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FORMAL AND INFORMAL MANUFACTURING IN GREATER BOMBAY : A SPATIO-SECTORAL ANALYSIS

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ABSTRACT : Forces of capitalist growth and technology have produced divergent patterns of spatial and sectoral growth of the metropolitan economies in the developed and developing countries. Unlike a uniform urban capitalist pattern of the former group, the urban economies of the latter are marked by a distinct bipolarity with a disproportionately large informal sector and a small formal sector having complex functional linkage between the two. The present pattern examines the spatial dyanamics of bipolarity of the manufacturing activities in Bombay during early eighties and focusses on the varied forms of spatial interdependence that exist between the two sectors in different types of manufacturing.

Manufacturing, that played a key role in the process of economic growth and development in the developed world, failed to replicate the same in case of the third world countries. A series of studies on urban and industrial growth undertaken in the post-war period have emphasised on the distinctly different experience of the developing countries on the same. The differences are borne by the dual economic structure of the colonial past, increasingly high rates of urban growth without the supportive secondary sector accompanied by extreme conditions of primacy and last but not the least, the bi-polarity in the structure and composition of their metropolitan economies.

Primacy of these metropolitan economies was also associated with capital and technology intensive, productive economic activities and infrastructure on the one hand and large inflows of unskilled, illiterate and less educated migrants from the villages and small towns in the far stretched, marginalised hinterlands, on the other.

Heterogeneity in their growth patterns, however, could be traced in the differential patterns of distribution, and allocation of resources and population, the policies implemented by their respective governments and more so the manner in which their national economics have been exposed to the international capital (Banerjee-Guha, 1993). Consequently, the metropolitan economies of these countries could promote only a narrow front of the modern, formal, organised economic activities having a limited labour absorption capacity, leaving aside, thereby a large section of the migrant as well as the local workers unabsorbed and unemployed.

Forces of capitalist growth and technology that penetrate these economies adapt to these conditions to their advantage. The cheaply available, almost unlimited supply of unskilled labour is used in the informal sector to promote profit. A consequent bi-polarity in the economic structures is thus, manifested giving rise to intricate patterns

of functional co-existence and spatial affinity of the formal and informal sectors.

The informal activities include various traditional and non-capitalist forms of production, that persist employing the craft workers as well as the unskilled non-craft workers absorbed by the degenerated versions of craft production adapted to suit the changing patterns of demand of the metropolitan economies (Gandhi and Banerjee Guha 1996). They also include modern types of activities organised and adapted to use semi-skilled and semi-trained workers at production sites, to use the indigeneous technology and labour intensive production methods producing wide ranging products and services. Both these components of the informal sector facilitate parasitic, non-parasitic and intermediate links with their formal counterparts and together seek for a specific interpretation of space (Banerjee-Guha, 1993). The dynamics of the metropolitan economic space that evolves, reflects the linkages shaped by the colonial duality further modified and redesigned by the forces of the post-colonial bi-polarity. The factors of physical environment, prevailing market and transport conditions, administrative and legal framework add their own nuances and dimensions to it. Various informal activities in such situations are pressurised to adapt themeslves to a flexible mechanism and explore ways of offering their labour, thereby reflecting their peripherality. The needs and convenience of the formal sector go to affect their legitimatization, eviction or relocation, expansion or growth. The economic and spatial links between the two sectors are thus shaped and reshaped under these complexities and constantly remain in a flux. The present paper attempts to interpret these processes and patterns as reflected in the spatial dynamics of the formal and informal manufacturing in Bombay in early eighties. A number of studies have been undertaken on the size and characteristics of surplus labour in Bombay in sixties and seventies (Joshi and Joshi, 1976) or on trends of segmentation and flexibility in its labour market (Deshpande, L.K. 1983, 1988), but there always has been a dearth of research on the spatial configuration of such items to which the paper proposes to attend.

The study is based on the NIC code economic census data of 1981 obtained at four digit level for the eighty-eight sections of Greater Bombay. Following the factory act of 1948 and the size criterion used by papola (1980) and others, units employing ten workers or less have been identified as the informal sector units. These have been further grouped to distinguish between the self-employed households and very tiny wage workers' units. The remaining units have been grouped on the basis of capital investment and technology, to indicate an overlap between formal and informal sectors. Correlation and regression analysis has been carried out to find out the relation between manufacturing workers and establishments at section level. Residual values obtained therefrom have been mapped to show areas of formal and informal activities. Positive value areas with more workers and less establishments indicate formal activities and negative values indicate areas with less workers and more establishments, in other words, areas with informal units.

The analysis reveals that the bi-polarism of manufacturing in Greater Bombay exhibits a complex symbiotic relationship between the formal and informal sectors expressing varied forms of spatial affinity rather than distinct spatial concentration areas of each in exclusion of the other.

Estimates of informal sector employment in third world economies range between 20 to 70% (Sreerammurthy, 1987). In India

Table 1a.

Estimates of Informal Sector Empolyment in Urban Areas in the Third World

	Cities	Country	Year	% of Employment in the Informal Sector
1.	Nairobi	Kenya	1972	44
2.	Kumasi	Ghana	1974	60/70
3.	Bogota	Colambia	1970	43
4.	Jakarta	Indonesia	1976	45
5.	Lagos	Nigeria	1976	50
6.	Abidjan	Ivory Coast	1970	31
7.	Colombo	Sri Lanka	1971	19
8.	Singapore	-	1970	23

Source : Sreerammurthy, K., 1987, Table 1.2, pp 118-119.

Table 1b.

Estimates of Informal Sector Employment in Indian Cities

City	Years			City	Years		
	1961	1971	1981		1961	1971	1981
1. Delhi[a]	61	54	63	7. Hyderabad[c]	-	35.32	-
2. Calcutta[a]	-	45	42	8. Vishakhapattanam[d]	-	-	45.23
3. Bombay[a]	49	50	56	9. Allahabad[e]	-	35.85	-
4. Madras[a]	-	-	63	10. Jaipur[e]	-	58.66	-
5. Ahmedabad[a]	-	46.5	-	11. Wardha[e]	-	61.41	-
6. Bangalore[b]	-	-	40.34				

Source : a) Deshpande, S. and Deshpande, L. 1991 Table I.A, pp 6. b) Abdul, Aziz, 1984, pp 51
c) Afzal Mohammad 1990, pp4 d) Sreerammurthy, K., 1987, Table 4.4, pp 55.
e) Rai, Anil, 1987, pp 29.

during seventies it accounted for 45 to 65% of the total workforce in case of the primate metropolitan centres. Some of the second order metropolitan centres are also reported to have a similar large share of workers absorbed in this sector (Table 1a, 1b). As regards manufacturing, informal sector employment in some cities ranged between 30 to 40% of the total industrial workforce. In Bombay it was around 49% in 1961 and 50% in 1971, respectively. Most of these works, however, mainly use census data and estimate informal sector employment as the residual of the formal sector. Very few works have used economic census data and the detailed size class analysis as the base.

STRUCTURE OF MANUFACTURING IN GREATER BOMBAY, 1980 :

In seventies Bombay's population grew at an average annual rate of 3.2 reaching a gruesome size of 82.24 lakhs in 1981. Though the proportion of the migration component in Bombay's population growth showed a

declining trend since 30s (48.7% and 47% during 1960-70 and 1970-80 respectively) (Obserai, A.S., 1993), in absolute terms it was considerably large and vulnerable due to characteristics such as low education profiles and young age groups. The total workforce participation rate in 1981 was estimated to be 35.22 while that of labour force (workforce + unemployed) to be 38.5% (Deshpande & Deshpande 1991). Bombay's slum population was reported to have increased from 1.5 million in 1971 to 3.3 million accounting for 40% of the total population in 1981 (Deshpande & Deshpande, 1991). This indicates that in seventies and eigthies Greater Bombay's demographic characteristics reflected a process of pseudo urbanisation, a characteristic feature shared by many other third world cities.

Analysis of the structure of manufacturing based on data from the Inspectorate of the Registered Factories, establishment census of 1971 and economic census 1981 further substantiate these observations (Table 2).

Since the post-war period Greater Bombay experienced a diversification and growth in its industrial base (BMRDA, 1973). However, growth of the registered factories and employment therein was limited while the small, unregistered factories seem to have grown at an increasingly higher rate since early sixties. The number of registered factories in Bombay increased from 4064 to 5732 in 1961-71 and to 7770 in 1981, recording a decadal growth of 41 and 35.6% respectively. Employment in the factories during this period, however, grew at annual compounded rate of 1.02 in 1961-71 which decreased to 0.01 in 1971-81 (BMRDA, 1991).

The economic census of 1971 recorded a total of 35835 industrial establishments of which 14.39% were the registered units. In 1981 this

Table 2

Growth of Industrial Units and Workers in Greater Bombay in 1971 and 1981

Year	Industrial Units			Industrial Workers		
	Total	Register	Unregister	Total	In Register Units	In Unregeister Units
1971	45835	5732	34103	669946	592649	77297
%	(100)	(14.39)	(85.61)	(100)	(88.46)	(11.54)
1981	71411	7770	63641	791080	603787	187293
%	(100)	(10.88)	(89.12)	(100)	(76.32)	(23.68)
Change between 1971-81						
Absolute	+35576	+2038	+29538	+121134	+11138	+109996
In per centage	99.28	35.6	86.61	18.08	1.88	142.3

Source : Data collected from : 1) Inspectorate of Factories. 2) Establishment Census 1971. 3) Economic Census, 1981.
as tabulated by Directorate of Economics & Statistics, Bombay.

proportion declined to 10.88%. Thus, out of 71411 industrial units in Greater Bombay about 89.12% were marked as the unregistered units (Table 2).

In terms of employment the unregistered units claimed a share of 11.54 percent in 1971. In 1981 this proportion increased to 23.68% while the absolute decadal growth in the number of workers in the unregistered units amounted to 142.3% as against 1.88% in case of the workers in the registered units.

A detailed analysis of 1981 economic census data focussing on the size criterion and nature of industrial workers further corroborates this point. Out of 284,207 total establishments and 2,199,381 workers in Greater Bombay enumerated by the economic census in 1981, manufacturing services and construction activities together accounted for a quarter of all units, employing about 36% of the total workers. Of these 12.5% were unpaid workers, who constituted a proportion of nine per every hundred of paid workers. About 1/2 of these

Table-3

Structure of Manufacturing in Greater Bombay, 1980
(Based on the number of workers)

Size Category/ Nature of Units	I. Unorganised or Informal Sector						II. Interface Sector				
	Tiny Units						Transitional Small Units				
	'House' hold	Single worker	Units with 2-6 workers	7-10 workers	1-10 workers (2+3+4)	House-hold & 1-10 workers (1+2+3+4)	11-20 workers	21-40 workers	Units with 11-40 workers (7+8)	House-hold& 1-20 workers (6+7)	House hold& 1-40 workers (6+9)
	1	2	3	4	5	6	7	8	9	10	11
% of Establishments to total Industrial units	34.45	9.72	36.07	10.75	56.54	90.99	5.05	1.98	7.03	96.04	98.02
% of workers to total Industrial workers	5.59	1.89	15.60	9.2	26.68	32.27	8.45	6.04	14.5	40.72	46.76

Size Category/ Nature of Units	III. Organised or Formal Sector Medium and Large Units				Grand Total
	Units with				
	41-100 workers	100 workers	41- 100 workers (12+13)	1-100 workers (5+9+14)	Household + 1-100 workers (11+14)
	12	13	14	15	16
% of Establishments to total Industrial Units	1.02	0.96	1.98	65.55	100
% of workers to total Industrial workers	6.02	47.21	53.24	94.41	100

Source : Economic Census, 1980.
Directorate of Economics & Statistics, Bombay.

unpaid workers belonged to the category of the household workers.

As per the size criterion the industrial workforce in 1981 could be grouped as:

a) Workers employed mainly in organised or formal sector units- This category was identified with the units employing 41 to more than 100 workers categorised as the medium and large scale units and constituting less than 2% of the establishments and more than 53% of the total industrial workers (Table 3). This category goes to make the main core of the organised manufacturing employment of Bombay.

b) Workers employed mainly in the unorganised or informal sector units - They are identified with household and the tiny sector units with less than ten workers accounting for 91% of the establishments and 32% of the workers. Keeping aside the household units holding 5% of the workers, the rest were grouped into 3 size categories (Table 3). Among these, units with 2.6 workers had the lion's share accounting for 35% of the establishments and 15.6% of the workers followed by units with 7-10 workers constituing 10.75% of the establishments and 9% of the workers. Own account enterprises with single worker had relatively smaller share.

c) Workers employed in the transitional units - This category was found to be existing as an interface between the formal and informal sector units comprising of the units with 11-20 and 21-40 workers. Due to fragmentation and casualisation many of these units (on the basis of their modes of labour utilisation) qualify to be included in the category of informal sector units. In this context, it should be mentioned that an earlier study on surplus labour in Bombay (Joshi & Joshi, 1976), mainly using data from the Directorate of Employment and Census of 1961, considered 25 workers as the cut-off point while estimating informal sector employment in the city. Hence, if workforce in the above transitional category is added to that in the informal sector units the total strength of the latter increases to 46.5% in 1981. It then tallies with the estimation of Joshi & Joshi for 1961. Even if this category is not included in the informal sector, the numerical significance of the latter remains an undoubted reality.

SPATIAL PATTERN OF MANUFACTURING :

The structure and typology of manufacturing is also reflected in the territorial organisation of the city as evolved through various phases of growth and expansion during the colonial and post-colonial period.

The spatial matrix of the metropolitan economy of Greater Bombay could have exhibited a strong negative spatial association between the number of workers and establishments, if the formal and informal sectors would have evolved independent and exclusive of each other giving rise to greater concentration and spatial segregation. However, bivariate correlation value of + 0.63 tested at the 5% level of significance calculated for the section level data on the total number of manufacturing establishments and workers, indicates that in Greater Bombay large, medium and small as well as tiny and household units tend to co-exist with each other on space. Variation in the relative degree of concentration of these units in different parts of the city can be explained in the context of the phases of capitalist industrial growth and urban expansion experienced by the city in the colonial and postcolonial era.

This variation has been traced and analysed through regression analysis and residual mapping. The residual values are grouped and mapped as high, medium and low following the standard error classification. Areas showing high positive residuals in the map indicate a

proportionately high ratio of workers vis-a-vis the establishments denoting a relative concentration of large size factories and mills having a greater rate of labour absorption. Thus, these categories constitute the major and submajor areas of formal manufacturing. In contrast, areas with negative residual values have high establishment ratios vis-a-vis workers. These conform to be the major areas of informal manufacturing. Besides these two a third category can be observed comprising of some of the major industrial pockets with either low positive or low negative (<1SE to 1SE) residual values. These areas can be marked as the transitional areas characterising a greater degree of functional as well as spatial affinity between the formal and informal units. The spatial configuration of these three categories reveals the following patterm.

AREAS OF FORMAL MANUFACTURING :

The main core of the formal manufacturing identified by high positive residual values as well as high workers to establishment ratio has two spatial components (Fig. 1). The first one located in the south and central parts of the island city is associated with the initial growth of factory industries in Greater Bombay (Fig.2) during the colonial period led by cotton textiles and its different linkage industries, such as metal, wood, chemicals leather as well as food and other consumer goods industries (Chandavarkar, 1993). It is remarkable that these old industrial areas of Bombay island city are characterised by high population density ranging between 50,000 to 100,000 per sq. km. (Thomas, 1988) associated with the residential areas of the mill and dock workers and other low income groups. These residential areas are also the sources of supply of informal workers as well as demand for informal consumer goods and services. Many pockets in these belts degenerating into slums or squatters tend to house a varied range of informal activities e.g. bidi rolling with female workers coming from the families of textile workers in B.D.D. chawls in Worli or jari and embroidary workers having muslim workers from Wadala slum which is also a dominatly textile mill area, etc.

The second major core of formal units is located in the central, north-eastern and north-western parts of Salsette island associated with post-war and post-independence growth and signified by capital and technology intensive activities including machinery and tools, transport equipments and assembly of vehicles, chemicals, pharmaceuticals, oil refinery and petroleum products, plastic and rubber, electrical machinery etc. These areas are located as corridors flanked along the main rail and road arteries. Among these Bhandup and Vikroli in the north-east housed capital intensive units with a lower labour absorption rate than the textile mills but higher than some medium and small scale units. Comparatively, Kurla, Sakinaka or Andheri belt comprises of a diversified base having large, medium and small scale units and making a highly complex functional linkage of metal, chemicals, plastic, paper and wood industries producing capital goods, spare parts, durable consumer as well as cheap consumer goods. Hence some of these areas and their adjacent counterparts can be identified as the transitional areas having relatively low positive or negative residual values and greater share of total manufacturing establishments (Fig. 1). Recent industrial growth in these areas is associated with export oriented industrial production of electronic goods as well as precious stone polishing, diamand cutting and jewellery making units. Although the former use highly modern technology, both thrive on the supply of low paid skilled labour often organised through informal networks.

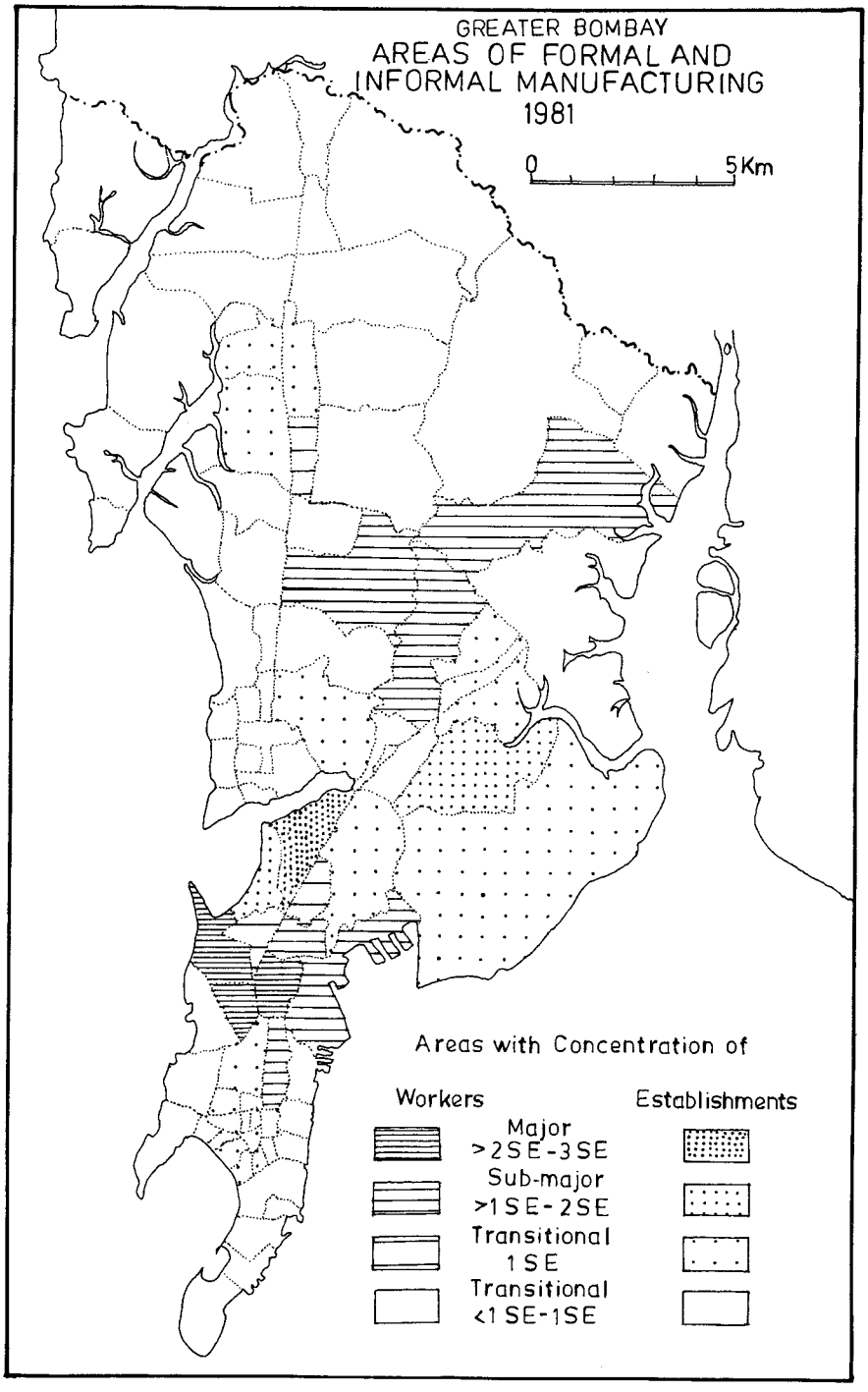

Fig. No. 1 : Greater Bombay - Area of Formal and Informal Manufacturing

AREAS OF INFORMAL MANUFACTURING :

Apparently, these areas seem to have grown randomly all over the city indicating a disorderly pattern. A careful scrutiny with a historical perspective however, helps to understand the forms of their spatial affinity vis-a-vis the formal activities.

Some of the main core areas of informal manufacturing associated with units producing the traditional craft-products organised mainly as household and self employed units have cropped up in (a) the back-lanes of the major wholesale and retail markets of the metropolis, such as market, Bhuleshwar, Umarkhadi, Phanaswadi, Mandvi occupying intricately partitioned and intensively used spaces of the dingy multifloor chawls, (b) old low and middle income residential areas in Girgaon, Khetwadi, Kumbharwada, Nagpada, Kamathipura, Mazgaon etc. These areas are also characterised with very high residential density shooting up to more than one lakh per sq. km. and together claim a sizeable share of the total manufacturing establishments. Concentration of traditional craft based consumer goods in these parts of Bombay can be traced back to 18th century, when systematic migration of the craft workers was promoted by the British traders to organise production through regulation and subordination of the craft workers and generate exports of cotton piece goods and other craft products from Bombay port (Chandavarkar, 1993).

Extension and expansion of these types of informal units have coincided with various phases of urban growth and expansion in the periphery of the island city and across the Salsette island as well during the post-independence period. Thus growth of slums at Dharavi, Wadala, Antop hill and Prabhadevi in the island city and of areas, such as Janata Colony of Chembur (relocated as Chita Camp at Trombay), Thakkar Bappa Colony, Shivajinagar, Bainganwadi at Govandi, slums along the western express highway at Bandra, Khar, Santacruz, Jogeshwari, Girgaum, Malad etc. house a large number of craft communities - both old as well as new entrants-and also those producing cheap consumer goods items. In these areas are located the tiny workshops of readymade garments, hosiery works, zari and other types of embroidary, leather and non leather footwear and other products, pottery and broom making, stone cutting, carpentry, diamond and precious stone cutting and polishing etc. as well as food items and seasonal consumer items like kites, festival items and toys for fairs etc. These areas reveal high to moderately low negative residual values due to greater concentration of tiny and small establishments. Some of them, however, also house few large and medium size units and thus, account for a substantial share of the total manufacturing units as well as workers.

Another type consists of units acting ancillary and auxillary to the old formal manufacturing concentrated in the south and central parts of the island city surrounding the main core in areas like Kumbharwada, Byculla, Chinchpokli, Mazgaon, Prabhadevi, Dadar etc. These areas are often located within the belts of formal manufacturing. Stretches of compound walls of the textile mills, old godowns, abandoned chawls, lower portions of the bridges, etc, offer convenient locations for such informal workshops, which also serve as residences of the workers.

SPATIAL DYNAMICS OF BI-POLARITY

Units proliferating due to fragmentation of the modern industrial activities producting spare parts in non-electrical and electrical machinery, various items in plastic, rubber, chemicals, fabrication and mould making units, book-

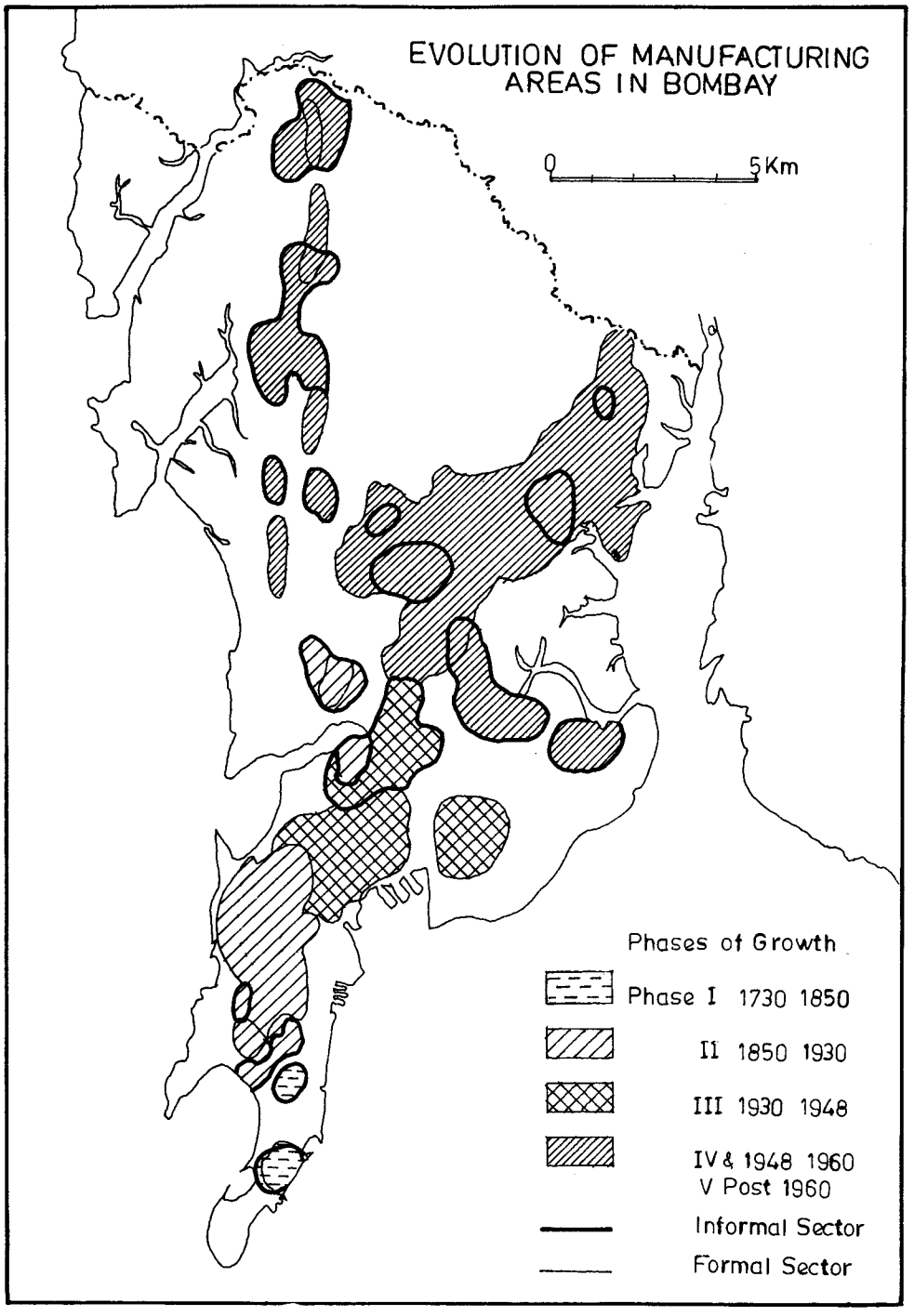

Fig. No. 2 : Evolution of manufacturing areas in Bombay

binding and printing, screen printing card board packing units, electronic units, and other assembly and repair workshops of various kinds etc. are located in the extensive areas surrounding the main formal industrial core. Thus, erstwhile villages of Eksar & Pakhudi in Goregaon west, extensive areas around the old Bombay studio in Malad west and adjacent undeveloped agriculatural land and hill slopes, interspersed with buffalo stables in Andheri, Jogeshwari, Goregaon east are strewn with informal manufacturing units that started operating since early seventies. By late seventies and early eighties their extension could be seen in the northwestern and northeastern periphery of the salsette island occupying the remote hill slopes, marginal marshy lands, old buildings in undeveloped gaothans etc. Similarly, many unauthorised buildings were constructed that housed small and tiny informal manufacturing units. These areas can be distinguished from their counterparts for having a greater proportion of tiny units employing wage workers instead of household or self-employed ones.

CONCLUSION :

The study clearly reveals that manufacturing in Bombay is characterised by a bi-polar structure in which formal and informal manufacturing units co-exist and conhabit. Forces of modern technology and capitalist growth facilitate the growth of the formal sector that simultaneously promotes informal activities. The latterin, turn ,gets intrinsically associated with the process of marginalisation and peripheralisation of space. Patterns of spatial affinity and functional interdependence of the two thus reflect a typical space-sector interface of a third world urban economy.

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