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Investigation on land accession for metro rail transit system implementation in Coimbatore city

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Abstract – Metro Rail System is an alternative to the existing traffic in any urbanized areas of India. The infrastructural development through this Metro System would be quite difficulty due to land availability, making hindrance to the system. The difficulty for land is proved to be evident by two major factor variables, gender and locality of Coimbatore city, the Manchester of South India. A questionnaire survey was done among residents of the Coimbatore locality and studied using varied statistical technique for analyzing different perspectives of civilians residing in Coimbatore City on a statement measuring "The land availability in the city for metro rail system is a dispute", using Statistical Package for Social Sciences (SPSS). The study was conducted for a period between October 2017 and January 2018. The result of the study falls on the percentile values obtained from the Chi-Square Test result. This study may help the planners to take decision on the land procurement for metro rail system in Coimbatore City.

Keywords – *Metro Rail System; Infrastructural development; Land Difficulty; Chi-**Square Test; Phi & Cramer's V.***

I. INTRODUCTION

Indian cities with more population and passenger hike tends to choke the traffic. In that sense Coimbatore is a known infrastructural developing city in the recent times with all its well designed road networks. The city due to its continuous increase in population with a passenger capacity of 0.2 million. The mode of travel regularities such as two-wheelers & 4-wheelers turns on the commuters making the city a heap of vehicle. This scenario projects the metro system to Coimbatore City. Metro is addressed as an international term under the 12th five year plan covering extensive cities (Paulose. N. kuriakose et.al., 2013). Metro carries 2.3 million passengers a day making it one of the most densely utilized track and also responsible for the residential development that has been a part of the rail infra works(Megan Walters 1999). Lowest carbon emission among various modes of mass transport providing very high passenger capacity using clean technology and is energy efficient with lesser noise level and ensuring enhanced mobility and reduces congestion on roads. Hindrance to metro rail system has many factors like suitability to the city, corridor selection, station spots, fare collection, construction difficulties, commuters satisfaction, travel time, utility options, facilities, etc., land difficulty ranks first among all the since it relates to the property loss of the civilians living in the city. It is important to work with this issue as it is a major problem governing not only implementation of new metro rails but also for the extension plans of existing metro networks. Mandate knowledge of difficulty management is vital to operators of the public transport system with key factors to

ensure safe, comfortable and reliable driving. (C. F. Cheung et.al., 2007).

A. News Feeds

Citizen Matters (Nov 15, 2017) highlights the connectivity of land and the transport development in Case of Namma Metros, Bengaluru. There should be enough space for parking facility, civilian walk to metro stations and other transport modes like bus stations and railway stations should be located near the metro stations to tackle the over-crowded situations in existing road networks of Indian cities like Bengaluru. This is due to unplanned land acquisition process for Metro stations and their interconnectivity to other commute modes.

Deccan Chronicle (Dec 8, 2017) deals with the delay of Hyderabad Metro rail extension as procurement land for viaduct erection is a problem Since the route of Metro network is running across a slums, Hero Honda Building and a village where land acquisition is major issue holding valuable land areas by civilians for which they expect more as compensation. These are the situations lined due to the unavailability of land and capturing of utility areas in the city like Hyderabad.

Deccan Chronicle (Dec 27, 2017) portrays the fact Kochi Metro Rail Ltd was in a land fix as there is less payment for the private acquired by KMRL exist. Since then land owners filed a case against KMRL to pay by 100% solitium, 12% additional market value and 9% interest for the land taken over for project. But according to the Land Acquisition, Rehabilitation and Resettlement Act 2013, the land should not be purchased by State or KMRL in terms of negotiations. The petitioners complained that the lands are acquired through
B. Modes of Data Collection

The data is collected for analysis through the questionnaire prepared. The Questionnaire designed, consists of respondent profile at first followed by set of questions related to feasibility study for implementation of metro rail system in negotiation basis which is a violation to LRRA. Due to this payment problems people neglect to provide land for metro projects.

Times of India (Jul 20, 2017) pictures the push of metro station from cantonment railway station 250m away in a playground owned by Bruhat Bengaluru Mahanagara Palike near Bamboo Bazaar. This is opposed by the people of vasanth nagar around Cantonment Railway Station due to which the residents wait 15 minutes for a feeder bus to take 10 minutes travel through Metro rail realigned at BBMP playground. This is due to the unavailability of land in a proper place for situating the Metro Rail Stations.

B. Research Gap

The base paper for the research is obtained from the previous work done by, (Niraj Sharma, Rajni Dhyani and S.Gangopadhyay 2010), where the challenges covered in Indian Metro networks are discussed in which the land acquisition plays a significant role. Since the previous work is confined to the northern Asia, the researcher aims to examine the same for Indian City, Coimbatore.

C. Objectives

The study is bounded with an objective to examine the land availability for the implementation of metro rail system to Coimbatore City.

II. METHODOLOGY

A. Scope of the Study

The study of the study is bounded only within the gender and locality perspective on land acquisition.
which land acquisition is a major factor for the same.

C. Descriptive Statistics

The Questionnaire was distributed to a strength of 271 and 243 were collected out of which 174 are male and 69 are female. Based on

locality there are 130 respondents from North and 113 from south regions of Coimbatore city with a percentile value of 71.6% male and 28.4% female were observed, where as 53.5% from north and 46.5% from south region.

D. Discussions and Conclusion

The analysis for the land availability was made through the Statistical Software SPSS in which Chi-Square test is used, as the questions are framed in YES or NO pattern.Further Phi and Cramer's V analysis was also conducted for the effective size computation of the responses.

TABLE I. GENDER * LAND ACQUISITION FOR METRO PROJECT IS A DISPUTE

			Land acquisition for Metro project is a dispute		**Total**
			Yes	***No***	
Gender	***Male***	Count	136	38	174
		Expected Count	136.8	37.2	174.0
		% within Gender	78.2%	21.8%	100.0%
		% within Land acquisition for Metro project is a dispute	71.2%	73.1%	71.6%
		% of Total	56.0%	15.6%	71.6%
	Female	Count	55	14	69
		Expected Count	54.2	14.8	69.0
		% within Gender	79.7%	20.3%	100.0%
		% within Land acquisition for Metro project is a dispute	28.8%	26.9%	28.4%
		% of Total	22.6%	5.8%	28.4%
Total		Count	191	52	243
		Expected Count	191.0	52.0	243.0
		% within Gender	78.6%	21.4%	100.0%
		% within Land acquisition for Metro project is a dispute	100.0%	100.0%	100.0%
		% of Total	78.6%	21.4%	100.0%

In the above descriptive table the response proportion of masculine and feminine groups for land availability in Coimbatore city was obtained along with the percentile response of masculine as 78.2% and feminine as 21.8% whereas total percentile responses from the population includes 78.6% male and 21.4% female.

By interpreting the result we could conclude the metropolitan city Coimbatore has an issue for land availability with respect to metro rail implementation. But a detailed report on this statement was presented in the below Chi-Square test result.

TABLE II. CHI-SQUARE TEST FOR GENDER

	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	.071[a]	1	.791		
Continuity Correction[b]	.008	1	.927		
Likelihood Ratio	.071	1	.790		
Fisher's Exact Test				.863	.469
Linear-by-Linear Association	.070	1	.791		
N of Valid Cases	243				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.77.					
b. Computed only for a 2x2 table					

The table above presents the detailed report on the statement of land availability for Metro project is a dispute by taking the Pearson Chi-Square technique. The test, without any violation for the assumption that every cells should have expected value of ≥ 5 has a continuity correction of 0.008 with associated significance level of 0.927 which is considered to be a larger valuethan the alpha value of 0.05 for 5% significance level.

TABLE III. PHI AND CRAMER'S V ANALYSIS FOR GENDER

		Value	**Approx. Sig.**
Nominal by Nominal	***Phi***	-.017	.791
	Cramer's V	.017	.791
N of Valid Cases		243	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

The above table signifies the effective size statistics by Phi coefficient value = -0.017 is a very small effect using Cohen's (1988) Criteria of 0.1 for small effect, 0.3 for medium effect and 0.5 for large effect. A Chi-Square test for independence (with Yates Continuity Correction) indicated no significant association between gender and land availability status, χ^2 (1, n = 243) =.017, P = .86, phi = -.01. This proves that the there is no significant difference between the response of male and female in case of land availability for metro rail project. Since

there is no significant difference the null hypothesis is accepted that the there is a dispute in land acquisition for metro project in Coimbatore city.

TABLE IV. LOCALITY * LAND ACQUISITION FOR METRO PROJECT IS A DISPUTE FOR LOCALITY

			Land acquisition for Metro project is a dispute		**Total**
			Yes	***No***	
Locality	***North Coimbatore City***	Count	99	31	130
		Expected Count	102.2	27.8	130.0
		% within Locality	76.2%	23.8%	100.0%
		% within Land acquisition for Metro project is a dispute	51.8%	59.6%	53.5%
		% of Total	40.7%	12.8%	53.5%
	South Coimbatore City	Count	92	21	113
		Expected Count	88.8	24.2	113.0
		% within Locality	81.4%	18.6%	100.0%
		% within Land acquisition for Metro project is a dispute	48.2%	40.4%	46.5%
		% of Total	37.9%	8.6%	46.5%
Total		Count	191	52	243
		Expected Count	191.0	52.0	243.0
		% within Locality	78.6%	21.4%	100.0%
		% within Land acquisition for Metro project is a dispute	100.0%	100.0%	100.0%
		% of Total	78.6%	21.4%	100.0%

The above table presents the descriptive statistics of responses collected from different parts of Coimbatore city where in population of civilians and vehicles marks high comparatively, split into north and south side of Coimbatore city based on Avinashi road as a center line to the city since the road runs as state highway across the city. The % within locality row of the descriptive table on both north and south regions carries a percentile value of 76.2% and 81.4% supportive for the statement by accepting there is a land availability problem for metro rail system in the city where as 23.8% and 18.6% percentile values signifies non supportive response to the same. Though the result can be obtained by the above, a precise report could be drawn by the following tables.

TABLE V. CHI-SQUARE TESTS FOR LOCALITY

	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	.995[a]	1	.318		
Continuity Correction[b]	.707	1	.400		
Likelihood Ratio	1.001	1	.317		
Fisher's Exact Test				.349	.200
N of Valid Cases	243				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 24.18.					
b. Computed only for a 2x2 table					

The detailed report on the statement of land availability for Metro project is a dispute by taking the Pearson Chi-Square technique sharpens the test without any violation for the assumption of every cells should have expected value 5 or greater has a continuity correction of 0.707 with associated significance level of 0.4 which is considered to be larger value than the alpha value of 0.05 for 5% significance level.

TABLE VI. PHI AND CRAMER'S V ANALYSIS FOR LOCALITY

		Value	**Approx. Sig.**
Nominal by Nominal	***Phi***	-.064	.318
	Cramer's V	.064	.318
N of Valid Cases		243	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

The effective size statistics by Phi coefficient value = -0.064 is a very small effect using Cohen's (1988) Criteria of 0.1 for small effect, 0.3 for medium effect and 0.5 for large effect was performed in the above table.

A Chi-Square test for independence (with Yates Continuity Correction) indicated no significant association between locality and land availability status, χ^2 (1, n = 243) =.064, P = .35, phi = -.01. This proves that the there is no significant difference between the response of north and south Coimbatore city in case of land availability for metro rail project and the null hypothesis is accepted that the there is a dispute in land acquisition for metro project in Coimbatore city.

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