SPATIAL DISPARITIES IN URBAN FACILITY- UTILITY SERVICES IN A CLASS-I TOWN IN WEST BENGAL, INDIA

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ABSTRACT

In the present context of rapid urbanization the regional disparity is a challenging issue towards the urban planners and policy makers in the developing countries. In India, socio-economic disparities in large scale create a wide range of variation in quality of life, well-being and welfare of the city dwellers. The present paper has tried to analyze ward-wise variation of available facilities and accessibility of utility services with reference to Purulia municipality of West Bengal, India, based upon Secondary Data. The work attempted to chalk out statistically, the intensity of backwardness of the wards with the help of quantitative tools like Principal Component Analysis and Prin Score along with Z score using SPSS-23. The study revealed that inter-ward disparities in terms of demography and available facilities are highly prominent in such a small town which is entering in a smart way of life through the absorption of technological advancement. These spatial disparities may be abolished through proper planning and sustainable resource distribution.

Keywords: Spatial Disparity, Utility services, Quality of Life, City Dwellers, Class-I town.

1. Introduction

Spatial disparity is a common phenomenon present over the globe. Spatial variation in terms of distribution of resource and immigration pressure in a small urban town may affect demographic, economic and cultural life and broadly, the Quality of Life of the inhabitants of that region. Improving the Quality of Life in cities is no longer a simple matter of bricks and mortars, but the human satisfaction with different urban attributes such as transportation, land-use pattern (Azeez, et. al. 2016), population and building densities and ease of access for all to basic goods, services and public amenities, as well as social attributes such as protecting public health, safety and security, education and social integration. But adverse physiographic characteristics and diverse socio-cultural belief resulted into the unequal and irrational distribution of resource in the region leading to the emergence of regional inequalities (Malik et. al., 2015). Urban expansion and often unplanned nature of such urban growth may lead to problems and create biased urban management (Mondal et. al., 2015). This regional disparity may result in economic, social and cultural problems (Hangaragi, 2008). Regional inequalities with regard to quality of urban life exist in both developed and developing countries. In developing countries like India, the basic problem is to provide a minimum level of subsistence to a large proportion of the population (Ray Chaudhury, 2001). In order to fulfill and satisfy the basic and other essential needs, people require access to certain facilities such as market, housing, water supply, electricity and adequate transportation (Adekunle et. al., 2011). Hence, Socio- economic development as a multi-dimensional process helps to improve the quality of Life of the people. Myrdal (1972), in his famous work "The Asian Drama: An Inquiry into the Poverty of Nations" addressed "Upward movement of the entire social system" which implies the requirement of the satisfaction of economic, social, political and cultural rights, equal distribution of distinguished living environment and gender equality along with women empowerment and development of the poor and marginalized people. Improving the quality of life in cities is no longer a simple matter of bricks and mortar, but the human satisfaction with different urban attributes such as transportation, quality of public spaces, recreational opportunities, land use pattern, population and building densities, and ease of access for all to basic goods, services and public amenities as a whole signifies the improvement of quality of life (Garau, 2018). The social attributes such as protecting public

health, safety and security, education and social integration, promoting equality and respect for diversity and cultural identities, increased accessibility for persons with disabilities, preservation of historic, religious and culturally significant buildings and districts, promoting spatial diversification and mixed use of housing and services at the local level in order to meet the diversity of needs and expectations (Munandar & Azhari, 2015) are also contributing as important component of quality of life. Furthermore, environmental attributes such as respecting local landscapes and treating the local environment (Mantila et al, 2018) with respect and care may improve quality of life as well. These caring and respectable attitudes termed as urbanism should be applicable for all the nations, for all geographical space and for all the backlogs for upgrading quality of life.

In the present scenario, the introduction of modern technologies has been taken an integral part for transformation of traditional way of life (Mutekwe, 2012). In case of small class-I towns where rate of urbanization is very slow and still deprived off large scale industries, nonetheless, adoption of modern technologies largely contributing in accelerating the transformation process. Therefore, it has been obvious to track the kind of transformation happening during urbanization along with role of technology in the place where industrialization has not been the driving factor. The use of technologies undoubtedly favoring the life in urban cities (Vago,1992), but how and what kind of technologies is actually paving the path for urbanization needed to be analyzed. Moreover technology may make a city or town smarter but the spatial diversity and differentiation in distributing facility- utility services may erode only through proper planning.

Against these backdrops, this paper has tried to underpin the disparities persist in a class-I and emerging smart town like Purulia Municipality. Furthermore, the paper has intensely tried to identify the disparities among the wards of the municipality through the ranking of the wards(through prin score) and also the factors behind the existing backwardness in terms of utility- facility services.

2. Review of Literatures

In India, after independence, the 3[rd]five-year plan (1961-66) introduced a separate chapter devoted to balance regional development (Chapter- IX). Several studies have been undertaken to analyze the regional inequalities that exist in India and aboard time to time. Several parameters such as socio-economical, demographic, land use pattern etc. were used as marker to analyze regional disparities in India. Scholars like Mathur (1983), Dadibhavi (1998) had tried to access the regional disparities in terms of per capita income as a measure of development. Mallikarjun (2000), Rahaman & Salauddin (2009), had tried to identify the inadequacies in urban public services of three selected blocks in Khulna city, Bangladesh where they used location quotient and Gini co-efficient as selected methodology. They found that two of the blocks were comparatively developed than the other one. Banerjee R. (2012) had tried to bring an appraisal on spatial variation based on land-use dynamics. Paul (2012) had tried to focus on the inter ward disparities present in the Burdwan town where he noted the problem of disparity as a national phenomenon. Principal Component Analysis (PCA) was used as methodology to understand the main factors responsible for the disparity among wards. Education and Financial, Health and Market, Transport and Communication were the three main factors which were mainly created disparity among the wards as per his study. Parryet. al. (2013) had tried to find out the disparities related to mainly health care facilities and ration depots among the wards in Srinagar city of Jammu and Kashmir. They also had found that disparity continued to the periphery of the CBD rather than in core. Secondary data analysis through spatial mapping was the methodology of their research. Zaliet. al. (2013) in their paper had addressed the regional disparities belong to the east and west province of East Azarbaijan. 44 indicators of development were taken and numeric taxonomic and cluster analysis methods were used. They found a sharp degree of inequality in between the two provinces and proper planning was needed as per their suggestion. Azad et. al. (2015) in their research work assessed the QoUL of residents

of city Fahraj, Iran. The importance was given both on objective as well as subjective conditions to conceptualize the standard of living. Descriptive- analytic method based on documentary librarian and field studies had been incorporated in the study. AHP model was built to analyze the findings. Weighted- index number method had been included with AHP model. The model, as expected by the authors, might help city planners to develop sustainable QoL in terms of happiness. Guhaet. al. (2016) in their paper had focused on an uneven development in four selected wards in Rajpur- sonarpur Municipality area of south 24 paragana district, West Bengal, India. Spatial variation was taken into account although in a very small scale, but lopsided development had clearly been seen. The study pointed out effective and transparent administrative structure is necessary to equalize the Quality of Life in all corners of an urban unit. Rastegari & Saraei(2016) had tried to find whether the influx of population in Yard province was able to get all facilities provided by the nation or it created problem for the nation itself. Descriptive analytical methods and Numerical – taxonomy models were used as methodology. Urban facilities and proper planning were pointed to be needed to maximize the Quality of life as per their findings.Borana&Yadav (2017) had tried to focus in their paper the prevailing disparities perceived by the municipal wards in Jodhpur city. Remote Sensing and Arc GIS was used for mapping police station, hospitals and schools in the city. They demarcated a sharp disparity among the municipal wards in terms of utility- facility services. Mishra (2017) had focused on economic inequality in his research work and had established that spatial variation and economic inequality is interrelated and the effect of urbanization is too much pervasive, where Mandal(2017) stressed on the level and trends of urbanization in Purulia District of West Bengal. Urban hierarchy and rate of urbanization was clearly revealed from their research works. Mondal et. al. (2017) in their paper had focused on the urgency to formulate plans for the backward blocks in terms of social and economic parameters in the district of Purulia, West Bengal. Quantitative methods and geospatial technology had been used as

methodology. Mukherjee (2017) in her work had tried to measure the urban deprivation through the access of partial and ultimate coverage of urban amenities in India. Slum households were the basic focus and it had found that better access to basic amenities and infrastructure made their life quality better. Mapping of variables and deprivation were the main methodological approach. Karmakaret. al. (2020) had assessed the pattern of disparities in socio- economic condition at block level in their paper of Koch- Bihar district, West Bengal. Composite score was used as methodology and they found that a huge disparity had existed among the blocks. They suggested for Governmental support and movement to erode the gaps and long term benefits.

3. Materials and Methods
3.1. Study Site

Purulia municipality, situated in the westernmost district of West Bengal, extends between $23^{\theta}10'05''$N to $23^{\theta}18'10''$N latitude and $86^{\theta}15'0''$E to $86^{\theta}20'10''$ E longitude, 12 square kilometer in areal extension (Figure-1). Purulia district is very low populated than the other districts of West Bengal. Purulia municipality has a population of about 1.2 lakh which is the most populous municipality located in Purulia district, and the only class-I town in the whole district. There are 22 wards in the municipality area and the population density is 8648 persons per square kilometres. The percentage of urban population is very low (12.75%) in Purulia than the average rate of West Bengal (31.89%) and India (31.16%) (Census of India, 2011).The growth rate of urban area in number is little much slower than the average rate of West Bengal. It is 142% in West Bengal and 133% in Purulia (District Census Handbook, Purulia, 2001, 2011). As of 2011 census there are 942 females per 1000 male in the town. About 62 thousand (52%) are male and about 59 thousand (48%) are female of the total population, among which 34% (about 41 thousand) population is engaged in either main or marginal works. For women 10% of the total female population is main workers and 5% are marginal workers. Overall literacy rate has been increased from 40.32% in 1991 to 64.48% in 2011. In these 20 years literacy rate has been increased more

than 50%. People have become more educated and female literacy rate has increased from 19.57% to 50.52% in 1991 to 2011 respectively (Census of India 1991, 2001 and 2011). The narrowing of gender gap is a good sign of societal change.
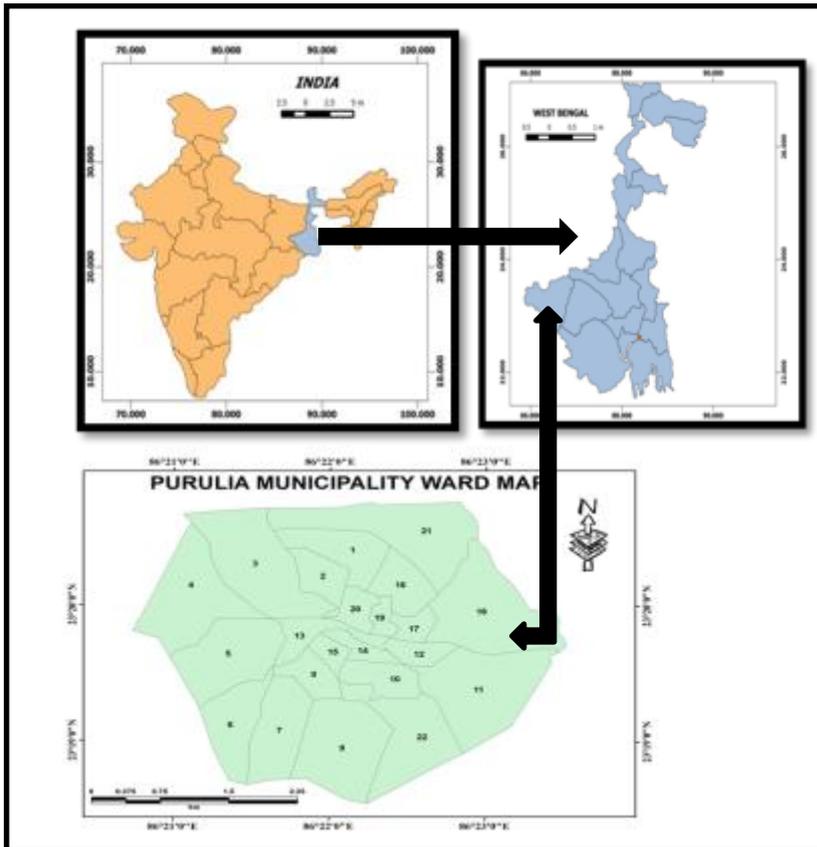
Figure:.1: Location Map of the Study Area.

For the last 10 years, it has been found that the life- style of Purulia Municipality town has drastically changed. Due to the huge in-migration and employment opportunities people from different districts of West Bengal and states of India came in Purulia town and resided as per their needs. Adding with this the influx of rural migrated population from different villages of Purulia also started to live in the town as the scopes for job has increased than earlier in the town area. Introduction of Toto, Shopping Mall, Digital world like ICT centers, establishment of Educational hub in 2013 make Purulia a small but proper urban center, backward but digitally and technologically flourishing town. With the successful makeover of urban life- style, all pace of life began to move towards a better quality of life during this time. There is one municipal market with about 294 shops. Total number of shops in the town is 2,604. The town is well connected with the rest of West Bengal and adjoining Jharkhand State. NH-32 passes through the central part of the town and is linked with Ranchi, the capital of Jharkhand. A major state highway passes through the town connecting N.H. and Coal mines belt at Asansol area and district Burdwan. It is well connected with Railways also. Asansol, and Durgapur are well linked with the state highway Barakar-Purulia Road and with National Highway through Barakar-Asansol road. This town is well connected with another Sub-divisional town Jhalda and Raghunathpur. There is no major industry in the town. The industrial town Asansol and Durgapur is very close to the town. Only Santaldih is one of the industrial town in Purulia which is situated 60 km away from the main municipal town. The town is a good service center for agriculture products. A considerable endeavor is being made for improvement in primary sectors like cottage industries, handloom, finishing and poultries. All the district administrative activities are operated from the headquarters situated in Purulia Municipality area.

3.2. Methodology

The present paper is entirely based on secondary sources of data, collected from Census of India; 2011, District Statistical Handbook (2011-2015) published by Bureau of Applied Economics and Statistics, 2011.

This paper is concerned with the analysis among 22 wards-level disparities in terms of socio-economic parameters pertaining to Purulia Municipality. The variables (10 variables) used in this analysis corresponds to selected demographic variables, i.e., household density, family size, population growth rate, percentage of slum population / ward, percentage of male working population, compactness, and some selected utility-facility services, i.e., health care facility/ 1000 population, commercial bank/ 1000 population, number of ATM per ward, road density per ward.

These parameters will help to find out the factors affecting the urban utility- facility disparities of Purulia Municipality. Some specific quantitative approaches have been selected for this particular study. Descriptive statistical methods are selected to study the measure of dispersion of the variables. The tools of inferential statistics used in this study are Principal Component Analysis (PCA) through SPSS software version-23. PCA is used to find out the most influential independent variables affecting the social disparities. In other words, it is used for detecting the structures in the inter-relationships among the variables.

The aim of PCA is to construct, out of a set of variables, ($[X_{ij}]$)'s (I=1, 2…, x), a new set of variables $[(P_i)]$ called principal components, which are linear combination of the X's.

The Principal Component Analysis has been done by using following formula:

$$[P_i] = [m.summation over (i=1)][n.summation over (i=1)][a_{ij}][2_{ij}]$$

The $[a_{ij}]$ are called loadings (Principal Components). These are chosen in such a way that the principal components will satisfy the followings i) principal components are uncorrelated (orthogonal) and ii) the first principal component $[P_i]$ has the maximum variance from the first set of variable set and the second principal component absorbs the next maximum variance and so on.

Using the factor loading of these principal components, Prin Score is used for ranking the wards on the basis of general characteristics of the used variable set. On the basis of Prin Score 1 and Prin Score 2, Z- Score1 and Z-Score 2 have been calculated and plotted subsequently. The formula used for Prin Score Calculation is as under:

PRIN SCORE = a1 X1 + a2 X2 + a3 X4 +..... + anXn

Where, a1, a2…. An are the coefficient of regression defined as $aj=\alpha ji\lambda n$

After calculating the prin score, Z score has been done against each ward using the following formula

Z Score 1 = (Prin Score 1 – Mean)/ Standard Deviation

Z score values have been plotted subsequently and three zones pertaining to development has been identified.

4. Results and Discussion

Availability of Life supporting facilities in proportion to its population size determines the indices of development in that area. In India the disparities of the available facilities is a common syndrome (Mukherjee, 2015). Amidst this known fact, analysis of availability and accessibility to urban facilities, studies are being carried out to decipher certain inference to draw the attention of the authority for proper planning and resource management.

The descriptive statistics (Table-1)shows that household density, having mean value of 162.44, is quite interesting. Though the mean value denotes that the household density of the wards is moderate in nature but the standard deviation value is 76.31 which imply that this variable is highly varied in nature. Working male population in the town is having higher mean value i.e. 51.77 and it indicates a frustrating situation. The variables like commercial bank/ 1000 population, ATM / ward, road density/ ward have very low mean value i.e. 0.13, 1.50 and 12.73 respectively, implying disappointing condition of prevailing utility- facility services. Compactness is in threat in the small town. To boot, health related infrastructure along with working population are the major areas of concern for the town.

Table: 1: Descriptive Statistics: Urban Utility- facility Services

VARIABLES	DESCRIPTIVE STATISTICS		
	Mean	Std. Deviation	Analysis N
Household Density	162.4441	76.31086	22
Family Size	5.1586	.43684	22
Population growth Rate	4.9091	13.55658	22
% of slum population	19.4091	9.85929	22
% of working Population(male)	51.7727	4.02293	22
Health care facility/ 1000 population	9.2709	11.06172	22
Commercial bank/ 1000 population	.1314	.21243	22
Compactness	-6.7323	2.88238	22
Number of ATM/ ward	1.5000	1.50396	22
Road Density/ ward	12.7273	5.40883	22

Source: SPSS Output; Computed by Authors, 2020

The factor analysis starts with the correlation matrix of the original set of ten variables. As the variables are not standardized, the correlation matrix is used as an input to PCA to extract the factors. From correlation matrix (Table- 2) it has been found that some of the factors for utility facility services prevailed in Purulia Municipality area are moderately correlated with each other with both positive and negative values. Commercial bank/ 1000 population and Health care facility /1000 population (0.663) positively influence each other, while number of ATM/ ward and Commercial bank/1000 population has a positive and strong correlation (0.700). Road density/ ward and Number of ATM/ ward also have a moderate positive (0.527) correlation with each other. On the contrary, there is no strongly negative relation in between variables and weakest (-0.007) correlation is having in between population growth rate/ ward and ATM facility / ward and also in between % of slum population / ward and health care facility/ 1000 population and it is -0.035. This refers to that Number of ATM / ward should be increased in the pace with population growth rate and health care facility also to be increased in proportion with percentage of slum population/ ward.

Table: 2 Correlation Matrix

Household Density	1									
Family Size	.185	1								
Population growth Rate/ ward	.232	.122	1							
% of slum population / ward	.400	.136	.475	1						
% of working Population (male)	-.070	.113	-.613	-.298	1					
Health care facility/ 1000 population	-.219	-.487	.094	-.035	-.230	1				
Commercial bank/ 1000 population	-.413	-.299	-.315	-.317	.256	.663*	1			
Compactness	.293	.135	-.162	.117	.321	-.425	-.279	1		
Number of ATM/ ward	-.485	-.396	-.007	-.284	-.043	.592	.700*	-.481	1	
Road Density/ ward	-.129	-.264	.415	.428	-.257	.309	.186	-.384	.527*	1

*correlation is significant at 0.01level (2 tailed test)

Source: SPSS Output; Computed by Authors, 2020

It is necessary to test the data adequacy before entering any further analysis, so a Kaiser- Meyer-Olkin and Bartlett's Test of Sphericity has been done. As we know, a KMO test is

used in research to determine the sampling adequacy of data that are to be used in factor analysis. KMO value ranges from 0 to1; value below 0.50 refers to data inadequacy. KMO value above 0.50 suggests that the dataset can be used for factor analysis. Here, the KMO value is 0.611 (Table- 3), and hence the variables are used for factor analysis due to little more adequacy of the dataset.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.611
Bartlett's Test of Sphericity	Approx. Chi-Square	89.996
	Df	45
	Sig.	.000

Source: SPSS Output; Computed by Authors, 2020

On the other hand, Berlett's test of sphericity showed that there was significantly sufficient correlation between the items to perform factor analysis, approximate x2 (89.996), p<0.001.

Communality shows how much of each variable is accounted for the underlying factor taken together. A high value of communality means that not much of the variable is left over after whatever the factor represent is taken into the consideration. The variance of each variable is standardized to unity and partitioned into two parts; communality of the variable and specific variance of that variable. No communality can be more than 1. We have used Principal Component Method for extracting communalities, where initial communalities are taken as unity (Kothari,

2019). From the table communalities(Table- 4), the values in extraction column indicate the proportion of each variable's variance that can be explained by the retained factors. It has been observed that the variance of nine variables ranges from 0.502 to 0.804, showing considerable variance from 50% to 80% of the variables. Variables with high values like Number of ATM/ ward, Commercial bank/ 1000 population, Health care facility/ 1000 population, Population growth Rate/ ward, % of slum population / ward etc. are well represented in the common factor space while variables with low values like Household Density, family size, percentage of working population and compactness are not well represented.

Table: 4: Communalities and Total Variance

| Component	Initial Eigenvalues			Communalities		
	Total	% of Variance	Cumulative %		Initial	Extraction
1	3.413	34.135	34.135	Household Density	1.000	.606
2	2.509	25.087	59.222	Family Size	1.000	.502
3	1.020	10.203	69.425	Population growth Rate/ ward	1.000	.764
4	.889	8.890	78.315	% of slum population / ward	1.000	.757
5	.704	7.038	85.354	% of working Population (male)	1.000	.676
6	.523	5.229	90.582	Health care facility/ 1000 population	1.000	.701
7	.440	4.404	94.987	Commercial bank/ 1000 population	1.000	.778
8	.259	2.589	97.575	Compactness	1.000	.694
9	.130	1.298	98.874	Number of ATM/ ward	1.000	.804
10	.113	1.126	100.000	Road Density/ ward	1.000	.659

Source: SPSS Output; Computed by Authors, 2020

Principal Component method of factor analysis has been used here. The initial number of factors is the same as the number of variables

used in the factor analysis (Kothari,2019). The column 'Total' contains the Eigen values. The first factor will always indicate for the most

variance, and rest factors will account for as much of the left-over variance as it can. For initial solutions, there are as many components as variables, and in a correlation analysis, the sum of the Eigen values equals the number of components. Only those factors with an Eigen value of 1.0 or more than 1 are retained. The higher the Eigen values, the more important is the component because of largest number of interconnected dominant parameters (Kothari, 2019).

Extracting three principal components, it can be explained 69.425% of total variance, having the Eigen values of 3.413, 2.509 and 1.020 respectively. Catell's (1966) scree test is also used, being the plots of the Eigen values of the factors.This plot is called 'Scree' plot because it often looks like a 'Scree' slope, where rocks have fallen down and accumulated on the side of the mountain. (Kothari, 2019).
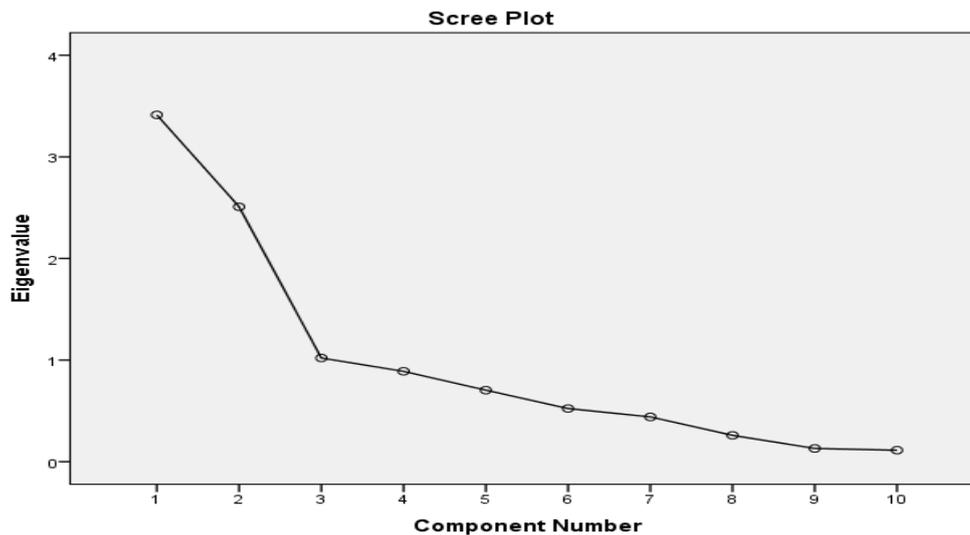
Figure: 2: Scree Plot

As we can see that, in independent axis, Component Number and on dependent axis, Eigen values have been plotted respectively. The diagram(Figure- 2) reveals that from the third factor, the slope of the curve is not so steep in nature as the rest of the successive factors are accounting for smaller amount of variance. But the first three factors have made the curve steep as larger amount of variance have been extracted.

Component Matrix (Table- 5) contains estimates of the correlations between each of the variables. The three principal components are found to be uniquely dominating the system, as follows:

PC1: In case of PC1, it has been found that six variables i.e., Number of ATM/ ward, Commercial Bank/ 1000 population, Health care Facility/ 1000 population, compactness, Household Density and family size are carrying high loadings of 0.897, 0.790, 0.785 (positively) -0.611, -0.582 and -0.561(negatively)respectively, thereby reflecting their dominant impact on the system.

PC2: In PC2, two factors are influenced on the system among which one variable has high loading, i.e. Population growth rate (0.857) and percentage of working population (male), although it negatively influences (-0.753) with high loadings. It can be said that more population have to engage with working group as per the growth rate of the population.

PC3: Road density and percentage of slum population although has a high loading factor of 0.715 and 0.615 respectively.

Table: 5: Component Matrix

	Components		
	1	2	3
Number of ATM/ ward	**.897**	.009	-.016
Commercial Bank/ 1000 population	**.790**	-.329	.214
Health care Facility/ 1000 population	**.785**	.176	.234
Compactness	**-.611**	-.286	.488
Household Density	**-.582**	.308	.415
Family Size	**-.561**	-.012	-.434
Population growth rate	-.066	**.857**	-.155
% of working population (male)	-.097	**-.753**	.315
% of slum population	-.292	.401	**.715**
Road density	.494	.194	**.615**

Extraction Method: Principal Component Analysis.

Source: SPSS Output; Computed by Authors, 2020

Rotated Component Matrix is used for grouping the variables. Here, varimax rotation(Table- 6) has been used. It is used to maximize the sum of the variance of the squared loadings. The groups are as follows:

Table:6: Rotated Component Matrix

	Components		
	1	2	3
Health care facility/ 1000 population	**.793**	.181	-.199
Commercial bank/ 1000 population	**.742**	-.287	-.381
Number of ATM/ ward	**.731**	.116	-.506
Family Size	**-.706**	.062	-.025
Population Growth Rate	-.065	**.849**	.197
% of working population (male)	.029	**-.820**	.050
Road Density	.570	**.574**	.075
House hold density	-.221	.092	**.741**
% of slum population	.047	.513	**.701**
Compactness	-.256	-.494	**.620**

Source: SPSS Output; Computed by Authors, 2020

1. The first group includes four variables like Health care facility/ 1000 population, Commercial bank/ 1000 population, Number of ATM/ ward , Family Size. These variables correspond to three basic urban amenities based on one demographic variable like family size and therefore this group can be called as **'Basic utility- facility services according to family group'.**

2. Second group can be named as **'Economic strength of utility- facility services'** because it include three variables like population growth rate, percentage of working male population and road density.

3. This group consists of three items, namely, House hold density, percentage of slum population and Compactness. This group can be applied as the **'Demographic group of utility facility services'.**

After several calculation and data analysis, we may finally conceptualize on the factors behind the disparities of utility facility service among the wards of Purulia municipality. It can be said that the most dominating factors are Population Growth Rate, Household density, Percentage of slum population, compactness, commercial bank/ 1000 population and number of ATM/ ward. . Besides, health care facility/ 1000 population, road density/ ward and

percentage of male working population are needed to be enhanced and care.

At the end, Prin Scores and Z scores have been employed to make an index for ranking of the wards on the basis of enlisted variables. The rank will show the backwardness of the wards. Based on the Prin Score-1 and Prin Score-2, Z Score-1 and Z Score-2 have been calculated (Table-7) and plotted subsequently (Figure-3).

Table: 7:Prin Score and Z-Score of the Wards

Ward no.	VARIABLE USED	PRIN SCORE 1	PRIN SCORE 2	Z SCORE 1	Z SCORE 2
1		-1.714	38.809	1.217	-0.313
2		-0.668	40.088	1.249	-0.247
3		15.863	20.429	1.750	-1.268
4		-5.618	34.695	1.0988	-0.527
5		-75.848	54.561	-1.029	0.504
6		-64.345	46.846	-0.680	0.103
7	number of ATM / ward	-77.72	55.682	-1.085	0.562
8		-92.029	71.473	-1.519	1.383
9	commercial bank/1000 Population	-109.038	93.78	-2.034	2.542
10		-72.885	65.438	-0.939	1.069
11	health care facility/ 1000 population	-29.892	41.134	0.363	-0.193
12		-54.723	26.496	-0.389	-0.953
13	compactness	-13.532	6.684	0.859	-1.983
14		-41.99	33.27	-0.003	-0.601
15	household density	-23.852	34.671	0.546	-0.528
16	family size	-24.719	58.391	0.520	0.703
17	population growth rate	-43.503	45.523	-0.049	0.035
18		-72.432	41.742	-0.925	-0.161
19	% of working population	-9.497	17.86	0.981	-1.402
20		-51.63	57.25	-0.295	0.644
21	% of slum population	-42.827	57.346	-0.028	0.649
22	road density(sq km)	-28.849	44.4998	0.394	-0.018

Source: SPSS Output; Computed by Authors, 2020

The wards of Purulia municipality have been plotted as per their z-scores (Figure- 3) of the respective wards. The whole plotting area can be differentiated between three zones:

Zone I- Highly developed 1st Quadrant),
Zone II-Moderately Developed (3rd and 4th Quadrant) and
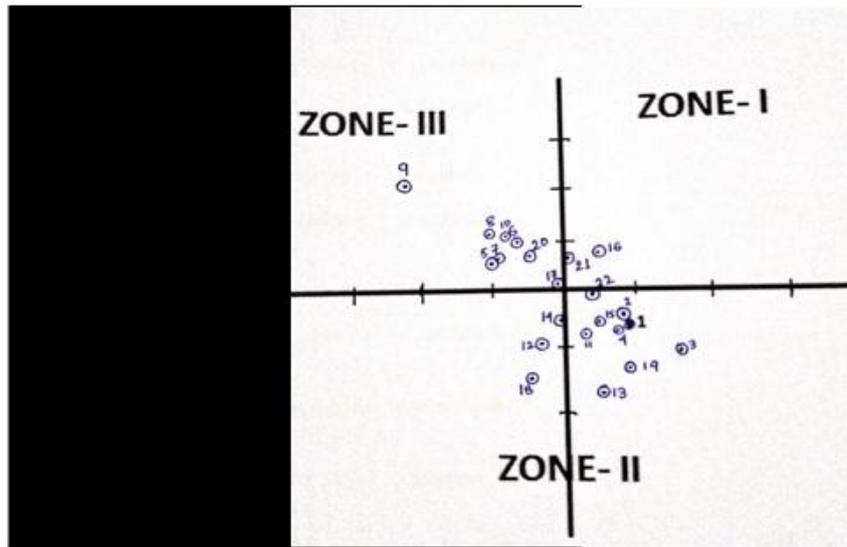Zone III- Less Developed area (2nd Quadrant).

Figure: 3:Zonation Showing the Position of municipality wards as per Z-Scores

Zone I consists of Ward number 16 and 21. These wards comprise only 9 percent of the total wards and that can be depicted as developed wards. At the Zone II, the wards like 1,2,3,4,11,12,13,14,15,18,19 and 22 have been included, comprising 55 percent of the wards. These wards are moderately developed. At Zone III, 5, 6, 7,8,9,10,17 and 20 ward numbers are being plotted. These wards together constitute 36 percent of the municipality wards. These are the less developed wards.
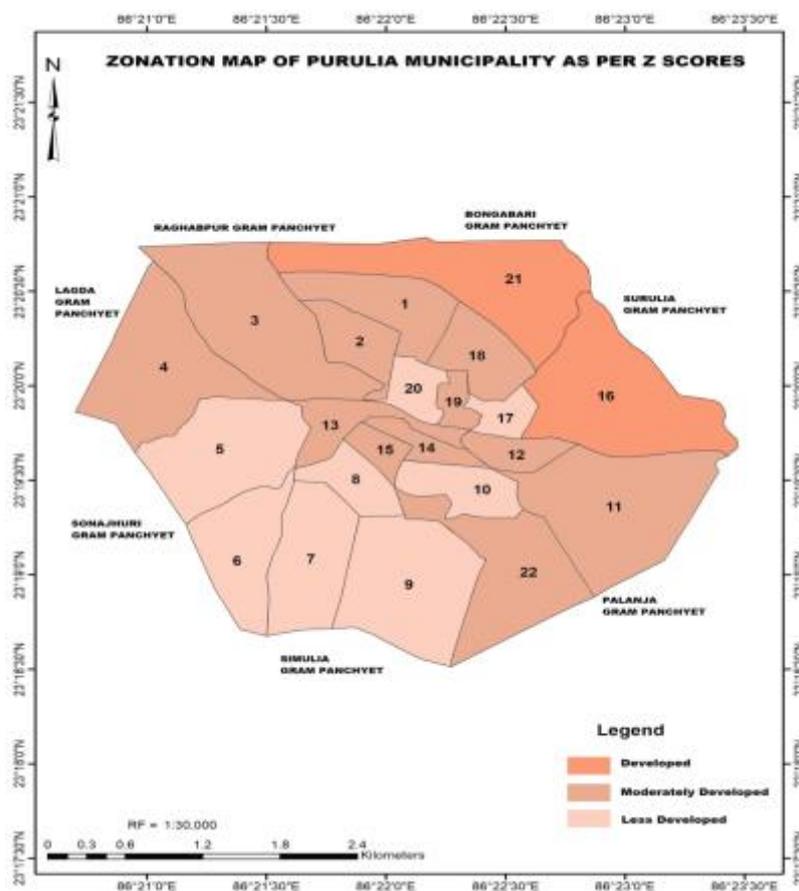

Figure: 4: Zonation Map of Purulia Municipality based upon Z scores.

It is remarkable fact that some wards are in transition or at the zone of interface between two divisions of perceiving facility status. Ward number 17 and 22 (Figure- 3) are two of such wards which are attracted by pull factors. On the other hand, Ward number 9, 13 and 18 are located far from the axis, which reveals that these wards are extremely affected by gaining utility and facility services. Ward number 9 is the second most populous ward among other wards of the municipality (Population Density 1745 persons/ square kilometer; as per Census of India, 2011) and dominated by minority population, but the available facilities are least in this ward according to its population density, household density and population growth rate. Near about six wards (Ward number 1,2,4,11,15 and 22) will be entered in the Zone 1in coming future as they are in the located at the edge of XX axis.

It has been clearly defined that in Purulia Municipality area the development has started from one side of the area (Figure: 4) i.e. from ward number 16 and 21and the other adjoining wards has started to merge with the main developed zone. This may be the reason that zone I is well connected with the railways and the vacant lands are available for the establishment of residential and official flats, buildings, IT sectors, Shopping Malls, ATM centres, commercial banks etc. But the moderately developed wards are however entering and merging with the developed zones in coming future, where more attention and planning should be needed for the less developed minority based areas and slum areas and old settlement house.

5. Conclusions

Basic facility- utility services in three terms i.e., family groups, economic empowerment and demographic infrastructure among the 22 wards of Purulia municipality should needed to manifests with proper planning and depolarization of available resources also in an urgent requirement with the pace of being smartness.In a nutshell, at the end of the analysis of present scinario of Purulia Municipality area in the view of basic amenities and utility- facility services perceived by the Class-I town inhabitants is not in a good and well condition, whereas, the development of technological outlook has drastically change in the recent decade. It is obviously a responsibility of the Governance to provide a better life- style by providing basic amenities and services to the city- dweller with the pace of modernization and digitization in all round of life. With the successful makeover of urban life- style in every sphere of life began to move towards a better quality of life during this time. In addition to this the district of Purulia has great importance for tourism and is internationally famous for 'Chou' dance that harbors a great historical root. However, it has surprisingly seen that the urban facility- utility services has not provided with a satisfactory manner. It is the responsibility of the municipal authority to offer a better life- style by providing basic amenities and services to the city- dweller with the pace of modernization and digitization in all round of life. Proper urban planning on behalf of theMunicipal Government may eradicate the imbalances and disparities among the wards to make the town properly inhabitable for the city-dwellers.

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