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Chennai – Smart City for Smart People

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Abstract: ***India is one of the major developing country who even after standing 2nd in the global population is the 10th largest economy in the world. With development problems have also grown parallel to it resulting in making this issue a major cause of concern for the researches. Converting the urban cities of our nation to smart cities is one possible solution. Urban cities contributes a huge percentage to our GDP but a very little investment is done in them. Unlike urban city, a smart city does not require a mammoth investment, instead it utilises new technologies and innovations for smart development. Chennai is also one such city which requires smart development. This research work pays attention to the problems faced by Chennai city to become a smart city. The work is completely based on questionnaire survey which is prepared to know which problems are mostly restricting Chennai to become a Smart city after which recommendations are given for major restricting problem.***

Keywords: Smart City, Chennai, Factors Affecting, Development.

I. INTRODUCTION

The ministry of urban development has launched the first smart city plan in the year 2015.Smart city has developed the infrastructure of existing city and optimized the problem. In urban development planning, the premise of a smart city has become important because technological innovation is gradually occurring. The smart city involves technology ICT information communication and technology which improves the citizen quality of life. The key to solving such urban problems is the development and technologies designed to improve the quality of urban life and decreasing the operating expenses of the city while discounting the goals of sustainability. An Indian government implement smart city 100 cities including Chennai city. A smart city can also react more rapidly and responsibly to any urban recession since it has a good level of urban opposition. The concept of a smart city concentrates on the use of innovative technologies, including IT, and the activity and inventiveness of its individuals. Resource shortage, government accountability and structure in developing countries are among the leading causes of the inability to deliver public service. Chennai city is capital of Tamil Nadu and it has highest population more than 4.6 Million. A Chennai city population rapidly growth and peoples get several of problems in daily life activities.

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The problems in storm water management, Transportation including NMT, Solid waste management, waste water management, theft etc., involved in Chennai city. In smart city mission (SCM), Chennai city has dived into two parts of implementation that is 1. Area based development 2. Pan city development. The Area based development is fully based on voting by people, meeting conference. Many of the members are point out the T-Nagar and Pan City development modified the entire city. The need of smart city is done by modelling and aspect are involved in smart city development. Smart city reduces the constraints, development of infrastructure and responsibility for development and resist the several of problem involved. The future of smart city innovations is look positive and take us to the next phases of what is possible, and mostly workable. Morphing any city into a smart city with better performance is a process that requires to be supported by powerful and durable technologies, methods and systems. Investing in urban areas is found to be profitable by many governments, however this should be done in a planned and effective manner. A new rules and regulation are required to promote the smart city services in an easy manner in smart city. Resource shortage, government accountability and structure in developing countries are among the leading causes of the inability to deliver public service

II. METHODOLOGY

Being both qualitative as well as quantitative the work in this study is extremely widespread. For this cause it was imperative to pick a process in which the work could be completed in an orderly way so that there is no dearth of confidence, clattering of point of view and work can be finished with a strong attitude and line of attack. The entire work of the study count on the questionnaire survey, answer of which will be assembled from the localities of Chennai City. Figure 1 describes the procedure followed in the whole study. In the commencement, a study of prior research works linked to smart city is carried out from which the key factors obstructing Chennai city to become a Smart City is fixed.

The questionnaire survey here is planned to recognize the major factors obstructing Chennai city to become a Smart City. Questionnaire survey had two parts. First part consists of general information such as name of respondent, age, work place, designation in current work place, for how they have been in Chennai, etc. The second part consists of the factors obstructing Chennai city to become a Smart City for analysis purpose. Likert Scale of 1-5 was used for survey, which is a psychometric response scale and respondents were asked to mark how much they agree or disagree to the questions. For collecting response,

first the respondents were made to understand the idea of study, what exactly is desired from them and the chief emphasis of this study. If respondent had uncertainty, the problem was made clear immediately and elaborately. The questionnaire was circulated only when the respondents were clear with the object, goal and purpose of this study.

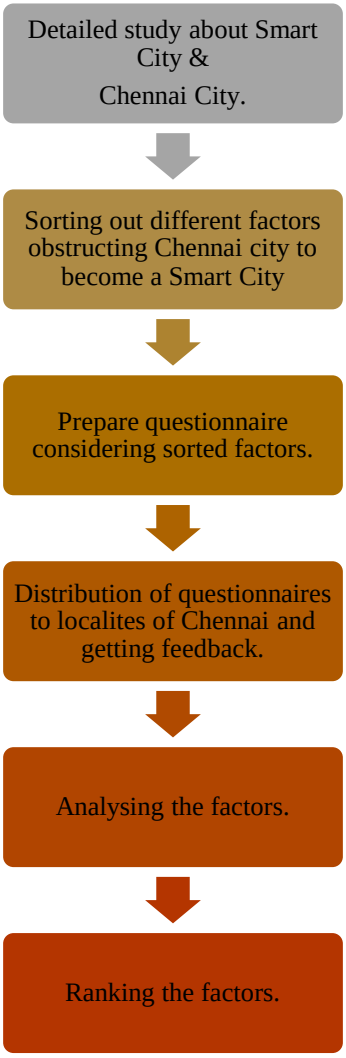

Fig 1: Methodology Flowchart

III. FACTORS GOVERNING SMART CITY

Figure 3 narrates the different factors that govern smart city, which is sorted out after extensive literature review.

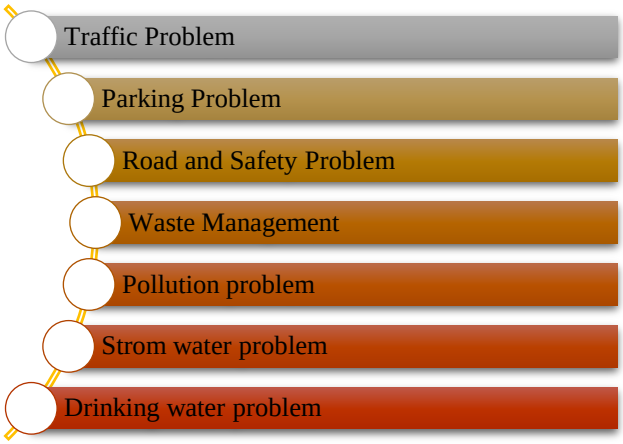

Figure 3: Factors Governing Smart City

IV. ANALYSIS METHOD DESCRIPTION

The data was analysed in an organised way so that there is no possibility of mistake. ANOVA Test was accomplished in order to identify whether the factors considered had any difference as a whole. ANOVA Test is anthology in nature, i.e., it considers all the means of samples simultaneously and can be labelled as 'For all Test'. Result of ANOVA Test designates that there are factors which fluctuate from each other, but it does not highlight exactly which factors fluctuate. To gain a cavernous knowledge of exactly which factor fluctuate, Tukey Test was accomplished to see pairwise metamorphosis. Tukey Test is also recognised as 'Honest Significance Difference Test' because it establishes the metamorphosis between various sample groups. Formula for Tukey Test is well-defined in equation 1. After knowing the polarization amongst different factors, ranking was specified by means of Relative Importance Index criteria, for which formula is defined in equation 2.

$$Q = \frac{(x_i - x_j)}{\sqrt{\frac{S}{n}}}, \text{ Eq 1,}$$

where, x_i and x_j is the difference between the pair of means,
S is the Mean Square of Group, and,
n is the number of group.

$$RII = \frac{\sum W}{n \times A}, \text{ Eq 2,}$$

where, W is the weighting given to each factor,
A is the highest weight (i.e. 5 in this case), &,
n is the total number of respondents (i.e. 200 in this case).

V. RESULTS & DISCUSSION

Table 1 terms the outcomes attained from ANOVA Test. The p-value corresponding to the F-statistic of one-way ANOVA is lower than 0.05, suggesting that there is significant difference between the factors.

Table 1: ANOVA Test Results

Source	Sum of squares	Degrees of freedom	Mean square	F statistic	p-value
Groups	2.6102	7	0.3729	12.2387	$1.7049e^{-07}$
Error	0.9750	32	0.0305		
Total	3.5851	39			

Table 2 narrates the results of Tukey Test. The Q-value of Tukey HSD Test for each pair of factors is greater than the critical value, $Q_{critical}$ = 4.0659 (for α=0.05, k=5, ν=35), suggesting that there is a significant difference between each of the factors.

Table 2: Tukey Test Results

Pair	Tukey $Q_{statistic}$	Tukey p-value	Tukey Inference	Pair	Tukey $Q_{statistic}$	Tukey p-value	Tukey Inference
Traffic vs Parking	5.1793	0.0099947	Significant	Road Safety vs Pollution	4.6133	0.0254484	Significant
Traffic vs Road Safety	5.8672	0.0050235	Significant	Road Safety vs Strom water	4.6774	0.0015720	Significant
Traffic vs Waste Management	5.1273	0.0034897	Significant	Road Safety vs Drinking water	4.9371	0.0076999	Significant
Traffic vs Pollution	8.4806	0.0010053	Significant	Road Safety vs Crime	4.9600	0.0032084	Significant
Traffic vs Strom water	4.8918	0.0034321	Significant	Waste Management vs Pollution	7.3532	0.0010053	Significant
Traffic vs Drinking water	6.2643	0.0023414	Significant	Waste Management vs Strom water	4.6625	0.0380342	Significant
Traffic vs Crime	7.8272	0.0010053	Significant	Waste Management vs Drinking water	5.1370	0.0192989	Significant
Parking vs Road Safety	6.0466	0.0035659	Significant	Waste Management vs Crime	6.6999	0.0010053	Significant
Parking vs Waste Management	6.3067	0.0474506	Significant	Pollution vs Strom water	5.2907	0.0146498	Significant
Parking vs Pollution	8.6599	0.0010053	Significant	Pollution vs Drinking water	5.2162	0.0395268	Significant
Parking vs Strom water	5.3692	0.0028390	Significant	Pollution vs Crime	4.6533	0.0370259	Significant
Parking vs Drinking water	6.4437	0.0016501	Significant	Strom water vs Drinking water	4.6745	0.0394816	Significant
Parking vs Crime	8.0066	0.0010053	Significant	Strom water vs Crime	4.6374	0.0455754	Significant
Road Safety vs Waste Management	4.7399	0.0384151	Significant	Drinking water vs Crime	4.5829	0.0047599	Significant

Table 3: Ranking Of Factors

S.No.	Factors	RII value	Ranking
1	Traffic Problem	0.8572	2
2	Parking Problem	0.8600	1
3	Road and Safety Problem	0.7656	5
4	Waste Management	0.8074	4
5	Pollution problem	0.7350	7
6	Strom water problem	0.8396	3
7	Drinking water problem	0.7594	6
8	Crime problem	0.7248	8

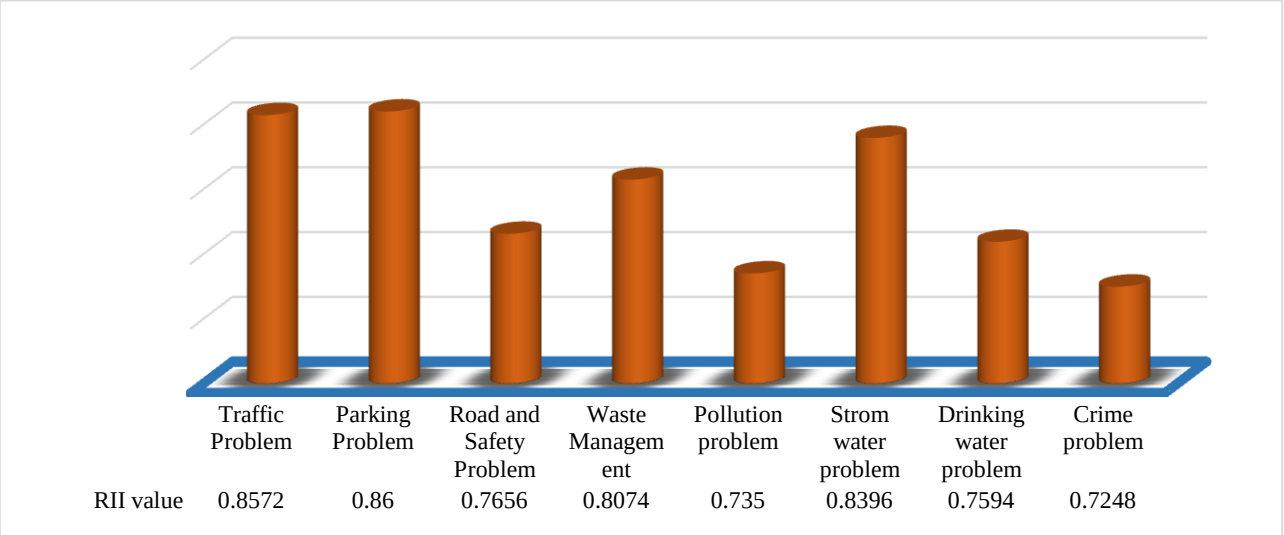

Fig 3: Graphical Presentation of RII Result.

VI. CONCLUSION

For making Chennai a smart city it is very essential to solve the different problems that are obstructing Chennai to become a smart city. Moreover, such solutions must be proposed which will not only will solve most of the problems but should also be practically applicable and along with it should be as economical as possible. It is suggested that parking issues in Chennai should be solved first because according to people of Chennai parking is the biggest problem faced by them. Fellows of Chennai city are facing traffic issue due to which their daily routine work gets affected thereby affecting a smart life, thus wide roads with proper and regular maintenance should be brought up. Chennai being a low land area gets affected from submission of strom water every year during monsoon for which proper water disposal system must be built all long the Chennai region. Viewpoint of professionals having pronounced quantity of knowledge in smart city is at all times suggested before taking any decisions and steps towards making Chennai a smart city because there is constant ambiguity due to unidentified circumstances and situations.

VII. LIMITATIONS OF STUDY

The study is hinge on questionnaire survey and answer of individuals are well thought-out to be dependable, precise and genuine. The entire work of study is restricted to 200 samples only, which is accompanied only in Chennai, for additional expansion one can magnify the work by piloting survey in different divisions of India.

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