

NEWER ASPECTS OF LOCATION IN EGYPTIAN INDUSTRY

by

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1.—Significance of the term location.

The term location connotes a relation between industry and geographical area (1), but—as Florence puts it—the significance to the economist lies in the relation of the industry to the distribution of the occupied industrial population as a whole (2). Moreover, many writers about location in Egypt as elsewhere have devoted much space to the study of the general theories of location. To me, it seems idle to search for a theory of location which may be used to explain the present distribution of industry in Egypt and the industrial population. The present distribution represents a growth from the past and can only be understood in the light of that past. The explanation of present location must therefore—as J. H. Jones (3) puts it—be sought in a combination of circumstances including « historical accident », rather than in a single cause or an inevitable chain of causation.

Nevertheless, it is possible to some extent to disentangle many of the factors influencing the distribution of industry in Egypt during the last decade. The distribution of industry and industrial population in Egypt is best shown by the results of 1944 and 1947 Censuses of Industrial Production.

2.—Analysis of present location.

The 1944 census reveals that, of 22,220 productive factories, 18 % were located in Cairo, and 8 % in Alexandria, while the

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- (1) Marshall: *Principles of Economics*, Chap. X, book IV, p. 268. Eighth Edition 1947.
 - (2) P.S. Florence : *Investment, location and Size of Plant*, p. 34.
 - (3) Report: *Royal Commission on the Distribution of the Industrial Population*. London 1940. p. 249.

total number of workers engaged in productive factories (1) as a whole was 316,144, of which 23 % were in Cairo and 16 % in Alexandria. The 1947 census shows that, of 26,742 productive factories 4,650 units were located in Cairo, that is to say about 17.4 % of the total for all Egypt; 1,870 factories were in Alexandria, i.e. about 7 %; while the total number of workers engaged as a whole was 347,266, of which 23.6 % were in Cairo and 20.5 % in Alexandria. The relatively higher percentages of labour engaged in Alexandria compared with Cairo in spite of the comparatively lower percentage of number factories in Alexandria than Cairo is mainly due to the prevalence of a bigger size of factory as a whole in Alexandria than Cairo.

Such a high degree of concentration of diversified industries in Cairo and Alexandria is perhaps the most striking feature of the location of industry in Egypt. Various factors account for the location of industry in these two cities :-

(i) *Proximity to the market :*

In Egypt, proximity to the market was of greater importance in deciding the location of industries than any technical forces. Cairo and Alexandria containing large aggregations of the population, made the effective demand in the two cities greater than elsewhere. The 1947 population census proved that Cairo had a population of 2,100,486 and Alexandria 928,237 out of a total population for Egypt of 19,333,705 and that only 11 towns in Egypt had a population of over 50,000 persons. Thus, the food, clothing and building industries were the early industries which catered for the demands of a rapidly growing community. Needless to say, that income per head is much higher in Cairo and Alexandria than elsewhere, especially as landbords prefer to stay in big cities. A great portion of the purchasing power is therefore concentrated in the two cities, and the country districts are, in fact but badly depressed areas (1).

It must not be forgotten that the principle of minimum differentiation can be well applied here, for once industries

(1) Yearly income per capita in the countryside averaged between L.E.3 and L.E.5 (Report of Committee on Industry, 1948, p. 4) while the average for Egypt as a whole was about L.E.30 in 1945.

have been established in a region, favourable conditions are created which, in their turn, strengthen the attractions not only of the locality but also of the whole region in which the industries have started to gain external economies.

Thus, as stated in the Barlow report on the Distribution of the Industrial Population, « regional concentration... not only offers further advantages to the « basic » industries but also offers advantages to other industries. Thus the closed district tends to grow like a snow—ball and become a large « conturbation » (1).

Nevertheless, some industries catering for the large demand of Cairo and Alexandria have found other locations (2)—as will be seen later—with advantages reflected in reduced costs, which outweigh the transport costs involved.

(ii) *Availability of capital and enterprise.*

Financiers who are residents of the two cities were anxious to keep their ancillary activities close to their main lines of commerce or finance, unless technical factors interfered. The supply of entrepreneurial ability was mostly limited to the two centres of economic activity, especially in the early stages of Egypt's industrializations. Also industry requires a supply of skilled technicians, scientists, consultants, administrators, accountants, clerks, etc., and all those are more inclined to prefer living in cities, where the comforts and amenities of life are available. The facilities that provide a general stimulus to industrial efficiency, such as universities technical colleges, etc., are also available in the two cities.

(iii) *Abundance and regularity of Labour*

The amount of labour available and the regularity of its supply was a factor favouring location in the two cities. The supply of skilled and sem-skilled labour in cities and towns is more elastic, owing to relatively higher standards of literacy labour supply in rural districts is also subject to seasonal

(1) See Report p. 29. The term "conturbation" was given by Prof. P.S. Florence in a report presented to the Commission.
 (2) Or at least they believed so.

fluctuations, being scarce during the cotton gathering season. Industrial work is often taken up by peasants as a side-line to their main agricultural work. This affects the economy of firms located in rural areas, since it results in a high labour turnover and a high percentage of absenteeism.

(iv) *The transport factor:*

Cairo, capital of Egypt, is favoured by relatively better systems of transport, whether by rail, road or waterways. Alexandria, the main sea port in Egypt, also enjoys convenient transport. Other places in Egypt are less fortunate in this connection. The entrepreneur has to incur the cost of providing transport if the factory is established outside the big cities. This may well affect the balance of the forces of location. The difficulty is increased by a railway tariff which is framed to yield the highest possible revenue. The extension of transport facilities however has created new possibilities of industrial developments outside Cairo and Alexandria. Improvements in the road system helped in creating new towns, such as Kafr El-Dawar, Shoubra El-Khema etc. In the future it is expected that this tendency will be accentuated as a result of vast programmes of road construction. Industrial centres in rural districts are likely to arise on a larger scale. A good example is Kafr El-Dawar where Misr-Bradford (fine cotton textile firms) created a new centre which attracted other firms such as the new giant rayon company.

(v) *Powder generating* plants were established early in Cairo and Alexandria and it was estimated in 1944 that 80% of Egypt's electrical energy was confined to Cairo and Alexandria. (1)

Added to the above, the location of industry in Cairo and Alexandria offered the entrepreneurs a chance to benefit from external economies due to the expansion of industry as a whole. The importance of external economies will tend to diminish after a certain point, however for excessive localisation may give rise to external diseconomies.

From the above it seems that entrepreneurs in Egypt found in many cases that the optimum location which achieved the

(1) Bulletin of the Ministry of Commerce & Industry 1945.

lowest cost per unit of output was in either of the two big cities. As differences in location result in variations of costs, all potentialities should be studied before choosing a particular site. The location factor which leads to the greatest economies, and so reduces the cost of the marginal unit to a minimum, should be the factor to follow in deciding the location.

3.—Some special cases of location.

(i) *Spinning and weaving.*

The mechanical spinning and weaving industry which came into being in 1930, depending on local and imported yarn, became highly localised in Mehallat, Alexandria and Kafr El-Dawar. In 1946 the principal Egyptian cotton mills, which accounted for about 80 % of the total output of the industry—produced 32,900,000 Kgs. Of this 45 % were processed in Mehallat, 43 % in Alexandria, and 12 % in Kafr El-Dawar. The choice of Mehallat was a departure from the traditional practice (being in the two big cities). The supposed causes were stated to be, the high degree of humidity, the situation in the centre of the most important cotton growing zone, relatively lower wages, availability of cheap land and availability of skilled labour in the ranks of handloom weavers. These supposed advantages proved to be without foundation. The difference in humidity between Mehallat and Alexandria is negligible and artificial methods are used at present in Mehallat. In the outskirts and suburbs of Alexandria land is even cheaper than in Mehallat. Nearness to the cotton growing zone is of no vital importance, for the most important world cotton industries have existed in areas even far from the supplying countries, meanwhile Alexandria is fortunate in having the privilege of blends of many grades of cotton a matter which is highly appreciated by the industry. Moreover location near cotton zone involves an increased cost of transport of finished products to places of consumption. The regional differences in wage-levels is not a decisive factor and there is no statistical evidence to prove that such differences are real ; and even if they existed are generally wiped off or at least minimised due to high labour turnover, high percentages of absenteeism and higher costs of training ; or may be changed by a powerful trade-union movement (e.g. the Mehallat trade union comprises over 27,000 workers).

The above economic factors point to Alexandria as a more suitable place for the spinning and weaving of cotton textiles, having the advantage of a highly organised cotton market, and moreover it is one of the big consuming centres, and therefore there are no costs of transporting the finished products.

(ii) *The Cement Industry.*

The cement industry is one of Egypt's most important and efficient industries. It is highly localised at Tourah and Helwan (1) which are close to each other in the outskirts of Cairo. Location took place near the source of raw materials, for rich deposits of limestone exist within a five miles radius of the producing firms. Shoal is brought by ship from the near-by village of El-Saaf and gypsum is brought from El-Ballah near the Suez canal, but the costs of transporting those two items are small when compared with the total costs of the raw materials. But as the principal raw material is bulky and heavy, any location other than by the source of raw material would be uneconomical and would lead to increased costs. The present location has therefore achieved great savings in delivery costs, and ensured the least possible transport cost combination.

(iii) *The Sugar Industry.*

The location of the sugar industry in Upper Egypt is governed by geographical considerations—the need for rather hot climate for growing sugar-cane, and the abundance of cheap seasonal labour. The five crushing plants naturally located near the sugar-cane cultivating areas as delays in crushing lower the saccharose content of the sugar-cane and may cause deterioration (2). Also the crushed cane loses weight whilst processing, a matter which favours manufacturing near the source of the raw material. The refinery is located at Hawam-dieh, far to the north of the crushing factories. The decisive factor for such location is the proximity to important markets of consumption in Cairo and Lower Egypt. Moreover the sugar

(1) Only late in 1947 a new factory was established near Alexandria. It started its production in June 1950 and its yearly productive capacity is 100,000 tons, while the other two producing factories have a capacity of 900,000 tons yearly.

(2) J. Mazuel: *Le sucre en Egypte*, p. 126.

company needs to import considerable quantities of raw sugar, if the refinery is to be working to capacity. It was suggested that the refinery should have been located in between the crushing plants (1). But, the above reasons, added to the company's monopolistic position; the guarantee of its profits by the government, the absence of foreign competition due to the prohibition of imported refined sugar, combined with a discrimination policy in transport costs granted to it by the railways, the resale price maintenance policy agreed upon between the government and the company during the period of the sugar convention are all factors that make the suggestion for re-localising the refinery doomed to failure.

4.—Measurement of co-efficient of localisation for important industries.

In my book «Economics of Egypt» (2), I made the first attempt to measure localisation for important industries. The co-efficient of localisation gives a general picture of the degree of local concentration of a particular industry as compared with the distribution of the working population as a whole. Prof. P.S. Florence in his book "Investment, Location and Size of Plant" devises the statistical measurement of this coefficient; "when workers are divided up region by region as percentages of the total in all regions, the co-efficient is the sum (divided by 100) of the plus deviations of the regional percentages of workers in the particular industry from the corresponding regional percentages of workers in all industry" (3). Prof. Florence adds that "complete coincidence region by region of the particular industry : with all industry gives a coefficient of 0, extreme differentiation (e.g. workers in the particular industry being all concentrated in one region) gives a figure approaching 1."

I had to be content, when working out these coefficients for certain Egyptian industries, with the figures published in the 1937 Industrial and Commercial Census, since the necessary

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- (1) A. A. Ismail: *The cost of transport and the location of industry in Great Britain and Egypt*. Ph.D. thesis presented to the University of Birmingham, p. 435.
 - (2) Dr. G. E. M. Said: *Economics of Egypt*.
 - (3) See page 34.

data for calculation was not published in the 1944 or the 1947 Censuses of Industrial Production. The ten industries taken in this attempt were chosen according to their importance in the national economy, measured here by the volume of employment in each ; (the only possible measure). They employ between them 58 % of the total working population. The following table gives the results of the computations.

CALCULATION OF COEFFICIENTS OF LOCALIZATION FOR IMPORTANT INDUSTRIES IN EGYPT.

Regions of Egypt	Percentage of all workers										Deviation from total in Production												
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	b-a	c-a	d-a	e-a	f-a	g-a	h-a	i-a	j-a	k-a		
	Total employed in production	Vegetable food.	Textiles	Metallurgy	Transport	Construction	Material	Animal Food	Oils and Fats	Chemical	Paper	Leather and Furs											
All Regions	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0											
1. Cairo	31.0	11.5	7.0	52.7	46.7	28.6	16.6	9.6	40.1	32.6	43.5	19.5	-24.0	21.7	15.7	2.4	-14.4	-21.4	-9.1	1.6	12.5		
2. Alexandria	16.3	9.7	13.4	15.8	17.8	7.7	17.1	21.7	44.0	63.0	37.5	6.6	-2.9	.5	1.5	8.6	.8	5.4	27.7	46.7	21.2		
3. Canal	2.4	1.0	.2	1.1	14.4	1.2	1.3	.4	.1	3.1	.6	1.4	2.2	-1.3	12.0	1.2	1.1	-2.0	-2.3	.7	-1.8		
4. Suez	.7	.4	.0	1.9	2.1	.1	.3	.0	.4	—	—	.1	-.3	.7	1.4	.6	.4	.7	-.3	-.7	-.6		
5. Damietta	1.8	.7	3.8	.5	.3	.4	2.1	.5	—	—	—	1.1	2.0	-1.3	-1.0	1.4	.3	-1.3	-1.8	-1.8	-1.8		
6. El-Beheira	2.7	3.3	3.0	2.1	1.3	7.7	3.6	.3	10.9	—	—	.9	.6	.3	-1.4	5.0	.9	-2.4	8.2	-2.7	-1.8		
7. El-Daqahliya	2.9	2.9	2.3	5.7	.5	1.4	7.4	1.8	—	—	—	1.6	.0	.6	2.8	-2.4	4.5	-1.1	-2.9	-2.9	-1.3		
8. El-Gharbiya	12.1	4.6	44.1	6.0	2.9	8.3	7.1	43.9	1.3	.8	3.8	7.5	32.0	6.1	9.2	3.8	5.0	-31.8	-10.8	-11.3	-8.3		
9. El-Minutiya	2.2	2.2	4.0	1.7	.2	.3	7.6	.3	—	—	—	.3	.0	1.8	-5.5	2.0	1.9	5.4	-1.9	-2.2	-1.9		
10. El-Qalyubiya	2.5	1.6	6.4	0.9	8.3	2.6	2.7	.4	.9	—	—	.3	.9	3.9	-1.6	5.8	.1	.2	-2.1	-1.6	-2.2		
11. El-Sharqiya	1.8	2.4	2.0	1.3	1.3	1.1	4.1	.8	—	—	—	.1	.6	.2	.5	.7	2.3	-1.0	-1.8	-1.8	-1.7		
12. Aswan	1.5	4.5	.0	.2	.0	.1	.4	.9	1.8	—	—	—	3.0	-1.5	-1.3	1.4	1.1	.6	.3	1.5	-1.5		
13. Asyut	3.0	3.9	3.6	2.5	.6	.8	7.6	5.2	.3	—	—	2.4	.9	.6	.5	2.2	4.6	2.2	2.7	3.0	0.6		
14. Beni-Suef	1.0	1.8	1.0	.9	.0	.3	2.4	—	.1	—	—	.6	.8	.0	1.1	1.0	.7	1.4	-1.0	-1.0	0.4		
15. El-Faiyum	1.0	1.3	1.1	.8	.5	.2	2.3	—	—	—	—	4.3	.3	.1	-2.1	.8	1.3	-1.0	-1.0	-1.0	3.3		
16. Girga	2.5	2.6	.9	1.7	.3	.5	6.3	1.5	.1	—	—	2.5	.1	1.6	.8	-2.2	3.8	-1.0	-2.4	-2.5	.0		
17. El-Giza	3.3	9.4	1.3	2.3	.3	19.5	2.2	1.6	—	0.5	—	.1	6.1	-2.0	-1.0	3.0	16.2	-1.1	-1.7	-3.3	-2.8	-3.2	
18. El-Minya	4.0	12.0	5.0	1.4	1.8	.7	4.5	.1	—	—	—	.4	8.0	1.0	2.6	2.2	3.3	.5	3.9	-4.0	4.0	-3.6	
19. Qena	5.8	24.1	.9	.5	.0	9.1	4.4	2.0	—	—	—	1.0	18.3	-4.9	-5.3	5.8	3.3	1.4	-3.8	-5.8	-4.8		
20. Frontier Dist.	1.5	.1	.0	.0	.2	9.4	—	9.0	—	—	—	.0	-1.4	-1.5	-1.3	7.9	-1.5	7.5	-1.5	-1.5	-1.5		
Total Deviations		+38.7	+41.9	+25.7	+36.4	+32.5	+26.0	+32.5	+32.5	+26.0	+32.5	+26.0	+32.5	+26.0	+32.5	+26.0	+32.5	+26.0	+32.5	+26.0	+32.5	+26.0	
Coefficient of localization		39	42	26	36	33	26	47	45	49	45	49	45	49	45	49	45	49	45	49	45	49	

Total Deviations
Coefficient of
localization

NA

The table shows that coefficients of localisation varied considerably for the different industries, being 0.26 in industries connected with animal food and metallurgy, and rising to 0.49 in the paper manufacturing industry. The textile industries and industries connected with vegetable food, oil and fat extraction, chemicals and paper yielded a medium coefficient, while the others yielded a poor coefficient of localisation.

More sensitive results would have been obtained, had not the data for the industries been lumped together, for example industries connected with vegetable foods comprise eleven industries, textiles comprise 16 industries, etc. Better results would have been obtained too, if there had been a greater number of regions to allow analysis of the whole country county by county.

It may be suggested that the tables of the Census of population would serve the latter purpose, but in fact, it may be misleading because persons in the population census in Egypt are classified according to their place of residence and not employment.

There remains few words to be added. There are some new dynamic factors at work now and which will certainly affect the future trends for location. Industry most probably will move towards the South at Asswan, if the generating of the hydroelectric power is to be taken serious. There is also another probable future trend, for some industries may locate in the Northern Delta, with the aim of the coming into being of rural reform as is understood from the new egyptian move. A third trend may be towards the Red Sea near the oil fields.

The social aspect of the problem of location should receive more attention now, as social costs may exceed by far marginal private costs.

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