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STRUCTURE AND COMPOSITION OF MANUFACTURING IN GREATER BOMBAY

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ABSTRACT : Despite a general consensus about bi-polarity as the characteristic feature of third world metropolitan economies, precise estimation of any sort of the informal sector, however, has never been very easy. Due to its unauthorised nature and the numerically prepondering presence although the informal sector emerges as an experimental reality in the economic space of the third world metropolitan cities, it is systematically found absent or only obscurely traceable in the official records and secondary data sources necessitating thereby a proper analysis of its placement. Based on 1971 and especially 1981 Economic Census data, the present paper substantiates the existence of bi-polarity in the manufacturing employment in Greater Bombay in the post-independence times. It clearly indicates that the growth of modern capital and technology intensive manufacturing in the city has not led to any significant increase in the formal sector employment. Rather, it has accentuated a process of fragmentation of the economy making informal sector an organic reality in various forms of household and wage units in both traditional and modern activities. The variety of combination of formal and informal activities as explained in the final part of the paper highlights the above complex process.

INTRODUCTION

Preponderance of informal, labour-intensive units a trade, manufacturing and services exhibiting a wide range of functional and spatial links with the formal sector has been a characteristic feature of metropolitan economies of the developing world. Despite controversies about the nature of relationship between the formal and informal sectors (Tokman, 1978), it has been generally agreed that bi-polarity in such urban economies is a result of the very nature and process of urbanisation and industrialisation in the developing world, which is closely associated with their involutionary growth. Innumerable pre-industrial and non-capitalized forms of production popularly knows as informal sector activities are thus found to exist that continuously get attenuated to the needs of the changing metropolitan economy.

Despite its significance, the nature, size, and rate of growth of informal sector has been found to vary in the countries of the developing world (Gandhi, Banerjee-Guha,1995) corresponding to the varying dimensions of their growth (Banerjee-Guha, 1993). Precise estimation of inform sector employment is rather difficult especially due to its unauthorised status, that is largely expressed in numerical preponderance in the marginal spaces of a metropolis. Again, in the absence of the official record and data the bi-polar structure is displayed by the relative proportion of the number of units and size of the workforce as

well as the nature of products. Focussing on the manufacturing sector of Greater Bombay the present study analysis the economic census data of 1980, that claims total coverage of all types of economic units (though in private the officers admitted that, actually the office could enumerate upto 20% of the total informal units, especially missing the relatively mobile, remote, inaccessible as well as seasonal and ephemeral units).

The four digit NIC code data of manufacturing establishments and workers for the 88 sections of Greater Bombay has been analysed with the help of percentage of various size categories of different production activities regrouped at on and two digit levels respectively, highlighting thereby the structure, composition and product links. The informal and formal components of different production activities have been identified in association with certain size categories and displayed with the help of the scatter diagrams and simple line graphs. Finally comparison of the patterns of line graphs unfolds bi-modal and multimodal trends in the size class distribution indicating different dimensions of formal and informal linkages between various manufacturing activities.

CHANGING SECTORAL COMPOSITION OF THE METROPOLITAN ECONOMY

The decadal changes in the sectoral composition of the metropolitan economy in general and the structure and activity composition of manufacturing in particular between 1971 and 1981 reflect a distorted urban and industrial growth (Tables 1,2) reflecting increasing tendency of territorialization fragmentation.

i) It could be seen that this urban growth ironically led to the increase in number of establishments as well as workers in primary activities like agriculture, mining, quarrying and fishing as well. Rapid increase in construction activity accelerated stone quarrying in the northern and eastern periphery. Vacant land owned by railways and other organisations was intensively cultivated while fishing hamlets along the north-western urban fringe grew absorbing mainly the casual agricultural labourers and fisherman migrating from the neighbouring hinterlands. This sector accounted for more than 1.6% of the total workers in 1981. (Table 1a,b).

ii) Proportion of establishments in manufacturing increased from 23.6% in 1971 to 25.17% in 1981 with an associated fall in proportion of workers from 43.84% to 36.5% respectively.

iii) In contrast to manufacturing, the proportionate share of establishments as well as workers in trade and transport displayed a rise. In absolute terms both establishments and workers in service sector also recorded a rise. A sizeable number of both establishments as well as workers that could not be grouped under the category of commercial, social and personal services were enumerated separately in 1981. All these observations conformed the increasing trend of tertiarisation and relative stagnation of the manufacturing sector, necessitating a detailed analysis of changes in structures and activity composition of manufacturing (Table 1a).

PRODUCT COMPOSITION AND SIZE ASPECTS OF MANUFACTURING :

A three tired structure of manufacturing characterised by the numerical importance of household, tiny and smell sector units employing ten or less than ten workers, followed by a noticeable share of transitional type of units employing a per unit strength of 11 to 40

Table 1

The Economy of Greater Bombay : Composition, Nature and Growth

a) Major Economic Sectors in Descending Order of Size in Terms of Workers and Decadal Variation, 1971-81.

Major Economic Sectors								
Establishments				One Digit NIC Code	Workers			
Decadal Variation 1971-81		% to Total			% to Total		Decadal Variation 1971-81	
Absolute	%	1971	1981		1981	1971	%	Absolute
32745	82.20	23.67	25.43	Manufacturing	36.73	43.84	22.06	147772
57685	70.14	48.87	49.04	Trade	24.50	18.46	93.44	263540
10461	49.72	12.52	11.04	Services	13.64	15.03	32.14	073827
05569	90.72	3.65	04.11	Transport	09.43	08.33	64.80	082547
11798	00-00	00.00	04.13	Other Activities	07.10	00.00	00.00	157996
-05383	-32.12	09.95	03.99	Finance	06.24	12.27	-26.00	-048676
01387	92.84	00.89	01.01	Agriculture, Fishing	01.04	00.76	98.60	011457
00482	153.50	00.19	00.28	Electricity, Energy, Gas	00.65	00.94	00.44	000063
02309	498.70	00.28	00.97	Construction	00.63	00.36	153.90	008503
00029	1450.00	0.001	00.01	Mining & Quarrying	00.04	00.01	342.30	000712
117079	69.57	100.00	100.00	Total	100.00	100.00	45.66	697741

Table 1. b

Ratio of Workers to Establishments

	Economic Sector	1971	1981
1.	Manufacturing	16.82	11.27
2.	Trade	03.43	03.90
3.	Services	10.92	09.64
4.	Transport	20.74	17.90
5.	Other Activities	00.00	13.40
6.	Finance	11.18	12.20
7.	Agriculture, Fishing	07.78	08.01
8.	Electricity, Energy, Gas	45.62	18.08
9.	Construction	11.93	05.06
10.	Mining and Quarrying	104.00	29.08
	Total	**09.00**	**07.80**

Source : *1. Establishment Census - 1971 2. Economic Census - 1981*
Directorate of Economics and Statistics, Bombay.

workers, surfaced significantly in contrast to the relatively insignificant share of medium and large sized units employing a per unit strength of 41 to more than 100 workers. The latter held only 2% of the units and 53% of the total industrial workers while the tiny informal sector accounted for 91% of the manufacturing establishments and 32% of the workers (Gandhi & Banerjee-Guha, 1995) in 1981.

Significance of this structure is traced in the manufacturing sector in Bombay since early days. Factory industry in the city in mid 19th century and later in 20th century supported various symbiotic and non-symbiotic linkages leading to the growth of unorganised and informal sector employment (Madgaonkar, 1863; G.B.C.I.,I. 1909); Chandavarkar, 1993). The trend persisted during inter-war and post-war period of diversification (B.M.R.D.A. 1973; Chandavarkar, 1993). Since sixties, following the import substitution policies of the post-independence phase, the industrial growth in capital and technology intensive components in Greater Bombay especially in metal, chemical, rubber and plastic industry became more noticeable. Even this growth promoted employment in unorganised sector (Joshi and Joshi 1976; Desphande 1983; Desphande and Desphande 1991; B.M.R.D.A.1991 April 1991 October), although with a small share; simultaneously it worked on a wider spectrum of production linkages of various subgroups. Structural bi-polarity in the manufacturing economy of Greater Bombay has thus become integrated over the years.

The import of this structural characteristic was reflected in the product composition of manufacturing in Greater Bombay. Concentration of workers in the household or wage units, small and large suggests whether the given activity would be mainly informal or formal. A sizeable distribution of workforce simultaneously in both categorised would also qualify to be of a transient type having bi-modality. All these characteristics again would very considerably in intensity giving rise to various sub-types, which can be understood better at a two digit level analysis of the Economic Census data.

TYPOLOGY OF THE ACTIVITIES : AT ONE DIGIT LEVEL

i) The analysis conformed that textile industry accounting for less than quarter of the units and 35% of the workers continued to be the largest industrial activity in terms of employment followed by the metal industry, which housed 16.8% of the units and a quarter of the total workforce. Both these activities employed an average of 15 to 16 workers per unit and about 68% and 45% of the workforce in the large sized units besides the 20% and 28% in the household and tiny sector (Table 2) respectively. Though these observations apparently seen to be contradictory to those based on factory employment data of 1980-81 (B.M.R.D.A Octo., 1991), these only confirm that the decline of the textile industry was more significant in the organised sector and that the informal linkages of this industry are likely to have continued to expand. From this one may infer that both the major industrial activities of Bomaby tend to show bi-modality though metal industry seems to have developed more linkages in the informal as well as the transient categories, which can be noticed in the detail analysis at two digit level.

ii) Significance of informal sector in manufaturing in Bomaby is also emphasised as repair activities claim the third highest position in terms of establishments

Table 2

Composition of Manufacturing in Greater Bombay and the Size Characteristics, 1981

Sr. No.	Industry	Percentage Share in Total		Average No. of Workers Per unit	Percentage of Workers in	
		Units	Workers		Mainly Informal	Mainly Formal
					Household & Tiny Units	Units with>100 workers
1.	Textiles (T)	24.66	35.05	15.12	20.04	68.26
2.	Metal (Me)	16.79	25.02	15.92	28.08	45.35
3.	Repairs (Re)	13.70	05.57	04.34	63.15	22.01
4.	Food (F)	07.28	03.36	04.92	55.68	25.94
5.	Wood (W)	06.44	02.82	04.68	59.26	26.73
6.	Miscellaneous (Mi)	06.35	07.35	12.36	29.97	38.96
7.	Paper & Printing (P)	05.24	04.84	09.87	48.79	24.71
8.	Silver & Gold Jewellery Precious stone polish (S & G)	04.25	02.43	06.10	67.16	00.60
9.	Leather (Le)	03.71	01.43	04.12	75.30	11.64
10.	Construction (C)	03.23	01.23	04.08	60.81	09.05
11.	Plastic (Pl)	02.79	02.88	11.00	44.54	21.26
12.	Chemicals (Ch)	01.81	04.62	27.30	14.36	61.25
13.	Non-Metal Goods (NM)	01.66	01.41	09.05	41.96	36.77
14.	Tobacco, Bidi & Cigarettes (TB)	00.98	00.58	06.34	28.73	65.83
15.	Rubber (Ru)	00.59	00.96	17.39	29.35	59.95
16.	Stationery & Sports goods (StSp)	00.52	00.45	09.50	41.86	25.42

Source : *Economic Census, 1981*

accounting for more than 5% of the workfoce.

iii) The traditional production sector like food, wood, paper and printing as well as miscellaneous units each account for more than five to seven percent of the industrial establishments. Among these the category of miscellaneous activity seems to have more large and medium sized units, while the rest have larger sharge of the workforce in the household and the tiny sector units. The fact that the modern activity like plastice competes with these in terms of its share in the establishments as well as workers

suggests that the modern technology seems to have adapted more labour intensive production techniques promoting fragmentation and growth of informal sector employment.

v) Among the remaining ones, chemical industry is the most significant with which Bombay has been associated long since the beginning of the post-independence era. Being more capital and technology intensive, chemical industry, unlike the textiles, neither employed a large number of industrial workers, nor developed an elaborate base of production linkages. Thus, having 1.81% of the total establishments, it accounted only for 4.62% of the total industrial workers recording an average of 27.3 workers per unit establishments. It is, however, interesting to note, that this apparently modern industrial activity did not miss any opportunity of using informal workers and thus employed as many as 24.36% of the workers in the household and tiny sector. Rubber industry reflected similar characteristics, though it had relatively insignificant share in the total industrial workforce.

vi) Non-metal goods and stationery and sports goods industrial activities have a relatively balanced contribution in terms of number of establishments and workers, with the former claiming more than one percent in both the counts.

vii) Tobacco processing, bidi and cigarettes processing activity claims about 1% of the establishments and 0.58% of the workers. It has a higher value of workers per unit as compared to industries like food, wood, repairs etc.

TYPOLOGY OF THE ACTIVITIES : AT TWO DIGIT LEVEL

5.1 The Formal Type -

Out of the 16 major industrial categories, which constitute Greater Bombay's manufacturing sector textiles, chemicals, tobacco processing and bidi rolling can be identified as the most formal types with more than 60% of their workforce employed in large size units. The household and the tiny sector employ 14% to 29% of their workers respectively.

Rubber and metal industries can be identified as the mainly formal type activities having 50 to 60% of their workers employed in the large sized units with the household and tiny sectors share ranging between 25 to 28% each (Fig.1) All these activities, however, reveal varying degrees of bi-modality if analysed at two digit level, grouped as per their sub-categories based on product linkages.

a) At two digit level textile industry is classified into four categories of (i) textile spinning and weaving , (ii) other textile products, (iii) tailoring, hosiery and garment manufacturing and (iv) embroidery and jari making units respectively. Detail size class analysis of these categories indicates that the first two categories are dominantly formal showing highly skewed distribution with a distinct bias towards large sized units employing more than 90% of their workers. The latter two, on the other hand, are mainly informal (Fig. 2.I.a). Among these tailoring, hosiery and garment manufacturing units are significant accounting for a share of 19.16% of the total industrial establishments and 8.36% of the workforce. More than 62% of its workers are in the household and tiny sector. While more than 10% conform to the large sized units. These two activity types typically represent

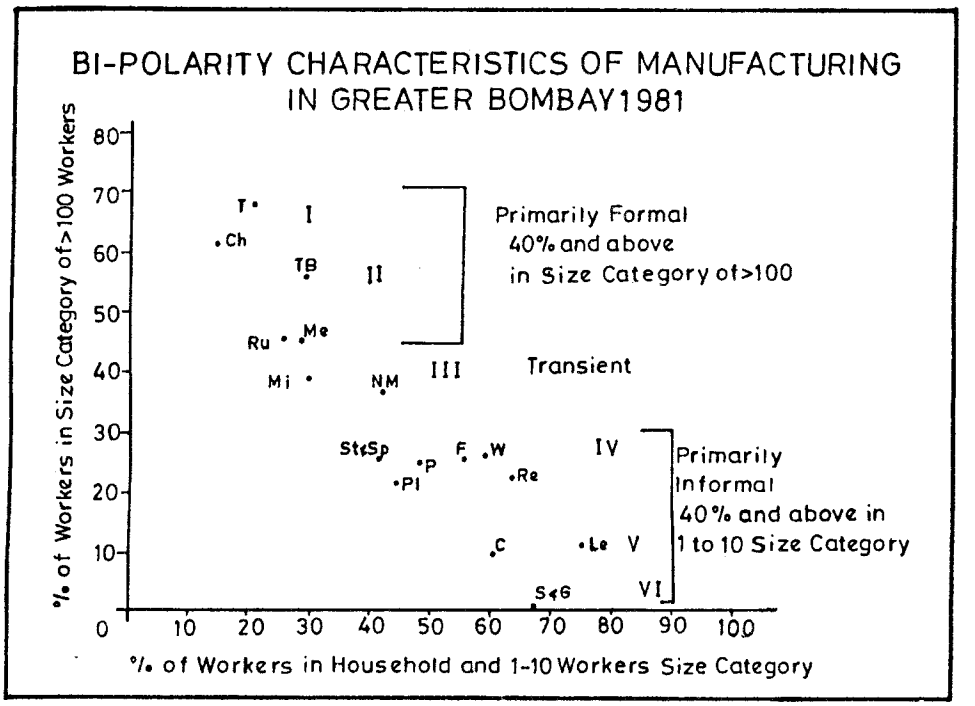

Fig. 1 : Bi-Polarity Characteristics of Manufacturing in Greater Bombay 1981

the informal linkages of the textile industry.

b) Among the various subcategories of chemical industry, while paints and varnished and other chemical products accounted for 21 to 22% of the workforce each in the household and the tiny sector, drugs and pharmaceuticals had a low presence of 6.09% . The latter along with the category of perfumes and cosmetics had more than three fourth of their workers in the large size units. The size categories of 11 to 20 and 21 to 40 are also important in case of most of the sub-categories of the chemical industry. (Fig. 2.I.b).

c) One of the extreme cases of bi-polarity is represented by tobacco processing, bidi, rolling and cigarette making industry, which house about 22% of its workers, mostly females, in the household category engaged in bidi rolling. About 66% of the workers on the other hand are employed in the large scale cigarette factory (Fig.2.II.a)

d) Both metal and rubber industry show similarity in size composition and degree of formal sector component. Among the two, metal industry having a longer history has developed multiple backward and formal linkages and has expanded into various sub-categories having different structural characteristics.

Thus, the sub-categories of non-electrical machinery, basic metal processing and metal products manufacturing units have larger share

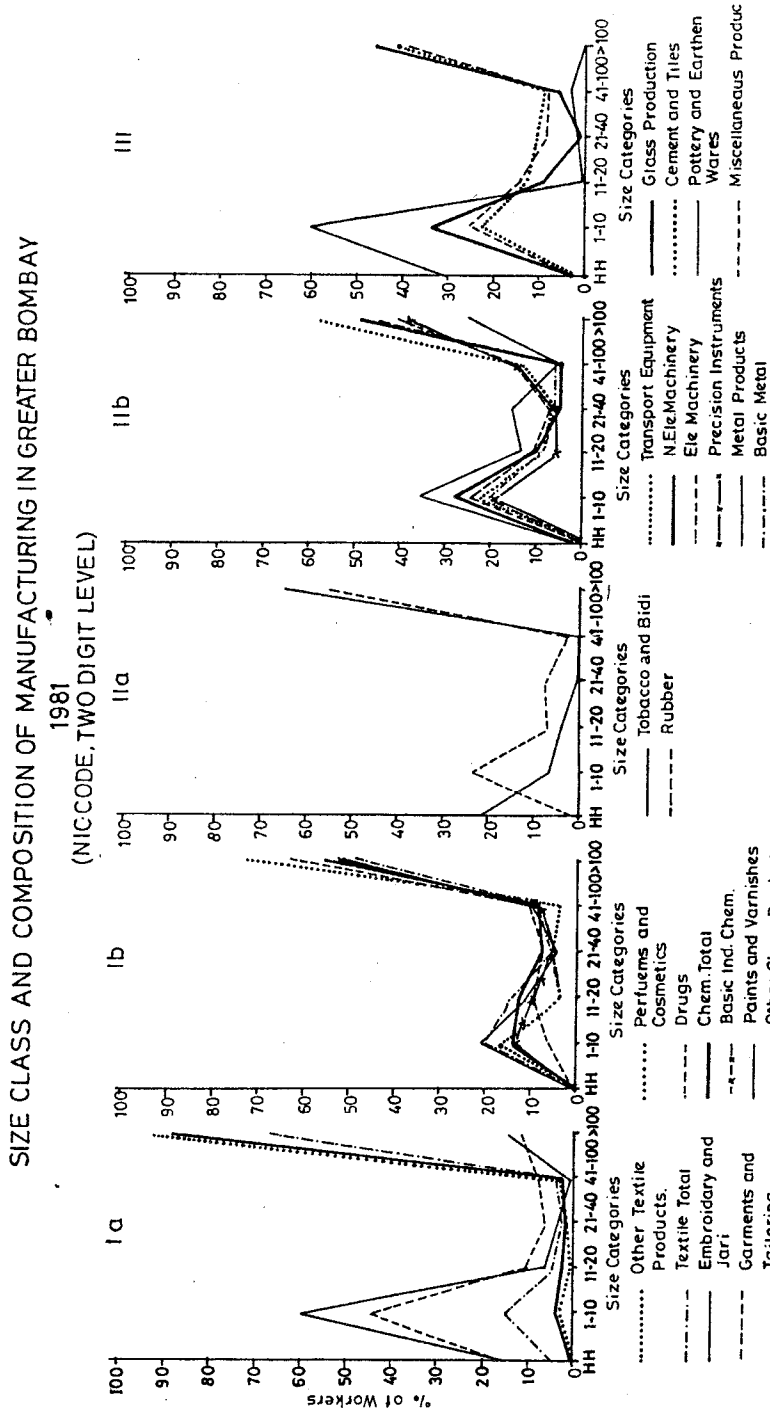

Fig. 2 : Size Class and Composition of Manufacturing in Greater Bombay

in the total establishments and workers. Electrical machinery and precision instruments have a relatively smaller numerical strength while the category of transport equipments has the least. The latter, however, displays greater orientation towards large size units having fewer linkages with the household and tiny sector. Production units making metal products, on the other hand, have more traditional base and linkages with textiles and other consumer product industries. About 40% of the workers of this sub-category are in the informal sector. All the remaining sub-categories of metal industry house 20 to 30% of their workers in the household and tiny sector. It can be observed that the bi-modal size composition of employment is more distinct in case of the various types of metal industries and the gap between the two maximas is less as compared to the other industrial activities of formal type (Fig. 2.IIb).

5.2 Primarily Informal Type :

Industries employing more than 60 to 90% of the workforce in the tiny and household sectors respectively constitute this group. All these having one projected maxima and very weak second maxima claim less than 10% of the workers in the large size. It includes industries such as construction, leather and its sub-categories and jewellery and precious stone units (Fig .2 V &VI).

a) Among these leather industry along with its subtypes is highly informal claiming more tan 70% of the workforce engaged in household and the tiny sector together. The subtypes like leather footwear and leather products other than footwear (mainly consumer products) have a large contingent of workers in the household category and only marginal workforce in the large size units. Activities allied to construction also show similar traits as these have more number of self employed single worker operators. Relatively the category of leather and fur products (mainly industrial products) and construction accounts for smaller proportion of workers in the household sector and relatively larger proportion of workers in the large and medium sectors.

b) Jewellery and precious stone units, despite their recent emphasis on the export markets claim the lowest share in the large size units. Household labour also has only a moderate contribution. Tiny sector giving wage employment accounts for 55% of the workforce followed by the transitional size categories claiming more than 30% of its total workers.

5.3 Primarily Informal with Partial Formal Character :

This group comprises of the activities having about 50 to 90% of the workers in the household and the tiny sector. It is distinguished from the former as employment in the large size units is relatively ranging between ten to more than twenty percent of their workforce. Except a few, most of the sub-categories of food, wood and repair industry along with non-metal miscellaneous production units represent this group (Fig.2 IVb, 2 IVc. 2. IVd).

a) Among various sub-categories of food industry the activities like grain-milling and units making various fried snacks mark a larger informal contingent ranging between 60 to 70% of their total workers with the share of the household accounting for about 16% of the total. Employment in the large size units ranges between 17 to 20% each. The remaining two categories of bakery products and the other food products can be distinguished due to their relatively greater inclination towards

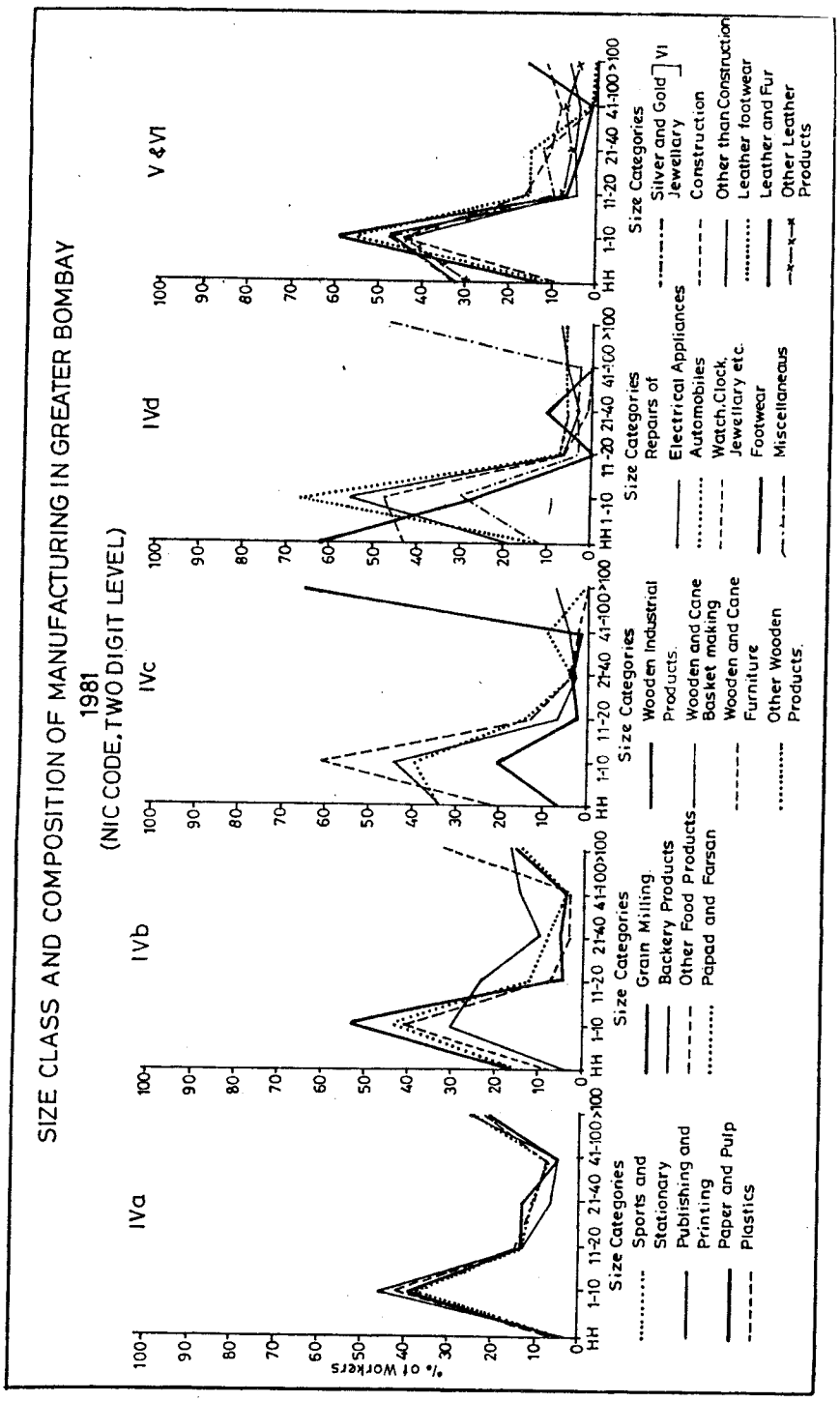

Fig. 3 : Size, Class and Combination of Manufacturing in greater Bombay

medium and large size units. Among these two the bakery units show a more balanced size class distribution of the workforce.

b) Wood industry shows more diverse patterns of organisation. While the category of wooden industrial products has more linkages in the formal sector claiming more than 65% of the workers in the large size units, the categories of wooden and cane furniture making and other wooden production units have no workers in the large size units. Furniture making units claim more than 60% of their workers in the tiny sector while units claim more than 60% of their workers in the tiny sector while the activities like wooden cane basket making and other wooden products reveal a distinct bias towards household units and record more than 70 % of the workforce in the informal category.

c) The informal bias of the repair activities is very apparent and some of its categories claim more than 75 to 92% of the workers in the household and the tiny sector. However, the activities such as the of electrical appliances repairs and especially miscellaneous repairs claim a relatively higher formal sector component with the latter marking 48% of its workers in the large size units.

d) Non-metal industry and miscellaneous production units also show a combination of the informal and formal components. Out of the three sub-categories of the non-metal industry, the activities like cement and tiles making and glass production along with the miscellaneous units mark a balances distribution of workforce in the household and tiny sector as well as large size units. These also claim a sizeable proportion in the transitional size categories. However, pottery making and earthern wares production have almost unimodal distribution concentrated in the household and the tiny sectors (3.III).

This analysis of mainly informal activities emphasizes that, though these constitute mainly labour intensive and skill based production types, presence of capital and technology production process are not totally absent. It also suggests that these two forces seem to have conveniently adapted to the third world, developing intricate linkages of production function appropriating cheap labour and using modern technology as the need arises.

5.4 Formal /Informal Combines :

This group can be distinguished by the activities having 30 to 50% of the workers in the household and the tiny sector and about 20 to 40% in the large units. Industries like paper and printing, plastics and sports and stationery goods conform to this group. These activities can be distinguished from the rest of the mainly informal type activities for the following reasons : (i) Unlike wood, food or repair activities, these have relatively narrow linkages with the traditional household sector. Among them plastic industry has the lowest count of household. (ii) Wage employment is significant accounting for 40 to 50% of the workforce in the tiny sector. Thus, their size composition reflects more equally projected two maximas and the moderate protrusion representing the workforce in the transitional categories tend to characterise them as the multimodal type, (iii) All the three categories have linkages in capital and technology intensive as well as labour intensive production processes (Fig. 2. IV.a)

CONCLUSION :

The analysis clearly brings out the significance of bipolarity in Greater Bombay's economy

with an increasing tendency of informalisation. With a focus on the manufacturing sector, the study emphasizes the imbalance in the urban economic sector of the metropolis that has led to disaggregation of production activities and increasing informalisation of the sector. Linked sectorally and spatially and evolving through various phases of urban growth, the above bipolarity has contributed considerably to reshape the city's economy in different phases. Analysis of the economic census data of 1981 elaborates the above linkages in a detailed manner. With the household and tiny informal sector accounting for 91% of the establishments and 32% of the workers, and the large size formal sector units accounting for 53% of the industrial workforce and 1.98% of the establishments, manufacturing sector in Greater Bombay in 1981 had a complex functional and spatial complementarily of both the sectors.

The study also highlights the degrees of bi-polarity of different production activities and their respective status in the manufacturing environment of the metropolis. Classification of these activities suggests that while almost all types of production activities have adapted to profit oriented production system in contrast to a labour surplus situation, a few have established linkage between household and tiny wage sectors. Size profiles of products also indicate that the modern technology intensive production activities like plastic and rubber and various sub-types of chemical and metal industry besides textiles have taken to some informal forms of production. Activities oriented to consumer products and service industry like wood, paper, food, construction, repairs etc. have a more balances structure. All the above characteristics are representative of a typical third world metropolitan economy with bifurcation and cohabitation between capitalist and non-capitalist sectors.

NOTE

The article has heavily drawn from Chandavarkar, R., 'The Origins of Industrial Capitalism in India', Cambridge, 1993 for the section on the Evolution of Manufacturing in Greater Bombay.

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