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Exploring the Perception about Role of Civic Engagement in Solapur Smart City Mission

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Abstract:
A smart city refers to the use of technology to improve the overall quality of life of its residents. However, the ambitious Smart City Mission requires not only technological advancement but also a shared vision, collective action, and responsible civic behaviour among citizens. The present study examines the level of awareness and satisfaction regarding the smart city concept and its major elements, along with citizens' perceptions of civic engagement under the Solapur Smart City Mission. Data were collected from 150 citizens belonging to diverse gender, age, and educational groups through a non-random convenience sampling technique. The study emphasizes the critical need for people's participation, shared vision, and civic engagement in the planning and implementation of smart city projects. It suggests that without active resident involvement, a smart city cannot become truly citizen-centric. Therefore, awareness about the importance of community participation in planning, execution, and identifying intervention areas must be strengthened to ensure more inclusive and effective smart city development.

Keywords: *Smart City Mission, Civic Engagement, Citizen Participation, Urban Governance, Public Awareness, Community Involvement, Solapur Smart City*

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1. Introduction:

The transformative journey of Solapur, a vibrant city in Maharashtra, towards becoming a smart city began in 2016 under the Government of India's Smart Cities Mission. The Solapur Smart City Mission is a transformative initiative aimed at developing the city into a more sustainable, efficient, and inclusive urban environment. This ambitious mission requires not only technological advancement but also a shared vision, responsible civic attitudes, and active community involvement. Scholars emphasize that smart city development must integrate both technological infrastructure and citizen participation to ensure inclusive urban governance and long-term sustainability (Meijer & Bolívar, 2016). The success of the Smart City Mission therefore depends on collective vision, responsible behaviour, informed civic attitudes, and citizen engagement in decision-making processes. Studies on smart city governance indicate that citizen participation and collaborative planning significantly enhance the effectiveness of urban development initiatives (Nam & Pardo, 2011). The Smart Cities Mission of India aims to develop 100 cities with advanced infrastructure, digital technologies, and sustainable planning to improve urban liability and economic growth. Solapur, with its strong cultural heritage and strategic regional importance, was selected as one of the cities under this initiative. However, the success of the mission depends not only on the development of physical infrastructure but also on strengthening "soft infrastructure," which includes public awareness, civic responsibility, and community participation. Urban development research highlights that active citizen engagement, behavioural adaptation to technology, and collaborative governance are critical for the successful implementation of smart city initiatives (Albino, 2015). Therefore, fostering community engagement and responsible civic behaviour is essential for transforming Solapur into a truly citizen-centric smart city.

2. Background of Study

The concept of smart cities has emerged as a significant urban development strategy aimed at integrating information and communication technologies with sustainable urban planning to improve the quality of life of citizens. In India, the Smart Cities Mission launched by the Government of India seeks to promote cities that provide core infrastructure, clean and sustainable environments, and improved citizen services through technology-driven governance. Solapur was selected as one of the cities under this initiative with the objective of enhancing urban mobility, digital governance, environmental sustainability, and citizen-centric services. However, global studies indicate that the effectiveness of smart city initiatives depends not only on technological infrastructure but also on public awareness, civic participation, and collaborative governance between authorities and residents. Citizen engagement plays a crucial role in ensuring transparency, accountability, and the successful implementation of urban development programs. Therefore, understanding citizens' perception, awareness, and satisfaction regarding civic engagement becomes essential for evaluating the progress and inclusiveness of the Solapur Smart City Mission (Caragliu & Nijkamp, 2011).

3. Objective of Study

- To examine the level of awareness among citizens regarding the concept and initiatives of the Solapur Smart City Mission
- To analyze citizens' perceptions about the role of civic engagement in the planning and implementation of smart city projects in Solapur
- To assess the level of citizen satisfaction with various smart city initiatives and services introduced under the Solapur Smart City Mission
- To evaluate the influence of community participation on the effectiveness and success of smart city development initiatives
- To suggest strategies for enhancing civic engagement and public participation in the planning, design, and execution of smart city projects in Solapur

4. Review of Literature:

Research on smart cities increasingly highlights the importance of civic engagement and citizen participation in the success of urban development initiatives. Adriana Zait (2022) examined the skills required for citizens to actively participate in smart city development and argued that technological infrastructure alone cannot ensure successful smart city transformation. The study emphasizes that creative thinking; communication abilities, collaboration, and value-driven civic behaviour are essential characteristics of "smart citizens." According to the author, these qualities can be strengthened through education, community initiatives, and innovation-driven public spaces that encourage citizens to contribute actively to urban governance and development processes.

Sengboon Lim and Zurinah Tahir (2021) discussed that citizen attitudes, behavioural orientation, and participation in decision-making processes are crucial for building citizen-centred smart cities. Their study highlights that trust between citizens and governing authorities, collaborative governance structures, and participatory planning are essential elements for successful smart city implementation. The authors argue that technological systems alone cannot transform cities unless residents actively engage in shaping policies and development initiatives. Similarly, Shruti Vaishampayan (2020) emphasized the importance of citizen participation in the planning and implementation of smart city infrastructure projects. Her work discusses the example of Pune, where citizens were involved during the design and execution stages of urban development initiatives, demonstrating that inclusive planning improves transparency, accountability, and project success.

Deepak Kumar critically examined India's Smart Cities Mission and argued that the concept of "active citizenship" promoted within the program sometimes limits genuine citizen participation by encouraging passive acceptance rather than meaningful engagement. The study suggests that true civic participation should involve citizens in decision-making and governance rather than merely expecting them to support government initiatives (Kumar, 2019). In addition, Nasrin Khansari emphasized that smart cities are designed to enhance quality of life through technological solutions; however, citizen participation remains essential for identifying real community needs related to

energy efficiency, mobility, environmental sustainability, and urban wellbeing (Khansari, 2014). Francesco Caputo (2023) further noted that smart cities represent complex socio-technical systems where technology and citizen behaviour must work together to promote sustainable urban development. The study proposes frameworks that help policymakers use technology as a tool to encourage responsible civic behaviour and active citizen participation in shaping sustainable cities.

5. Research Statement:

While smart city initiatives regularly focus on infrastructure development and uses of technology for betterment of life of the residents, the success of these projects' hinges on community engagement and responsible behavioural citizens. Exploring civic engagement and responsible behaviour to realize mission smart city is focal point of the study. How citizens of Solapur perceive the smart city vision and behavioural transformation to adopt new technologies and practices for mission smart city?

Research Hypothesis:

To observe above mentioned objective following hypothesis are formulated.

H: Civic perception about civic engagement and its elements under Solapur smart city mission is independent of gender respondents.

H: Civic perception about civic engagement and its elements under Solapur smart city mission is independent of level of education of the respondents.

H: Civic perception about civic engagement and its elements under Solapur smart city mission is independent of age groups of the respondents

6. Research Methodology:

This study employs descriptive and exploratory research approach and has adopted survey method in order to address the research problem. Present research paper is based on primary and secondary data, primary collected from different parts of Solapur city in Maharashtra through structured questionnaires covering a variety of interrelated aspects of civic perception, participation and engagement towards smart city mission and demographic variables. Primary survey was conducted to gather responses from responsible citizens using non-random convenient and judgmental sampling techniques was used because of which respondents of the study belonged to divers' gender, age, education and occupation groups. Sample size (150) is based on Rao's sample size online calculator 'Raosoft'. A 5-point Likert scales ranging from strongly agree (1) to strongly disagree (5) have been used to obtain the views about given statement. Data obtained through survey were analysed using suitable statistical tools and techniques such as mean, percentage, weighted average, rank correlation and testing of hypothesis (chi-square and t-test) have been applied to analyse the data. In order to calculate weighted average, strongly agree is given weight as one, agree as two and so on, weighted total and weighted average are calculated and that have been analysed based on various parameters. Secondary data used to for conceptual framework and understanding. The scope of the study was defined by certain questions provided to the respondents in Solapur city. The present study is based on primary data collected in the month of November -December 2024 and findings are based on the analysis of data collected by the respondents of smart city Solapur.

7. Data Analysis and Discussion:

- **Demographic Profile of the Respondents:**

In order to cover responses from various respondents, in a survey primarily four parameters were included to select its participants such as, gender, age, level of education and occupation presented in Table 1. Table gives the details of different demographic parameters of the sample size collected through the survey (N = 150)**.** Table 01 clearly describes the fact that more than half of the respondents were male 57.33 percent, while 42.67 percent were female respondents. The sample respondents were mostly young, 48 percent respondents have an average age of up to 30 years, 46 percent respondents belonged to 30 to 50 years age category and the remaining 6 percent respondents belongs to 50 to70 years age group. It is interesting to note that the 36.67 percent of the respondents

were graduates, 30.67 percent respondents have their education up to HSC, and 16.66 percent were postgraduates and 16 percent respondents have their education up to SSC.

Table :01				
Demographic Profile of the Respondents				
Demographic Variable	**Category**	**No. of Respondents (F)**	**Percentage (%)**	**Cumulative (%)**
Gender	Male	86	57.33	57.33
	Female	64	42.67	100.00
Total		**150**	**100.00**	
Age Group	18-30 Years	72	48.00	48.00
	30-50 Years	69	46.00	94.00
	50-70 Years	09	06.00	100.00
Total		**150**	**100.00**	
Education	SSC	24	16.00	16.00
	HSC	46	30.67	46.67
	Under Graduate (UG)	55	36.67	83.34
	Post Graduate (PG)	25	16.66	100.00
Total		**150**	**100.00**	
Source: Primary Data				

- **Level of Awareness and Civic Engagement under Solapur Smart City Mission:**

Table 02, presents level of awareness about concept and aspects of Solapur smart city mission and civic engagement in Solapur smart city mission. It is understood form the data that 98 percent respondents are aware about the concept and aspects of smart city as well as work which is ongoing under mission smart city. It is to be noted that only 34 percent respondents admit that waste management mechanism in Solapur is in line with smart city mission. The SMC has launched an android app for filing online complaints, merely 21.33 percent respondents are aware about the app rest 78.7 percent respondents have no idea about such app, talking about the use of the app only 5.33 percent respondents have used the app for complaint file.

Table:02							
Level of Awareness and Civic Engagement in Solapur Smart City Mission							
Sr. No.	**Statements**	**Yes**		**No**		**Total**	
		F	%	F	%	F	%
1	I am aware about the concept and aspects of smart city.	147	98	3	2	150	100
2	I am aware about work in progress and work completed under smart city project.	147	98	3	2	150	100
3	I am aware about that waste management mechanism in Solapur is in line with smart city mission.	51	34	99	66	150	100
4	I know that '**Parivartan Solapur App' has been** launched by Solapur municipal corporation for online complaint registration.	32	21.33	118	78.7	150	100
5	I always use "**Parivartan Solapur App"** for filing online complain with Solapur municipal corporation (SMC)?	08	5.33	142	94.7	150	100
Source: Primary Data							

Analysis of Level of Satisfaction about Various Aspects of Smart City:

Table 03, includes the various important aspects of smart city and their average score along with level of satisfaction. Data depicts that respondents are not at all satisfied about mobility and public transportation system which is one of the important aspects of smart city because its average score is 1.87 out of 10. As far as water supply management, solid waste management and sanitation practices in the city, traffic management system, affordable housing especially for poor is concerned average score is 2.5 to 5.0, which means partly satisfied about those aspects is moderate. While assured and stable electricity supply in the city, amount of work done under smart city mission, qualitative of work done under smart city mission, and effective implementation of smart city project in Solapur score is in the range of 5.0 to 7.5 means more than satisfied. It is to be noted that the highly educated respondents are not at all satisfied with the waste management system.

Table: 03

Analysis of Level of Satisfaction about Various Aspects of Smart City Solapur

00 to 2.5 – Not at all Satisfied**, 2.5 to 5.0 –** Partly Satisfied**, 05 to 7.5 –** More than Satisfied**, 7.5 to 10 –** Highly Satisfied

Sr. No.	Aspects of Smart City	Average Score (Out of 10)	Remark
1	Efficient mobility and public transportation system in the city	1.87	Not at all satisfied
2	Traffic management system	2.21	
3	Water supply management	2.8	Partly satisfied
4	Solid waste management and sanitation practices in the city	2.9	
5	Affordable housing especially for poor	3.4	
6	Assured and stable electricity supply in the city	6.2	More than satisfied
7	Amount of work done under Solapur smart city mission.	5.67	
8	Qualitative of work done under Solapur smart city mission.	5.08	
9	Effective implementation of smart city project	5.76	

Source: Primary Data

- **Level of Satisfaction about Performance of Administrative System of Solapur Regarding Mission Smart City:**

To understand the level of satisfaction about performance of administrative system of Solapur regarding mission smart city respondents' data have been collected and presented in chart 03, Chart 03, illustrates that 15 percent respondents are completely unsatisfied about the performance of administrative work while 60 percent respondents are found satisfied about performance administrative system, 25 percent respondents believe that performance administrative system is the best, whereas zero percent respondents think that performance administrative system is excellent poor. In short majority (85 percent) of the respondents are satisfied about the performance administrative system of Solapur which work for mission smart city at the same time not a single respondents rate the performance at excellent grade.

- **Average Responses about Civic Engagement and its Elements Under Solapur Smart City Mission on the basis of Gender**

To understand perception about civic engagement and its elements under Solapur smart city mission, some of the statements are asked to the respondents and their responses are collected in five-point scale. Weighted averages and average response have been calculated of the responses by assigning weight and same is presented in table 04. The focus is also being made on weighted average of the responses on the basis of gender along with the difference of these averages. It is understood that

higher difference indicates more variation in responses about the statement. Average difference between weighted averages is found to be 0.31, which is small that indicates, perception among male and female respondents is similar about various parameter and statements given table 04.

Table :04

Weighted Averages and Average Responses of Perception about Civic Engagement and its Elements Under Solapur Smart City Mission on the basis of Gender

SA- Strongly Agree**, A-**Agree**, NAND-** Neither Agree Nor Disagree**, D-**Disagree**, SD-**Strongly Disagree, **WA-** Weighted Average, **AR-** Average Responses

Sr. No.	Statements	Male		Female		Difference
		WA	AR	WA	AR	
1	Truly realize the vision of a Smart Solapur, the community engagement and active participation is important.	1.48	SA	1.66	A	0.18
2	Self-discipline and cleanliness are most important part of mission smart city Solapur.	1.67	A	1.52	A	0.15
3	Community empowerment for adoption of new technology is needed for successful accomplishment of mission smart city Solapur.	1.80	A	1.36	SA	0.44
4	The collective responsible behaviour of residents is important for the development Solapur smart city.	1.89	A	1.69	A	0.20
5	Robust use of smart technology to improve public safety, energy, efficiency, sustainability and overall quality of life under smart city.	2.26	A	1.95	A	0.31
6	Residents of Solapur adapted use of smart technology for energy saving, water conservation, pollution control etc. align with smart city mission.	2.09	A	2.77	NAND	0.68
7	There is a lack of belongingness among civilians for public property in Solapur	1.87	A	1.71	A	0.16
8	Shiny and clean railway station and bus stand is an essential of element of smart city, that is maintained under smart city mission in Solapur.	1.30	SA	1.72	A	0.42
9	Decent language, sophisticated and responsible behaviour are important behavioural aspects smart city mission is observed in Solapur.	1.17	SA	1.67	A	0.50
10	Active participation, sophisticated and responsible behaviour of citizens are key elements in making true smart city which is seen in under smart city mission Solapur.	3.89	D	3.32	D	0.57
11	Existing waste management system at in Solapur is in line with smart city mission.	2.59	NAND	2.50	A	0.09
12	To discourage littering in public places strict action must be initiated, that is ongoing under mission smart city Solapur.	3.69	D	3.93	D	0.24
13	Adhering to rules and regulations is features of responsible behaviour is observed in residents of	3.37	NAND	3.77	D	0.40

	Solapur.					
14	Residents enjoy the convenience of having garbage van services available in every area in Solapur city	2.00	A	2.00	A	0.00
					Average	0.31
Source: Primary Data						

- **Correlation Coefficient and t-statistic:**

Correlation coefficient of weighted averages has been computed to see the harmony in responses by male and female respondents about perception about civic engagement and its element under Solapur smart city mission. Correlation coefficient between responses by male and female respondents is r = 0.88, it means there is high degree association, implies harmony in responses. T-test has been used to test the significance of the obtained correlation coefficient. Since the calculated value of 't' at 5% level of significance for 12 degree of freedom is greater than table value, so hypothesis is rejected and concluded that there is significant association exists in responses.

H: There is no significant association between weighted averages based on gender responses about civic engagement and its elements under Solapur smart city mission.

r = 0.88; **Degree of Freedom (DF = N-2)** =12; **1- r^2** = 0.217925; **DF/1-r^2** = 59.65355; **SQRT** = 7.723571; **Calculated value of - t** = 6.83034; **Table Value** = 2.16

Result: Since the calculated value of 't' at a 5% level of significance for 12 degree of freedom is greater than table value, so hypothesis is rejected, it means there is significant association exist between weighted averages calculated based on responses of male and female respondents.

Weighted Averages of Perception about Civic Engagement and its Elements under Solapur Smart City Mission on the basis of Level of Education of the Respondents:

Weighted averages of perception about civic engagement and its elements under Solapur smart city mission on the basis of level of education of the respondents have been calculated. Correlation coefficient of weighted averages has been computed to understand the degree of association in responses by the respondents belongs to various level of education and age groups. Correlation coefficient between responses by respondents of different levels of education and age groups presented in the table 05. Similarly, to test the level of significance of calculated correlation coefficient t-test has been applied and presented in table 05.

Table :05

Correlation Coefficient and t-statistic of Correlation Coefficient Between Weighted Averages of Perception about Solapur Smart City on the basis of Level of Education and Age Groups of the Respondents.

H: There is no significant association exist between weighted averages of perception about civic engagement and its elements under Solapur smart city mission on the basis of level of education of the respondents.

- SSC, **2 -** HSC, **3 -** Under Graduate, **4-** Post Graduate

Level of Education	'r' Value	Degree of Freedom	Calculated value of - t	Table Value	Result
(1-2)	0.93	12	8.86	2.16	Since the calculated value of 't' at a 5% level of significance for 12 degree of freedom is greater than table value, so hypothesis is rejected, and it can be concluded that there is significant association exist between weighted averages of perception about civic
(1-3)	0.80	12	4.79	2.16	
(2-3)	0.84	12	5.61	2.16	
(1-4)	0.84	12	5.59	2.16	

					engagement and its elements under Solapur smart city mission on the basis of level of education of the respondents.
H: There is no significant association exist between weighted averages of perception about civic engagement and its elements under Solapur smart city mission on the basis of age groups of the respondents.					
1- 18 to 30 Years**, 2 -** 30 to 50 Years**, 3 -** 50 to 70 Years					
Age Groupe	**'r' Value**	**Degree of Freedom**	**Calculated value of - t**	**Table Value**	**Result**
18 to 30 and 30 to 50 Years (1-2)	0.95	12	10.97	2.16	**Rejected -** significant association exist between weighted averages of perception of age group respondent.
18 to 30 and 50 to 70 Years (1-3)	0.37	12	1.44	2.16	**Accepted** - no significant association exist between weighted averages of perception of age group respondent.
30 to 50 and 50 to 70 Years (2-3)	0.95	12	10.97	2.16	**Rejected -** significant association exist between weighted averages of perception of age group respondent.

8. Findings of the Study

- The study found that although a considerable number of citizens are aware of the Solapur Smart City Mission, the depth of understanding about its objectives, projects, and long-term benefits remains limited among many residents. Awareness is higher among educated and younger respondents, while older and less educated groups demonstrate comparatively lower familiarity with the concept and initiatives of the smart city.
- The analysis indicates that citizens recognize the importance of civic engagement in the successful implementation of smart city projects. A majority of respondents believe that public participation in planning, monitoring, and evaluation of projects can enhance transparency, accountability, and effectiveness of urban development initiatives.
- The findings also reveal that community participation in decision-making processes is still moderate, as many citizens feel that opportunities to contribute their ideas or feedback are limited. This indicates a gap between policy expectations of citizen participation and the actual level of involvement experienced by residents.
- The study further shows that citizens perceive technology-driven services positively, especially in areas such as digital governance, urban infrastructure, and public services. However, respondents emphasize that technological solutions must be supported by active citizen cooperation and responsible civic behaviour for achieving sustainable urban development.

9. Conclusion

The study concludes that the success of the Solapur Smart City Mission depends not only on technological infrastructure and urban development initiatives but also on active civic engagement and community participation. While citizens generally recognize the importance of smart city

initiatives and show a positive attitude toward technology-driven urban development, the level of awareness and involvement in decision-making processes remains moderate. The findings indicate that strengthening citizen participation, improving communication between authorities and residents, and promoting awareness about smart city initiatives are essential for achieving a truly citizen-centric smart city. Encouraging collaborative governance, responsible civic behaviour, and inclusive participation will help ensure that smart city projects effectively address the needs and aspirations of the community while promoting sustainable urban development.

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