

## **EMPLOYMENT COST SPECTRUM OF LARGE-SCALE MANUFACTURING IN KARACHI**

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### **ABSTRACT**

Size of production labor, ratio of employment cost to total industrial cost, labor cost intensiveness and level of labor costs in various industrial categories represent the key features of employment cost spectrum of an industrial complex. This paper identifies major and minor industrial categories in terms of employment size, using Thomas model. Out of total of 21 industrial categories, 6 were major, employing 80.79% average daily employment, and also meeting 84.08% of the labor cost. The cost intensiveness showed remarkable variation across the spectrum. Labor cost levels associated with respective industries were categorized into six classes. Nine industrial categories in very high labor cost classes incurred 50.93% of total labor cost on 42.27% of total average daily employment (ADE). The medium cost class with 9 categories had an outlay of 41.76% of total labor cost against 45.08% of total ADE. Thus, in the spectrum high labor cost, classes were almost balanced.

**KEYWORDS:** Employment cost structure, Industrial categories, Employment size, Cost intensiveness, Labor cost classes

### **1. INTRODUCTION**

The essential input employment cost has a role in the productivity of an industry (Clark, 1996; Gokhman, 1961; Pannell and Schmidt, 2006). An industrial center thrives on the efficiency of its labor force, skilled and unskilled, employed in various types of industry (Polovitskaya, 1968; Muroyama and Stever, 1988; Popova, 1974). Payments to production workers which form part of the production cost in various industries represent the labor cost spectrum of a manufacturing center (WEF, 2019). The purpose of this paper in hand is to analyze the employment cost structure of Karachi industrial center in terms of distribution of production workers' wages by industrial categories, labor cost intensiveness of an industrial category which is a function of proportion of labor cost to the total industrial cost, and differentiation of industrial categories by labor cost classes such as very high, high and medium costs characterizing various industrial categories in the Karachi industrial region (Greenlaw and Shapiro, 2017; Singh, 2014; Das and Kalita, 2009).

## 2. METHODOLOGY

### 2.1. Source of Data

The Census of Manufacturing Industries (CMI) 2005-06 is the latest issue published in 2010 which presented a range of characteristics of manufacturing including number of establishments by industrial categories, employment, cost of production, value added, industrial cost or value of production, employment cost, contribution to GDP, value of fixed assets, and industrial taxes (CMI, 2005-06). The district-wise data collected by the CMI on Sindh (CMI, 2005-06), was obtained from the Bureau of Statistics, Sindh, which enabled differentiation of industry by districts across the province (Sindh Bureau of Statistics, 2010; Pakistan Bureau of Statistics, 2010). The data on Karachi Division and its five districts, as of 2005-06, including the selected variables aggregated for the industrial categories as devised in the CMI, have been used for the analysis. The CMI data covered only the large-scale manufacturing industries registered under the Factories Act 1934, Section 2 (j) and 5 (i), employing ten or more workers or using power in their manufacturing operations.

### 2.2. The variables

The study is based on the chief variables of manufacturing which define several structural aspects as well as the position of its various types. These are as follows:

1. Employment in terms of ADE as size measure of an industry.
2. Employment cost (outlays/expenditure on wages of production workers).
3. Industrial cost or the cost of production subdivided into (a) employment cost, and (b) other cost which covers raw material and energy cost.
4. Employment cost per worker. This variable serves as a parameter for further differentiation in terms of labor cost incurred by the industrial categories allowing comparison through ranking by labor cost and more significantly the cost classes *i.e.* high, medium, and low cost categories.

### 2.3. Analysis Model

In order to ascertain which industrial categories constitute major industries that dominate the manufacturing complex of Karachi, a statistical technique known as Thomas Model was applied (Hussain, 1995). It uses variance to classify *major* and *minor* industrial categories based on their average daily employment. Thomas Model is an improved technique originally employed by Weaver (1954) in agricultural situations to determine a regional crop combination pattern. Weaver's formulation had its limitation as it was restricted to fewer elements and could not cover

larger numbers of variables or phenomenal factors. Thomas removed this limitation by constructing the model (Thomas, 1963) as under:

The model comprises the percentages of variables, combining theoretical percentages for different combination patterns and classifies the pattern on the basis of crop combination which best suites the situation. In the formula for the calculation of variance

$$\sigma^2 = \frac{\sum d^2}{N} = \frac{\sum(X_1 - \bar{X})^2}{N}$$

Weaver substituted the expected theoretical percentage of variables for the expected values i.e. mean  $\bar{X}$  in an array of variables. To determine a two- crop (variables) region from six variables or crops existing in a region that is 45, 21, 13, 11, 6 and 5 in an area, Weaver used the following formulation

$$\begin{aligned} &= \frac{[(50 - 45)^2 + (50 - 21)^2]}{2} \\ &= (25 + 841) / 2 \\ &= 433 \end{aligned}$$

Thomas improved the Weaver's formula by inserting actual percentages of remaining crops beyond two major crops.

$$\begin{aligned} &\frac{((50 - 45)^2 + (50 - 21)^2 + (0 - 13)^2 + (0 - 11)^2 + (0 - 6)^2 + (0 - 5)^2)}{6} \\ &= \frac{(25+841+169+121+36+25)}{6} \\ &= 202.33 \end{aligned}$$

Thomas model has been successfully applied in identification of major and minor industries in an industrial center or the national industrial structure (Ahmed H., 1995).

#### **2.4. Index of labor Intensiveness of Manufacturing Industries**

Since large-scale manufacturing employs a sizeable amount of labor in its production process, industrial categories can be characterized and differentiated by comparative labor intensities that serve to indicate, in broad terms, their labor intensiveness in an industrial complex. For this purpose an index is devised by using two key variables: (1) labor cost, and (2) industrial cost. To obtain the index, which may be termed as 'labor intensity index' the ratios between the two costs incurred in an industry can be derived as quotient in a division of the labor cost by the total industrial cost (total cost of production) as given by under-noted formulation:

$$\text{Labor Intensity Index} = \frac{\text{labor cost of industry 'A'}}{\text{Industrial cost of industry 'A'}}$$

The index has two distinct advantages. First, it helps compare high and low ratios of labor cost to the industrial cost expended in the production process in an industry. Higher indices show where the labor costs are higher, and by the same implication, costs other than labor costs (also termed as 'Other Cost' by the CMI) are relatively lower. Second, it is essentially a comparative indicator of labor intensiveness, which in its formulation, with the data specific to a center or complex, is endemic so that each industrial center would show its own intensiveness.

### **2.5. Method of Classification / Segmentation by Cost Class**

Based on a parameter *i.e.* labor cost per worker, manufacturing categories can be classified by a statistical method of mean and standard deviation, a parametric technique that requires the quantitative data to be normally distributed. A categorization /segmentation by cost classes is obtained by this method, which is helpful in bringing out the differences of labor cost across the entire complex and further differentiate between the cost classes with their shares under each class, thus constituting and portraying the labor cost spectrum of a manufacturing center.

## **3. RESULT AND DISCUSSION**

### **3.1. Manufacturing Employment: Share of Karachi in Sindh and Pakistan**

Karachi Division, with its five districts (now six since 2015) has conspicuously emerged as the largest industrial region of Pakistan, possessing a high concentration of large-scale manufacturing to the extent of about 21.15 per cent of the total average daily employment of Pakistan, as recorded by the Census of Manufacturing (CMI) 2005-06, even though its share of manufacturing employment underwent a continuous decline from its highest percentage share, 30.42 in 1969-70, mainly due to growth of manufacturing in other parts of the country, particularly Punjab (Iqbal, 2014). Its share of average daily employment (ADE) in the Sindh province was 68.58 per cent in 2005-06, down from 71.83 per cent recorded for the previous year, the reason for the share decrease being the increase in manufacturing employment in other districts of Sindh. In absolute terms, manufacturing employment in Karachi showed continuous increase. It recorded a growth of 36.07 per cent over the employment level in 1969-70, a trend also maintained from the preceding decades.

### **3.2. Karachi Industrial Structure: Employment (ADE) by Industrial Categories (2005-06)**

Large-scale manufacturing in Karachi is categorized into 21 groups termed by the CMI as industrial categories (Table 1, Fig. 1). Using the Thomas model on employment (ADE) data for the year 2005-06, Karachi's industrial categories are further classified into major and minor categories primarily with a twofold purpose: (a) pattern of the concentration of industrial employment as displayed by the categories, and (b) specialization of Karachi as demonstrated by the extent (share percentages) of ADE in its major categories. As a result of application of the model, out of 21 categories, six were determined as major and the rest fifteen as minor. The major categories contained 80.79 percent of total ADE of Karachi (as recorded for the year 2005-06) which also clearly indicated the nature of specialization of the manufacturing sector in Karachi. Manufacturing of Textiles emerges as the dominant category with very high share of employment (ADE). Other major categories with considerable employment size are Chemical and Chemical Products, Wearing Apparel, Basic Metals, Food Products and Beverages and Motor Vehicles and Trailers. Among the minor categories six groups stand out with sizeable employment, and those are 1) "Other" Non-metallic Mineral Products, 2) Machinery and Equipment, 3) Other Transport Equipment, 4) Radio, T.V and Commercial Equipment, 5) Tobacco Products and 6) Leather Products. The six minor categories employed 12.30 percent of ADE out of total 19.21 percent in all minor categories.

### **3.3. Labor costs incurred by industrial categories**

Using variance to differentiate major and minor categories on the basis of labor costs (payments made to production workers) incurred in each category, a group of seven categories is identified as major which includes Coke and Petroleum in addition to six already identified as major in terms of employment size (Table 2, Fig. 2). Coke and Petroleum category has low employment (Table 1) but very heavy labor cost, signifying higher wage level per worker compared to other industrial categories. The major categories incurred 84.08 percent of the total employment cost expended by all 21 categories against 80.79 percent of the manufacturing employment (Table 2). The higher ratio of cost to workers implies higher average wages generally in Karachi manufacturing as reflected by the labor costs in major categories. A comparison of labor costs in Karachi with that of the rest of the country also confirms comparatively higher wage levels in large-scale manufacturing in Karachi (Table 3).

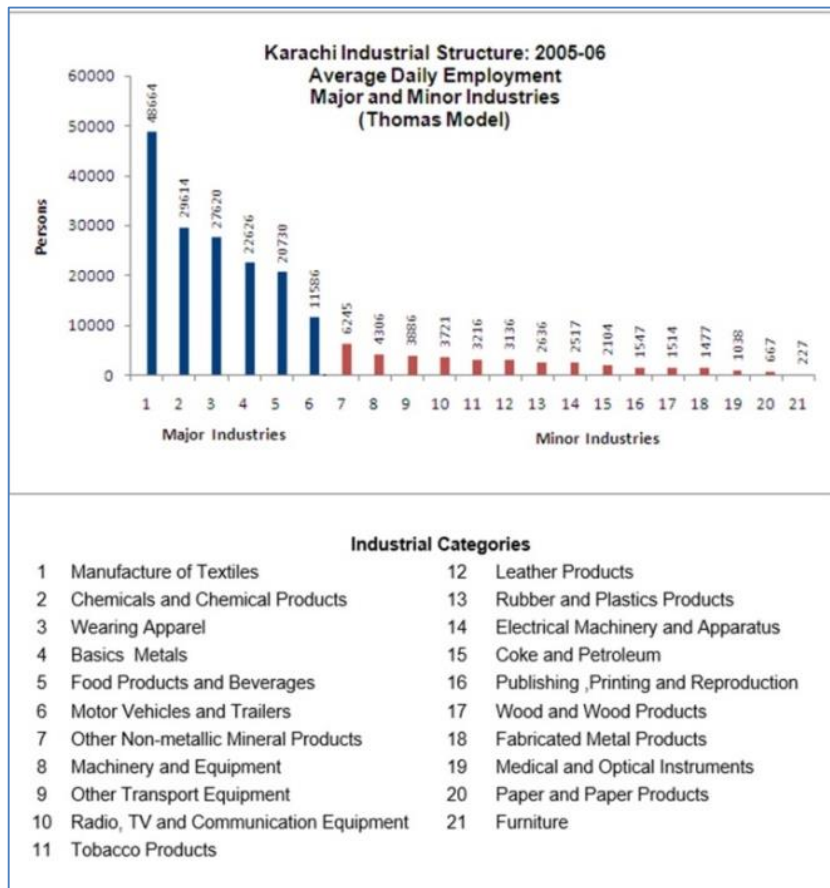
## Employment Cost Spectrum of Large-scale Manufacturing in Karachi

**Table 1:** Karachi Industrial Structure: Average Daily Employment, 2005-06 Major and Minor Industries (Thomas Model).

S. No.	Industrial Categories	Average Daily Employment	Percentage	Variance
<b>Major Industries</b>				
1	Manufacture of Textiles	48664	24.44	306.06
2	Chemicals and Chemical Products	29614	14.88	113.54
3	Wearing Apparel	27620	13.87	52.53
4	Basics Metals	22626	11.37	28.01
5	Food Products and Beverages	20730	10.41	15.11
6	Motor Vehicles and Trailers	11586	5.82	13.80
		<b>160840</b>	<b>80.79</b>	
<b>Minor Industries</b>				
7	Other Non-metallic Mineral Products	6245	3.14	16.52
8	Machinery and Equipment	4306	2.16	19.71
9	Other Transport Equipment	3886	1.95	22.42
10	Radio, TV and Communication Equipment	3721	1.87	24.67
11	Tobacco Products	3216	1.62	26.73
12	Leather Products	3136	1.58	28.47
13	Rubber and Plastics Products	2636	1.32	30.13
14	Electrical Machinery and Apparatus	2517	1.26	31.60
15	Coke and Petroleum	2104	1.06	33.00
16	Publishing ,Printing and Reproduction	1547	0.78	34.39
17	Wood and Wood Products	1514	0.76	35.63
18	Fabricated Metal Products	1477	0.74	36.74
19	Medical and Optical Instruments	1038	0.52	37.84

20	Paper and Paper Products	667	0.34	38.93
21	Furniture	227	0.11	40.01
		<b>38237</b>	<b>19.21</b>	

Source: CMI 2005-06



**Figure1:** Karachi Industrial (2005-06) data reflection of average number of employees in major and minor industries

The labor cost in Karachi’s large-scale manufacturing was about 60.84% of the total labor cost recorded for Pakistan in the year 2005-06. Labor cost per worker in Karachi was appreciably higher than Pakistan or the rest of Pakistan excluding Karachi. Higher wage levels as reflected in per worker labor cost signify unequivocally the predominance of high-tech, high-value addition and highly efficient industry that relies on educated, skilled manpower and its proficient performance.

### 3.4. Labor Cost Verses “Other Costs”

The proportion of the labor costs in the industrial cost (cost of production) is an indicator, in broad terms, of the efficacious role of labor and manpower in the manufacturing process. Conversely higher proportion of “Other Costs” *i.e.* cost other than labor is indicative of its importance or effective contribution to production, quantitatively as well as qualitatively. As presented in Table 4, under both major and minor categories, considerably higher proportions of employment cost are incurred by two district groups: one under major category that includes (a) Manufacture of Textiles, (b) Chemical and Chemical Products, (c) Wearing Apparel, (d) Basic Metals, and (e) Food and Food Products, and the other in the minor category consisting of (a) Medical and Optical Instruments, (b) Fabricated Metal Products, (c) Wood and Wood Products, (d) Paper and Paper Products, and (e) Furniture. For the first mentioned group, the proportion of “Other Cost” (Energy and Raw Material Cost) ranges from 90.63 percent down to 83.22 percent, while in the second group of minor categories, it ranges 88.92 percent to 85.35 percent, excepting the Medical and Optical Instruments, where it is exceptionally higher, that is 58.39 percent against its labor cost ratio of 41.61 percent.

**Table 2:** Karachi Industrial Structure: Employment Cost, 2005-06, Major and Minor Industries (Thomas Model).

S. No	Industrial Categories	Employment Cost (in Thousand Rupees)	Percentage	Variance
<b>Major Industries</b>				
1	Manufacture of Textiles	8,614,420	20.90	335.78
2	Basics Metals	7,381,481	17.91	111.93
3	Chemicals and Chemical Products	5,773,379	14.01	49.69
4	Wearing Apparel	3,928,553	9.53	29.23
5	Food Products and Beverages	3,064,202	7.43	20.95
6	Motor Vehicles and Trailers	3,040,292	7.38	15.52
7	Coke and Petroleum	2,855,062	6.93	12.2



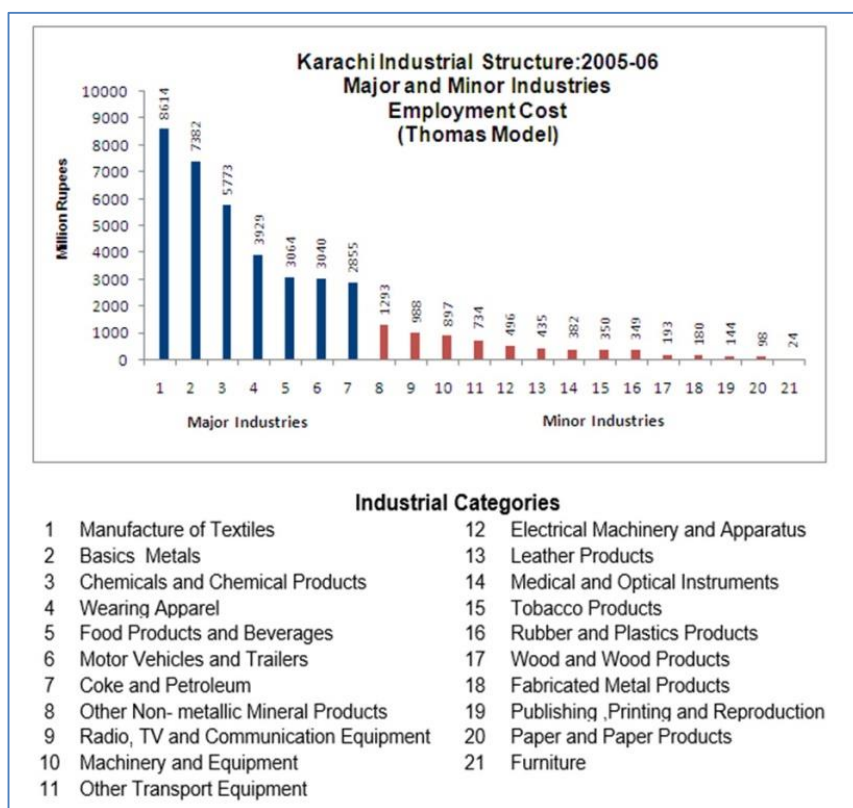
				5
		<b>34,657,389</b>	<b>84.08</b>	
	<b>Minor Industries</b>			
8	Other Non-metallic Mineral Products	1,292,949	3.14	14.32
9	Radio, TV and Communication Equipment	988,147	2.40	16.70
10	Machinery and Equipment	897,150	2.18	18.82
11	Other Transport Equipment	734,271	1.78	20.90
12	Electrical Machinery and Apparatus	496,181	1.20	23.08
13	Leather Products	434,769	1.05	25.04
14	Medical and Optical Instruments	382,163	0.93	26.81
15	Tobacco Products	350,587	0.85	28.39
16	Rubber and Plastics Products	349,207	0.85	29.78
17	Wood and Wood Products	192,943	0.47	31.21
18	Fabricated Metal Products	179,523	0.44	32.50
19	Publishing ,Printing and Reproduction	143,883	0.35	33.70
20	Paper and Paper Products	98,319	0.24	34.83
21	Furniture	24,206	0.06	35.94
		<b>6,564,298</b>	<b>15.92</b>	

## Employment Cost Spectrum of Large-scale Manufacturing in Karachi

**Table 3:** Manufacturing Labor Cost, Pakistan and Karachi, 2005-06

	<b>Annual Labor Cost</b>	<b>Annual Labor Cost per worker</b>	<b>Average Monthly Labor Cost Per worker</b>
Pakistan	67747000	72815.62	6067.18
Karachi	41221697	207064.08	17255.20
Rest of Pakistan	26525303	36270.74	3422.20

Source: CMI 2005-



**Figure 2:** Karachi industrial data (2005-06) reflection of employment cost in major and minor industries

In the group under major category, Coke and Petroleum and Motor Vehicles and Tailors incurred extraordinary higher ratio of “Other Costs”, which were 95.31 percent and 97.72 per cent respectively.

### **3.5. Labor Cost Intensiveness of Industrial Categories: Labor Cost Intensity Index**

In an industrial complex, various industrial categories are characterized by varying labor intensities, which also determine the ratio of labor costs to the industrial costs in each industry.

**Table 4:** Karachi Industrial Structure Industrial Categories: Percentage Distribution of Employment Cost and “Other Cost” in the Industrial Cost, 2005-06

<b>S. No.</b>	<b>Industrial Categories</b>	<b>Employment Cost as Percentage of Industrial Cost</b>	<b>“Other Cost” as Percentage of Industrial Cost</b>
<b>Major Industrial Categories</b>			
1	Basics Metals	16.78	83.22
2	Chemicals and Chemical Products	10.81	89.19
3	Wearing Apparel	10.37	89.63
4	Manufacture of Textiles	9.37	90.63
5	Food Products and Beverages	5.78	94.22
6	Motor Vehicles and Trailers	4.69	95.31
7	Coke and Petroleum	2.28	97.72
<b>Minor Industrial Categories</b>			
8	Medical and Optical Instruments	41.61	58.39
9	Fabricated Metal Products	14.65	85.35
10	Wood and Wood Products	13.59	86.41
11	Paper and Paper Products	11.57	88.43
12	Furniture	11.18	88.82
13	Machinery and Equipment	8.99	91.01
14	Radio, TV and Communication Equipment	7.69	92.31

## Employment Cost Spectrum of Large-scale Manufacturing in Karachi

15	Other Transport Equipment	7.32	92.68
16	Publishing ,Printing and Reproduction	7.03	92.97
17	Other Non-metallic Mineral Products	6.90	93.10
18	Leather Products	6.86	93.14
19	Tobacco Products	5.07	94.93
20	Electrical Machinery and Apparatus	4.34	95.66
21	Rubber and Plastics Products	2.43	97.57

Source: CMI 2005-06

A labor cost intensity index calculated as a ratio of labor cost to industrial cost in an industry and obtained as costs quotient can show comparative labor cost intensiveness of various industrial categories in a manufacturing complex.

As is evident from Table 5, four major categories, namely, Basic Metal, Chemical and Chemical Products, Wearing Apparel and Manufacture of Textiles showed high labor cost intensiveness while two major categories *i.e.* Food Products and Beverages, and Motor Vehicles and Trailers indicated low labor cost industries. This clearly implied that most major industrial categories which employed 80.79 percent of the total labor force in the complex were by and large labor intensive, and as such their efficacy invariably depended on a large amount of both skilled and unskilled labor. Industries such as Motor Vehicles and Trailers, and Coke and Petroleum had extraordinary heavy costs on energy and raw material (“other costs”) to the extent of 95.31percent for the former and 97.72 percent in the respective cost of production (industrial cost), but they also entailed ‘heavy’ to ‘high’ labor costs as indicated by the employment cost per worker variable (Table 6), meaning that these industries paid much higher wages than other categories. In the set of minor categories, Medical and Optical Instruments tops the list with exceptionally very high ratio of labor cost to ‘other cost’ implying extraordinarily high costs through high wages of educated, skilled, and knowledgeable manpower used in the production process. As shown in Table 5, the mean labor cost intensity index was 0.416 and, in the array the median value was represented by 0.083. So, the group of categories above the median may signify cost intensiveness compared to those with indices below the medium. Further, a quartile distribution may yield sets of categories having very high and high cost

intensiveness as represented in the first and second quartiles respectively and similarly the categories falling in the third and fourth quartiles as showing low and very low labor cost intensiveness. In terms of employment, the group in the first quartile covers 12.73 percent of total ADE including Basic Metals, a major category with 11.37 percent of total employment. The second quartile contains three major categories *i.e.* Chemical and Chemical Products, Wearing Approved and Manufacture of Textiles which together share 53 percent of ADE out of 54.46 percent of the ADE covered by the second quartile. This group may be taken as representative of the employment cost intensiveness characterizing the Karachi's industrial complex. Interestingly the fourth quartile includes the major category of Food Products and Beverages which employed a high percentage of labor (10.41), suggesting that wages are lower than most major categories. Also in the same quartile the major categories of Motor Vehicles and trailers with 5.82 percent of labor force showed rather strongly a low cost intensiveness, even though as a major category it incurred 7.38 percent of the total labor cost. This, in fact, arises from the incidence of its extraordinary high 'other cost' against a much smaller proportion of employment cost.

### **3.6. Labor Cost Classes of Industrial Categories**

Karachi manufacturing is divisible into several labor cost classes identified on the basis of annual employment cost per worker, which considerably varied across the spectrum from one group or category to another. Twenty industrial categories (excluding Coke and Petroleum as an exceptional group) were amenable to a nominal classification using mean and standard deviation since the employment cost data formed the normal distribution (Table 6). The derived classes are termed as (1) *very high* (2) *high* (3) *medium* (4) *low* (5) *very low*, all to enunciate their qualitative dimensions in accordance with their different levels. Due to its exceptionally heavy

labor cost as indicated by the employment cost per worker, Coke and Petroleum is a separate, exclusive category as it is additional to the array of rest of twenty categories that form a normal

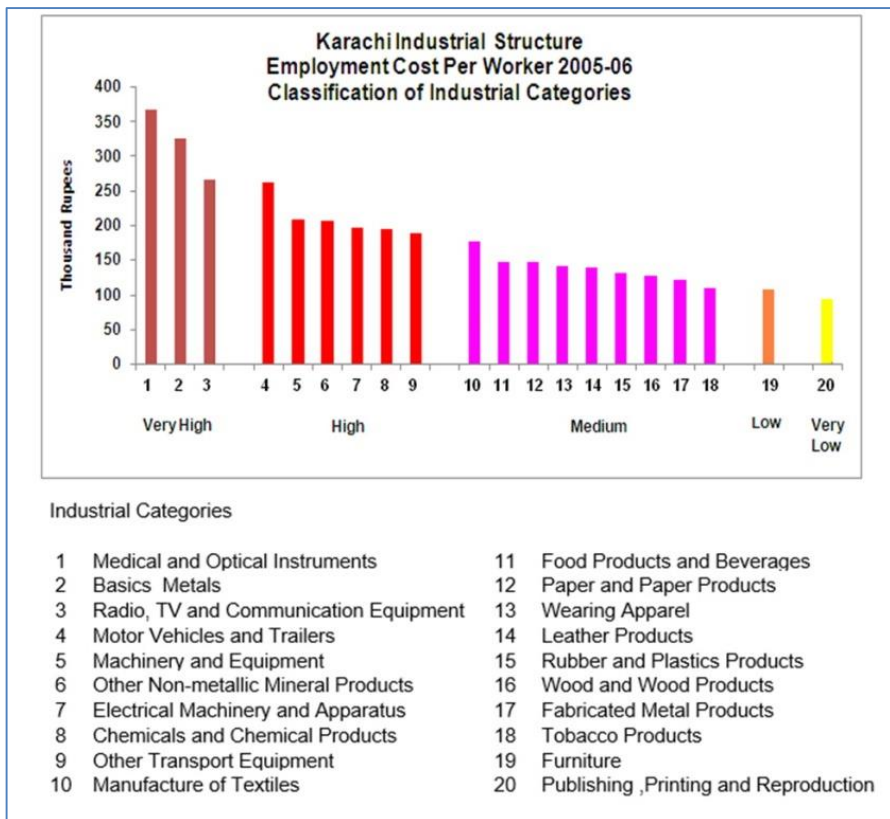
## Employment Cost Spectrum of Large-scale Manufacturing in Karachi

**Table 5:** Karachi Industrial Centre: Labor Cost Intensity Index(Ratio of Labor Cost to Industrial Cost) 2005-06.

S. No.	Industrial Categories	Labor Intensity Index
1	Medical and Optical Instruments	0.416
2	Basics Metals	0.168
3	Fabricated Metal Products	0.147
4	Wood and Wood Products	0.135
5	Paper and Paper Products	0.115
6	Furniture	0.112
7	Chemicals and Chemical Products	0.108
8	Wearing Apparel	0.104
9	Manufacture of Textiles	0.094
10	Machinery and Equipment	0.090
11	Radio, TV and Communication Equipment	0.077
12	Other Transport Equipment	0.073
13	Publishing ,Printing and Reproduction	0.070
14	Other Non-metallic Mineral Products	0.069
15	Leather Products	0.069
16	Food Products and Beverages	0.058
17	Tobacco Products	0.051
18	Motor Vehicles and Trailers	0.047
19	Electrical Machinery and Apparatus	0.043
20	Rubber and Plastics Products	0.024
21	Coke and Petroleum	0.023
	Mean	0.0997

distribution. A very large outlay on a much smaller labor force (employing only 1.06 percent of Karachi's ADE) and with its lowest labor cost intensiveness, remains the hallmark of this industry. Out of twenty industrial categories, nine fall under the classes of very high and high labor cost. One of the major categories, Basic Metals falls in very high labor cost class. Two major industries *i.e.* (1) Motor Vehicles and Trailers and (2) Chemical and Chemical Products also fall in high labor cost class. The aforementioned three major categories together cover 32.07 percent of the total ADE. The next high labor cost class includes Motor Vehicles and Trailers and Chemical and Chemical Products which employed 5.82 and 14.88 percent of the total ADE respectively. Both very high and high classes comprise mainly high-tech industries, using advanced engineering and special scientific applications to produce high quality value-added

manufactures, and operated by an efficient skilled labor force. The higher proportion of skilled and knowledgeable manpower engaged in these industries on high wages normally entails much larger cost as is evident from the annual employment cost per worker incurred in these industrial categories (Table 6, Fig. 3). The medium class containing nine categories, that is, Manufacture of Textile, Food and Food Products, and Wearing Apparel, which together employed 48.72 percent of the total ADE out of 55.08 percent of the total ADE in this class. The class is by and large characteristic of labor-intensive manufacturing, dominating, as it does, the larger part of the spectrum. Because of its medium labor costs, these industrial categories may have considerable potential for comparatively high growth. Low and very low labor cost classes employed mainly 0.89 percent of ADE. Furniture with very low employment share of only 0.11 percent of the total ADE indicated higher labor cost intensity, while Publishing, Printing and Reproduction industry had much lower labor cost intensity.



**Figure 3:** Karachi Industrial data (2005-06) classification based on employment cost per worker

## Employment Cost Spectrum of Large-scale Manufacturing in Karachi

**Table 6** : Karachi Industrial Structure, Classification of Industrial Categories and Employment Cost Per Worker, 2005-06

S. No.	Class	Class Range	Industrial Category	Employment Cost Per Worker (In 1000)
1	<b>Exceptionally High</b>		Coke and Petroleum	<b>1357</b>
2	<b>Very High</b>	Above +3SD	Medical and Optical Instruments	368
			Basics Metals	326
			Radio, TV and Communication Equipment	266
3	<b>High</b>	+2SD to +3SD	Motor Vehicles and Trailers	262
			Machinery and Equipment N.E.C	208
			Other Non-metallic Mineral Products	207
			Electrical Machinery and Apparatus N.E.C	197
			Chemicals and Chemical Products	195
			Other Transport Equipment	189
4	<b>Medium</b>	Mean (183.1) to 1SD	Manufacture of Textiles	177
			Food Products and Beverages	148
			Paper and Paper Products	147
			Wearing Apparel	142
			Leather Products	139
			Rubber and Plastics Products	132
			Wood and Wood Products	127
			Fabricated Metal Products	122
			Tobacco Products	109
5	<b>Low</b>	Mean(183.1) to -1SD	Furniture	107



6	<b>Very Low</b>	-1SD to -34.9	Publishing, Printing and Reproduction	93
Note: The value of Coke and Petroleum Category is very high; therefore it is not included in the calculation for normal distribution and kept as a separate class				

#### **4. CONCLUSION**

As the largest manufacturing complex of Pakistan, Karachi's employment in the large-scale industries amounted to 21.15 percent of the total average daily employment of Pakistan as recorded by the Census of Manufacturing Industries (CMI) for the year 2005-2006. The total labor cost outlay was about 60.84 per cent of the total labor cost incurred in Pakistan in the same year. Per worker costs are indicative of levels of wages paid to production workers. In Karachi the wage level is much higher than the payments made monthly or annually to workers in other parts of Pakistan.

The CMI classifies the large-scale manufacturing in Karachi in 21 industrial categories of which six are identified as major industrial categories employing 80.79 percent of the total ADE in Karachi, thus signifying/representing Karachi's specialization in manufacturing. The major categories had incurred 84.08 per cent of the total employment cost. The proportion of labor cost in the industrial cost varies considerably from one industry to another. Higher ratios of labor cost or outlays result in higher levels of labor cost intensiveness that has a bearing on both human resource efficiency and productivity. Under major categories, Manufacture of Textiles, Chemicals and Chemical Products, Wearing Apparel, and Basic Metals, have much higher proportion of labor cost in the total industrial cost. On the basis of labor cost per worker, nine industrial categories fall in the "very high" and "high" labor cost classes which include Basic Metals (in the very high cost class), Motor Vehicles and Trailers, Chemicals and Chemical Products (in the high cost class). The medium cost class includes nine categories. Three major categories, namely Manufactures of Textiles, Food Products and Beverages, and Wearing Apparel belong to this class, implying comparatively better profitability.

#### **5. ACKNOWLEDGE**

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## REFERENCES

Clark Carol L 1996 The Transformation of Labor Relations in Russian Industry: The Influence of Regional Factors in the Iron and Steel Industry Post-Soviet Geography and Economics 37(2) 88-112  
<https://doi.org/10.1080/10889388.1996.10641014>

Das Deb Kusum and Gunajit Kalita 2009 Do Labor Intensive Industries Generate and Employment? India Council for Research on International Economic Relations (ICRIER) India

Gokhman V M 1961 Geography of Industry in the United States Soviet Geography 2(6) 21-39 <https://doi.org/10.1080/00385417.1961.10770788>

Greenlaw Steven A and David Shapiro 2017 Introduction to Cost and Industry Structure In : Principal of Economics Rice University Houston USA

Hussain Ahmed 1995 Growth and Dispersion of Manufacturing Industries in Pakistan A Study in Location and Regionalization PhD. Thesis Department of Geography University of Karachi

Muroyama Janet H and H Guyford Stever 1988 Globalization of Technology: International Perspectives Annual meeting of the 6th Convocation of the Council of Academies of Engineering and Technological Sciences National Academy Press, Washington D C USA

Pannell C W & Philipp Schmidt 2006 Structural Change and Regional Disparities in Xinjiang China Eurasian Geography and Economic 47(3) 329-352 <https://doi.org/10.2747/1538-7216.47.3.329>

Popova Ye I 1974 The Transport Industry in the West and East Zones of the USSR Soviet geography 15(4): 187- 243

Polovitskaya M Ye 1968 Some Aspects of the Influence of Scientific and Technical Progress on the Formation of Economic Regions (with particular reference to the United States) Soviet Geography 9(10) 813-829.  
<https://doi.org/10.1080/00385417.1968.10771044>

P B S 2010 Census of Manufacturing Industries 2005-06 Pakistan Bureau of Statistics Government of Pakistan Islamabad

Singh Lakhwinder 2004 Technological Progress, Structural Change and Productivity Growth in Manufacturing Sector of South Korea World Review of Science Technology and sustainable Development 1(1) 37 – 49

S B S 2010 Census of Manufacturing Industries (CMI) data on districts of Sindh Province 2005-2006 Sindh Bureau of Statistics Government of Sindh Karachi Pakistan

Thomas D 1963 Agriculture in Wales during the Napoleons Wars, Cardiff Wales Press

World Economic Forum 2018 The Future of Jobs Reports World Economic Forum 91-93 route de la Capite CH-1223 Cologny/Geneva Switzerland

Weaver J C 1954 Crop Combination Regions for 1919 and 1927 in the Middle West Geographical Review 44(4) 560-572.