Smart Cities Mission and AMRUT scheme: Analysis in the context of Sustainable Development

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OIDA International Journal of Sustainable Development, Ontario International Development Agency, Canada
ISSN 1923-6654 (print) ISSN 1923-6662 (online) www.oidaijsd.com
Also available at http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html

Abstract: Smart cities play a crucial role in the development of a New India, the smart city is a red hot topic on the urban strategy of governments all over the country, Humanity faces a variety of problems due to the increasing population, including food, water and energy shortage, crowded cities, environmental destruction and global warming. With introduction of a new mission, 100 smart cities and 500 cities in India will be rejuvenated and transformed through Smart Cities Mission and AMRUT scheme. 'Smart City' has been interpreted quite liberally because of the fact that each city has its own history, culture and ecology. Smart city mission offers great opportunity of developing cities in the context of sustainable development. This study explores the changes and challenges for achieving sustainable and environment friendly urbanization; it also makes attempts to understand the development of cities by case study methodology by studying the proposals of few cities and progress that has taken place.

Keywords: Case study, Development, Ecology, Sustainable environment, Urbanization

Introduction

The concept of smart city is relatively new and can be seen as a successor of information city, digital city and sustainable city (Trindade, E.P; Hinnig. M.P.F.,. However it has been used frequently, especially after 2013, when it exceeded a frequency of citations of other terms including sustainable city. Despite the discussion about its concept in recent years, there is a lack of consensus on what a smart city is. Although a number of authors have the difficulty of conceptualisation, these definitions are not contradictory but partially overlapping. In general, however, it is understood that smart cities make use of information and communication technology (ICT) extensively to help cities to build their competitive advantages, or that it is a conceptual model where urban development is achieved through the use of human, collective and technological capital. The term smart city is, therefore, an umbrella concept that contains a number of sub-themes such as smart urbanism, smart economy, sustainable and smart environment, smart technology, smart energy, smart mobility, smart health, and so on (Gudes et al. 2010; Cocchia 2014; Lara et al. 2016).

The idea of smart city came into formulation owing to the need to accommodate rapid urbanization of the age. Cities are known to have large concentration of resources and facilities. Such environments attract people from rural areas. However, unprecedented attraction has now become an overwhelming issue for city governance and politics. Urban performance currently depends not only on the city's endowment of hard infrastructure ('physical capital'), but also on the availability and quality of knowledge communication and social infrastructure ('human and social capital'). The increased phase of urbanization is impacting on the livelihood householders. Rapid urbanization and investment in infrastructure seem to be modifying the pattern of economic growth. All the governments have increased their stress on urbanization. In general, the efforts has been focused towards shifting resources from agriculture sector towards more attractive sectors like manufacturing sector and services sector which are concentrated in urban areas. The manufacturing and services sectors demand need of sophisticated infrastructure.

Urbanization is defined as**(Aghion2009)**"the demographic process whereby an increasing share of the national population lives within urban settlements." Settlements are also defined as urban only if most of their residents derive the majority of their livelihoods from non-farm occupations **(Bairoch, 1988).** Throughout history,

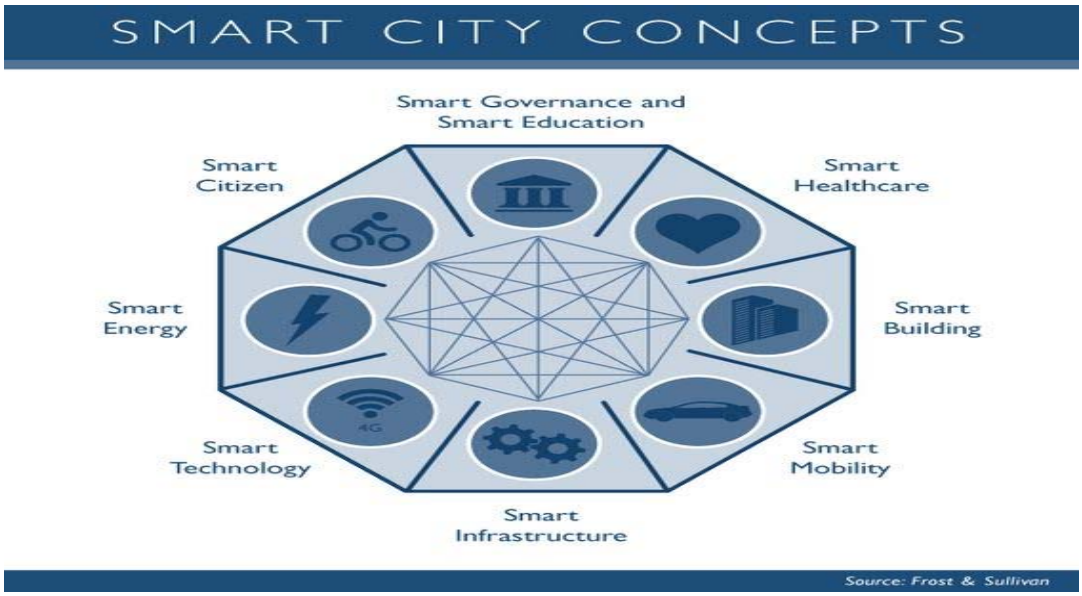
urbanization has been a key force in human and economic development. "The vision of 'Smart Cities' is the urban center of the future, made safe, secure environmentally green and efficient because all structure – whether for power, water, transportation, etc. are designed constructed, and maintained making use of advanced, integrated materials, sensors, electronics, and networks which are interfaced with computerized systems (Hall; 2000).

Definition of Smart City

The concept of "Smart City" embraces several definitions depending on the meanings of the word "smart": intelligent city, knowledge city, ubiquitous city, sustainable city, digital city, etc. Many definitions of Smart City exist, but no one has been universally acknowledged yet. According to literature, it emerges that Smart City and Digital City are the most used terminologies to indicate the "smartness" of a city. Smart cities represent a conceptual urban development model based on the utilization of human, collective, and technological capital for the enhancement of development and prosperity in urban agglomerations (Angelidou, 2014).

Many national or international governments, institutions or political bodies, finance the implementation of project called "Smart Cities", as they suggest it as an answer to city sustainable development. The Smart City is nowadays seen like a key strategy to improve the quality of life of billions of people living in cities all over the world.

Smart city Concepts



By this diagram we can understand the concept of the smart city is "The Smart City is a process, or series of steps, by which cities become more "livable" and resilient and, hence, is able to respond quicker to new challenges. Thus, a Smart City should enable every citizen to engage with all the services on offer, public as well as private, in a way best suited to his or her needs". Necessity of Building Smart Cities Achievement of sustainability is the main need of building smart cities, as smart cities use Information and Communication Technology more efficiently thereby it helpful to cope up with environment related problem which is present major agenda. Cities account for about 2/3 of global energy and 70% of rapid increase in world's population causes for the higher rate of migration and urbanization which in turn cause for development of slum areas in urban areas. However, the building of smart cities plays a vital role in providing the basic infrastructure to the existing cities. The rapid changes in life styles of urban people such as increasing usage of smart mobile phone for various purposes such as education through Internet, Recreation, and News etc. give way for the development of an innovative city that is "SMART CITY".

Table- 1: Statistics of six smart cities in Karnataka with Population, Area, Number of wards, Length of Roads

Smart cities / Parameters	Belagavi	Davangere	Hubli-Dharwad	Mangaluru	Shivamogga	Tumakuru
Population as per 2011 census	4,88,157	4,34,971	9,43,788	4,99,487	3,22,650	3,05,821
Area	94.08sq.kms	68.6.sq.kms	202.3sq kms	132.45sq.kms	70.01sq.kms	48.21kms
Number of properties	1,21,023	1,48,000	2,34,658	2,11,578	86,717	93,494
Number of wards	58	41	67	60	35	35
Length of Roads	805.200kms	1007.70	2100kms	1170.00kms	721kms	575kms

Source: Census Survey Report, 2011

The table highlights on the Smart cities number of population as per Census Survey,2011 in which Hubli-Dharwad has the highest in population of 9,43,788, area in square kilometers-202.3, Number of properties-2,34,658, Number of wards -67 and length of Roads-2,100 kilometers. The cities were selected under Smart City Program 2016, The Ministry of Urban Development (MoUD) received proposals from the 97 cities to be the beneficiaries of the first year financing from 2016 onwards.

Coverage and Duration

The Mission will cover 100 cities and its duration will be five years (FY2015-16 to FY2019-20). The Mission may be continued thereafter in the light of an evaluation to be done by the Ministry of Urban Development (MoUD) and incorporating the learnings into the Mission.

How many Smart Cities in Each State?

The total numbers of 100 Smart Cities have been distributed among the States and UTs on the basis of an equitable criterion. The formula gives equal weightage (50:50) to urban population of the State/UT and the number of statutory towns in the State/UT. Based on this formula, each State/UT will, therefore, have a certain number of potential Smart Cities, with each State/UT having at least one. The number of potential Smart Cities from each State/UT will be capped at the indicated number. This distribution formula has also been used for allocation of funds under Atal Mission for Rejuvenation and Urban Transformation - AMRUT. The distribution of Smart Cities will be reviewed after two years of the implementation of the Mission. Based on an assessment of the performance of States/ULBs in the Challenge, some re-allocation of the remaining potential Smart Cities among States may be required to be done by the Ministry of Urban Development.

Financing of Smart Cities

The Smart City Mission will be operated as a Centrally Sponsored Scheme (CSS) and the Central Government proposes to give financial support to the Mission to the extent of Rs. 48,000 crores over five years i.e. on an average Rs. 100 crore per city per year. An equal amount, on a matching basis, will have to be contributed by the State; therefore, nearly Rupees one lakh crore of Government funds will be available for Smart cities development.

Convergence with other Government Schemes

Comprehensive development occurs in areas by integrating the physical, institutional, social and economic infrastructure. Many of the sectoral schemes of the Government converge in this goal, although the path is different. There is a strong complementarily between the AMRUT and Smart Cities Mission in achieving urban transformation. While AMRUT follows a project-based approach, the Smart Cities Mission follows an area-based strategy. Similarly, great benefit can be derived by seeking convergence of other Central and State Government Programs/Schemes with the Smart Cities Mission. At the planning stage itself, cities must seek convergence in the SCP with AMRUT, Swachh Bharat Mission (SBM), National Heritage City Development and Augmentation Yojana (HRIDAY) Digital India, Skill development, Housing for All, construction of Museums funded by the Culture Department and other programs connected to social infrastructure such as Health, Education and Culture.

Objectives of the Study

1. To understand and compare Smart cities Mission and AMRUT scheme.
2. To know the selection and implementation process of Smart cities Mission and AMRUT scheme.
3. To analyze the Sustainability component in the **Smart** cities Mission and AMRUT scheme.
4. To study Smart cities Mission and AMRUT schemes in the context of Karnataka State.
5. To evaluate the thrust areas of Smart cities Mission and AMRUT scheme.

Literature Review

GIS Steering Smart Future for Smart Indian Cities by Anuj Tiwari & Dr. Kamal Jain (2014) in this book explained that the concept of a smart city is a new one. This paper describes the smart city projects in India namely LAVASA: SMART HILL CITY & GIFT: GUJARAT INTERNATIONAL FINANCE TEC-CITY. By 2050, the urbanization in India is expected to raise upto 70 percent compared to only 30 percent in 2011. According to the **McKinsey Global Institute Analysis Report**, India will have 68 cities with 1 million or even more than 1 million Populations, 13 cities with more than 4 million population & 6 megacities with population of 10 million or more by year 2030. A Smart City is the integration of technology into a strategic approach to sustainability. Smart city is a booming international phenomenon. According to the statics over 2000 smart city projects have been started or going on in Asia, Europe America & Africa.

The three pillar basic smart city model is used in this research paper. The Three main dimensions of this model are Economy, Environment & Society. GIS solutions can help the policy makers & planners for decision making purposes. Ultimately this paper helps to understand the use of GIS & its integration with various approaches to formulate, stimulate, interpret and validate the sustainable development of urban areas, steering a smart and sustainable future for smart cities.

The Smart city concept has been recent one which is trending towards urban development with the focus on role of ICT infrastructure. Smart City is a broad concept including many aspects of urban life, such as urban planning, sustainable development, environment, energy grid, economic development, technologies, and social participation. The availability and quality of the ICT infrastructure is not the only definition of a smart or intelligent city. Other definitions stress the role of human capital and education in urban development. Berry and **Glaeser (2005) and Glaeser and Berry (2006)** show, for example, that the most rapid urban growth rates have been achieved in cities where a high share of educated labour force is available. In particular **Berry and Glaeser (2005)** model the relation between human capital and urban development by assuming that innovation is driven by entrepreneurs who innovate in industries and products which require an increasingly more skilled labour force. Profound attention to the role of social and relational capital in urban development. A smart city will be a city whose community has learned to learn, adapt and innovate **(Coe et al 2001).** People need to be able to use the technology in order to benefit from it.

The Smart City Cornerstone: Urban Efficiency by Charbel Aoun (2013):

This paper shows a five stages approach for changing over our urban centers into more efficient and sustainable places to live.

1. Setting the vision
2. Bringing in the technology
3. Working on the integration
4. Adding innovation

5. Driving collaboration

Smart cities: Researches Projects and good practices for the cities **by Rocco Papa, Carmela Gargiulo, & Adriana Galderisi (2013),** the concept of smart city is giving the answer for making the cities more efficient & sustainable. It is quiet popular in the policy field in the recent years. During the 1990's the development of the information technologies was at the peak level & people felt that new technologies can produce new forms of productions, markets, society organization, industries, business districts, residential districts & so on. The term smart city has become more and more widespread in the field of urban planning. Urban planners could give the fundamental direction for making cities smart by using smart devices and smart concepts.

The characteristic of social inclusion of urban residents in public services represents a demand and therefore strong business opportunities for new applications to be used for e-governance. Also, the interest of citizen policymakers in "concrete and short-term solutions, benefiting business creation, stimulation of SMEs" **(Schaffers et al., (2011)** emphasizes a support of entrepreneurial activity. High-tech and creative industries in the form of highly skilled human resources are an economic factor for new and established businesses. The characteristic of social and environmental sustainability **(Kourtit et al., 2012)** of Smart Cities becomes an increasingly important economic factor, offering economic opportunities for businesses **(Bakici et al., 2013).** Pollution is a major threat to cities and urban areas, expanding upon the overall issue of environmental pollution (air and water pollution, global warming, ozone layer depletion, etc.) that engages citizens and governments.

AMRUT Mission

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) has been launched by the Ministry of Urban Development, GoI on 25th June 2015 with the purposes (a) to ensure that every household has access to a tap with assured supply of water and a sewerage connection; (b) to increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and (c) to reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). AMRUT believes that the infrastructure creation should have a direct impact on the real needs of people, and hence, focus should be on infrastructure creation which has a direct link to provision of better services to people. Besides, a sound institutional structure is the foundation to make Missions successful. Therefore, Capacity Building and a set of Reforms have been included in the Mission to enhance the transparency in services delivery by the ULBs through improving governance. Reforms will lead to improvement in service delivery, mobilization of resources and making municipal functioning more transparent and functionaries more accountable, while Capacity Building will empower municipal functionaries through augmenting their skills as well as knowledge and lead to timely completion of projects. AMRUT also actualising the spirit of cooperative federalism through making States and ULBs equal partners in planning & implementation of projects, as the plans (Action Plans) have to be prepared every year and will be approved for a year, instead of project-by-project sanctions.

AMRUT Scheme

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme was launched in June 2015 with the focus of the urban renewal projects is to establish infrastructure that could ensure adequate robust sewerage networks and water supply for urban transformation. India is urbanising and data from last two Censuses has indicated that it is urbanizing at a faster rate than past. It is well acknowledged that urbanisation is going to be one of the important factors, which would define the trajectory of development. The urbanisation led by migration of rural population to urban areas in years to come is going to pose enormous challenges for urban governance – the way cities are being governed and the provision of urban services – how efficiently and effectively they are delivered to citizen on universal basis at an affordable cost. Therefore, Government of India has set the national priority to provide basic services such as water supply, sewerage, urban transport, etc., to households and build amenities in cities which will improve the quality of life for all, especially the poor and the disadvantaged. Keeping these objectives in the forefront, GoI has launched Atal Mission for Rejuvenation and Urban Transformation (AMRUT) on 25 June 2015 to improve basic urban infrastructure in 500 cities/ towns which would be known as Mission cities/ towns. Learnings from the earlier Mission have shown that infrastructure creation should have a direct impact on the real needs of people, such as providing taps and toilet connections to all households. This means that the focus should be on infrastructure creation that has a direct link to provision of better services to people.

Providing basic services (e.g. water supply, sewerage, urban transport) to households and build amenities in cities which will improve the quality of life for all, especially the poor and the disadvantaged is a national priority. An estimate of the funds required over a 20 year period, at 2009-10 prices, was made by the High Powered Expert

Committee (HPEC) during 2011. The Committee estimated that Rs. 39.2 lakh crore was required for creation of urban infrastructure, including Rs. 17.3 lakh crore for urban roads and Rs. 8 lakh crore for services, such as water supply, sewerage, solid waste management and storm water drains. Moreover, the requirement for Operation and Maintenance (O&M) was separately estimated to be Rs. 19.9 lakh crore. Learnings from the earlier Mission have shown that infrastructure creation should have a direct impact on the real needs of people, such as providing taps and toilet connections to all households. The purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to (i) ensure that every household has access to a tap with assured supply of water and a sewerage connection; (ii) increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and (iii) reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). All these outcomes are valued by citizens, particularly women, and indicators and standards have been prescribed by the Ministry of Urban Development (MoUD) in the form of Service Level Benchmarks (SLBs). However, the pursuit of better outcomes will not stop with the provision of taps and sewerage connections to all (universal coverage). Other benchmarks will be targeted following a step-by-step process after achieving the benchmark of universal coverage. Such a gradual process of achieving benchmarks is called "incrementalism". This does not mean that other SLBs are less important, but that in the incremental process SLBs are achieved gradually according to National Priorities. In the case of urban transport the benchmark will be to reduce pollution in cities while construction and maintenance of storm water drains is expected to reduce, and ultimately eliminate, flooding in cities, thereby making cities resilient. Earlier, the MoUD used to give project-by-project sanctions. In the AMRUT this has been replaced by approval of the State Annual Action Plan once a year by the MoUD and the States have to give project sanctions and approval at their end. In this way, the AMRUT makes States equal partners in planning and implementation of projects, thus actualizing the spirit of cooperative federalism. A sound institutional structure is the foundation to make Missions successful. Therefore, Capacity Building and a set of Reforms have been included in the Mission. Reforms will lead to improvement in service delivery, mobilization of resources and making municipal functioning more transparent and functionaries more accountable, while Capacity Building will empower municipal functionaries and lead to timely completion of projects.

The Mission will focus on the following Thrust Areas:

i. Water Supply,
ii. Sewerage facilities and seepage management,
iii. Storm Water drains to reduce flooding,
iv. Pedestrian, non-motorized and public transport facilities, parking spaces, and
v. Enhancing amenity value of cities by creating and upgrading green spaces, parks and recreation centers, especially for children.

- Rajasthan was the first state in the country to submit State Annual Action Plan under Atal Mission for Rejuvenation and Urban Transformation (AMRUT).
- AMRUT is the new avatar of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM).
- The scheme is dependent with public private partnership model (PPP) model.
- AMRUT adopts a project approach to ensure basic infrastructure services relating to water supply, sewerage, storm-water drains, transportation and development of green spaces and parks with special provision for meeting the needs of children.
- AMRUT will be implemented in 500 locations with a population of one lakh and above. It would cover some cities situated on stems of main rivers, a few state capitals and important cities located in hilly areas, islands and tourist areas.
- Under this mission, 10% of the budget allocation will be given to states and union territories as incentive based on the achievement of reforms during the previous year.
- Central assistance will be to the extent of 50% of project cost for cities and towns with a population of up to 10 lakhs and one-third of the project cost for those with a population of above 10 lakhs.
- Under this mission, states get the flexibility of designing schemes based on the needs of identified cities and in their execution and monitoring.
- States will only submit state annual action Plans to the centre for broad concurrence based on which funds will be released. But, in a significant departure from JNNURM, the central government will not appraise individual projects.

Modifications in AMRUT

Recently, MoUD modified the AMRUT reform matrix, creating a template that enables States and cities to go beyond instrumentalism and implement transformational changes over three years.

- AMRUT alters the approach in two ways: First, the number of reforms aimed at has been reduced and separated from project assistance. Second, shifted focus from penalisation to incentivisation.
- AMRUT now sets aside 10 per cent of funds for incentives to be given based on self-assessment by ULBs and corroborated by State-level high-powered steering committees based on the report of independent monitoring agencies.
- While AMRUT cascades the autonomy to design, monitor and approve projects to states and civic bodies, it also persuades local stakeholders to put more skin in the game by participating in execution.
- The Centre is also increasingly looking at impact-oriented urban programmes where States and ULBs take more responsibility for implementation and sustaining urban infrastructure. So traditional grant-based programmes are being embedded with impact and outcome milestones.
- JNNURM was considered to have big city bias. AMRUT has cast the net wider, reaching all urban centres with a population of one lakh and more.
- Under the programme, the number of reforms expected from States and ULBs has decreased, but the number of cities expected to adhere to reforms have increased.
- Earlier, several committees have elaborated upon various tax and non-tax revenue improvement measures for municipalities.
- To empower ULBs financially, resorts to market borrowings (pooled finance, municipal bonds and institutional finance) and project execution mechanisms such as public-private partnerships and land-based financing instruments.
- Under the new AMRUT reforms, in the initial year, States are also expected to formulate value capture financing policy, tools and rules for all cities with a million plus population. In the subsequent years, they will have to operationalise and implement it.
- Cities with investment grade rating will be encouraged to float municipal bonds and those below the rating will continue working on improving their ratings.

List of cities covered by AMRUT Scheme in Karnataka

Karnataka State has also started AMRUT scheme in full-fledged in all the 27 cities notified by Government of Karnataka. The category wise notified AMRUT Cities are shown in the following table.

Table- 2: Category Wise AMRUT Cities in Karnataka

Category-I -26 Cities **Cities with a population of over one lakh**	**Category-III - 1 City** **City classified as Heritage Cities by MoUD under the HRIDAY Scheme**
1. Bellary 2. Bidar 3. Gulbarga 4. Gangavathy 5. Raichur 6. Hospet 7. Belgaum 8. Dharwad 9. Bijapura 10.Gadag-Betageri 11. Bagalkote 12. Rannebennur 13. Tumkur city 14. Shimoga city 15. Bhadravathi 16. Chitradurga 17. Davanagere 18. Kolar 19. Robersonpet 20.Mangalore 21. Mandya 22.Mysore 23.Hassan 24.Udupi 25.Chickamagalur 26.Bangalore	1. Badami

Table- 3: Sector Wise Project Fund Allocation/Requirement for the Mission Period (2015-2020)

Sectors	Yr. 1	Yr. 2	Balance three years (2017-18, 2018-19, 2019-20	Total (Rs. In Cr.)
Water supply	551.54	726.44	821.450	2099.43
Sewerage (UGD)	612.65	727.24	1061.470	2401.36
Storm Water	48.80	118.83	118.470	286.1
Green Space & Parks	27.65	35.23	46.950	109.83
Urban Transport	17.90	16.98	21.270	56.15
Total	1258.54	1624.72	2069.610	4952.87

Source: Government of Karnataka Report 2015

PIB (2015) The Ministry of Urban Development has so far approved city level Action Plans for improving basic urban infrastructure in 474 cities in 18 States and Union Territories with an investment of Rs.19, 170cr under Atal Mission for Urban Rejuvenation and Transformation (AMRUT). About 90% of this expenditure will be on improving water supply and sewerage infrastructure followed by storm water drains, non-motorised urban transport and provision of green spaces and parks. Central assistance for this project outlay is over Rs.9, 000 cr.

In case of Karnataka, the 27 urban local bodies included in Atal Mission were required to contribute 30% to 47% of project costs and the State Government to increase its share in project costs to reduce the burden on municipal bodies. For Karnataka, the Apex Committee approved a project expenditure of Rs.1, 258cr. out of this, Rs.552cr will be spent on augmenting water supply in mission cities, Rs.613 crores on sewerage projects, construction of storm water drains-Rs.49 cr, provision of green spaces and parks-28 cr and urban transport-Rs.18 cr. In Karnataka, coverage of households with water taps ranged from a low of 18% in Chickmagaluru to 87% in Mandya. Water supply is reported to be in the range of 35 litres per capita per day in Robertsonpet to 106 lpcd in Ranebennur. In the capital city of Bengaluru coverage of water taps is 72% and water supply is at 94 lpcd. None of the 27 mission cities in the state have water supply at the norm of 135 lpcd prescribed for urban areas in the country. Under AMRUT Plans, investments to be made in the mission cities in water supply, sewerage, storm water drains and urban transport projects are : Bengaluru-Rs.173 cr, Raichur-Rs.77 cr, Hubli-Dharwad-Rs.75 cr, Bellary-Rs.72 cr, Gulbarga-Rs.66 cr, Belgavi-Rs.60 cr, Bijapur-Rs.60 cr, Tumakuru-Rs.53 cr, Bhadravati-Rs.51 cr, Mysore-Rs.50 cr, Davanagere-Rs.50 cr, Shivamogga-Rs.48 cr, Gadag-Betagiri-Rs.45 cr, Bidar-Rs.42 cr, Hospeta-Rs.38 cr,Chitradurga-Rs.34 cr, Hassan-Rs.32 cr, Bagalkot-Rs.31 cr, Ranebennur-Rs.25 cr, Chikkamagaluru-Rs.24 cr, Kolar-Rs.18 cr, Gangavati-Rs.16 cr, Robertsonpet-Rs.14 cr, Badami-Rs.12.00 cr, Mangalur-Rs.3.25 cr. Under AMRUT, central assistance is provided to the extent of 50% of project cost in case of cities with population of less than 10 lakhs each and up to one third in case of cities with population of above 10 lakhs each.

Challenges and Issues of AMRUT and Smart City Concept

As initiatives to develop smart solutions to address the challenges associated with rapid urbanization are being undertaken and the high focus is given by Government of India on creating 100 smart cities, multiple challenges / issues are likely to affect the implementation phase. Select issues and potential solutions have been elaborated in the table below.

Table- 4: Challenges and Issues in AMRUT and Smart City Concept

Key issues	Potential Solutions
Financial Challenges	
Developing a new or green field Smart City with target population of 5 to 10 lakhs is likely to require financial investment ranging between INR 75,000 and 150,000 crores and may require 8 – 10 years for implementation	For new cities, a large part of the initial investments may be recovered through sale of land and/or commercial and residential real estate. Suitable land pooling options and other related mechanisms (like higher Floor Area Ratio/ Floor Space Index etc.) need to be considered for this purpose
Most ULBs are not financially self-sustainable and tariff levels fixed by the ULBs for providing services often do not mirror the cost of supplying the same. Even if additional investments are recovered in a phased manner, inadequate cost recovery will lead to continued financial losses	Suitable financing options like BoT (Build-Operate-Transfer) may be considered to stagger the initial requirement
	Tariff structure needs to be redesigned to enable cost recovery through some level of cross subsidization
	Initial investment cost for ICT related applications, which are anyway significantly lower than associated network-level infrastructure (pipeline extensions, for example), can be reduced and recovered in a phased manner by adopting a cloud based scalable model, with cost recovery being transaction-based
Technical Capacity Constraints	
Most ULBs have limited technical capacity to ensure timely and cost effective implementation and subsequent operations & maintenance due to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rate	Leverage private partnership and outsourcing arrangements both for implementation as well as operations & maintenance with output based contracts
	Opt for a cloud based model or architecture for implementation of ICT as it results in the operations and maintenance responsibility being taken over by private vendors
Institutional Capacity	
Successful implementation of smart city solutions need effective horizontal and vertical coordination between various institutions involving institutions providing various municipal amenities as well as effective coordination between central government (MoUD), state government as well as local government agencies on various issues related to financing, sharing of best practices and sharing of service delivery processes	Develop a tripartite framework as part of which local governments is provided access to defined financial and technical support in lieu of undertaking specific governance reforms and setting up requisite institutional mechanisms like a Central Control Room with representation from all agencies, having a common database for sharing of data etc.

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of undertaking specific governance reforms and setting up requisite institutional mechanisms like a Central Control Room with representation from all agencies, having a common database for sharing of data etc.

Comparative Analysis

S.No	Components	Smart cities Mission	AMRUT
01	Funding	A total of Rs 48,000 crore would be spent on creating 100 smart cities across India.	A total of RS 50,000 crore has been allocated for this scheme for 500 cities
02	Selection process	The 100 smart cities will be selected on the basis of a city challenge competition	states have been asked to recommend cities which can be included under this scheme
03	Implementation	Central Govt/State Govt	Central Govt/State Govt/ULB

Findings

- 90% of AMRUT expenditure will be on improving water supply and sewerage infrastructure followed by storm water drains, non-motorized urban transport and provision of green spaces and parks
- Smart Cities Mission is a Centrally Sponsored Scheme (CSS) and the Central Government proposes to give financial support to the Mission to the extent of Rs. 48,000 crores over five years i.e. on an average Rs. 100 crore per city per year.
- There is a strong complementarily between the AMRUT and Smart Cities Mission in achieving urban transformation. While AMRUT follows a project-based approach, the Smart Cities Mission follows an area-based strategy.
- Synergy of Implementation bodies is clearly laid out in the modus operandi of the schemes.
- Citizen engagement and participation has been the most highlighting factor in the selection process of Smart cities.
- There are constraints and challenges with respect to Finance, Technical Capacity and Institutional Capacity
- Cooperative federalism and ULB participation at the gross root level implementation are hallmarks of the schemes.
- Both schemes have given adequate priority to Area specific Sustainable development and environment issues.

Conclusion

The smart city concept is one such upcoming concept which is deemed to be the solution for the present day problems as well as the sustainable future. there is need for further research to work out the parameters, definitions and guidelines for the development of new cities on green field developments.In that context, AMRUT and Smart Cities Mission schemes have been initiated prioritising core areas of urban development, there is a need to review the progress of projects and implementation of reforms, periodically and it has to be strengthened by the Central Government for effective implementation of projects. More and more sustainable development projects to be included as add on components in the schemes. There is a need for convergence of these two schemes from the perspective of sustainable development and local issues.

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