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Regional Budgetary Allocation for Smart City Mission in India

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Abstract

Decentralization of Urban local Bodies have been empowered with up-gradation of their respective core nodal centers. With intensive competition among states, the economy is flourishing with a positive correlation between urbanization and prosperity. India experiencing exponential demographic growth the motivating signal is through renovation from smart growth to Smart City Mission, which has reinforced the possibility of application of technology willingness. To widen the ability towards up-gradation of technology, Induced investment from the central government is financed through Centrally Sponsored Scheme. The study would examine the trend of budgetary allocation and funds received by various cities among the chosen states. The paper would also attempt to evaluate various design framework for sustainable city development. The paper aims to find equity in budgetary allocation, secondly, to examine the governance and participation of smart cities, finally to analyze indicators to smart city development.

Keywords*: Budget, sustainability, smart city, schemes*

I.INTRODUCTION

The smart city mission initiated in the year 2014 gave a boost to the competing states. However, all cities could not avail of the opportunity in the competitive race. Urbanization in India is very steadfast towards technology up-gradation make the citizens living to a quality life. Among the 100 cities planned and chosen at a given time were able to get the attention of the center in acquiring the allocation of funds. The formula gives equal weightage (50:50) to the urban population of the State and Union Territories and the number of statutory towns in the State and Union Territories. The number of potential Smart Cities from each State and Union Territories has been capped based on the allocation of funds under the Atal Mission for Rejuvenation and Urban Transformation AMRUT. A crucial purpose behind the shortcoming of the ULBs is their restricted ability to fund-raise through tax collection or other government income plans. Setting up an institutional system for well-working urban help conveyance has demonstrated trying for India.

II.RELATED WORK

Review of Literature

Gordon Falconer Shane Mitchell (2012) Smart city framework, Cisco is contributing to the Connected Urban Development which demonstrates the reduction of carbon emissions through ICT. But this mission does have some strings attached such as these private and public sectors do not understand how each sector works within the context of city development and operations. Experts and academics think about the "why" at great length, while technology companies and consultants focus on the "what." Overall, less time is spent discussing the "how," which ironically is where city leaders need the most assistance. Some of the easiest ways through which Smart cities implementation can be started is with the support of the government, to

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work more closely with the private sector and lastly work more on solving the "how" than the why.

Sotiris Zygiaris(2012), Smart City Reference Model: Assisting Planners to Conceptualize the Building of Smart City Innovation Ecosystems, the creator has examined that urban communities come in various shapes and sizes, his model could be received and used in a scope of shrewd approach ideal models that grasp the green, broadband, and urban economies. Manageability challenges in a nearby setting. savvy city organizers could utilize the reference model to characterize the calculated design of a brilliant city and portray the shrewd advancement attributes in every last one of the six layers. Shrewd urban areas, for example, Barcelona, Edinburgh, and Amsterdam are analyzed to assess their aggregate concerning the Smart City Reference Model.The creators' applied model is proposed to synchronize and advance the city's interests in green and broadband economies. It likewise gives a typical comprehension among brilliant city partners of venture needs. The examination of basic city's assets that will add to its preparation to brilliant vision is a pivotal fundamental arranging step. The results of this exploration could be used by savvy city organizers to forestall impractical speculations and to expand upon the socio-specialized complementarities in the shrewd city strategy. Execution markers ought to be investigated for supportability as well as for competitiveness, employment age, battle against neediness, social partitions and that's just the beginning.

Noriyasu Ninagawa (2018) Smart City Initiatives driven by local startups, the author explains the various faces to a Smart City, where an entrepreneur with a start-up to address various social challenges and providing solutions, for example, a US-based company Y developed and offers solar-powered, sensor-equipped waste and recycling stations, which not only compresses and reduces the waste but also indicating in which stations the waste would be collected. Start-ups face a lot of challenges concerning finding a large place to test their prototype, data constraints, and most importantly support from the government. In addition to traditional measures to solve these problems (i.e., development of infrastructure), fast and low-cost solutions are needed. Building Smart Cities through open innovations can be applied to cities not just in developed countries but also in emerging countries. And more urban challenges would be solved through open innovations.

Louis Celi Daniel Miles, (2018) Smarter Cities 2025, in this report, they have assigned a smart city maturity score, based on some parameters such as level of investments, use of data analytics, etc. Once the overall score was derived the cities were classified into three main categories, beginner, transitioning, and leader. The model also found that as cities were adapting to this transformation, they were able to better reap the benefits of investments concerning technologies and systems. The 10 pillars for the success of smart cities are mentioned in the article, where each pillar is very crucial for the economy.

Rumi Aijaz and Kristian Hoelscher (2016) Challenges and opportunities in an urbanizing India, based on India's Smart Cities Mission: An Assessment Indian cities and their peripheries are bustling with people and activity. The launch of the Smart Cities Mission in June 2015 is seen as yet another attempt at enabling better living conditions and achieving higher economic growth in some 100 existing cities. An outlay of INR 48,000 crore (US$ 7.4 billion) to be spent over five years (2015-16 to 2019-20) has been approved by the central government for this purpose, which would describe the planning and financing strategy. Further, creators have suggested that strategy of creating town and urban areas, method of reasoning for choice of a region inside the city, City plans must address hazy areas, for example, arrangement for social and social practices, needs of poor people, casual and transient laborers, and so on income

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model, necessity and difficulties of existing civil establishments.

Regal Danish Embassy, India (2016)Smart Liveable Cities in India,Opportunities for Danish Companies, the obligation regarding money related administration and conveyance of essential administrations is divided across various offices, which are frequently not considered responsible and have scarcely any impetuses and assets to team up and perform well. As saw by the Planning Commission, as of recently, urban arranging in India has to a great extent been restricted to the arrangement of essential administrations to a disordered urban spread. There has been an absence of a progressively coordinated way to deal with cutting edge urban necessities.

Mahendra (Sethi, 2015) Smart Cities in India: Challenges and Possibilities to accomplish Sustainable Urbanization. With the greater part of the world's mankind currently living in urban regions, it is apparent that the way to feasible advancement must go through urban communities. Henceforth with the ongoing declaration of 100 new shrewd urban communities, the Government of India has deliberately reacted to both the universal and the local crowds. The creator examines on Government of India's approach or the Guidelines, audits the individual brilliant city proposition and investigates the methods for their powerful usage. The article unveils that, inspite of having no globally acknowledged meaning of a Smart City and a national urbanization arrangement in India, the smartcities idea anyway holds massive potential to accomplish numerous advantages of maintainability, frameworks proficiency, financial development, participatory administration and better personal satisfaction. While techno-monetarily, a Smart city doesn't appear to be quite a bit of an issue, the greatest test is to intertwine it with the current urban, administration and social texture of the nation. This could be satisfied successfully if 100 new Smart urban areas activity centers around economical urbanization, great administration, straightforward measurements, and announcing, and to wrap things up keeping individuals at the cutting edge.

Shrimoyee Bhattacharya, Sujaya Rathi, Sonali Anusree Patro, Niepukhrie Tepa(2015)Center for Study of Science, Technology and PolicyRe-conceptualizing brilliant urban communities, A reference structure for India have examined that there is nobody 'size fits all' model for shrewd urban areas that can be repeated in India. This report contends that the bigger thoughts of manageability and great administration incorporate the larger objectives of brilliant urban communities over the globe. Innovation, particularly Information and Communication Technology (ICT) is a significant empowering influence in achieving supportability and great administration.

Research Questions

Based on UN announcement have the policy decision-makers been able to do justice to allocation criteria. In the allocation of seat capital based on the competitive grounds are their been equity, justice, and efficiency in the allocation of resources?. At the beginning stage of smart city adaptation has all cities been able to gain equity in distribution? Is the inclusiveness among all states benefited respective cities? Smartness adapted by gainful cities transparency of information on data availability is it complete or incomplete? Measurement of sustainability assessment is based on performance indicators from the fundamental heritage layer of city participation, interconnection layer of a growing population, instrumental governance layer, Integrative digital availability layer, with digital settlement layer, has outpaced growth to smart adaptation.Layersexplain the smart environment in India. It is a smart city in India at the initial stage, transforming stage and in the Leadership stage.

For the individuals and benefit to be coordinated, the planet ought to be maintainable. Since the elements

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of urban areas are mind boggling in data stream, the leap forward of the idea rose up out of 1992, basically determined by organizers, engineers, network activists, and noteworthy preservationists. The idea suggested that the centralization of development in a city happens in a reduced (blended land-use and minimized plan) and walkable urban focuses (scope of transportation and lodging choices), where the network partakes in settling on improvement choices that are reasonable, unsurprising and financially savvy (feeling of network living). This idea increased massive notoriety during the 1990s however bit by bit blurred away, and another idea called "Insightful Cities" rose. Savvy urban areas included how information and data innovation could affect the manner in which urban areas work. From these discussions on savvy development and canny urban areas, the possibility of a 'Shrewd City' rose. A significant part of the talks simultaneously additionally originated from 'canny' and 'savvy' ventures, (for example, IBM, CISCO, and Siemens). Other innovation mammoths like Hitachi and Microsoft likewise thought of 'brilliant' advancements for urban areas. The Massachusetts Institute of Technology (MIT) research centers likewise added to this discourse.This period saw extraordinary cuts in urban accounts and social welfare and looked for the help of the private part to offer open urban types of assistance (Paroutis, Bennett, and Heracleous, 2014)

Research Gap

Several articles and cases have discussed technical aspects and framework, however, studies on the investigation of responsible investing and performance of smart cities have not been made so far.

Conceptual Model

With imaginary mapping based on identified variables, a study was designed to propose the stake layer concept model. Recognizing center's responsibility of investment variables likeconducive open technology, demography, local government, electricity,digital payment based on digital availability, each of these indicators has a spillover effect with seed fund for cities to grow.The stack layer integrity model, emphasizes the horizon of outer growth. Induced seed funding could influence the inclusion of induced ICT Investment with urban local bodies,to induce capability in building a smart grid and this could enhance capacity building with smarter widespread.

III.Objectives of the study

- To find equity in the allocation of funds by decision authorities to chosen smart cities.
- To examine the relationship between governance and participation of cities.
- Toanalyze the association among chosen indicators towards the performance of smart cities

Hypothesis

- Null Hypothesis: Seed funding is not affected by the independent variable
- Alternative hypothesis: Seed funding is affected by the independent variable.

Methodology

The study has chosen secondary data sources mostly taken from government websites, literature studies from journals and white papers. From the list of 100 smart cities, asample of 25 cities has been chosen from the catalog, as per study objectives smart cities in India were identified. The data has been analyzed with the help of multiple regression analyses using E-Views software. The variables indicated for analysis are an initial investment, consumption of electricity, governance, total population, technology, and digital payment, local government revenue, and expenditure.

Analysis

The study has discussed and analyzed applying Multiple Regression Equation: framed equation sequence reveals the way the dependent variable is influenced by the various chosen independent variable as mentioned in the methodology,b1x1+b2x2+b3x3+b4x4+b5x5+b6x6+

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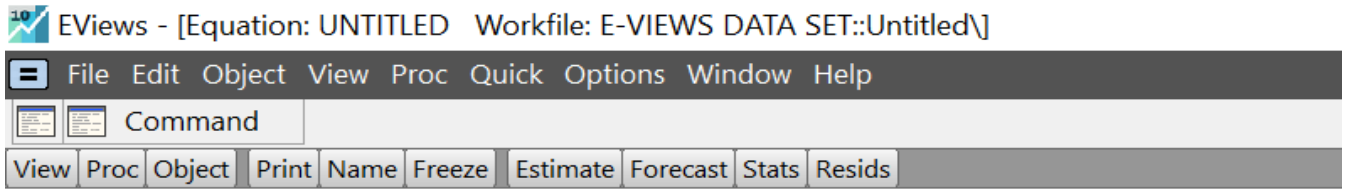
b7x7+c. The b's the regression coefficient given in the following snapshot for each variable, it represents the value at which the creation value (independent variable) changes when the predictor value changes (dependent value).



Dependent Variable: CAPITAL_PROVIDED_IN_3_YEARS
Method: Least Squares
Date: 09/03/19 Time: 12:14
Sample: 1 19
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	69.06554	41.41772	1.667536	0.1236
DIGITAL_ACCESS_ONLINE_BUYING_O...	20.90249	49.06528	0.426014	0.6783
MUNICIPAL_S_EXPENDITURE	0.000216	0.001061	0.203238	0.8427
NO_OF_REGISTERED_VOTERS	4.07E-05	4.24E-05	0.958641	0.3583
ONLINE_REQUEST_OF_DISCLOSURE...	-43.85645	62.27653	-0.704221	0.4959
POPULATION	-9.46E-06	3.51E-05	-0.269287	0.7927
STATE_GOVERNANCE_IN_000_MUNI...	-0.001730	0.001646	-1.050980	0.3158
TOTAL_CONSUMPTION	0.172525	0.119360	1.445424	0.1762

R-squared	0.323495	Mean dependent var	125.3158
Adjusted R-squared	-0.107008	S.D. dependent var	80.97534
S.E. of regression	85.19775	Akaike info criterion	12.02339
Sum squared resid	79845.23	Schwarz criterion	12.42105
Log likelihood	-106.2222	Hannan-Quinn criter.	12.09069
F-statistic	0.751435	Durbin-Watson stat	2.359985
Prob(F-statistic)	0.636861		

Relapse Coefficientsis deciphered as the difference in 4% in the reaction dependent on 1 unit change in the quantity of enlisted voters, which is administration. R2measures the achievement of the relapse in anticipating the estimations of the reliant variable. It implies 32% the first fluctuation, and are left with 68% lingering inconstancy. Balanced R2 modifies for the quantity of autonomous regressors by punishing R2. It is a superior model to decipher a solid match. R2 accept that each and every factor clarifies the variety in the needy variable. The balanced R2 uncovers the level of variety clarified by just the free factors that influence the reliant variable. Balanced R2 is - 10% which implies the logical variable is unimportant.

S.E of relapse, it is a synopsis measure dependent on evaluated fluctuation. The SE tells test measurement (like the example mean) goes amiss 85% from the genuine populace mean. The bigger your example size, the littler the SE and bad habit versa.Sum squared remaining, reports the whole of squared residuals. Equivalent to (S.E pf relapse) ^2 * (T-k-1)Log-Likelihood – Reports the log-probability work assessed at coefficient gauges accepting ordinarily dispersed mistakes. The probability is a capacity that partners with every parameter the

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likelihood (or likelihood thickness) of watching the given sample.F-insights tests whether all extension coefficients (barring the consistent) are zero. F-test can evaluate numerous coefficients all the while. 0.75 F insights connote there is a 75% possibility in 100 that the entirety of the relapse parameters are zero and the relapse condition probably won't have legitimacy in fitting the data.Durbin – Watson detail – Measures sequential connection in the residuals. As a general guideline DW insights, under 2 means that positive sequential relationship. Here the worth is 2.35, there is no as much as auto co-connection exists among x and y.

Hypothesis Testing

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	-47161.11	11	0.0000
F-statistic	2.22E+09	(1, 11)	0.0000
Chi-square	2.22E+09	1	0.0000

Null Hypothesis: C(4)=2
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
-2 + C(4)	-1.999959	4.24E-05

Restrictions are linear in coefficients.

The **Wald test** (also called the Wald Chi-Squared Test) is a way to find out if explanatory variables in a model are significant. “Significant” means that they add something to the model.The significant value is less than the p-value thus we will reject the null hypothesis thus variables can be removed from the model without any harm to the dependent variable.

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Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.532829	Prob. F(2,9)	0.6044
Obs*R-squared	2.011544	Prob. Chi-Square(2)	0.3658

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 09/03/19 Time: 13:43
Sample: 1 19
Included observations: 19
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.15390	45.26454	0.290601	0.7779
DIGITAL_ACCESS_ONLINE_BUYING_O...	5.676121	55.16869	0.102887	0.9203
MUNICIPAL_S_EXPENDITURE	-7.13E-06	0.001110	-0.006420	0.9950
NO_OF_REGISTERED_VOTERS	5.52E-06	4.90E-05	0.112634	0.9128
ONLINE_REQUEST_OF_DISCLOSURE...	-5.459707	68.36191	-0.079865	0.9381
POPULATION	-3.80E-06	4.05E-05	-0.093713	0.9274
STATE_GOVERNANCE_IN_000_MUNI...	0.000423	0.001773	0.238780	0.8166
TOTAL_CONSUMPTION	-0.061494	0.140795	-0.436762	0.6726
RESID(-1)	-0.359740	0.391703	-0.918400	0.3824
RESID(-2)	-0.204402	0.359079	-0.569239	0.5831

R-squared	0.105871	Mean dependent var	-2.15E-15
Adjusted R-squared	-0.788259	S.D. dependent var	66.60215
S.E. of regression	89.06424	Akaike info criterion	12.12201
Sum squared resid	71391.96	Schwarz criterion	12.61908
Log likelihood	-105.1591	Hannan-Quinn criter.	12.20613
F-statistic	0.118407	Durbin-Watson stat	1.869143
Prob(F-statistic)	0.998026		

The Breusch-Pagan-Godfrey Test is a test for heteroscedasticity of errors in regression.The null hypothesis for this test is that the error variances are all equal.The alternate hypothesis is that the error variances are *not* equal. More specifically, as Y increases, the variances increase (or decrease).Results reveal that the coefficients are statistically insignificant. The test fails to rejects the hypothesis of no serial correlation.

Findings

- Irrespective of the size, tradition, and population of the states chosen smart cities in the competitive grounds there is heterogeneity in the budgetary allocation of seed funding.
- Region-wise it is found that all states have not got equal distribution in the budgetary allocation of funds towards revitalizing the smart cities.
- There is a wide disparity in the population amongst the chosen state. Therefore, digital availability and usage are uneven.
- The analysis study has found that the impact of the dependent variable influenced by the independent variable, is because while a selection of smart cities exponential growth of population with migration and immigration a constant feature of growing cities.
- The inclusion and participation of local government in the decision of funding is marginalized as well as expenditure incurred is also meager.

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- Evaluation of framework enabled by premier corporate organizations has concentrated on ITC, slicers, surveillance, but the need for government to customize in terms of framework implementation based on local government participation has to be enabled.

Limitation

- The study encountered several difficulties in the navigation of data information. Document the performance of smart cities does not reveal the particulars with the utilization of resources.
- The website of smart cities does not reveal the actual performance of non-selected smart cities. There was no data indication of progress.

Scope for further research: Further concentration on smart city mission could be made on the gap in macro indicators and non-city development.

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