

From Policy to Practice: A Critical Assessment of Kanpur's Smart City Mission

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Abstract

Urban transformation is in essence a process that is dynamic in nature which transforms cities keeping in view with changing opportunities and challenges. In 2015, Indian government started India's smart city mission which aims at developing 100 cities as smart cities which are citizen centric and technologically advanced cities. The present research work is a critical evaluation of the development of the Kanpur city within the framework of the smart city mission, in terms of governance, and the use of policy and infrastructural improvement. The present research is the way of measuring the population opinion on the smart city mission initiatives in the city of Kanpur using both secondary and primary data which includes survey of 100 individuals who are living in the city of Kanpur. According to the findings of the survey, the responses are mixed and the residents note improvements in the areas that comprise infrastructure, employment and water supply. However, some of the concerns still remain related to public safety, healthcare, financial transparency and waste management. The efficaciousness of the existing policies and their adequacy is questioned by sizable number of the respondents. The necessity to involve the communities, transparent governance and increased financial planning has also been demonstrated in this research study. Kanpur city's experience provides not only the valuable insights but also important lessons for the other cities looking at smart city transformation, including the need for a sustainable, integrated and inclusive approach to the urban development.

Keywords: *Kanpur, Smart City, Urban Transformation, Sustainable Development, Urban Planning.*

Introduction

Urban transformations is basically a process that is dynamic in nature, that reshapes not only the social, economic but also physical landscape of the city in answer to the evolving opportunities and also challenges. Technological advancement along with fast urbanization in 21st century has necessitated for a shift towards optimal as well as sustainable urban planning. Under the concept of smart cities, the world has realized that the concept has been adopted as an effective way of tackling the challenges of urbanization by encouraging infrastructure sustainability, digitalization, and solutions that are innovative. (Caragliu, Del Bo, & Nijkamp, 2011). Due to the growing population in the urban space that exceeded that of 50 percent, the smart city projects are now picking pace as a channel to help boost the living standard and enhance economic development as well as better utilization of the resources. (United Nations, 2019).

India is the country with massive population and one of the rapidly developing economies in the world embraced the idea of smart city by introducing its flagship urban transformation program that is known as Smart City Mission and was initiated by Indian government in the year 2015. The main objective of Smart City mission is to transform the hundred Indian cities into the smart cities, and in this respect the focus would be on the main aspects of sustainable urban development and infrastructural development besides the digital integration, and hence these smart cities are not only technologically developed, but also are the people friendly urban centers (Ministry of Housing and Urban Affairs, 2021). The focus of transformation process is

on the key areas which includes, water and energy management, smart governance, waste disposal system, efficient transformation along with economic growth through innovation-driven industries. Kanpur city that is a commercial and industrial hub of Uttar Pradesh, in this framework has marked as one of the cities which is undergoing with the significant urban transformation under the Smart City Mission.

Kanpur often referred as 'The Manchester of the East' because of its thriving textile along with leather industries is being a strategic hub of learning, trade and industry. However, as the time passed, urban center grappled with numerous challenges which includes, pollution, inefficient urban management, over population and inadequate infrastructure. And therefore, the necessity of the great city change is the necessity of the hour, because city's rapid expansion has outpaced its infrastructural capacity along with deteriorating air and water quality, traffic congestion as well as challenges in the waste management. As an answer to this the Kanpur Smart City Mission has focused on the projects that aims to modernize the transportation network, enhance the digital governance, improve the waste disposal mechanism as well as promote sustainable urban development (Kanpur Smart City Limited, 2022).

In spite of these initiatives of the Kanpur Smart City Mission, the Kanpur city conversion to a smart city has not been easy at all. Obstacles including bureaucratic hurdles, financial constraints, resistance to change as well as gaps in the public awareness has hindered in the seamless execution of the smart city projects. Moreover, with the aim to bring about the true urban transformation not only one require the infrastructural advancement but also equally the active involvement of the community. The present research does not only critically analyse the Kanpur Smart City Mission's initiatives but has also evaluated their effectiveness, impact along their long-term sustainability.

The research is conducted using an analytical approach to explores the key policies and the governance mechanism along with infrastructural development that shape the Kanpur city to transform into a smart city. The study also brings attention to socio-economic implication of these challenges by addressing the questions which includes, whether these initiatives of Kanpur Smart City Mission has enhanced economic opportunity for citizens, do they improved the standard of living, have they judiciously utilized allocated fund for initiatives of Smart City Mission and many more. Additionally, this paper evaluates the lesson learnt from the progression of urban transformation of Kanpur city with the aim of providing the insights into how other cities across the globe can navigate the complex process with the aim of becoming smarter, more efficient along with more liveable urban centre.

By the comprehensive assessment of the Kanpur city's progress, this research study aims to enrich the ongoing present debate of the urban transformation which is taking place in India by providing the policy recommendations as well as actionable insights that can assist in the achievement of the Smart city objectives for the country on a pan-India level.

Literature Review:

In 21st century the smart city concept has witnessed increasing adoption because of the reason that urban regions all over the globe is confronting a variety of challenges which includes technological integration, inefficient resource management, environmental degradation as well as population growth. Kanpur city, both industrial and commercial centre of the Uttar Pradesh state is one of the cities that have been included in Smart City Mission that was initiated by Indian government in the year 2015. The specific case of Kanpur's journey towards becoming a smart city, whether it is theoretical foundation of the smart city as well as the evolution of the urban transformation is all of which the literature review explores.

- ***The theoretical base concerning smart cities***

The idea associated with the smart city is based on the integration of the sustainability and governance along with technology to raise the standard of living of residents. A smart city is the one which invest in the social and also human capital, promotes the participatory governance while also aiming to improve economic and environmental sustainability, uses technology, according to Caragliu et al. (2011). Similarly Batty et al (2012), also highlighted the important role associated with the internet of thing (IoT) as well of data driven decision making in order for creating efficient urban systems. And hence these basic studies stress on the critical role of governance along with technology in shaping of the smart cities.

- ***Smart City Initiatives along with Urban Transformation in India***

Indian Smart City Mission has identified a goal of making 100 cities to be smart cities by integrating sustainability, infrastructure and technology. According to Kundu (2014), socio-economic disparities, poor infrastructure along with poor governance are key challenges that hamper the urban transformation in India. According to (MoHUA, 2015), the critical issues in development of Smart City Mission of India will overcome through the involvement of citizens and also public-private partnership. The Kanpur city that is industrial as well as commercial hub provide a unique lens to evaluate such dynamics.

- ***Kanpur Smart City Missions Initiatives***

The proposal of Smart City Mission of Kanpur focuses on digital governance, waste management, transportation along with water supply. Key projects related to the development of Smart City Mission of Kanpur are rejuvenation of Ganga river-front, building of integrated command and control centers as well as smart water metering as per the report of Kanpur Smart City Limited, 2018. These initiatives combine with the larger objectives related to the development of Smart City Mission which drives the citizen centric development along with the environmental sustainability.

- ***Kanpur City and Its Challenges as well as the Urban Evolution***

Kanpur city which is also called as the Manchester of East is also facing lot of pressing urban challenges which include socio-economic inequality, pollution as well as inadequate infrastructure. The problem of Kanpur city being hit with the industrial decline and environmental degradation are co-related. Though technological innovation along with sustainable urban planning is what Smart City Mission brings forth in revitalization of Kanpur for fulfilling these challenges.

- ***Smart City Developments in Critical Perspective***

Since the idea of Smart City Mission is promising, the critics claim that Smart City Mission tend to place the emphasis on technology on top and above of the social equity. As per Datta (2015), Smart City Mission of India has aggravated the risk by pronouncing on the difficult areas as well as neglected the marginalized community and thus this is increasing the existing inequalities. Concerns have been raised at the inclusivity of the initiatives of Smart City Mission and their impact on the informal settlements specially in the case of Kanpur as per (Bhan, 2019). And hence the critiques emphasize the need for balanced way instead, which will integrate the technology with the social justice.

The literature of urban transformation as well smart cities gives us valuable insights of the challenges as well as opportunities of Kanpur City's journey to become a smart city. In the context of Smart City Mission, the infrastructural development along with technological innovation are important as well as crucial, but ensuring

inclusive growth also remain critical for its overall success. The focus of the future research should be on examination of implementation as well as impact of the initiatives related to the development of Smart City Mission in Kanpur with an emphasis on social equity and environmental sustainability.

Research Objectives:

Present research includes the following objectives:

1. To explore the present strategies and plans which has been established by the government to transform Kanpur City to a Smart City.
2. To determine the effectiveness of such government tailored made strategies and programmes to transform Kanpur City to a Smart City.

Materials and Methods:

To achieve the research goal, both secondary and primary data shall be utilized.

Primary Data: In order get the public feedback, sample amounting to 100 citizens from the city of Kanpur Nagar in Uttar Pradesh has been surveyed. Through structured questionnaire along with interviews primary data were collected. One hundred residents of various municipal areas of Kanpur City were given the questionnaire in a bid to obtain information on their perception towards the development initiatives of the Smart City.

Secondary Data: Review of the official documents which includes, policy frameworks along with reports which are directly related to the Smart City Mission of Kanpur. This includes: plans and progress reports of Kanpur Smart City Mission, government publications on smart cities, academic articles as well as case studies.

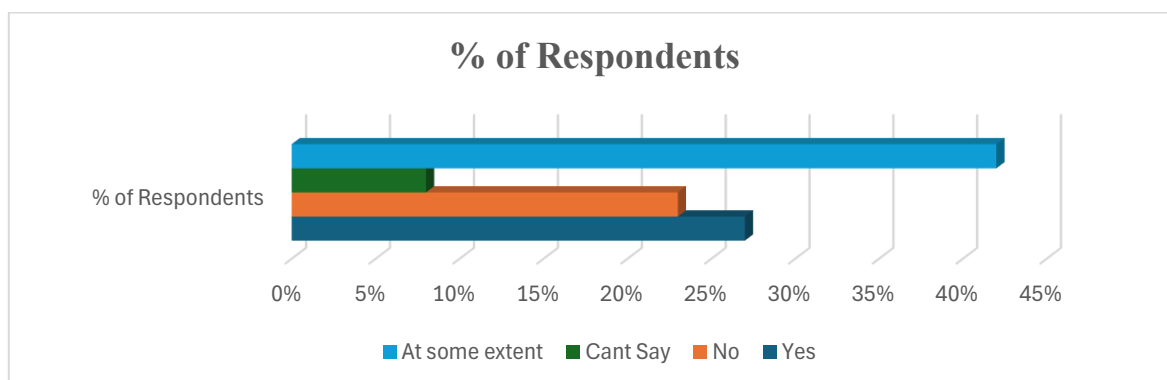
Data Analysis: The study targets to find out the plans as well as policies which are being tailored for the urban development and also to find out the effectiveness of those in delivering the intended transformation. A combination of descriptive as well as field surveys is what the research methodology adopted.

Results and discussions

Question No. 1

Are the policies as well as strategies designed for the urban transformation effective in shaping the smart city?

Figure-1



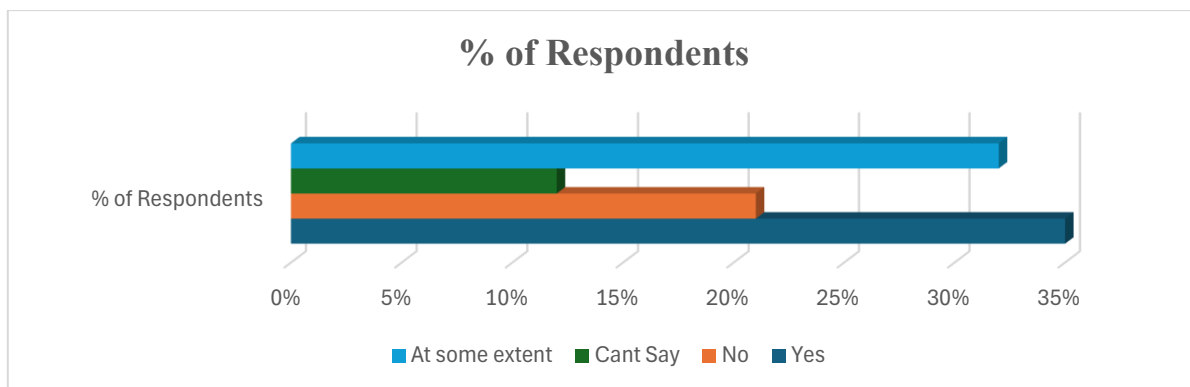
Source: As per Survey done by researcher

When surveyed, the findings indicate that in this question, about 27 respondents answered that the strategies and policies of urban transformation were well implemented and effective. However, there were around 23 respondents who strongly denied this claim which indicated that these policies appear to be not sufficient and effective to develop a smart city in Kanpur. On the other hand, around 42 respondents left no doubt, meaning that these policies may be suitable, some 8 were unaware of the issue and so could not offer an opinion.

Question No. 2

Is the Kanpur city's transformation being acknowledged?

Figure-2



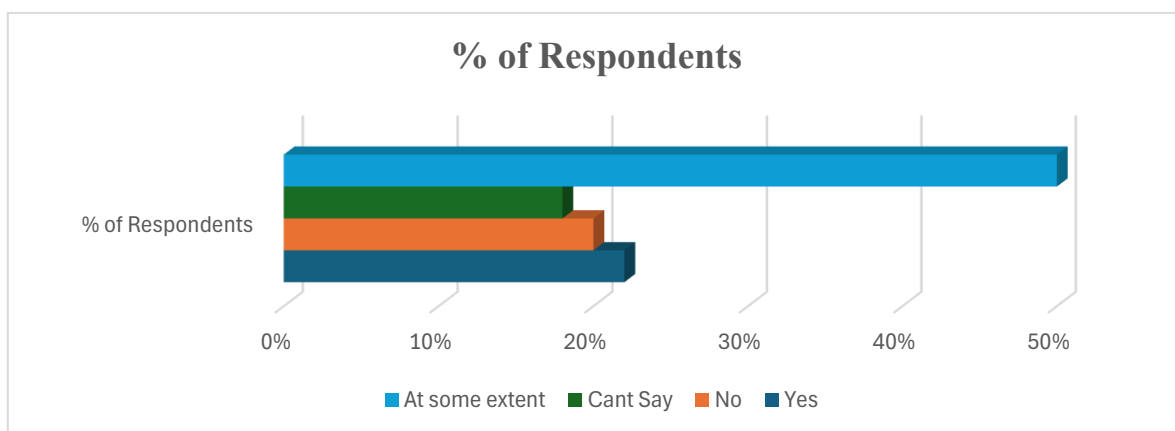
Source: As per Survey done by researcher

When surveyed, the findings indicate that in this question, about 35 respondents agreed that the transformation of Kanpur is being recognized in various parameters. Conversely, total of about 21 respondents expressed that they disagreed, stating that in their view there is no substantial transformation which will be regarded as evident. Approximately 32 respondents were unclear and hesitated to form a definite answer, and some around 12 respondents lacked awareness and could not comment.

Question No. 3

Are the allocated funds adequate for transforming cities into the smart cities?

Figure-3



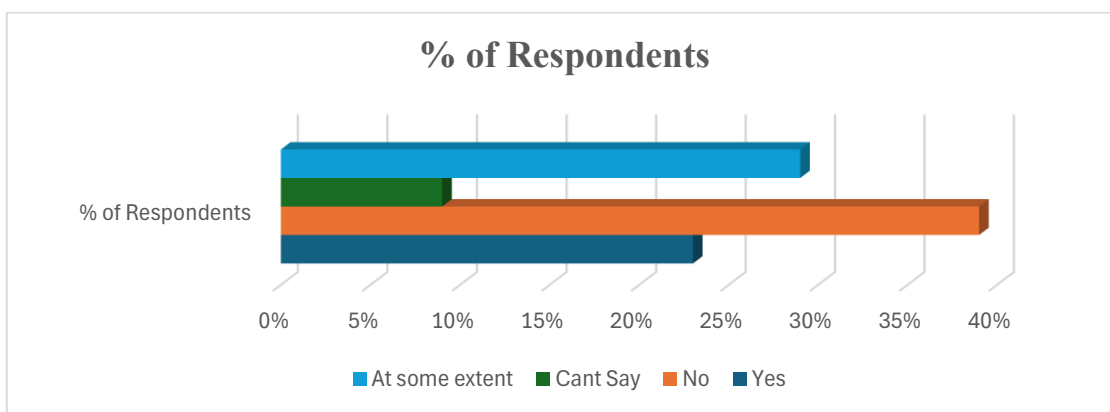
Source: As per Survey done by researcher

When being surveyed, the findings indicate that in this question, about 22 respondents agreed that the allocated funds for Kanpur's transformation to smart city are sufficient. In contrast, some 20 of the respondents ensured that the amount sanctioned to carry out the transformation for the development of the city is not sufficient. Nonetheless about 50 respondents still believed that the funds allotted can be adequate whether used judiciously. About 18 participants answered about not being aware of this and, therefore, were unable to give opinion.

Question No. 4

Are the sanctioned funds for the city transformation into the smart cities being utilized effectively?

Figure-4



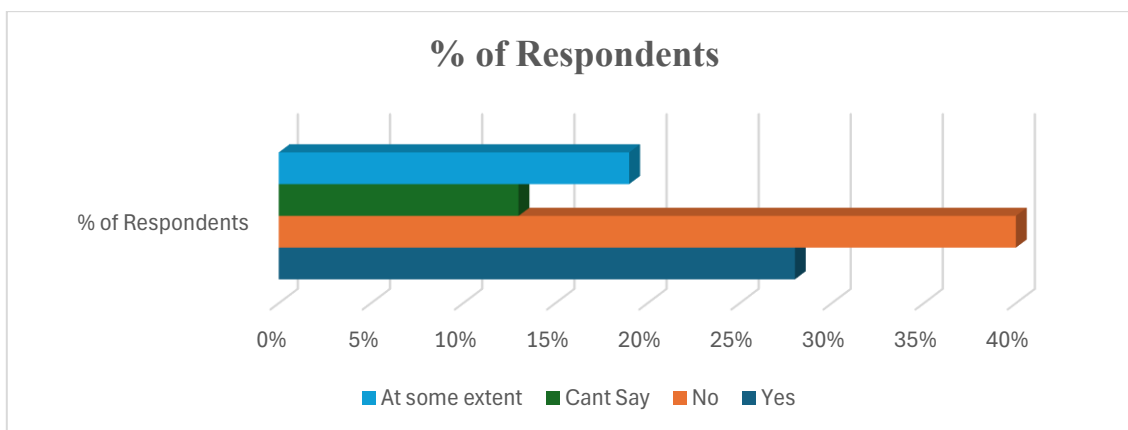
Source: As per Survey done by researcher

When surveyed, it was found out in this question around 39 people believed that the funds allotted were not utilized judiciously. On the other hand, about 23 respondents were of the opinion that the allocated funds were utilised put judiciously. However, around 29 respondents were not sure if the allocated funds may be used judiciously. Around 9 of the respondents confessed they lacked knowledge on this matter.

Question No. 5

Are these policies and as well transformations actually contributing well to the nation's economic growth?

Figure-5



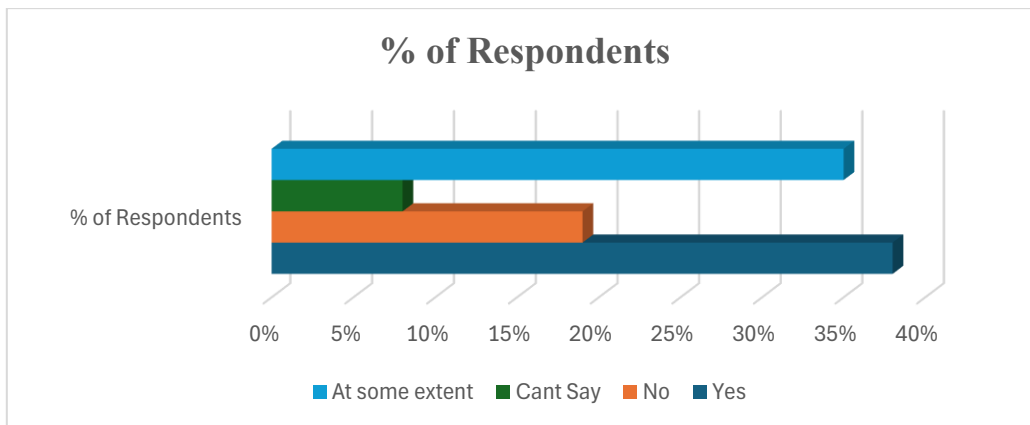
Source: As per Survey done by researcher

When it was surveyed to know this question, about 28 respondents agreed that these policies contribute to the economic development of the nation. On the other hand, about 40 respondents disagreed with that belief, stating that they don't see any significant impact. Approximately 19 participants were uncertain, indicating the possibility of the above policies to contribute to the economic growth of the nation. Roughly 13 respondent admitted lack of knowledge regarding this matter.

Question No. 6

Is the standard of living for citizens in the Kanpur city getting better?

Figure-6



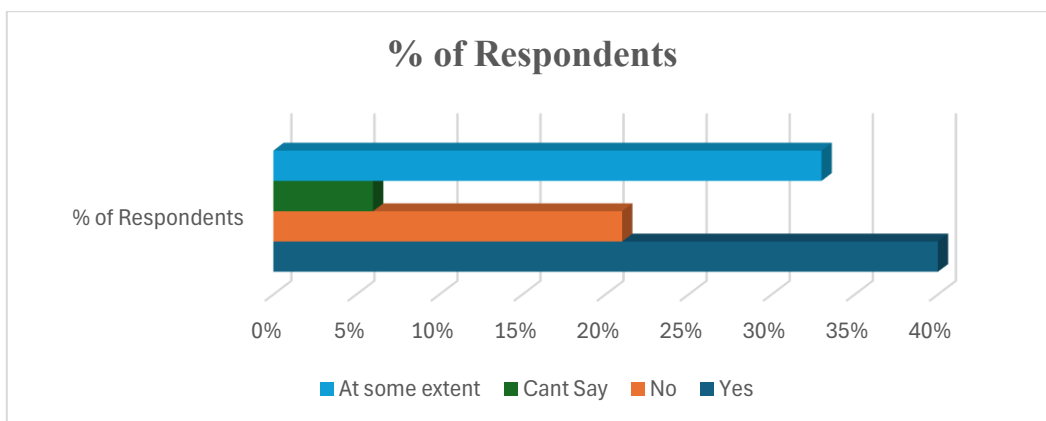
Source: As per Survey done by researcher

When asked in a survey regarding this question, the findings indicate that the percentage who backed this argument was about 38 percent, people in Kanpur now have their standard of living better than before and people are leading their daily life well now. In contrast, there were some respondents, about 19 percent who didn't agree and said a significant improvement has not occurred. Approximately, 35 participants agreed to the fact that these changes have affected the living standards of the residents of Kanpur to some extent. Around 8 respondents confessed about the lack of knowledge of this issue.

Question No. 7

Have the fundamental facilities in the Kanpur city been enhanced?

Figure-7



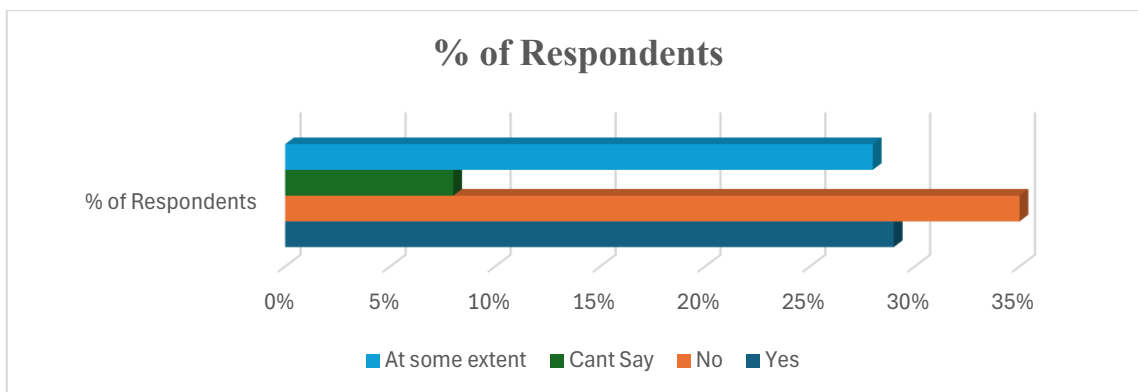
Source: As per Survey done by researcher

When surveyed it was found that in this question around 40 participants agreed to the fact that fundamental facilities available in Kanpur has improved. On the contrary, around 21 participants are of the view of not having substantial improvement in the basic facilities of Kanpur. About 33 respondents recognised some level of improvement resulting in a slightly more comfortable environment. Around 6 participants accepted to the fact of having lack of knowledge on this matter.

Question No. 8

Is Kanpur now recognized as a smart city?

Figure-8



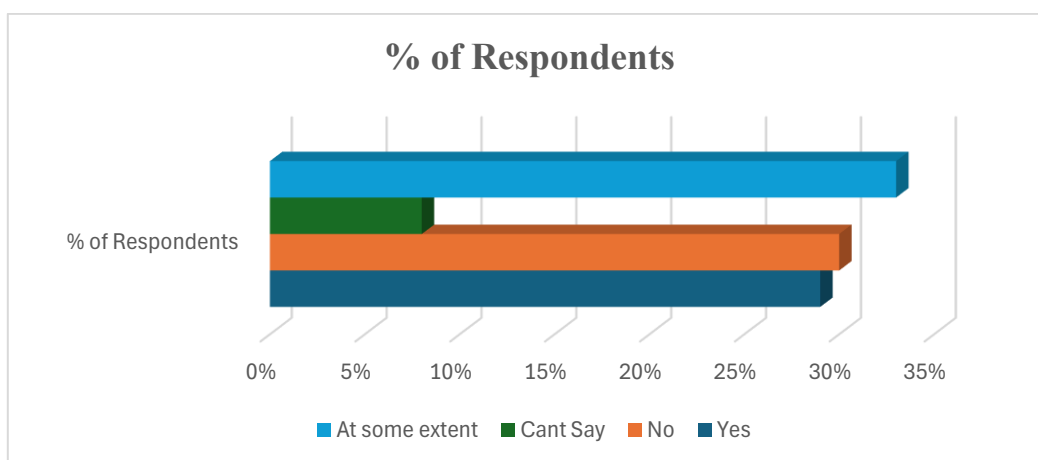
Source: As per Survey done by researcher

When surveyed, it was found that in this question, around 29 respondents agreed that Kanpur can now be recognised as a smart city, owing to the improvements done in the infrastructure and facilities. On the other hand, around 35 of them said that the amenities available today are not sufficient to call Kanpur a smart city. Approximately 28 respondents had felt that argument has some validity to some degree and roughly about 8 respondents had admitted lack of knowledge about this issue.

Question No. 9

Are the smart cities contributing to the educational advancement of women as well as girls?

Figure-9



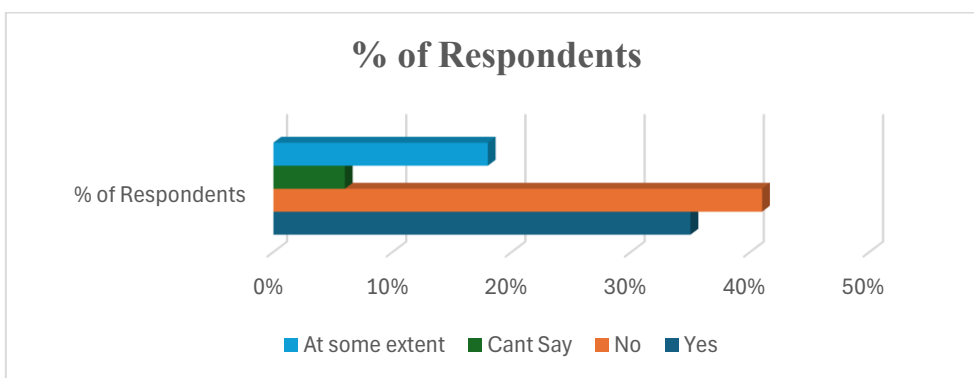
Source: As per Survey done by researcher

When surveyed one of the questions asked was that is advancement in education is improving for girls and women in Kanpur 29 agreed this answer. Contrary to this around some 30 respondents who disagreed, accepting to the fact that there has been no noticeable change in the education sector with regards to women and girls. Approximately 33 participants agreed to the fact that some sort of improvement has taken place, where a slight improvement in the education system. 8 respondents confessed that they lacked knowledge in this regard.

Question No. 10

Is the smart city transformation enhancing the medical facilities?

Figure-10



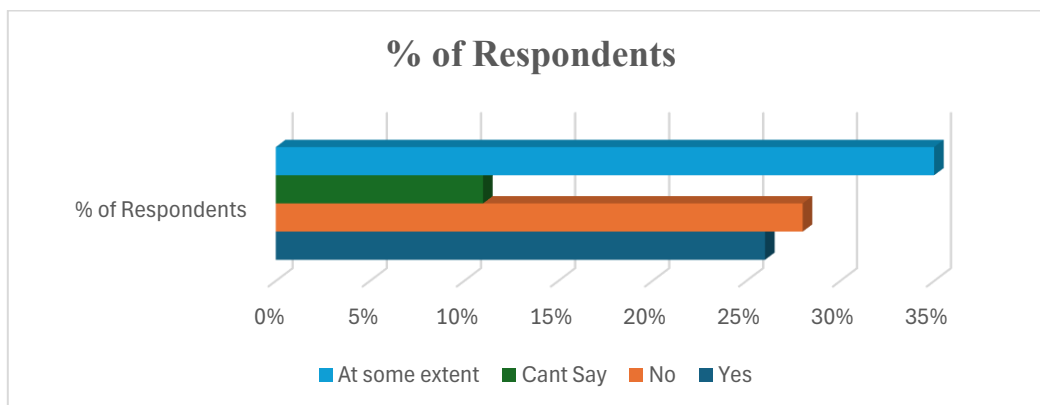
Source: As per Survey done by researcher

When survey was conducted on this question, the findings indicate that in this question about 35 participants has accepted to the fact of some kind of enhancement that has taken place in the medical facilities in Kanpur. On the other hand, around 41 of the respondents didn't agree regarding this, given that no significant improvement has occurred in the area of healthcare. About 18 of the respondents feel that there is improvement to some extent in the healthcare sector. Around 6 of these respondents admitted lack of awareness on this matter.

Question No. 11

Do the smart cities have adequate provisions for the elderly individuals?

Figure-11



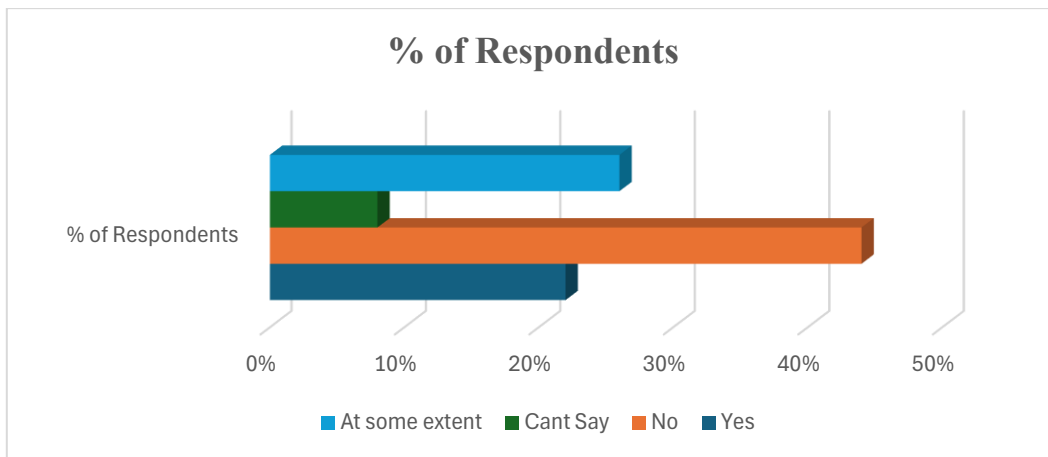
Source: As per Survey done by researcher

When survey was conducted, it was found out that in this question, 26 respondents were in the agreement list of the questions that Kanpur is adequately equipped with the facilities for elderly persons. Contrary to this, 28 respondents disagreed and said that the city continues to face a shortage of essential facilities for the senior citizens. Approximately 35 of the respondents had no opinion, and admitted that facilities for the elderly persons might be present or absent. Around 11 respondents admitted their lack of knowledge on this issue.

Question No. 12

Are the safety measures in the smart cities adequately protecting women and children?

Figure-12



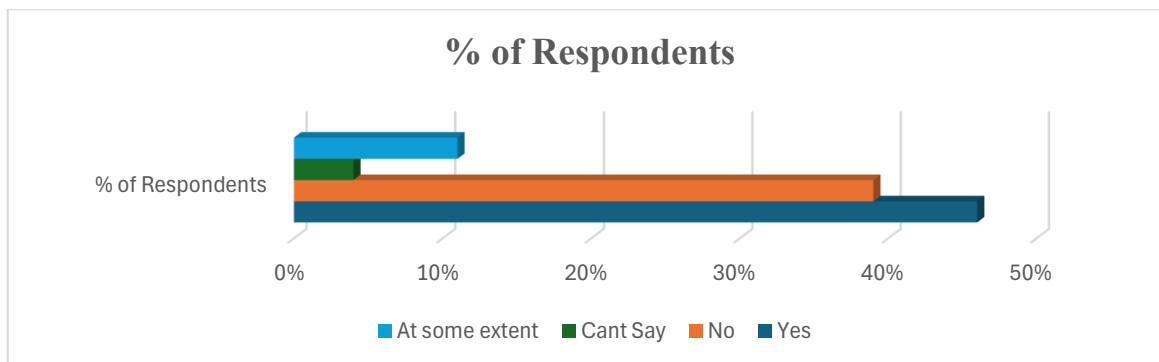
Source: As per Survey done by researcher

When the survey was done on this question, it was found that in this question around 22 people agreed that provision regarding women and child safety in Kanpur is adequate and security measure has improved. On the contrary, there were 44 respondents who roughly disagreed stating to the fact that the required safety standards have not been improved and are still not good enough. An estimated 26 participants agreed to the fact of having certain improvement in safety measures, but it was not satisfactory. Around eight respondents admitted that they lacked knowledge in this regard.

Question No. 13

Have the facilities for electricity and also water supply been enhanced?

Figure-13



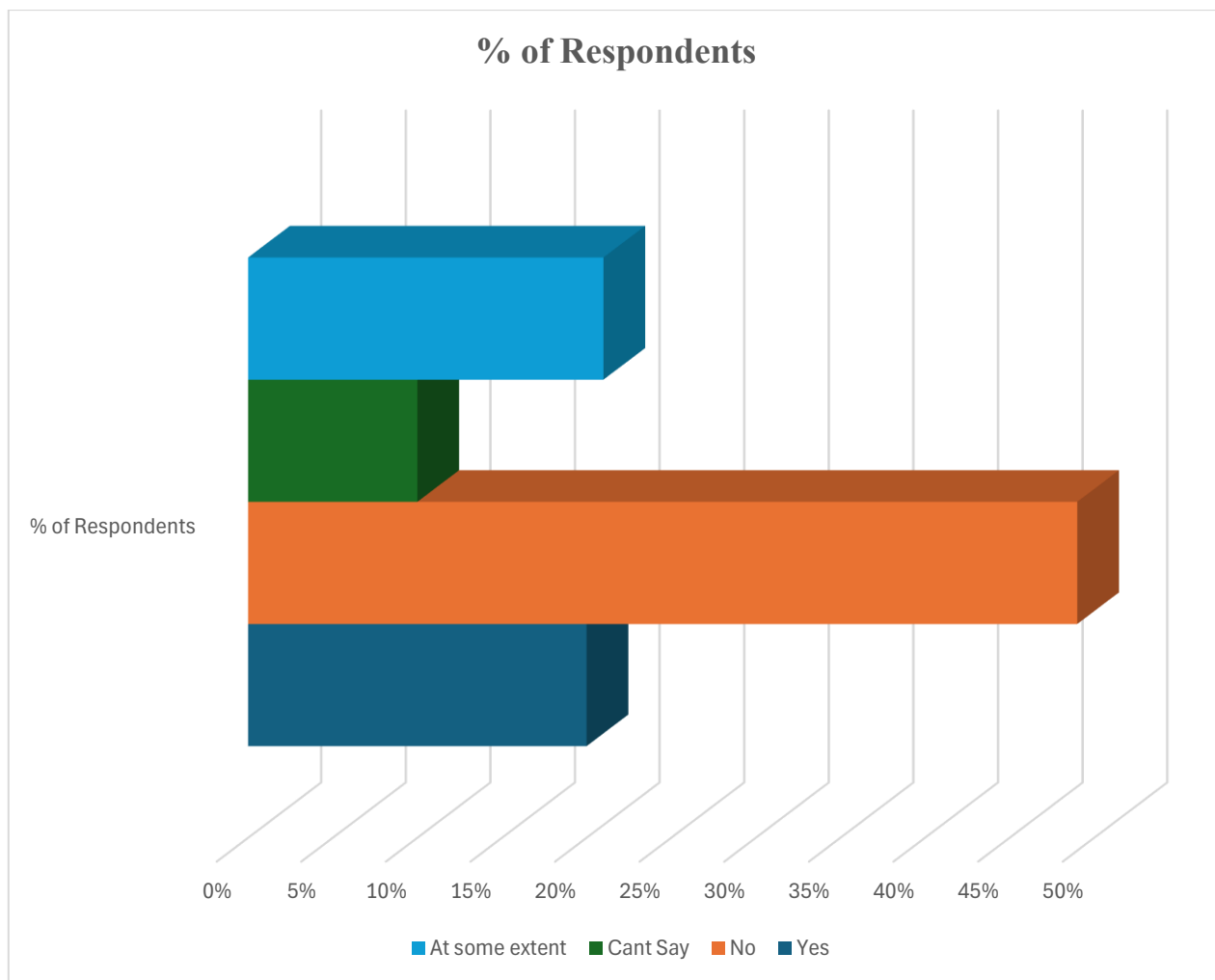
Source: As per Survey done by researcher

When surveyed it was found that around 46 respondents about this question agreed that water supply and electricity facilities in Kanpur have improved. Contrary to this about 39 answerers who disagree to the fact that there is not much advancement that is made when it comes to these vital services. About 11 respondents were unsure and the implication is that there could be some level of improvement. Only 4 respondents indicated that they do not know on this issue.

Question No. 14

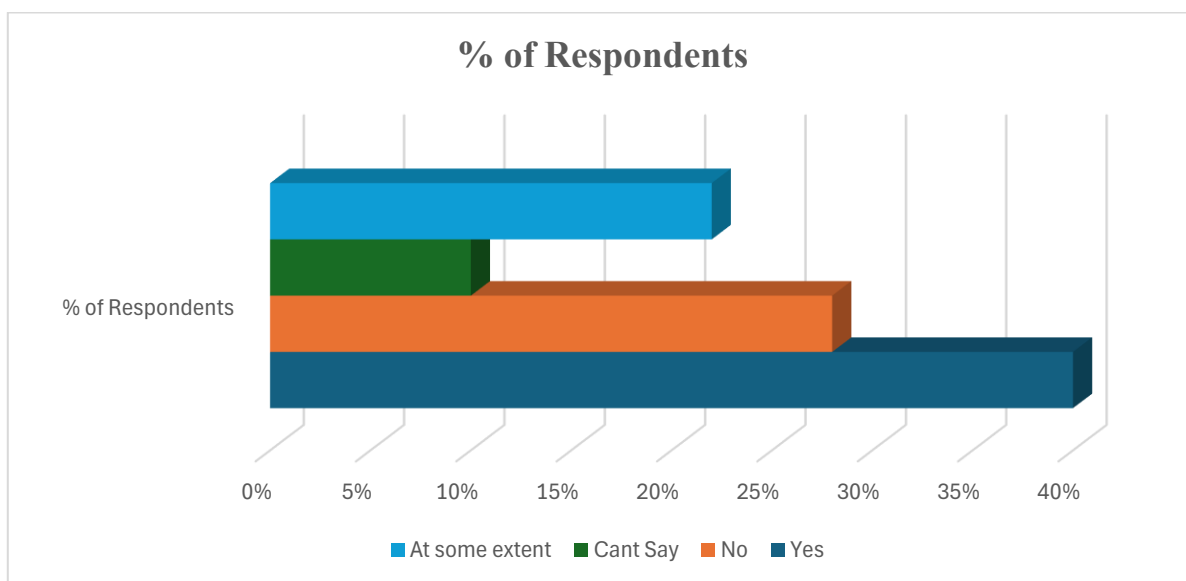
Has the issue of the waste management been resolved?

Figure-14



Source: As per Survey done by researcher

When a survey was conducted on this question, the findings indicate about this question that, around 20 people agreed to the fact pointing to the presence of a resolution of waste management problem in Kanpur. On the contrary, almost 49 of the respondents vehemently disagreed the aforementioned statement, and said that the management of waste is a continuous challenge to the city. Approximately 21 respondents were in the position of not being sure and took a neutral position, i.e., the problem of waste management has been solved or not been. Around 10 participants agreed of having lack of knowledge on this matter.

Question No. 15**Have the employment opportunities in the Kanpur city expanded?****Figure-15****Source: As per Survey done by researcher**

When surveyed, it was found that in this question, about 40 people said that employment opportunities in Kanpur have increased and indicates a positive trend in relation with job availability. However, there were around 28 people who disagreed to the fact that there has been significant improvement in the employment sector of the city. About 22 participants agreed to the fact of positive growth in job opportunities to some extent. Around 10 respondents entered no response indicating lack of knowledge on this issue.

Conclusion

The transformation of Kanpur under Smart City Mission is a multidimensional and complex process which is a proof and progress achieved with the constant efforts over the time. The results of the research findings direct that in spite of some improvement in governance and infrastructure, public opinion towards the importance of these initiatives is deeply divided. A huge portion among the inhabitants appears to be satisfied and sees improvement in various areas like employment opportunities, supply of water and electricity and other necessary services. Nevertheless, huge scepticism is found on allocation of funds, adequacy of policy frameworks and overall path towards making Kanpur a fully functioning smart city. The assorted responses received from the survey therefore calls for the necessity for inclusive approach as well as participatory way of working on urban development where residents are highly engaged and well-informed during the procedure of transforming the city.

Regardless of the strategies that have already been implemented by the government, there are number of critical issues that need to be addressed. Among residents include healthcare infrastructure, public safety, waste management and the elderly tremendous needs. The failure to make best use of allocated funds for smart city initiatives brings in the other round of problems and here the need is for proper strategic planning and financial responsibility. Small growth has been achieved in terms of economic opportunities, the cumulative effect on living standard as well as financial development is the subject of discussion. Consequently, according to the research findings, it is visible that while some changes, induced by the Smart City Mission of Kanpur,

have taken place yet the promise of providing a citizen-friendly, sustainable, and technology-driven urban environment has not been delivered.

In order to be more long-term successful, the Kanpur Smart City Mission should focus on effective governance, citizen participation, and a continuous evaluation of the implemented policies. Further, to bolster some of the dimensions in the effort for urban transformations, efforts must be boosted in terms of digital governance, socio-economic inequalities, allocation of resources. The lessons that could be learnt from Kanpur's efforts to become a fully functioning smart city could turn out to be rich sources of learning not only to the Indian municipality but to other cities that are making the same transition around the world. A vision of a transparent and holistic approach at multiple levels integrated with community driven development and development of technological advances, is what holds the potential for the actualisation of the vision of a truly smart, inclusive and sustainable urban future.

Funding statement

There were absolutely zero grants from any kind of public, commercial or not-for-profit agency whatsoever.

Clinical Trial Number

Clinical trial number: not applicable.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent to Publish

Informed consents were secured including 'Consent to Publish' from all the participants that were part of this study. Specially for all those participants which were below the age of 18 consent was provided by their parent and/or legal guardian in accordance to the ethical standards.

Consent to Participate

Informed consents were secured including 'Consent to Participate' from all the participants who participated in this study. Specially for all those participants which were under the age of 18, consent was provided by their parent and/or legal guardian in accordance to ethical standards.

Ethical Approval and Accordance

The requirement of the ethical approval for the current study was waived by the Institutional Ethics Committee, Chhatrapati Shahu Ji Maharaj University, Kanpur, India, in accordance with the Declaration of Helsinki. The study involved interviews related to urban development perceptions, and informed consent was obtained from all participants prior to data collection.

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