, and this means industry (i) is satisfying only local demand.

The theoretical rationale for the location quotient approach could be shown easily using equation (6) with the following interpretation:

$\frac{E_{ir}}{E_{in}}$ = An estimate of the region's share of total national production of (i) (supplied).

$\frac{E_r}{E_n}$ = An estimate of the region's share of total national consumption (Demand).

Any excess supply is then assumed to be exported.

Finally, it is worthwhile to mention that the location quotient approach is based on the following four assumptions. First, labor productivity in industry (i) must be the same in region (r) as in the nation. Second, consumption per worker of industry ((i) 's output is the same in region (r) as in the nation. Third, products are homogeneous which means a region cannot both import and export the products of industry (i). Fourth, no net exports from the nation, or in other words, the nation consumes its entire production [2].

## 2.2 Economic Base Multiplier

The above standard Economic Base Theory yields a single multiplier for each region. Therefore, all basic employment is assumed to have the same local multiplier effects[3]. The essential assumption of the theory is that any change in the employment of basic activity (B) should result in a change in the non-basic (NB) activity in the same direction and by the same proportion [4]. For example, a decline in basic employment should result in a proportionate fall in non-basic employment. This effect is described by the Economic Base Multiplier (EBM) and it could be expressed as[5].

$$EBM = \frac{\text{Total Employment (T)}}{\text{Basic Employment (B)}} = \frac{B + NB}{B}$$
$$= 1 + b$$

This means if basic activity was to rise by one worker, total activity would rise by (1+b) workers.

## 2.3 Some Related Measures

More than one quantitative measure of industrial activity will be introduced in this section such as concentration index (CI), linkage coefficient (LC), and correlation coefficient (CC). The concentration index shows the degree of concentration of each industry. It compares population relative distribution among regions to the relative distribution f manufacturing employment among regions. This index could be calculated using the following formula:

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(2) If an industry exports to international markets, then the ratio (Er/En) is higher than it ought to be, which means that (Bir) is underestimated.

(3) Such multiplier may conceal a great deal of important information. For example, aggregate multipliers ignore differences in wage rates paid to workers in different segments of the basic sector.

(4) This means the ratio NB to B is constant, that is $\frac{NB}{B} = b = \text{Constant}$ .

(5) It is often called the export base multiplier and it is derived in the following way:
Since $T = B + NB$, where the NB is dependent upon the basic sector and is proportional to it in size, therefore,: $NB = a + bB$
Frequently, empirically (a) has been found to be zero : $a \cong 0$
This means : $NB = bB$
By direct substitution in the T equation : $T = B + bB = B(1+b)$
Thus $\Delta T = \Delta B (1+b)$
$\frac{\Delta T}{\Delta B} = \frac{T}{B} = 1 + b$

$$CI = \frac{1}{2} \sum \left( \frac{N_r}{N_n} - \frac{E_{ir}}{E_{in}} \right)$$

where,

$\frac{N_r}{N_n} =$ percentage of region (r) population to the country 's total population.

$\frac{E_{ir}}{E_{in}} =$ percentage of region (r) employment in industry (i) to the country 's total employment in the same industry (i).

The spatial concentration is large when the index value is high, and the opposite is true.

The second measure is the linkage coefficient, which shows the degree of spatially aggregation of industrial activities and the spatial interdependency of one industry to another or to other industries. This coefficient could be calculated using the following formula:

$$LC = \frac{100 - \sum \pm \left( \frac{E_r}{E_n} - \frac{E_{ri}}{E_{ni}} \right)}{100}$$

where,

$\frac{E_r}{E_n} =$ percentage of manufacturing employment in region (r).

$\frac{E_{ri}}{E_{ni}} =$ percentage of region (r) manufacturing employment in industry (i).

A linkage coefficient of one would indicate that industry (i) and other industries are perfectly associated geographically with each other, which means they are spatially linked together and vary in the same fashion. Values of zero means that no spatial linkage between industry (i) and other industries, and they tend to vary spatially independent of one another.

The last measure is the correlation coefficient. It shows how employment in a given industry distributed among regions is correlated to population distribution among the same regions. Absolute values of correlation coefficient range from 0 to 1. A value of 1 would indicate that there is a balanced distribution of industry (i) activity among different regions.

### III. The Saudi Manufacturing Sector

One of the main objectives of the Saudi sixth development plan (1995-2000) is the expansion and the diversification of the country economic base. More emphasis in this plan is given to the manufacturing sector for two reasons: First, to lessen the country's dependency on the depletable resource of oil as the main source of national income. Second, to establish a developed industrial base that benefits from the country's comparative advantages in capital-intensive industries.

The manufacturing sector in Saudi Arabia is a major producing sector in the economy, and it consists of three main sub-sectors. The first is the petrochemicals sub-sector, which constitutes the base of the country's industrial development. Most

petrochemicals' industries production is attributed to SABIC [Saudi Arabia Basic Industries Company]. The oil refining is the second sub-sector. It includes all incorporated industries into Saudi ARAMCO, which undertakes all refining and marketing activities within the country. Lastly, the transforming industries sub-sector includes all other manufacturing industries.

The contribution of the manufacturing sector and its sub-component to the Saudi Gross Domestic Product (GDP) during the fifth development plan (1990-1995) is given in Table (1). It shows that other manufacturing industries sector had the highest contribution to GDP and it constitutes 47% of total manufacturing contribution. At the same time, it achieved the lowest average annual growth rate. The petroleum refining industries reached the highest growth rate.

Table (1)
The Contribution of Manufacturing Sector to GDP in (1990-1995)
(At constant 1990 prices)

| Sector | Value Added (SR billions) | Average Annual Growth (%) |
|---|---|---|
| Petrochemicals | 3.0 | 5.6 |
| Petroleum Refining | 13.5 | 7.5 |
| Other Manufacturing | 14.6 | 4.4 |
| Total Manufacturing | 31.1 | 4.3 |

Source: Sixth Development plan, 1990-1995, Table 2.2

The administrative classification of Saudi Arabia divides the Kingdom into five large regions, which are: Western, Eastern, Northern, Southern, and Central region. Moreover, these five regions include 13 sub-regions, namely, Riyadh, Qasim, Makkah, Madinah, Eastern region, Jizan, Najran, Aseer, Baha, Hail, Tabouk, Northern region, and Jouf. These sub-regions differ in many economic, demographic, and geographic factors such as the economic development level, population size, land area, etc. The spatial unit employed in this study is the sub-region, which we will refer to as a region.

In 1995, the total number of Saudi licensed productive factories in different manufacturing industries was (2,476), with a total number of (224,877) manpower employment. The total invested capital in these productive factories is SR (163) billions ($ 44 billions).

Table (2) shows the relative distribution of the total number of factories (N), financed or invested capital (K), and employment in productive licensed factories according to administrative regions in the Kingdom up to the end of 1995, [6]. The top three regions regarding the number of factories and total financing were Riyadh, Makkah, and the Eastern region respectively. The first region reached (861) factories accounting for (34.8%) of the total factories, the second achieved (660) factories accounting for (26.7%) and the third got (600) factories accounting for (24.2%). For the same year, the opposite order holds for the top three regions regarding capital investment of total financing in billions of Saudi Riyals (SR). The Eastern region

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(6) The factories are licensed under the national industry protection and encouragement law and the foreign capital investment law.

occupies the first position with about SR (83) billions, representing (50.7%) of the total financing of all factories. The second position is occupied by Makkah region, where the financing amount for the factories reached SR (31.4) billions accounting for (19.3%) of total financing. Riyadh occupied the third position with total financing of SR(22.1) billions and accounting for (13.6%) of total financing. Finally, the top three regions in terms of employment in productive factories were Riyadh, the Eastern region, and Makkah respectively. Riyadh industrial employment was (78,614) workers, representing (35%) of total manufacturing employment, while employment in the Eastern region was (64,288) workers representing (26.6%) of total manufacturing employment. In Makkah, there were (62,518) workers representing (27.8%) of total employment. At the other extreme, the Northern region was considered the last region regarding the number of factories (5 factories only), capital financing (SR 13.9 billions), and manufacturing employment (92 workers).

Table (2)
Relative Distribution of Total Number of Factories (N), Capital (K),
and Total Employment (L) in Productive Licensed Factories according to Regions.

| Variable Region | Factory | | Labor | | Capital | |
|---|---|---|---|---|---|---|
| | N | % | L | % | K (billion) | % |
| Riyadh | 861 | 34.77 | 78614 | 34.96 | 22133.7 | 13.56 |
| Qasim | 101 | 4.08 | 5537 | 2.46 | 2439.92 | 1.50 |
| Makkah | 660 | 26.66 | 62518 | 27.80 | 31441.39 | 19.27 |
| Madinah | 94 | 3.80 | 8704 | 3.87 | 22048.7 | 13.51 |
| Eastern | 600 | 24.23 | 64288 | 28.59 | 82724.31 | 50.70 |
| Jizan | 24 | 0.97 | 1273 | 0.57 | 1361.9 | 0.83 |
| Najran | 15 | 0.61 | 450 | 0.20 | 105.45 | 0.06 |
| Aseer | 50 | 2.02 | 1760 | 0.78 | 483.68 | 0.30 |
| Baha | 11 | 0.44 | 214 | 0.10 | 46.93 | 0.03 |
| Hail | 22 | 0.89 | 583 | 0.26 | 125.07 | 0.08 |
| Tabouk | 21 | 0.85 | 541 | 0.24 | 182.54 | 0.11 |
| Northern | 5 | 0.20 | 92 | 0.04 | 13.94 | 0.01 |
| Jouf | 12 | 0.48 | 303 | 0.13 | 72.15 | 0.04 |
| Total | 2476 | 100 | 224877 | 100 | 163179.71 | 100 |

Regarding the shares of different industrial activities in the above three variables: number of factories (N), capital (K), and total employment (L), Table (3) shows their relative distributions according to industrial activity [7]. The highest Saudi industries in terms of number of factories and total employment is the fabricated metal products followed by the chemicals and petroleum industry. There were (658) factories in the former industry, representing (27.7%) of total number of Saudi factories, and employing (56,251) workers that accounts for (25%) of total manufacturing employment. In the latter activity there were (464) factories, representing 1(8.7%) of total factories, and total employment of (51,937), accounting for (23%). The highest industry in terms of capital financing is the manufacture of chemicals and petroleum,

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(7) The relative distributions of those three variables among regions within each industry and also among industries within each region are shown in Appendix.

followed by the manufacture of construction materials. The first represents (61.8%) of total capital invested in manufacturing while the second represents (13%) only. At the other extreme, the lowest industry is the transportation and storage; its share is less than 1% in each of the above discussed variables.

Table (3)
Relative Distribution of Total Number of Factories (N), Capital (K), and Total Employment (L) in Productive Licensed Factories according to Industrial Activities.

| Economic Variable / Industrial Sector | Factory | | Labor | | Capital | |
|---|---|---|---|---|---|---|
| | N | % | L | % | K (billion) | % |
| Food and Beverages | 391 | 15.79 | 31405 | 13.97 | 11293.98 | 6.92 |
| Textile & leather Industries | 108 | 4.36 | 12905 | 5.74 | 2592.47 | 1.59 |
| Wood & furniture | 109 | 4.40 | 9241 | 4.11 | 1495.58 | 0.92 |
| Paper products & Publishing | 163 | 6.58 | 12242 | 5.44 | 4599.11 | 2.82 |
| Chemicals & Petroleum | 464 | 18.74 | 51937 | 23.10 | 100874.8 | 61.82 |
| Construction Materials | 463 | 18.73 | 40758 | 18.12 | 21169.12 | 12.97 |
| Basic Metal Industries | 15 | 0.61 | 3727 | 1.66 | 4371.87 | 2.68 |
| Fabricated Metal Products | 658 | 27.67 | 56251 | 25.01 | 15457.66 | 9.47 |
| Other Manuf. Industries | 59 | 2.38 | 4455 | 1.98 | 933.75 | 0.57 |
| Transport & Storage | 19 | 0.77 | 1956 | 0.87 | 391.37 | 0.24 |
| Total | 2476 | 100 | 224877 | 100 | 163179.71 | 100 |

In general, the above comparisons of structural and geographical relative distributions of number of factories, manufacturing employment, and financed capital indicate that the top three Saudi industrial regions were Riyadh, Makkah, and the Eastern region. The share of these three regions is (85.7%) of total number of factories, (91.3%) of total manufacturing employment, and (83.5%) of total capital invested in manufacturing. On the other hand, the top three Saudi industrial activities were chemicals and petroleum, construction materials, and fabricated metal products. The share of these three activities is (65.1%) of total factories, (66.2%) of manufacturing employment, and 84.2% of total manufacturing investment.

During the period 1983-1996, the number of productive factories has increased from 1,078, with total financed capital of SR (53) billions, to (2,476) factories with SR (163) billions of financed capital. The annual growth rates in the number of productive factories and total financed capital were (6.6%) and (9.0%) respectively.

Table (4) shows the growth rates of the number of factories and total capital in each Saudi industrial activity for the 1983-1996 period. As mentioned above, during this period the national average rate equals (6.6%) in the number of factories, and (9%) in the capital financing, and (4.8%) in manufacturing employment. There were six of the ten industrial activities with growth rate in the number of factories above the national rate. The highest growth rate was achieved by the textile and leather industries (13.0%), followed by other manufacturing industries (10.6%), whereas the lowest growth rate was achieved by the construction materials industry (4.5%).

Table (4)
Industrial Annual Growth Rates of Number of Factories, Capital,
and Manufacturing Employment: 1983-1996.

| Economic Variable / Industrial sector | Number of factories (N) | | Capital financing (K) | | Manufacturing Employment (L) | |
|---|---|---|---|---|---|---|
| | Growth Rate (%) | Relative performance | Growth Rate (%) | Relative performance | Growth Rate (%) | Relative performance |
| Food and Beverages | 5.8 | B | 4.7 | B | NA | NA |
| Textile & leather Industries | 13.0 | A | 7.7 | B | NA | NA |
| Wood & furniture | 8.4 | A | 10.2 | A | NA | NA |
| Paper products & Publishing | 5.0 | B | 7.9 | B | NA | NA |
| Chemicals & Petroleum | 9.1 | A | 15.3 | A | NA | NA |
| Construction Materials | 4.5 | B | 2.5 | B | NA | NA |
| Basic Metal Industries | 8.8 | A | 19.8 | A | NA | NA |
| Fabricated Metal Products | 6.7 | A | 5.5 | B | NA | NA |
| Other Manuf. Industries | 10.6 | A | 6.6 | B | NA | NA |
| Transport & Storage | 0.0 | B | 0.0 | B | NA | NA |
| Total | 6.6 | __ | 9.0 | __ | 4.8 | __ |

\*   (A) refers to above average and (B) to below average.
\*\* NA means data are not available to calculate growth rates.

The same Table shows that there were only three industries with capital growth rate above the national average rate. These industries were basic metal industries (19.8%), chemicals and petroleum (15.3%), and wood and furniture (10.2%).

Clearly, the relative performance of these three industries was above the national average growth rates both in number of factories and financed capital. The lowest growth rate in capital financing was (2.5) and achieved by construction materials industry. Finally there is no growth in the transport and storage industry.

Table (5) shows regional rates of growth of the following variables: number of factories, capital and manufacturing employment for the 1983-1996 period. During this period there were two regions only (Madinah and the Northern region) with growth rates in each variable above the national growth rate. At the other extreme, five regions achieved relative performance in growth rate in each variable below the national average rate. The highest growth rate in number of factories was reached by Jouf (14.8%) , while the lowest was achieved by Baha (1.6%). The Northern region achieved highest growth rates in capital financing (44.2%) and manufacturing employment (19.6%). The lowest rate for capital growth was obtained by Jizan (0.3%), and for manufacturing employment the lowest was obtained by Baha (1.7%).

The location of Saudi industries in different regions depends on the principle of profit maximization. For this reason, industrial investors have a tendency to locate their projects in developed regions (e.g. Riyadh, Makkah, Madinah, and the Eastern region) to utilize the infrastructure achievements and advanced services that are available in these areas. Also, to benefit from the good market conditions that exist in such developed regions. On the other hand, some other regions such as Najarn and the Northern region faced lack of industrial projects. Regional differences have increased

during the last two decades all over the country. This could be attributed to the unbalanced distributions of industrial investments among different regions. The main consequences of these regional differences are the noticeable inequalities in regional income levels and the continuous internal migration of Saudi labor forces from rural to urban areas.

Table (5)
Regional Annual Growth Rates of Factories Number, Capital,
and Manufacturing Employment: 1983-1996.

| Economic Variable / Region | Number of factories (N) | | Capital financing (K) | | Manufacturing Employment (L) | |
|---|---|---|---|---|---|---|
| | Growth Rate (%) | Relative performance | Growth Rate (%) | Relative performance | Growth Rate (%) | Relative performance |
| Riyadh | 7.4 | A | 4.7 | B | 5.1 | B |
| Qasim | 6.6 | A | 2.6 | B | 4.9 | A |
| Makkah | 6.2 | B | 7.9 | B | 4.3 | B |
| Madinah | 7.2 | A | 10.5 | A | 6.3 | A |
| Eastern | 6.1 | B | 33.3 | A | 4.7 | B |
| Jizan | 5.5 | B | 0.3 | B | 2.2 | B |
| Najran | 10.7 | A | 8.0 | B | 10.4 | A |
| Aseer | 5.8 | B | 3.3 | B | 4.7 | B |
| Baha | 1.6 | B | 0.9 | B | 1.7 | B |
| Hail | 5.5 | B | 6.1 | B | 6.9 | A |
| Tabouk | 4.4 | B | 3.0 | B | 3.2 | B |
| Northern | 13.2 | A | 44.2 | A | 19.6 | A |
| Jouf | 14.8 | A | 8.5 | B | 9.4 | A |
| Total | 6.6 | ____ | 9.0 | ____ | 4.8 | ____ |

* (A) refers to above average and (B) to below average.

Undoubtedly, an equal distribution of industrial investments among different regions in the country is not recommended. The existing differences between these regions especially in terms of the economic factors such as the market size, the availability of economic resources, and the distance from international markets influence the distribution of the industrial investment. Therefore the question is on what basis the Saudi industries have been distributed?, and has this distribution considered such economic factors or it has happened randomly?. These questions and others will be answered in the next section of the paper.

## IV. Statistical Results

The data for this study are published in the Industrial Statistics Bulletin for the year 1995[8]. These data are consistent for all variables and ready for use without any adjustment [9]. In order to analyze the regional distribution of different manufacturing industries in Saudi Arabia, the Economic Base Theory was applied using the above-discussed concepts of location quotient, base multiplier, and some other coefficients.

The main assumption in the study is that the manufacturing sector constitutes the

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(8) **Industrial statistics department, Deputy Ministry of Industrial Affairs** (1995), Ministry of Industry & Electricity, Kingdom of Saudi Arabia. *Industrial Statistical Bulletin*

(9) Data for economic variables, industrial activities, and regions are listed in Appendix.

basic activity in Saudi Arabia, and all other sectors constitute the non-basic activity. For the calculation of location quotient (Lq) coefficients, we used expression (2), which shows the ratio of regional share of a given industry employment to regional share of manufacturing employment. Expression (6) was used to calculate the $(B_{ir})$ coefficients, which give the regional excess supply and demand of manufacturing products. Table (6) gives the calculated (Lq) coefficients for each industry and each region, while Table (7) gives the matrix of $(B_{ir})$ coefficients. Table (6) also shows that food and beverages industries are localized in nine of the (13) Saudi regions; the location quotient coefficient in each of these places is greater than or equal to one $(Lq \geq 1)$. This means that each of these regions is satisfying non-local demand, and it is exporting food and beverages to other regions in the country. The highest regions contributing to exports are Jouf (2.221), Qasim (2.148), Aseer (2.217), and Tabouk (1.932). The areas of Riyadh, Madinah, the Eastern and Northern regions are importing this industry products, the (Lq)'s in these regions are (0.721), (0.883), (0.818), and zero respectively. Baha region is a self-sufficient region because its (Lq) coefficient was close to one (1.037).

According to the coefficient of $(B_{ir})$, shown in Table (7), Riyadh is considered the most important region in terms of importing food and beverages products. It imports the output of (3062) workers, whereas the Eastern region imports the output of (1633) workers. In contrast, Makkah was the most important in exporting these industrial products followed by Qasim. The previous conclusion about Baha as self-sufficient region is supported by the very low coefficient of $(B_{ir})$ for this region (1.11). That means it is neither exporting nor importing the products of food and beverages industry.

For the textile and leather industry, the Tables show that seven regions in the country have no such activity. This industrial activity is concentrate in three regions: Riyadh, Jouf, and Madinah. The (Lq) coefficient in each of these regions is greater than one. Regarding this industry, Riyadh occupies the first position in exporting its output. It exports the output of (3416) workers. The Eastern region and Makkah are two major importers of textile and leather products; they import the output of (2450) and (523) workers respectively.

The wood and furniture industry is localized in six regions. The (Lq) is greater than one in Hail, Riyadh, Qasim, Madinah, and the Eastern region. It is less than one in Makkah. In the other seven regions, the (Lq) equals zero, which means none of them has wood and furniture industry. The results show that Riyadh is the main exporter for products of this industry (907.45), while Makkah is the main importer. Although the (Lq) coefficient for Hail is relatively high (4.425), its exporting importance is limited (82.04). This unexpected result is attributed to the fact that the (Lq) for this region is overestimated, because of the low value of the ratio $\left(\frac{E_i}{E_n}\right)$, which is the denominator of the (Lq) coefficient.

The industry of paper products and publishing is spread out in ten Saudi regions. Five of them have (Lq) greater than one (Baha, Jouf, Hail, Makkah, and Riyadh), and the other five have less than one (Madinah, Aseer, Qasim, Jizan, and Eastern region). Three areas in the country do not have industrial paper products and publishing

activity (Najran, Tabouk, and the Northern region). The products of this industry are exported by Makkah and Riyadh. The first exports the production of (1322) workers while the second exports the production of (168) workers. In the meantime, the products are imported by the Eastern region (643), Madinah (447), and Qasim ((261). The Hail region exports are very limited (13.26), even though its (Lq) coefficient is high. The above reasoning applies here for the possibility of overestimation of this coefficient.

The chemicals and petroleum industry prevails in every region, but with different levels of concentration. Every region has a different share of this industry. This conclusion is drawn from the finding that (Lq) differs from one region to another. This coefficient is greater than one in five regions (Madinah, Eastren region, Tabouk, Najarn, and the Northern region) and less than one in the others. The high value of (Lq) in Madinah (1.706) and the Eastern region (1.366) means that this industry is highly concentrated in these two regions. This result could be attributed to the existence of new large industrial cities in these two regions: Yanbu and Jubail. The high value of the location coefficient in the other regions is due to the calculation method of the coefficient where each region is characterized by its noticeable low share of chemicals industry. The Eastern region is considered the most important region in exporting chemicals and petroleum; it exports the output of (5433) workers. Madinah comes next, where it exports the output of (1419) workers. Riyadh is the only main importer of this industry products; it imports the output of (4780) workers. Makkah and Qasim import chemical and petroleum products, but not as much as Riyadh. The first imports (964) and the second (453) of workers output. The exports or imports of other regions are very limited.

The construction materials industry is available in all Saudi regions. The (Lq) is greater than one in ten regions and less than one in the other three. The ($B_{ir}$) shows that Riyadh is exporting the amount of (1408) workers output, followed by Madinah (941), Jizan (624), Aseer (571), and Qasim (544). Also, it indicates that Makkah imports the output of (2993) workers and the Eastern region imports the output of (1355) workers. The importance of other regions in terms of exports and imports is limited.

The activity of basic metal industries is located in three regions: the Eastern region, Makkah, and Riyadh. The (Lq) is greater than one in the first and less than one in the other two regions. The Eastern region is the only net exporting region of basic metal output in the country; it exports the output of (1471) workers. The main importer of this industry output is Riyadh. For the fabricated metal products, the (Lq) coefficient is greater than one in three regions only. Riyadh occupies the first position regarding the exports of fabricated metal products followed by Makkah then the Eastern region. They export the output of (1757), (606), and (368) workers respectively. On the other hand, Madinah imports (1722) of workers output while Qasim (348) only.

The other manufacturing industries are located in five regions only. The (Lq) coefficient is (1.411) in Makkah and (1.39) in Riyadh. This means they are the main two net exporters of these industry products. The first exports the output of (529) workers and the second exports the output of (509) workers. On the other hand, the

Eastern region imports the output of (899) workers. The other two importers are Madinah and Qasim.

Finally, the location of transport and storage industry seems to be in seven regions only. The (Lq) is greater than one in Jizan, Riyadh, and Tabouk, and it is less than one in Madinah, Qasem, Makkah, and the Eastern region. Riyadh exports the output of (753) workers from this industry. The Eastern region and Makkah imports the output of (389) and (346) workers, respectively. Other areas are limited in their exports or imports of this industry product.

In summary, the statistical results of this study indicate that Riyadh region is the main exporter of the following industries products: textile and leather, wood and furniture, paper products and publishing, construction materials, basic metal, other manufacturing industries and finally transport and storage. Moreover, Riyadh is the main importer of food and beverages, chemicals and petroleum, and basic metal products.

In order to determine and evaluate the importance of each region according to its contribution to the volume of total internal trade, we used the following expression:

$$T_r = \frac{\sum_i |B_{ir}|}{\sum_{i,r} |B_{ir}|}$$

It shows the ratio in absolute value between the sum of total exports and imports of all industries in a given region to the sum of total exports and imports of all industries in the country. This gives the ratio of regional trade volume to the ratio of industrial internal trade in the country. Table (8) gives these regional shares used in internal trade. It shows that about one-third of internal trade passes through Riyadh, one-quarter through the Eastern region, and one-fifth through Makkah. In general, (78%) of the total internal trade is concentrated in these three regions. Applying the same methodology, regional shares with respect to population size of different Saudi regions have been calculated as shown in the same Table (8) also. It shows that Makkah occupies the first position with a share of total population equals (26.36%), Riyadh comes second with a share of (22.6%) followed by the Eastern region with (15.2%).

Table (6)
Location Quotient (Lq) For Saudi Productive Industries
According to Employment (1995)

| Industrial Sector \ Region | Riyadh | Qasim | Makkah | Madina | Eastern | Jizan | Najran | Aseer | Baha | Hail | Tabouk | Northern | Jouf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Food and Beverages | 0.721 | 2.148 | 1.387 | 0.883 | 0.818 | 1.479 | 1.273 | 2.217 | 1.037 | 1.720 | 1.932 | 0.000 | 2.221 |
| Textile and leather Industries | 1.757 | 0.192 | 0.854 | 1.81 | 0.336 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.323 |
| Wood and Furniture | 1.281 | 1.134 | 0.635 | 1.032 | 1.037 | 0.000 | 0.000 | 0.000 | 0.000 | 4.425 | 0.000 | 0.000 | 0.000 |
| Paper Products and Publishing | 1.039 | 0.133 | 1.388 | 0.057 | 0.816 | 0.159 | 0.000 | 0.198 | 3.519 | 1.418 | 0.000 | 0.000 | 1.758 |
| Chemicals and Petroleum | 0.737 | 0.646 | 0.933 | 1.706 | 1.366 | 0.075 | 1.35 | 0.231 | 0.749 | 0.223 | 1.377 | 1.224 | 0.729 |
| Construction Materials | 1.099 | 1.542 | 0.736 | 1.597 | 0.884 | 3.706 | 2.366 | 2.790 | 2.707 | 1.287 | 1.316 | 3.058 | 0.747 |
| Basic Metal Industries | 0.159 | 0.000 | 0.950 | 0.000 | 2.381 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fabricated Metal Products | 1.089 | 0.749 | 1.039 | 0.209 | 1.023 | 0.254 | 0.524 | 0.482 | 0.000 | 0.864 | 0.636 | 0.652 | 0.858 |
| Other Manufacturing Industries | 1.339 | 0.711 | 1.411 | 0.974 | 0.294 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Transport and Storage | 2.101 | 0.581 | 0.364 | 0.977 | 0.304 | 3.702 | 0.000 | 0.000 | 0.000 | 0.000 | 1.700 | 0.000 | 0.000 |

Table (7)
Matrix of Saudi Regional Excess Supply and Demand of
Manufacturing Products ($B_{ir}$ Coefficients)

| Industrial Sector / Region | Riyadh | Qasim | Makkah | Madina | Eastern | Jizan | Najran | Aseer | Baha | Hail | Tabouk | Northern | Jouf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Food and Beverages | -3061.77 | 887.74 | 3379.10 | -142.55 | -1633.08 | 85.22 | 17.16 | 299.21 | 1.11 | 58.58 | 70.45 | -12.85 | 51.68 |
| Textile and leather Industries | 3415.58 | -256.75 | -522.72 | 90.50 | -2450.29 | -73.05 | -25.82 | -101.00 | -12.28 | -33.46 | -31.05 | -5.28 | 5.61 |
| Wood and Furniture | 907.47 | 30.46 | -938.09 | 11.32 | 97.18 | -52.31 | -18.49 | -72.32 | -8.79 | 82.04 | -22.23 | -3.78 | -12.45 |
| Paper Products and Publishing | 168.36 | -261.43 | 1321.60 | -446.83 | -642.75 | -58.30 | -24.50 | -76.81 | 29.35 | 13.26 | -29.45 | -5.01 | 12.51 |
| Chemicals and Petroleum | -4780.48 | -452.81 | -963.99 | 1418.75 | 5433.21 | -272.01 | 14.07 | -312.48 | -12.42 | -104.65 | 47.05 | 4.75 | -18.98 |
| Construction Materials | 1407.55 | 544.44 | -2993.12 | 941.44 | -1354.93 | 624.27 | 111.44 | 571.01 | 66.21 | 30.33 | 30.95 | 34.33 | -13.92 |
| Basic Metal Industries | -1095.91 | -91.77 | -52.14 | -144.26 | 1470.52 | -21.10 | -7.46 | -29.17 | -3.55 | -9.66 | -8.97 | -1.52 | -5.02 |
| Fabricated Metal Products | 1757.40 | -348.03 | 605.67 | -1722.23 | 367.92 | -237.43 | -53.56 | -228.25 | -53.53 | -19.83 | -49.33 | -8.01 | -10.79 |
| Other Manufacturing Industries | 528.59 | -31.69 | 509.47 | -4.43 | -898.60 | -25.22 | -8.91 | -34.87 | -4.24 | -11.55 | -10.72 | -1.82 | -6.00 |
| Transport and Storage | 753.21 | -20.16 | -345.79 | -1.71 | -389.18 | 29.93 | -3.91 | -15.31 | -1.86 | -5.07 | 3.29 | -0.80 | -2.64 |

Comparing trade shares to population shares in the same Table for each region, we notice that trade share of four regions is greater than its population share. These regions are Riyadh, the Eastern region, Madinah and Qasim. The opposite is true for some other regions such as Makkah, Jizan, and Aseer.

Finally, the Export Base Multipliers are calculated for each region in the country as shown in Table (8). The Table indicates that the multipliers are high in the less developed regions, especially Tabouk (15.42) and the Northern region (13.75), while the multipliers are low in the more developed regions especially Riyadh (4.28), Makkah (3.74), and the Eastern regions (4.07). Even though the multipliers of the less developed regions tend to be overestimated, their implication is very important. They indicate that the industrial investment in the less developed regions has greater impact than in the more developed regions. This implies the necessity of distributing industrial investment among Saudi regions on a more equitable basis.

Table (8)
Internal Trade, Population Size and Export Base Multiplier
in Saudi Regions

| Region | Internal Trade | Population Size | Export Base Multiplier |
|---|---|---|---|
| Riyadh | 31.54 | 22.64 | 4.28 |
| Qasim | 5.16 | 4.43 | 6.36 |
| Makkah | 20.52 | 26.36 | 3.74 |
| Madinah | 8.69 | 6.42 | 5.58 |
| Eastern | 26 | 15.20 | 4.07 |
| Jizan | 2.61 | 5.11 | 13.98 |
| Najran | 0.5 | 1.78 | 9.84 |
| Aseer | 3.07 | 7.91 | 11.20 |
| Baha | 0.34 | 1.96 | 10.60 |
| Hail | 0.65 | 4.42 | 8.92 |
| Tabouk | 0.54 | 2.87 | 15.42 |
| Northern | 0.14 | 1.35 | 13.75 |
| Jouf | 0.25 | 1.58 | 10.15 |
| Total | — | — | 4.97 |

Finally, Table (9) shows the calculated values of some related measures of all Saudi industrial activities. The overall concentration coefficient in manufacturing industry is (0.27), which is relatively low. The highest concentration coefficient value is (0.53) for the basic metal industries and the lowest is (0.24) for food and beverages industry.

Fabricated metal products have the highest spatial aggregation among other industries in Saudi Arabia with a value of linkage coefficient equals to (0.95), whereas the lowest linkage value equals (0.60) for the transport and storage industry.

Table (9) contains also the estimation of the correlation coefficients between the regional population distribution and the regional employment distribution for each industrial sector. These coefficients show that there is relatively balanced distribution of food and beverages industry among different Saudi regions, while the opposite is true for the basic metal industries. Generally, the correlation coefficient of Saudi manufacturing sector is (0.98), which is relatively high.

Table (9)
Coefficients of Some Related Measures: Concentration,
Linkage and Correlation.

| Industrial sector | Concentration | Linkage | Correlation |
|---|---|---|---|
| Food & Beverages | 0.24 | 0.85 | 0.99 |
| Textile & leather Industries | 0.39 | 0.73 | 0.93 |
| Wood & Furniture | 0.37 | 0.88 | 0.96 |
| Paper Products & Publishing | 0.34 | 0.87 | 0.97 |
| Chemicals & Petroleum | 0.27 | 0.87 | 0.97 |
| Construction Materials | 0.26 | 0.89 | 0.98 |
| Basic Metal Industries | 0.53 | 0.61 | 0.86 |
| Fabricated Metal Products | 0.32 | 0.95 | 0.97 |
| Other Manufacturing Industries | 0.37 | 0.77 | 0.96 |
| Transport & Storage | 0.51 | 0.60 | 0.88 |
| Total | 0.27 | — | 0.98 |

## V. Summary and Conclusion

The aim of this paper is to describe and analyze the spatial concentration and distribution of Saudi manufacturing industries among the different regions of the country. To achieve this objective the Economic Base Theory and some related measures have been applied using manufacturing data from the Industrial Statistics Bulletin for the year of 1995.

The analysis of the data shows that the top three regions in Saudi Arabia regarding the number of factories, total capital, and manufacturing employment in 1995 were Riyadh, Makkah, and the Eastern region. At the other extreme, the Northern region was considered the least region in the country regarding the number of factories, capital, and manufacturing employment.

During the period 1983-1996, the national average growth rate in number of factories was (6.6%), capital financing was (9.0%), and manufacturing employment was (4.8%). Three Saudi industries achieved growth rates above the national average growth rates. These industries were basic metal industries, chemicals and petroleum, and wood and furniture. On the other hand, there were two regions with growth rates in number of factories, capital, and manufacturing employment above the national rate. These regions were Madinah and the Northern region.

The statistical results of the Location Coefficient (LQ) and Export Base Multiplier (EBM) show that Riyadh region is the main net exporter of the following industrial products: textile and leather, wood and furniture, paper products and publishing, construction materials, basic metal, other manufacturing industries and finally transport and storage. Moreover, Riyadh is the main importer of food and beverages, chemicals and petroleum, and basic metal products.

The analysis of some related measures indicates that about one-third of internal trade passes through Riyadh, one-quarter through the Eastern region, and one-fifth through Makkah. Also the trade share of some regions is greater than their population share. These regions are Riyadh, the Eastern region, Madinah and Qasim. Generally, the results indicate the necessity of distributing industrial investment among Saudi regions on a more equitable basis.

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**Appendix**

Table (A1)
Total Number of Factories (N), Total Capital (K), and Total Employment (L) in Productive Licensed Factories Classified by Industrial Sector and Region (1995)

| Industrial Sector | Region | Riyadh | Qasim | Makkah | Madina | Eastern | Jizan | Najran | Aseer | Baha | Hail | Tabouk | Northern | Jouf | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Food and Beverages | N | 105 | 23 | 126 | 24 | 79 | 6 | 1 | 7 | 2 | 7 | 7 | 0 | 4 | 391 |
| | L | 7917 | 1661 | 12110 | 1073 | 7345 | 263 | 80 | 454 | 31 | 140 | 146 | 0 | 94 | 31405 |
| | K | 3341.64 | 614.52 | 4361.89 | 369.46 | 2086.92 | 68.95 | 30.6 | 232.14 | 14.2 | 49.91 | 92.7 | 0 | 31.05 | 11293.98 |
| Textile and leather Industries | N | 48 | 2 | 29 | 9 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 108 |
| | L | 7927 | 61 | 3065 | 590 | 1239 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 12905 |
| | K | 1402.41 | 6.9 | 905.03 | 59.41 | 215.82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 2592.47 |
| Wood and Furniture | N | 46 | 5 | 20 | 5 | 31 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 109 |
| | L | 4138 | 258 | 1631 | 369 | 2739 | 0 | 0 | 0 | 106 | 0 | 0 | 0 | 0 | 9241 |
| | K | 647.33 | 24.74 | 349.56 | 70.77 | 385.38 | 0 | 0 | 0 | 17.8 | 0 | 0 | 0 | 0 | 1495.58 |
| Paper Products and Publishing | N | 66 | 2 | 53 | 1 | 33 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 1 | 163 |
| | L | 4448 | 40 | 4725 | 27 | 2857 | 11 | 0 | 19 | 41 | 45 | 0 | 0 | 29 | 12242 |
| | K | 1292.2 | 8.5 | 2137.61 | 8.09 | 1128.79 | 4.7 | 0 | 1.01 | 7.11 | 8.9 | 0 | 0 | 2.2 | 4599.11 |
| Chemicals and Petroleum | N | 136 | 14 | 133 | 16 | 144 | 1 | 3 | 3 | 1 | 1 | 7 | 3 | 3 | 463 |
| | L | 13376 | 826 | 13475 | 3429 | 20281 | 22 | 118 | 94 | 37 | 30 | 172 | 26 | 51 | 51937 |
| | K | 4112.31 | 296.43 | 12547.67 | 18316.1 | 65459.27 | 1.33 | 31.46 | 24.1 | 8.55 | 7.3 | 53.47 | 6.62 | 10.62 | 100874.8 |
| Construction Materials | N | 157 | 21 | 82 | 22 | 113 | 12 | 9 | 29 | 5 | 5 | 4 | 2 | 2 | 464 |
| | L | 15656 | 1548 | 8338 | 2519 | 10297 | 855 | 193 | 890 | 105 | 136 | 129 | 41 | 41 | 40758 |
| | K | 5339.75 | 1259.43 | 4328.99 | 3070.88 | 5608.26 | 1264.2 | 33.42 | 192.85 | 17.07 | 21.65 | 24.2 | 5.52 | 3.1 | 21169.12 |
| Basic Metal Industries | N | 4 | 0 | 6 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| | L | 207 | 0 | 984 | 0 | 2536 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3727 |
| | K | 30.56 | 0 | 419.7 | 0 | 3921.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4371.87 |
| Fabricated Metal Products | N | 273 | 31 | 184 | 10 | 163 | 3 | 2 | 10 | 1 | 5 | 2 | 1 | 1 | 658 |
| | L | 21422 | 1038 | 16244 | 455 | 16449 | 81 | 59 | 212 | 126 | 126 | 86 | 15 | 65 | 56251 |
| | K | 5412.55 | 216.1 | 5824.75 | 88.96 | 3801.67 | 15.3 | 9.97 | 33.58 | 0 | 19.51 | 10.77 | 1.8 | 22.7 | 15457.66 |
| Other Manufacturing Industries | N | 23 | 2 | 22 | 4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 |
| | L | 2086 | 78 | 1748 | 168 | 375 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4455 |
| | K | 325.83 | 7.5 | 501.77 | 47.55 | 51.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 933.75 |
| Transport and Storage | N | 3 | 1 | 5 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 19 |
| | L | 1437 | 28 | 198 | 74 | 170 | 41 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 1956 |
| | K | 229.1 | 6 | 64.42 | 17.52 | 65.49 | 7.44 | 0 | 0 | 0 | 1.4 | 0 | 0 | 0 | 391.37 |
| Total | N | 861 | 101 | 660 | 94 | 600 | 24 | 15 | 50 | 11 | 22 | 21 | 5 | 12 | 2476 |
| | L | 78614 | 5537 | 62518 | 8704 | 64288 | 1273 | 450 | 1760 | 214 | 583 | 541 | 92 | 303 | 224877 |
| | K | 22133.7 | 2439.92 | 31441.39 | 22048.7 | 82724.31 | 1361.9 | 105.45 | 483.68 | 46.93 | 125.07 | 182.54 | 13.94 | 72.15 | 163179.71 |

Table (A2)
Relative Distribution of Total Number of Factories (N), Total Capital (K),
and Total Employment in Productive Licensed Factories Classified by Regions for Each Industry

| Industry | | Riyadh | Qasim | Makkah | Madinah | Eastern | Jizan | Najran | Aseer | Baha | Hail | Tabouk | Northern | Jouf | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Food and Beverages | n | 26.85 | 5.88 | 32.23 | 6.14 | 20.20 | 1.53 | 0.26 | 1.79 | 0.51 | 1.79 | 1.79 | 0.00 | 1.02 | 100.00 |
| | I | 25.21 | 5.29 | 38.56 | 3.42 | 23.39 | 0.84 | 0.25 | 1.74 | 0.45 | 0.45 | 0.46 | 0.30 | 0.27 | 100.00 |
| | k | 29.59 | 5.44 | 38.62 | 3.27 | 18.48 | 0.00 | 0.27 | 2.06 | 0.13 | 0.44 | 0.82 | 0.00 | 0.93 | 100.00 |
| Texile and leather Industries | n | 44.44 | 1.85 | 26.85 | 8.33 | 17.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.93 | 100.00 |
| | I | 61.43 | 0.47 | 23.75 | 4.57 | 9.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.18 | 100.00 |
| | k | 54.10 | 0.27 | 34.91 | 2.29 | 8.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 100.00 |
| Wood and Furniture | n | 42.20 | 4.59 | 18.35 | 4.59 | 28.44 | 0.00 | 0.00 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 100.00 |
| | I | 44.78 | 2.79 | 17.65 | 3.99 | 29.64 | 0.00 | 0.00 | 0.00 | 0.00 | 1.15 | 0.00 | 0.00 | 0.00 | 100.00 |
| | k | 43.28 | 1.65 | 23.37 | 4.73 | 25.77 | 0.00 | 0.00 | 0.00 | 0.00 | 1.19 | 0.00 | 0.00 | 0.00 | 100.00 |
| Paper Products and Publishing | n | 40.49 | 1.23 | 32.52 | 0.61 | 20.25 | 0.61 | 0.00 | 0.61 | 1.84 | 1.23 | 0.00 | 0.00 | 0.61 | 100.00 |
| | I | 36.33 | 0.33 | 38.60 | 0.22 | 23.34 | 0.09 | 0.00 | 0.16 | 0.33 | 0.37 | 0.00 | 0.00 | 0.24 | 100.00 |
| | k | 28.10 | 0.18 | 46.48 | 0.18 | 24.54 | 0.10 | 0.00 | 0.02 | 0.15 | 0.19 | 0.00 | 0.00 | 0.05 | 100.00 |
| Chemicals and Petroleum | n | 29.37 | 3.02 | 28.73 | 3.46 | 31.10 | 0.22 | 0.65 | 0.64 | 0.22 | 0.00 | 1.51 | 0.22 | 0.65 | 100.00 |
| | I | 25.75 | 1.59 | 25.94 | 6.60 | 39.05 | 0.04 | 0.23 | 0.18 | 0.07 | 0.06 | 0.33 | 0.05 | 0.10 | 100.00 |
| | k | 4.08 | 0.29 | 12.44 | 18.16 | 64.89 | 0.00 | 0.03 | 0.02 | 0.01 | 0.01 | 0.05 | 0.01 | 0.05 | 100.00 |
| Construction Materials | n | 33.84 | 3.80 | 20.46 | 6.18 | 25.26 | 2.59 | 1.94 | 6.25 | 1.08 | 1.08 | 0.86 | 0.65 | 0.43 | 100.00 |
| | I | 38.41 | 4.53 | 17.67 | 4.74 | 24.35 | 2.10 | 0.47 | 2.18 | 0.26 | 0.33 | 0.32 | 0.13 | 0.10 | 100.00 |
| | k | 25.22 | 5.95 | 20.45 | 14.51 | 26.49 | 5.97 | 0.16 | 0.91 | 0.08 | 0.11 | 0.86 | 0.03 | 0.13 | 100.00 |
| Basic Metal Industries | n | 26.67 | 0.00 | 40.00 | 0.00 | 33.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| | I | 5.55 | 0.00 | 26.40 | 0.00 | 68.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| | k | 0.70 | 0.00 | 9.60 | 0.00 | 89.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Fabricated Metal Products | n | 39.85 | 4.53 | 26.86 | 1.46 | 23.80 | 0.44 | 0.29 | 1.46 | 0.00 | 0.73 | 0.29 | 0.15 | 0.15 | 100.00 |
| | I | 38.08 | 1.85 | 28.88 | 0.81 | 29.24 | 0.14 | 0.10 | 0.38 | 0.00 | 0.22 | 0.15 | 0.03 | 0.12 | 100.00 |
| | k | 35.02 | 1.40 | 37.68 | 0.58 | 24.59 | 0.10 | 0.06 | 0.22 | 0.00 | 0.13 | 0.07 | 0.01 | 0.15 | 100.00 |
| Other Manufacturing Industries | n | 38.98 | 3.39 | 37.29 | 6.78 | 13.56 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| | I | 46.82 | 1.75 | 39.24 | 3.77 | 8.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| | k | 34.89 | 0.80 | 5.74 | 5.09 | 4.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 |
| Transport and Storage | n | 15.79 | 5.26 | 26.32 | 15.79 | 26.32 | 5.26 | 0.00 | 0.00 | 0.00 | 0.00 | 5.26 | 0.00 | 0.00 | 100.00 |
| | I | 73.47 | 1.43 | 10.12 | 3.78 | 8.69 | 2.10 | 0.00 | 2.02 | 0.00 | 0.00 | 0.41 | 0.00 | 0.00 | 100.00 |
| | k | 58.54 | 1.53 | 16.46 | 4.48 | 16.73 | 1.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.00 | 0.00 | 100.00 |
| Total | n | 34.77 | 4.08 | 26.66 | 3.80 | 24.23 | 0.97 | 0.61 | 0.78 | 0.10 | 0.89 | 0.85 | 0.20 | 0.48 | 100.00 |
| | I | 34.96 | 2.46 | 27.80 | 3.87 | 28.59 | 0.57 | 0.20 | 0.30 | 0.10 | 0.26 | 0.24 | 0.20 | 0.13 | 100.00 |
| | k | 13.56 | 1.50 | 19.27 | 13.51 | 50.70 | 0.83 | 0.06 | 0.03 | 0.00 | 0.08 | 0.11 | 0.01 | 0.04 | 100.00 |

Table ( A3 )

Relative Distribution of Total Number of Factories (N), Total Capital (K), and Total Employment in Productive Licensed Factories Classified by Industrial Activities for Each Region

| Industry | | Riyadh | Qasim | Makkah | Madinah | Eastern | Jizan | Najran | Aseer | Baha | Hail | Tabouk | Northern | Jouf | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Food and Beverages | n | 12.20 | 22.77 | 19.09 | 25.53 | 13.17 | 25.00 | 14.00 | 18.18 | 31.82 | 33.33 | 33.33 | 0.00 | 33.33 | 15.79 |
| | I | 10.07 | 30.00 | 19.37 | 12.33 | 20.66 | 17.78 | 30.97 | 14.49 | 24.01 | 26.99 | 0.00 | 0.00 | 31.02 | 13.97 |
| | k | 15.10 | 25.19 | 13.87 | 1.68 | 2.52 | 5.06 | 29.02 | 47.99 | 30.26 | 39.91 | 50.78 | 0.00 | 43.04 | 6.92 |
| Textile and leather Industries | n | 5.57 | 1.98 | 4.39 | 9.57 | 3.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.59 | 8.33 | 4.36 |
| | I | 10.08 | 1.10 | 6.78 | 1.93 | 1.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.59 | 5.74 | 5.74 |
| | k | 6.34 | 0.28 | 2.88 | 0.27 | 1.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 1.59 |
| Wood and Furniture | n | 5.34 | 4.95 | 3.03 | 5.32 | 5.17 | 0.00 | 0.00 | 0.00 | 9.09 | 9.09 | 0.00 | 0.00 | 4.02 | 4.40 |
| | I | 5.26 | 4.66 | 2.61 | 4.24 | 4.26 | 0.00 | 0.00 | 0.00 | 9.09 | 9.09 | 0.00 | 0.00 | 4.02 | 4.11 |
| | k | 2.92 | 1.01 | 1.11 | 0.32 | 4.26 | 0.00 | 0.00 | 0.00 | 18.18 | 14.23 | 0.00 | 0.00 | 4.11 | 0.92 |
| Paper Products and Publishing | n | 7.67 | 1.98 | 8.03 | 1.06 | 5.50 | 4.17 | 0.00 | 2.00 | 9.09 | 9.09 | 0.00 | 8.33 | 9.57 | 6.58 |
| | I | 5.66 | 0.72 | 7.56 | 0.31 | 4.44 | 0.00 | 0.00 | 0.00 | 19.16 | 7.72 | 0.00 | 9.57 | 8.33 | 5.44 |
| | k | 5.84 | 0.35 | 6.80 | 0.04 | 1.36 | 0.86 | 0.00 | 1.08 | 15.15 | 7.12 | 0.00 | 3.05 | 9.57 | 2.82 |
| Chemicals and Petroleum | n | 15.80 | 13.86 | 20.15 | 24.00 | 20.00 | 20.00 | 6.00 | 5.34 | 9.09 | 4.55 | 33.33 | 25.00 | 16.83 | 18.70 |
| | I | 17.01 | 14.92 | 21.55 | 31.55 | 26.22 | 26.22 | 5.34 | 17.29 | 5.15 | 5.15 | 31.79 | 28.26 | 16.83 | 23.10 |
| | k | 18.58 | 12.15 | 39.91 | 79.13 | 58.00 | 0.10 | 29.83 | 4.98 | 18.22 | 5.84 | 29.29 | 47.49 | 14.72 | 61.82 |
| Construction Materials | n | 18.23 | 20.79 | 12.24 | 18.83 | 18.83 | 50.00 | 58.00 | 58.00 | 45.45 | 22.73 | 33.33 | 20.00 | 16.67 | 18.74 |
| | I | 19.92 | 27.96 | 13.34 | 16.02 | 16.02 | 67.16 | 50.57 | 50.57 | 49.07 | 17.31 | 17.31 | 55.43 | 16.67 | 18.12 |
| | k | 24.12 | 51.62 | 13.77 | 13.93 | 18.83 | 92.82 | 42.89 | 45.45 | 23.33 | 13.26 | 13.26 | 39.60 | 13.53 | 12.97 |
| Basic Metal Industries | n | 0.46 | 0.00 | 1.57 | 3.94 | 0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.61 |
| | I | 0.26 | 0.00 | 0.00 | 0.83 | 0.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.66 |
| | k | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.68 |
| Fabricated Metal Products | n | 31.71 | 30.69 | 27.88 | 25.59 | 27.17 | 12.50 | 13.33 | 20.00 | 0.00 | 22.73 | 0.00 | 21.45 | 8.33 | 27.67 |
| | I | 27.25 | 18.75 | 25.98 | 5.23 | 25.59 | 6.36 | 13.11 | 12.05 | 0.00 | 21.61 | 15.90 | 16.30 | 31.46 | 25.01 |
| | k | 24.45 | 8.86 | 18.53 | 4.60 | 13.11 | 1.12 | 9.45 | 6.94 | 0.00 | 15.60 | 5.90 | 12.91 | 31.46 | 9.47 |
| Other Manufacturing Industries | n | 2.67 | 1.98 | 3.33 | 1.33 | 2.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.38 |
| | I | 2.65 | 1.41 | 2.80 | 0.58 | 1.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.98 |
| | K | 1.47 | 0.31 | 1.60 | 0.22 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.57 |
| Transport and Storage | n | 0.35 | 0.99 | 0.76 | 0.35 | 0.83 | 4.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.77 |
| | I | 1.83 | 0.51 | 0.32 | 0.76 | 0.26 | 3.22 | 0.00 | 0.00 | 0.00 | 0.00 | 1.48 | 0.00 | 0.00 | 0.87 |
| | k | 1.04 | 0.25 | 0.20 | 0.08 | 3.19 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.77 | 0.00 | 0.00 | 0.24 |
| Total | n | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| | I | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| | k | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

# تحليل التوطن في القطاع الصناعي السعودي

## ممدوح الخطيب الكسواني و خالد بن إبراهيم الدخيل

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**المستخلص** : تهدف هذه الدراسة إلى تطبيق نظرية "القواعد الاقتصادية" على القطاع الصناعي السعودي لوصف وتحليل توزيع الصناعات بين المناطق المختلفة في المملكة العربية السعودية. وتسعى هذه الدراسة للإجابة عن الأسئلة التالية: كيف تتوزع الصناعات بين المناطق المختلفة للمملكة؟ وهل يؤدي هذا التوزيع إلى الاستخدام الأمثل للموارد المتاحة؟. وهل يؤدي توزيع الاستثمارات الصناعية إلى فوارق إقليمية؟. كيف يمكن مقارنة الهياكل الصناعية للمناطق المختلفة في المملكة، وكيف يمكن مقارنة الصناعات المختلفة من حيث توزيعها المكاني؟.

يتضمن البحث خمسة أقسام رئيسة. يشمل أولها مقدمة البحث، ويغطي الثاني الجوانب النظرية والمنهجية والمؤشرات الكمية للتوطن الصناعي (معامل التوطن، مضاعف القاعدة الاقتصادية، مؤشر التركز، معامل الترابط). ويتناول الثالث توصيف القطاع الصناعي السعودي بتوزيع المصانع المنتجة جغرافياً (ثلاثة عشرة منطقة) حسب عدد المصانع وحجم التمويل وعدد العمال، وتوزيعها حسب النشاطات الصناعية (عشرة نشاطات) وفق المتغيرات الثلاثة ذاتها. ويستعرض القسم الرابع النتائج الإحصائية لمؤشرات التوطن الصناعي المختلفة. ويضم القسم الخامس ملخص البحث.

وبينت نتائج الدراسة توطن الصناعة السعودية في ثلاث مناطق رئيسة هي الرياض ومكة المكرمة والمنطقة الشرقية، وذلك بالنظر إلى عدد المصانع وحجم التمويل وحجم العمالة. ويلاحظ أن المنطقة الشمالية من أقل مناطق المملكة توطناً للصناعة. وتبين النتائج القياسية لمؤشرات التوطن أن منطقة الرياض من أهم المناطق تصديراً لمنتجات الصناعات التالية: المنسوجات والجلود، والخشب والأثاث، ومنتجات الورق والطباعة، ومواد البناء، والمعادن الأساسية، والمعدات، والنقل والتخزين. بينما تعد منطقة الرياض من أهم المناطق استيراداً لمنتجات الصناعات الغذائية والمشروبات، والمواد الكيميائية والنفطية. كما أبرزت الدراسة أن ثلث التجارة الداخلية في المملكة يمر بمنطقة الرياض، وربعها في المنطقة الشرقية، وخمسها في منطقة مكة المكرمة. وخلصت الدراسة أخيراً إلى ضرورة توزيع الاستثمارات الصناعية في المملكة بصورة أكثر عدالة بين المناطق المختلفة .