# Spatiality and Zoning of Urban Functions in the North-Eastern Part of Kolkata Metropolitan Area

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## Abstract

*Functional characteristics together or through different combinations determine the personality of urban as well as rural areas. Functional classification of towns is necessary in urban perspective to perceive the dominant and distinct functions of a town as well as the changing pattern of activity space for associated towns around a growth pole.*

*The present study concentrates basically on the spatiality and zoning of urban functions in the north-eastern part of Kolkata Metropolitan area with the help of successive correlation, Z-score of functions and location quotient, though the study begins with functional character of individual towns through rose diagrams.*

*The whole design is expressed by sequential zoning of service sector, industrial zone and primary sector around the growth pole of Kolkata Municipal Area (North-Eastern part) prominent with transition zone within the region in the tune of Von Thunens' Land use Model.*

## Introduction

Functional classification of towns is necessary in urban analysis to perceive the dominant and distinctive functions of a particular town as well as the pattern and the changing pattern of activity space for a cluster of towns. Here the outlook has been framed to grasp the above mentioned reality for the towns of the eastern bank of the River Hooghly, where urbanization and industrialization have a dominant role in designing the functional landscape of north-eastern part of Kolkata Metropolitan Area (K M A).
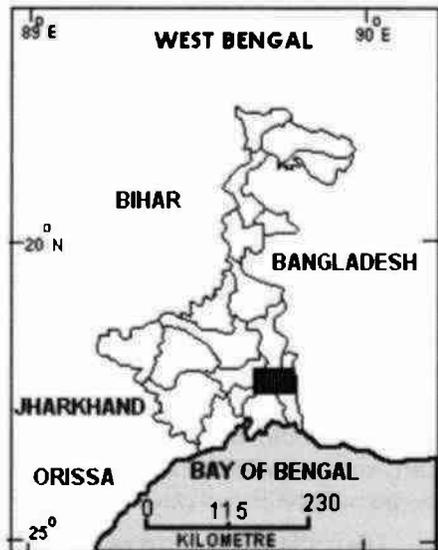
The spread of urbanization in West Bengal has been localized in five major pockets - namely Kolkata Metropolitan Region, Asansol-Durgpaur industrial region, Siliguri-Jalpaiguri area, Kharagpur-Midnapore area and Haldia industrial region. Other points are also conspicuous in their functional characteristics but not so much significant like the above five. But Kolkata Metropolitan Region is far and wide different in terms of functional complexity, diversity as well as spatial design because of its Metropolitan identity.

## Study Area

Kolkata Metropolitan Area lies in the lower Gangetic plain along the course of the River Hooghly-Bhagirathi, covering the eastern portion of Howrah and Hooghly districts and the western portion of South

# LOCATION MAP



## NORTH-EASTERN PART OF KOLKATA METROPOLITAN AREA



1 GAYESPUR
2 KALYANI
3 KANCHAPARA
4 HALISAHAR
5 NAIHATI
6 BHATPARA
7 GARULIYA
8 NORTH BARRACKPORE
9 BARRACKPORE
10 TITAGARH
11 KHARDAHA
12 PANIHATI
13 KAMARHATI
14 BARANAGAR

15 BIDHAN NAGAR
16 KM C
17 SOUTH DUM DUM
18 DUM DUM
19 NORTH DUM DUM
20 NEW BARRACKPORE
21 BARASAT
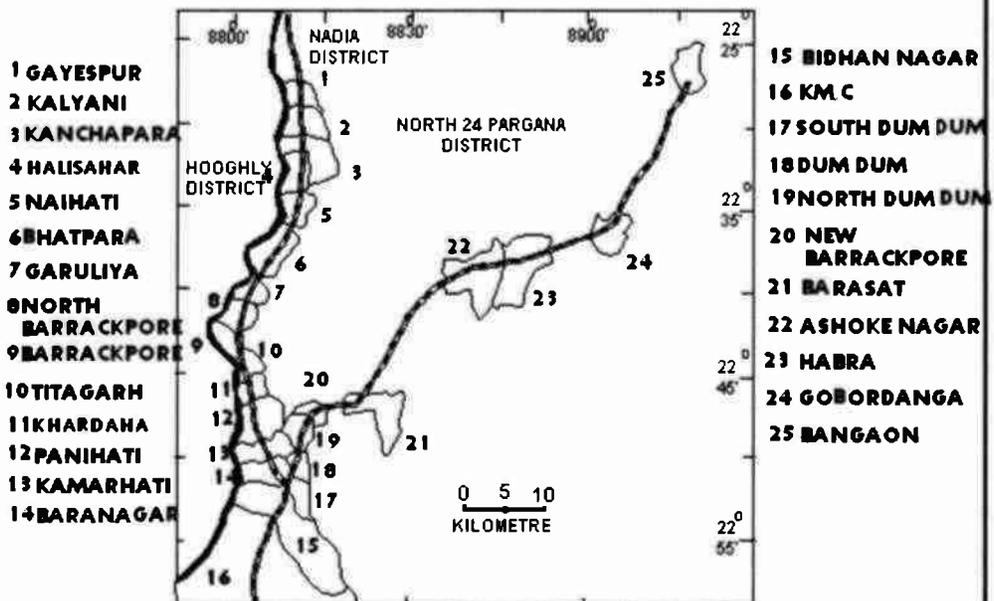22 ASHOKE NAGAR
23 HABRA
24 GOBORDANGA
25 BANGAON

Fig. 1

24 Parganas, North 24 Parganas and Nadia districts respectively. The regional system of urbanization of Kolkata Metropolitan Area is a significant macro urban process in respect to lineal habitation of narrow and continuous strip along both side of the River Hooghly-Bhagirathi. The nucleus of this localized system has been developed in the twin -cities of Kolkata and Howrah.

Kolkata Metropolitan Area covers a huge area containing thirty five municipal units in both directions. So it is not possible to work with the huge data base of this area with maintaining the parity in both sides of the river. To grasp the design and spatiality of functional character of this region with a consistent way, only north-eastern section of the region has been taken into consideration (figure 1). The KMC (Kolkata Metropolitan Corporation), North 24 Parganas and Nadia districts lie in this section excluding South 24 Parganas district as it has been influenced by very fragmented nature of urbanization. To fulfill the purpose of our study, two railway routes and their adjacent municipalities have been considered as a unit of investigation. The linearity of urbanization along these two routes - One from Seadaha to Kalyani covering eighteen municipal units (with one municipal corporation i.e. Kolkata Municipal Corporation, fourteen municipalities and three notified areas) and the other from Sealdaha to Bangaon covering eleven municipal units including five common municipal units of Sealdaha-Kalyani route (one corporation, one notified area and three municipalities) of Sealdaha-

Kalyani route, is so distinct that the design of inquiry have been expressed along the two concerned railway lines. Though the north-eastern portion of Sealdaha-Bangaon railway route does not belong totally to the Kolkata Metropolitan Area (as per 2001 Census), but for better analysis total stretch of this route has been included into the study area to establish firmly the urban functional dynamics as well as its spatial signature.

## Data base

The study has been cropped up with the 1991 census data of functional category of workers (nine unit classification) for the towns of north-east quadrate of eastern side of the Hooghly River. It would be better to reflect the reality with the data base of 2001 census, but unfortunately 2001 census has classified the occupational categories of workers into four groups i.e. cultivators, agricultural labourers, house hold industrial workers and other workers. Such a data base is very skewed as well as hazy in terms of functional distribution. For that limitation there is no way to unfold the reality with the help of 1991 census data. It should be mentioned here that, in some portions of our analysis 1961 census data base have been simultaneously treated for a comparative assessment.

## An Outlook to Inquiry

A three tire approach has been taken into consideration to investigate the functional characteristics of the towns in this region.

The first approach considers the functional association of towns in relation to their number of workers of different categories. The successive correlation between two adjacent towns will able to unfold the nature of functional association and at the same time it is able to find functional break. The second approach is dealt with the functional characteristics of individual towns where specialization and diversification of functions of each town will be expressed through the spatial sequence of the area. The third approach is related with the functional chorology of the area, where the attempt has been made to delimit the meso-functional region in terms of core-periphery concept of regional approach. In this context functional concordance, functional discordance and zone of transition will come the under focus with the help of location quotient of the functions.

The whole inquiry has been segregated into two sections. First section embarks on association and non-association of towns through their correlatedness and a reasoned explanation of different associations through functional dominance. Second phase of inquiry tries to unfold zoning of functions within a regional framework.

## Section I

## Functional association and Break-off Function

The term 'functional association' denotes the functional linkages of two or more settlements in terms of their economy, society and their culture. But here it bears some different meaning, as parity between the two adjacent towns regarding their category of workers is denoted as functional association.

Functional association is an attempt to study the spatial homogeneity as well as heterogeneity of the functions. Here all together eighteen municipalities of Sealdaha-Kalyani direction have been taken into consideration. Normally two adjacent municipalities have the possibility to show high correlation coefficient in terms of their category of workers, because of their interactions and interdependence. But the situation may not be the same in every case. The two adjacent municipalities may have two contrasting functional structure. For such a situation the correlation value will be low. For Hooghly Industrial belt, colonial legacy as well as industrial inertia will possibly tune up with the first one, i.e., most of the municipalities will show functional association with its surrounding towns.

On the basis of this methodology eighteen above mentioned municipalities have been diagrammatically represented according to their successive locations. The correlation values joined with curve show some jerks which are the strategic point of functional non-association. In the (fig. 1) the successive correlation curve shows three jerks - at the point of Barrackpur-Titagarh, Garuliya-North Barrackpur and Gayespur-Kanchapara respectively. Titagarh here is a misfit functional town in between KMC and North Barrackpur due to its higher

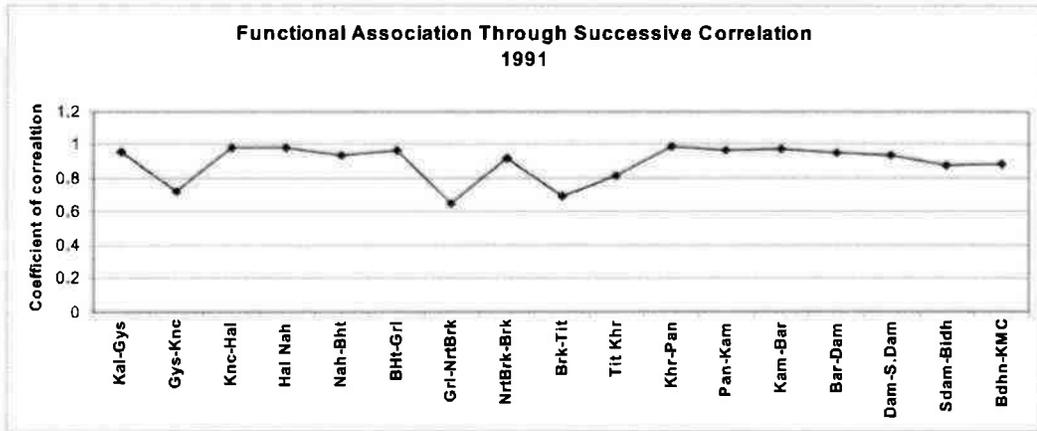**Functional Association Through Successive Correlation 1991**

Fig. 2

concentration of industrial workers (79.62% in Table No 1), while other municipal organizations in between KMC and North Barrackpur show higher concentration of tertiary workers. The reason behind it is not difficult to explain. From the early beginnings of this industrial region, Titagarh was given priority as a jute industrial estate due to its nearness to the Kolkata port, for what jute industry in the beginning and subsequently paper and other industries were developed there. To avoid statistical noise, another correlation curve has been drawn omitting Titagrah (fig. 2) where there are only two jerks. These two jerks are the break-off point of functional continuum, one lies in between Garuliya and North Barrackpur and the other one in between Gayespur and Kancharpara. So, the entire curve is expressed with two **functional ridges**, which can easily be explained with the percentage values of three categories of workers in table no 1. First one is characterized by relative dominance of service sector workers stretching from

KMC to North Barrackpur reflecting uniform correlation values. The second ridge lying in between Garuliya to Kanchrapara is the industrial zone, echoing the uniform correlation coefficients due to relative dominance of industrial workers.

To explain the rapid rise and fall at the middle of the correlation curve specifically around Titagarh, Barrackpore, North Barrackpore and Garulia in a realistic plain, we take a look at the correlation curve of 1961 census database. It is very clear that the second Curve (fig. 2) is very smooth which can easily explain the dissimilar functional growth of this area after 1961. Before and after independence the industrial inertia of Hooghly industrial belt was so strong that, most of the municipalities were dominated by industrial functions (table no 1) expressing more or less uniformly high correlation values in 1961 curve. But sickness of jute industry due to independence of East Pakistan (now Bangladesh) as well as decline of Kolkata port and subsequent fall
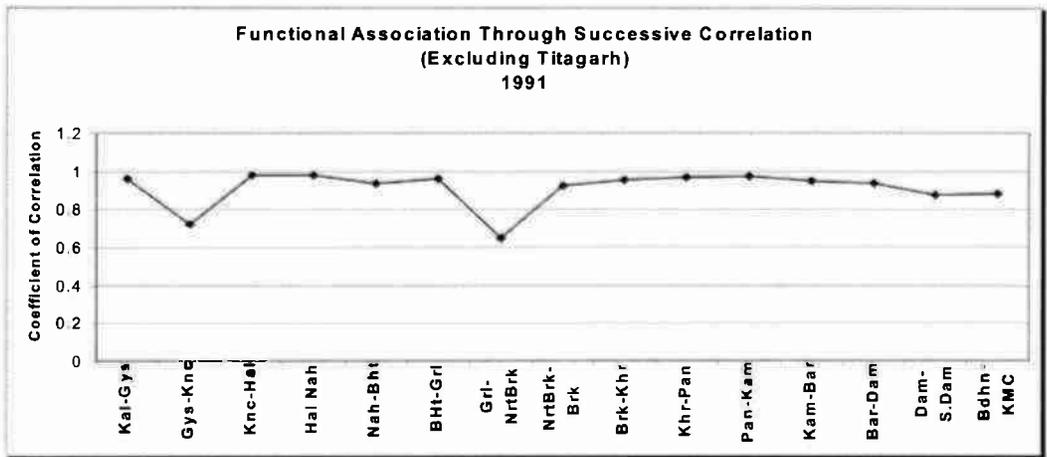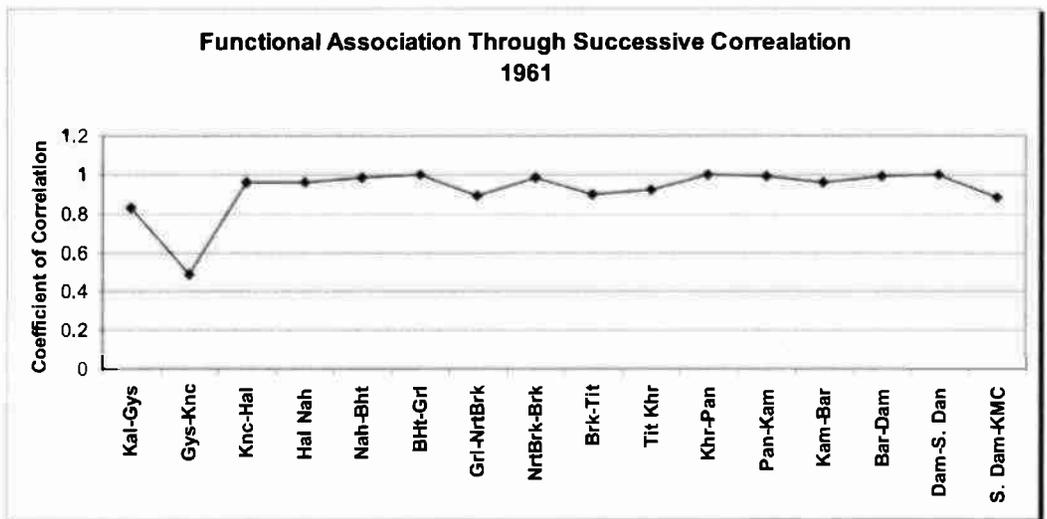
Fig. 3



Fig. 4

of industries in the entire belt especially from Titagarh to Garulia during 1970s and 1980s drastically reduced the industrial workers of this region. At the same time service sector has been substantially increased during this period. By this way we can establish the functional changes of 1991 in comparison to 1961.

**Functional Skewness**

The functional associations and non-associations are not able to analyze the specialization of functions as well as its significant change over the urban continuum. To explore this reality we have adopted radar diagram technique (Functional Kite) with

Table 1

| Municipal Units | Primary Activity | | Secondary Activity | | Tertiary Activity | |
|---|---|---|---|---|---|---|
| | 1961 | 1991 | 1961 | 1991 | 1961 | 1991 |
| Kalyani | 0.45 | 24.41 | 25.41 | 36.23 | 50.18 | 63.33 |
| Gayespur | 1.84 | 19.40 | 27.43 | 25.98 | 53.17 | 72.18 |
| Kanchrapara | 0.58 | 2.18 | 50.26 | 53.48 | 47.57 | 45.94 |
| Halisahar | 1.54 | 2.36 | 58.78 | 70.35 | 38.86 | 28.11 |
| Naihati | 0.81 | 2.10 | 49.88 | 59.03 | 48.02 | 40.16 |
| Bhatpara | 0.24 | 0.73 | 72.84 | 73.53 | 26.43 | 26.23 |
| Garulia | 0.28 | 1.41 | 56.38 | 80.24 | 42.21 | 19.49 |
| North Barrackpur | 0.69 | 2.12 | 32.75 | 53.03 | 65.13 | 46.27 |
| Barrackpur | 0.63 | 1.87 | 41.64 | 51.58 | 56.49 | 47.79 |
| Titagarh | 0.11 | 0.51 | 73.62 | 83.00 | 25.87 | 16.89 |
| Khardaha | 2.09 | 4.67 | 39.53 | 52.79 | 55.80 | 45.11 |
| Panihati | 1.29 | 1.10 | 42.55 | 56.50 | 56.35 | 42.21 |
| Kamarhati | 0.36 | 1.53 | 51.96 | 65.96 | 46.51 | 33.68 |
| Baranagar | 0.63 | 0.75 | 42.83 | 51.58 | 56.41 | 47.79 |
| Damdam | 2.59 | 0.81 | 35.49 | 44.11 | 63.70 | 53.30 |
| South Damdam | 2.25 | 2.11 | 29.05 | 42.89 | 68.84 | 54.86 |
| Bidhannagar | NA | 1.39 | 23.40 | NA | 75.21 | NA |
| KMC | 0.32 | 1.06 | 29.90 | 29.16 | 69.04 | 70.52 |

the percentage database of nine categories of workers. This is similar to rose diagram where each radiating axis can show the percentage of workers. All the functional categories of a town are then joined with each other forming an irregular polygon which is identified as the functional kite. Here the most dominant one or two functions having larger extension appear as the tail(s) of the functional kite. So, the tail(s) is/are the indicator of functional dominance of a town. Town with a single tail is an indicator of a particular specialized function, where as more than one tail indicate diversity of specialized functions.

Now the radar diagrams have been explored to find out the spatial sequence of functional dominance along Sealdaha-Kalyani route. Out of these eighteen municipal units, numbers of dominant tails vary from two to four (table no-2). Here ten percent or more is considered as the dominant function due to average loading of ten percent (100/10 categories of workers = 10%). On the basis of this consideration a systematic classification of town is possible in the sense that towns with relative dominance of secondary activity are showing very prominent tails, wherein the number of tails are only two or three (fig no3). But for towns with relative dominance of primary and tertiary activities instead of skewed tails, short to moderate tails appear with the number of four. Here, as a representative of functional dominance we have employed the technique for three towns only which is valid for other towns also. In this context Kalyani, Bhatpara and KMC are represented

Table 2

| Municipal Units | Cultivators | Agricultural Labourers | Livestock, Forestry, hunting and Plantations | Mining and Quarring | House-hold | Other than House hold | Constru-ctions | Trade & Commerce | Transport, Storage & Commu-nications | Other Servi-ces | No. of Tails |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Categories of Functions** | | | | | |
| Kalyani | 2.406 | **14.264** | 7.525 | 0.216 | 2.13 | **18.519** | 4.759 | **11.688** | 5.939 | **32.55** | 4 |
| Gayespur | 5.457 | **11.165** | 2.494 | 0.283 | 1.66 | **22.12** | 3.652 | **15.983** | 5.319 | **31.87** | 4 |
| Kanchrapara | 0.035 | 0.3738 | 1.747 | 0.02 | 1.424 | **45.06** | 3.773 | **20.679** | 8.699 | **18.19** | 3 |
| Halisahar | 0.274 | 0.677 | 1.372 | 0.035 | 1.439 | **57.229** | 0.115 | **19.389** | 6.352 | **13.12** | 3 |
| Naihati | 0.126 | 0.8658 | 1.062 | 0.044 | 1.291 | **45.929** | 2.662 | **23.361** | 7.487 | **17.17** | 3 |
| Bhatpara | 0.158 | 0.1994 | 0.346 | 0.028 | 0.274 | **70.817** | 1.745 | **12.731** | 4.214 | 9.487 | 2 |
| Garulia | 0.111 | 0.0707 | 1.162 | 0.071 | 0.636 | **48.995** | 6.748 | **20.204** | 7.415 | 14.59 | 3 |
| North Barrackpur | 0.062 | 0.5264 | 1.188 | 0.346 | 0.451 | **27.595** | 4.705 | **13.676** | 5.847 | 45.6 | 3 |
| Barrackpur | 0.084 | 0.2082 | 1.463 | 0.117 | 1.611 | **28.909** | 11.12 | **19.781** | 7.335 | 29.37 | 4 |
| Titagarh | 0.038 | 0.0206 | 0.441 | 0.006 | 0.271 | **70.905** | 2.447 | **12.968** | 4.255 | 8.648 | 2 |
| Khardaha | 0.75 | 2.3166 | 1.357 | 0.244 | 0.763 | **34.923** | 3.843 | **22.934** | 8.272 | 24.6 | 3 |
| Panihati | 0.042 | 0.306 | 0.576 | 0.177 | 1.06 | **37.818** | 3.673 | **25.964** | 9.433 | 20.95 | 3 |
| Kamarhati | 0.025 | 0.3024 | 1.135 | 0.064 | 0.626 | **48.391** | 2.944 | **19.643** | 8.506 | 18.36 | 3 |
| Baranagar | 0.043 | 0.0562 | 0.527 | 0.128 | 0.857 | **38.463** | 3.514 | **23.732** | 10.27 | 22.81 | 4 |
| Damdam | 0.322 | 0 | 0.346 | 0.145 | 1.103 | **30.142** | 4.244 | **18.723** | 15.17 | 29.8 | 4 |
| South Damdam | 0.019 | 0.0274 | 1.868 | 0.193 | 0.68 | **25.038** | 3.333 | **30.089** | 11.82 | 26.94 | 4 |
| Bidhannagar | 0.008 | 0.0446 | 0.973 | 0.365 | 0.284 | **15.863** | 7.248 | **23.281** | 11.26 | 43.43 | 4 |
| KMC | 0.145 | 0.2096 | 0.512 | 0.193 | 0.485 | **26.019** | 3.393 | **29.685** | 11.39 | 27.97 | 4 |

by radar diagrams where Kalyani (relative dominance of primary activity) and KMC (relative dominance of tertiary activity) are both showing four tails, but for Bhatpara (relative dominance of secondary activity) it is confined with two tails (table no-2)

From this above analysis and fig-3 we can easily spell out that the industrial function is very common to all the municipal units in the linear stretch of this urban agglomeration. Therefore, manufacturing associated with its own trade & commerce (shares more than 10% in all the municipal units) stands with maximum share in all the municipal units, while the municipal units specialized with tertiary or primary (relative domination) activities show dominance of other functions(agriculture or transport-communication or other services) apart from industry or industry-related trade.

## Section II
## Sequence of Functional Chorology

Kolkata Municipal area experiencing intensified urban agglomeration due to its regional primacy as well as historical inertia covers a huge area with a large number of municipalities in all directions. The earlier analysis considered successive correlatedness in a spatial continuum, where the spatial trend is clarified with a clear design. But this analysis is not able to chock out the spatial zoning of the urban functions. In the following section the attempt has taken to reflect the urbanization in a system approach which will be more appropriate to unfold the agglomeration and its spatial imprint within the frame of functional chorology. The term 'functional chorology' in this context denotes the sequence of economic activities and its

trend behaviour along the linear trend of urbanization in two directions. Here, we have included another direction of north-eastern part of Kolkata Metropolitan region with the ten municipalities along Sealdaha-Bangaon route to perceive the nature of urban agglomeration as well as comparative assessment of functional chorology.

The inquiry is solely dependent on the database of 1991 census. The nine unit classification of functional categories have been articulated into primary, secondary and tertiary activities and transformed into the percentage data in respect to each municipality. With the help of Z-score method the whole percentage data has been transformed in relative weightage in respect to each function. Now these three different dataset have been plotted against the actual distance of the municipalities to find out the breaking point of functions. The actual trend of these three functions is expressing irregularity with kinks and jerks. To avoid these irregularities, six degree polynomial curves have been plotted against the actual curve as those are well-fitted with secondary and tertiary activities and so likely, it has also been employed for primary activity. The spatiality of these functions can be observed with the intersection points of the curve (fig. 4), wherein we can easily demarcate the functional sequence of the region.

With the view of this graphical representation (fig. 4), it is clear that the tertiary activity occupies at the core of the region with the succession of secondary and primary sectors there after. The behavioural

trends in the two directions are same, though the spatial coverage as well as intensities of the functions are not the same. In the Sealdaha-Kalyani direction the service sector is extended up to twelve kilometer, while is only seven kilometer in the Sealdaha-Bangaon direction. This clearly prompts that the intensity of urbanization is stronger along Sealdaha-Kalyani direction than that of the Sealdaha-Bangaon direction. At the same time urban agglomeration in linear pattern along the first route has accelerated the growth of service sectors along this direction more intensively.

The industrial sector has also a bias stretch in the first direction as it is extended from Kamarhati to Kanchapara with a length of thirty five kilometers along the Sealcaha-Kalyani route (68.62% of total length) in contrast to only eleven kilometers (16.66% of total length) along Sealdaha-Bangaon route. The reason is very clear as Sealdaha-Kalyani route had experienced industrialization since long past in comparison to Sealdaha-Bangaon route. It should be mention here that industrial inertia of the first route is stronger due to its proximity to Hooghly river.

In river side direction primary activity curve of sixth degree polynomial overtakes secondary activity curve at the distance of fourty seven kilometers nearby Kanchapara and Gayespur, whereas in Sealdaha-Bangaon route the primary activity curve overtakes both secondary and tertiary activity at the distance of nineteen kilometer from KMC approximately after Barasat. It is very clear

Table 3

| Categories | Location Quotient | | | ValueZ-score Value | | |
| of | Primary | Secondary | Tertiary | Primary | Secondary | Tertiary |
| Function | Activity | Activity | Activity | Activity | Activity | Activity |
| **Municipal Units** | Sealdaha-Kalyani Railway Route | | | | | |
| Kalyani | 15.6477 | 0.678616 | 0.94868 | 3.0506 | -1.415835 | -0.21764 |
| Gayespur | 12.5854 | 0.741519 | 0.96017 | 2.3385 | -1.230826 | 0.003322 |
| Kanchrapara | 1.38017 | 1.328419 | 0.93886 | -0.2674 | 0.495351 | -0.40654 |
| Halisahar | 1.44582 | 1.501967 | 0.90755 | -0.2521 | 1.0057855 | -1.00861 |
| Naihati | 1.3335 | 1.320872 | 0.94055 | -0.2783 | 0.4731535 | -0.37412 |
| Bhatpara | 0.42788 | 1.776494 | 0.86633 | -0.4889 | 1.8132163 | -1.80135 |
| Garulia | 0.8785 | 1.459244 | 0.91934 | -0.3841 | 0.880128 | -0.78196 |
| North Barrackpore | 1.44665 | 0.930406 | 1.00905 | -0.2519 | -0.675276 | 0.943356 |
| Barrackpore | 1.23073 | 1.140905 | 0.97327 | -0.3022 | -0.056163 | 0.255157 |
| Titagarh | 0.29546 | 1.791989 | 0.86456 | -0.5197 | 1.85879 | -1.83542 |
| Khardaha | 3.06104 | 1.080094 | 0.97052 | 0.1235 | -0.235019 | 0.202377 |
| Panihati | 0.72378 | 1.165261 | 0.97269 | -0.4201 | 0.0154735 | 0.244116 |
| Kamarhati | 0.96436 | 1.367732 | 0.93496 | -0.3641 | 0.6109775 | -0.48163 |
| Baranagar | 0.49612 | 1.173307 | 0.97295 | -0.473 | 0.039139 | 0.249033 |
| Damdam | 0.55116 | 1.002082 | 1.00295 | -0.4602 | -0.464466 | 0.825995 |
| South Damdam | 1.46012 | 0.838551 | 1.02527 | -0.2488 | -0.945439 | 1.255157 |
| Bidhannagar | 0.99101 | 0.694453 | 1.05433 | -0.3579 | -1.369256 | 1.81406 |
| KMC | 0.73498 | 0.863746 | 1.02616 | -0.4174 | -0.871334 | 1.272299 |
| **Municipal Units** | Sealdaha-Bangaon Railway Route | | | | | |
| KMC | 0.56595 | 1.012447 | 1.00224 | -0.9034 | 0.4198982 | 0.705703 |
| Bidhannagar | 0.76309 | 0.814008 | 1.02975 | -0.8418 | -0.771352 | 1.861786 |
| South Damdam | 1.12432 | 0.982913 | 1.00137 | -0.7289 | 0.2426052 | 0.669123 |
| Damdam | 0.42441 | 1.174597 | 0.97957 | -0.9476 | 1.3933089 | -0.24668 |
| North Damdam | 2.22713 | 1.175625 | 0.9625 | -0.3843 | 1.3994766 | -0.96403 |
| New Barrakpore | 1.03019 | 0.995205 | 1.00043 | -0.7583 | 0.3163963 | 0.629816 |
| Barasat | 3.1843 | 0.955238 | 0.98612 | -0.0852 | 0.0764677 | 0.028778 |
| Ashokenagar | 6.70359 | 0.935545 | 0.95601 | 1.0146 | -0.041754 | -1.23672 |
| Habra | 5.28822 | 0.754444 | 0.99609 | 0.5723 | -1.128925 | 0.447514 |
| Gobardanga | 7.176 | 0.954028 | 0.94884 | 1.1623 | 0.0692056 | -1.53795 |
| Bangaon | 9.53797 | 0.614224 | 0.97695 | 1.9004 | -1.970682 | -0.35666 |

from the graphical presentation (Fig. 5) that Barasat area is characterized by all three types of activities, as three types pf curve have almost merged with each other.

## Concordance, Discordance and Zone of Transition

The spatial chorology mentioned above is a gradational one, in which the region is segmented into three zones, in the succession of primary, secondary and tertiary activities respectively. The ambiguity of the previous
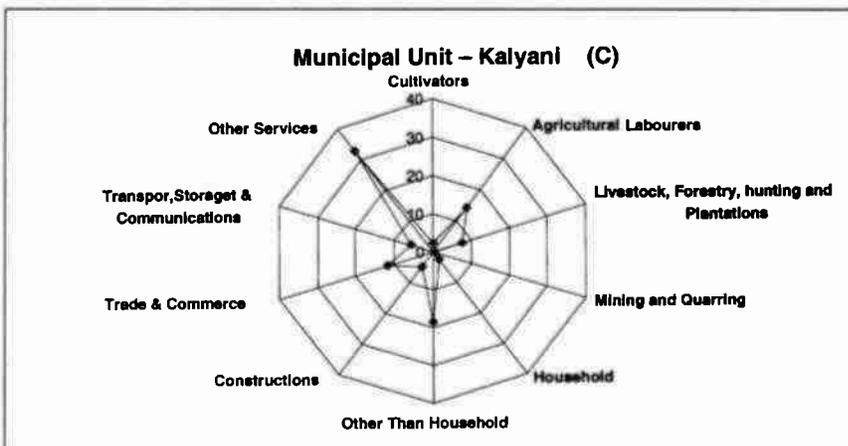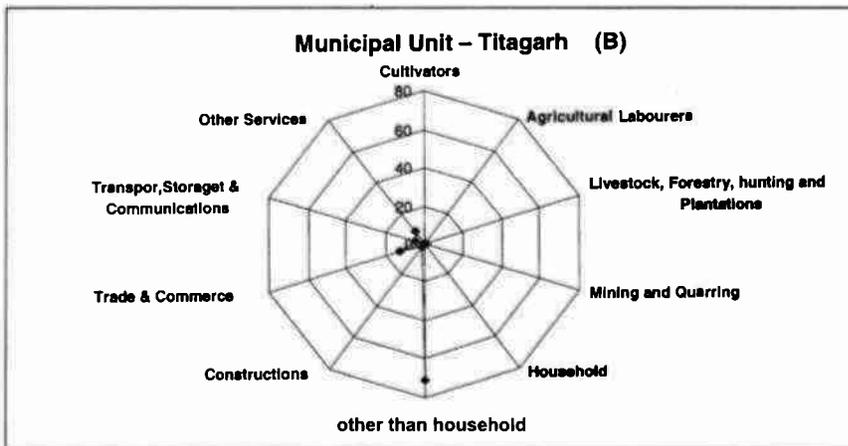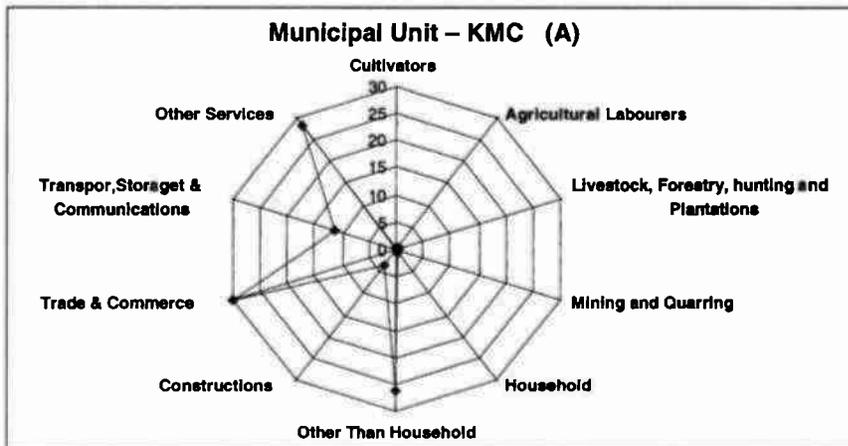
Fig. 4-a, b, c - Spactial Sequence of Functional Dominance

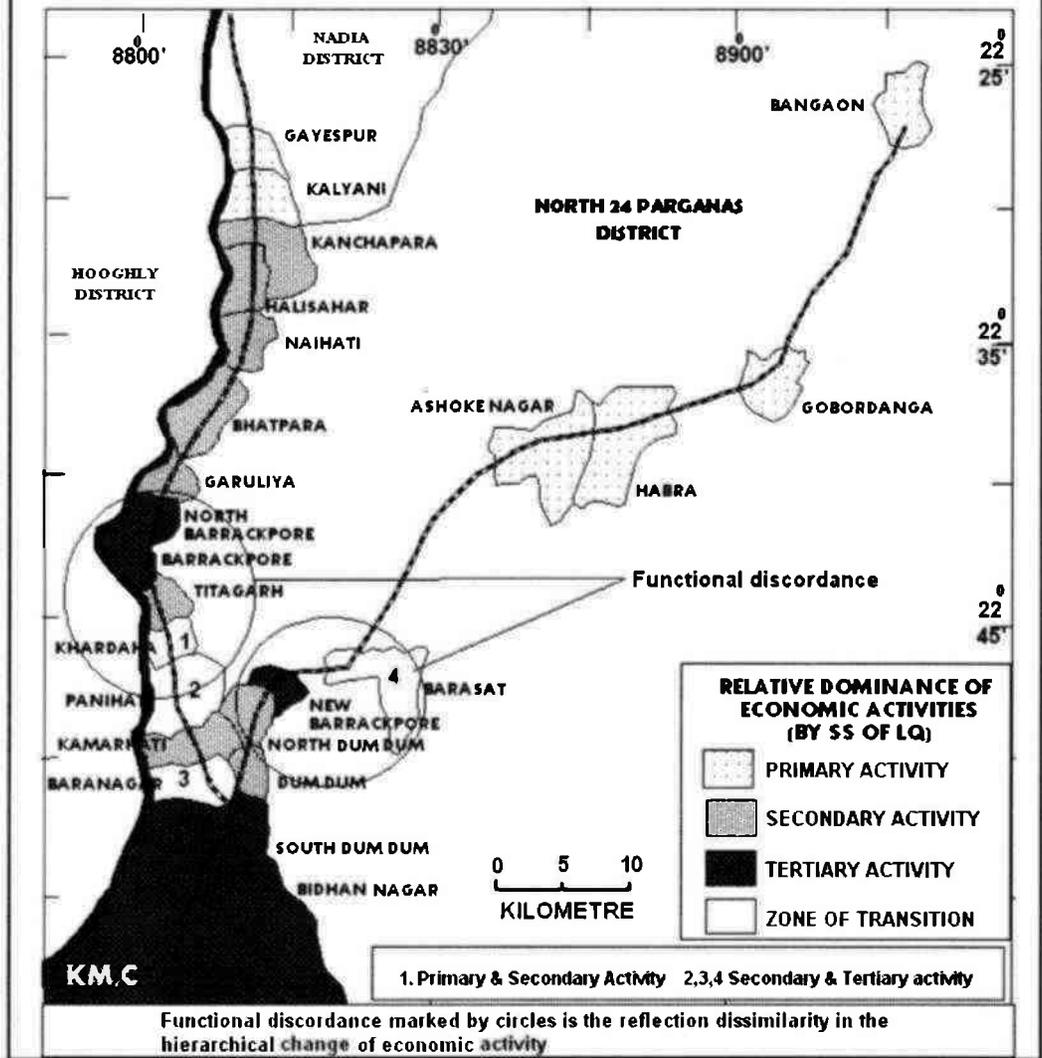**SPATIALITY OF FUNCTIONAL CONCORDANCE & DISCORDANCE IN KOLKATA METROPOLITAN AREA**

Fig. 5

analysis is that each municipality is reflected by the most dominant function where the role of other two functions is neglected. The digital reflection of the number of workers of the municipalities has a tendency to expressing irregularities over the area

concerned. So the same data base in both the directions has been exemplified through Z-score of location quotient to make a minute portrait of spatial concordance and discordance as well as the zone of transition.

Here primary, secondary and tertiary workers of the above mentioned municipalities have been measured in terms of location quotient value. As the location quotient values are sounding noise due to dominance of more than one category of workers in most of the municipalities, those normally jeopardize the nature of spatial reflection as well as concrete understanding. Therefore the L.Q values are transformed into Z-score for specific reflection.

In the table 3 the positive Z-scores of L.Q have been printed in bold face to show the intensity of functional dominance, which is once again employed in figure 2 with proper consideration as well as judgment. Here, out of twenty nine municipalities, twenty one are showing positive loading of Z-score only in one category of workers - those normally have a particular address of functional type (either primary or secondary or tertiary). Other eight municipalities are loaded with positive values in two types of workers. So it is necessary to consider those as a zone of transition. But for a clear distinction a base line of 0.5 has been taken into consideration ( for the eight municipalities only) where municipalities with Z-score value less than 0.5 are identified as critical zone of transition and those with a value of more than 0.5 are merged into previous classification.

Under this consideration starting from core, KMC to Dum Dum have enlisted in tertiary activity (figure 2). The zone of transition starts there after starting from Baranagar to Khadah with the exception

of Kamarhati showing dominance in secondary activities (0.611). Barackpore and North Baracporepore here emerged as a secondary growth pole as Z-score of tertiary activity has loaded positively. This is due to its military function which is significant by its nomenclature 'Barrack' (Militery Barrack). It is surrounded by dominance of secondary activity of Titagarh and Garulia. Because of presence of secondary growth pole in Barrackpore and North Barrackpore, it can easily be demarked as the zone of discordance. Municipalities north of North Barackpore with a continuous stretch starting from Garulia to Kanchapara having significant positive loading in secondary activity can easily be identified as zone of concordance. Similarly Kalyani and Gayespur are marked as zone of primary activity because of significant loading in that category.

Similarly in Sealdaha-Bangaon direction the same municipalities starting from KMC to Dum Dum appeared as zone of concordance of tertiary activities succeeded by secondary activity of North Dum Dum and New Barackpore. Barasat is only town in this direction showing the zone of critical transition with positive loading in both secondary and tertiary activities. Other municipalities beyond Barasat have significant high loading in primary workers as entire zone is surrounded by huge fertile agricultural tracts.

## Conclusion

The whole analysis of urban functions around a part of Kolkata Metropolitan area is an understanding about the spatial signature of metropolitan urban functions through the functional categories of workers in the light of Growth Pole Theory of Von Thunen. The spatial zoning is not static aspect; rather it is dynamic with its changing nature of urban functions, though, chorological sequence of the functions will remain same over the time but not in intensity.

To conclude this inquiry we may look forward to another direction that is the pragmatic reality of industrial restructuring and redevelopment of Hooghly industrial region. For the last fifteen years or so the core area (Kolkat Municipal Corporation and its immediate surrounding) of our investigation has experience a sea change in terms of urban restructuring and redevelopment in the form of real estate development, vertical integration of transport and ultra-modern development of trade centers in the form of shopping mall, multiplex etc. All types of redevelopment and restructuring are being confined in the core, while beyond the core area is facing functional recession and economic depression. The industrial prosperous zone (like Upward-transition Regions in Core-periphery Model, Friedmann) next to core is gradually transforming into depressed economic zone (like Downward-transition Regions in Core-periphery Model, Friedmann), which is not a healthy sign of balanced spatial development. So, if the industrial restructuring, redevelopment and others type of development are proposed and planned in depressed zone; the status of this zone will gradually be uplifted to its earlier position and that will rejuvenate the economic inertia of the whole region.
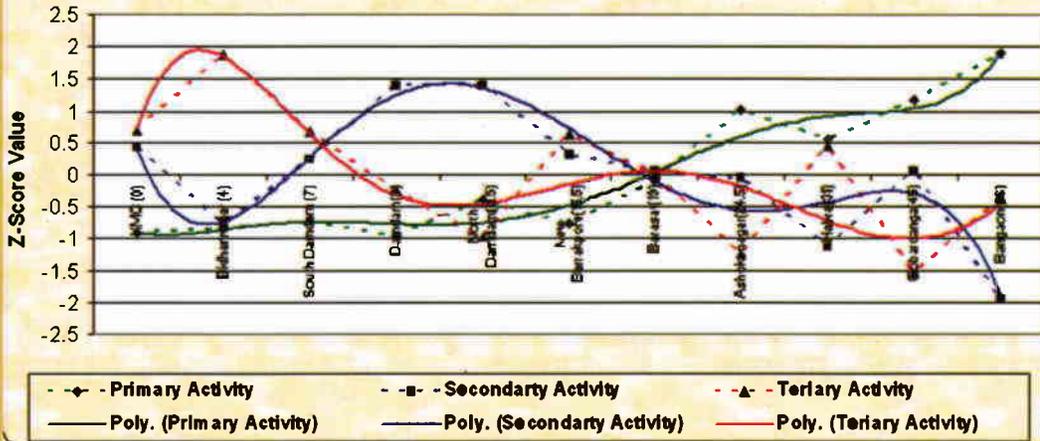
## References

Cadwallader M.T., 1996, *Analytical Urban Geography*: spatial patterns and theories, Prentice-Hall Englewood Cliffs

District Census Handbook, West Bengal, 1961, *24 Parganas*

District Census Handbook, West Bengal, 1991, Village and Town wise Primary Census Abstract

Hunter, W.W., 1875, A Statistical Account of Bengal, 24 Parganas, Government of West Bengal, Kolkata.

O'Malley, L.S.S, *Bengal District Gazetteers 24 Pargana*, 1996, Government of West Bengal

Richardson, H., 1971, *Urban Economics*, Penguin Education

Sadhukhan. S.K.1971, Industrial Cross-Profile of the North-East Calcutta Metropolitan District, *The Bhagirathi-Hooghly Basin,* Edited by Kanan Gopal Bagchi.

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