POKHARA METROPOLITAN CITY'S SMART CITY INITIATIVES :
TURNING AMBITIONS INTO REALITY

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LIST OF ACRONYMS AND ABBREVIATIONS

PMC   Pokhara Metropolitan City

PWC   PricewaterhouseCoopers

UN   United Nations

ABD   Area Based Development

CBO's   Community Based Organizations

BS   Bikram Sambat

CBD   Central Business District

IoT   Internet of things

ICT   Information Communication and Technology

ITU   Internation Telecommunication Union

UN   United Nations

GIS   Geographic Information System

GDP   Gross Domestic Product

ATM   Automatic Tailored Machine

NPC   National Planning Commission

Executive summary

This research was commissioned to examine the concept of Smart City, and initiatives of Pokhara Metropolitan City's (PMC) to progress toward the smart city. The research draws attention to the projects that PMC's has taken over the last two years. Although the idea of smart city has evolve short time ago and its idea differs with every scholar and nation. The image of basic understanding for Smart City can be found on the mindset of the each citizen. But that actually the Smart City means according to the idea of our Nation and national planning commission? Further investigations reveal the components, indicators and perquisites for the city to be smart.

Government of Nepal introduced a concept of smart city through the budget speech in 2072/73 to develop 10 cities smart. The central idea of smart city can be considered the development, in every components of the nation. While the concept of development differs with the phase of the nation, that might be developed or developing. The sense of smart city also differs with it. The definition of smart city is different in UK and different in Nepal.

Pokhara being one of the rapidly developing city and the tourism hotspot of the Nepal, also having its own beauty to manage and various pros and cons, challenges to build a smart city. Many countries in the world now have started doing revolutionary practices in different fields to give people more facilities and make the cities smart and livable, whose basic practices and example is also included in this paper. How the idea of smart cities are progressing in different countries either it is about the sensor intelligent transport system (ITS) in Singapore or disaster warning system in Barcelona, and also an initiatives of various other cities of Nepal.

After observing the secondary as well as primary data of PMC's in its initiatives to make the city smart and livable, we feel that the idea of smart city still should be properly understand by every citizen and government, than that of creating their own hypothesis for smart city before working on it to design around the principle and values of the people who live in the city, connecting with people, more than technological advancement and development.

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What is smart city?

Since the concept of 'Smart City' has been introduced, many scholars have defined it in various ways.(Albino et al., 2015). Sadiku, Shadare, Dada and Musa (2016) state that 'smart cities' is a fuzzy concept and there is not a one-size-first-all definition of the concept. However, they agree that 'smart' can be used to describe any device that can process information and can communicate. The concept of smart city is rooted to maximum utilization of information technologies for various purposes viz. comfort, safety and sustainability to the citizens (NTPCO, 2019). Concept of Smart cities have evolved in many countries around the world. It incorporates the development of the core physical infrastructures like supply of water, power, sanitation, waste management system, public transportation, housing, school, hospitals and other (Ranjit, n.d.). A smart city is a city, which has sustainability in terms of financial activities and employment opportunities to a wide section of its inhabitants, regardless of their level of education, skills or income levels and has smart financial system, smart environment, smart mobility, smart citizens, smart life, and smart governance with the help of technology, government and society through strong human capital, social capital, and/or ICT infrastructure.

The most accepted United Nations has forward 17 Sustainable Goals and 169 targets to its member nations for the sustainable development. The UN states that the utilization of ICT accelerates the achievement of all the 17 goals (Wahlen, 2017). There are advocacies about the use of technologies for sustainable cities. The ITU, for instance, has been advocating for smart sustainable city (ITU-T FG-SSC, 2014). It proposed the following definition for a smart sustainable city. "A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects". (ITU-T FG-SSC, 2014).Nepal being the member of UN body, it is following the guidelines proposed by the UN and running toward the goal to develop Nepal as the Smart city.

In Nepal with the devolution of jurisdictions to local level lately, there's been a great deal of discussion about smart cities and smart Nagarpalikas – yet it's not clear what they are. What characterizes a smart city and makes it different from a normal city is still under discussion. When all is said, a smart city is a city that utilizes innovation to offer different types of assistance and takes care of city issues. A smart city does things like improving

transportation and availability, improving social administrations and public service delivery, advancing supportability, and giving its citizens a voice. A Smart city in particular is a system, prevalently made out of Information and Communication Technologies (ICT), to create, send, and elevate reasonable improvement practices to address developing urbanization challenges.The developed and developing nations have their on way to describe and present the concept of smart cities. Developed nation present it as an the opportunity to leverage the impact of technological advancement integrate technologies from Energy, Transport, and Information and Communication Technologies (ICT) whereas developing country seek it as an opportunity to manage its resources, to provide comfort safety and sustainability for its development and use ICT to solve city's problem and improve public service delivery .

However, in the context of Nepal, the concept of smart city has been the topic of discussion among the planners and development practitioners recently. A smart city is an urban development vision to integrate information and communication technology (ICT) in a secure fashion to manage a city's assets (MUD, 2015). These assets include local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services (DUDBC, 2074 B.S.). A smart city is promoted to use urban informatics and technology to improve the efficiency of services (MUD, 2015). ICT allows city officials to interact directly with the community and the city infrastructure and to monitor what is happening in the city, Evolution of the city, and the way to enable a better quality of life. Basic characteristics of smart mobility includes; smart home, smart society, smart energy, smart building, smart working, smart governance etc. (DUDBC, 2074 B.S. c). While observing the concept of Smart City, two basic themes are very important to be connected with, viz. database and database operating system (Technology). Database on the one hand is a necessity to identify the existing urban status (population, infrastructures, service etc) and for linking it to the information technology, and technology is necessary to make urban service easier, safer, and guaranteed for residence. These two are interconnected to each other which are the hurt of smart city. Smart city concept is beyond the relationships between citizens and service providers. It is also helping in essentially enabling and encouraging the citizen to become active participants of the community, for instance , providing feedback on the quality of services provided by the government or the state of Infrastructures adopting a more sustainable and healthy lifestyle, volunteering for social activities or supporting minority groups (MOUD, 2015).

2. How can a city be smart?

Increase of urbanization is directly or indirectly leading a huge demand of the infrastructures and services for which the use of ICT for the environmental changes and proper supply of demand in urban areas, also a development of proper infrastructures, good governance, and making citizens smart for the proper utilization of the resources seems to be very important in the context of the Nepal.

Though the United Nations economic and social council has stated that there is no proper definition for the term "Smart City". It could mean different things to different cities of different countries regarding their level of development and cultural perspective.

The government of Nepal introduced the concept of the smart city in Nepal through the budget speech of year 2073/74 to develop 10 cities including Palungtar, Waling, Nijgadh and Lumbini.

Developed nations have given priority to the use of ITC for emphasizing on the development of the city, access to the services, employment, affordable housing and healthy environment. In short, the proper use of ICT and IOT for the proper public service can be considered as the Smart City.

That's why smart city is defined with elaboration of the word SMART as:

S- Sustainable (Sustainability of environment and services)

M- Measurable (Measurable services)

A- Assessable (Citizen's accessibility in services)

R- Replicable (features worth following)

T- Technical (Use of Technical development)

Which is accepted by the national Planning Commission and Department of Urban Development and Building Construction.

Characteristics of Smart City:

Smart People: People make a city and Smart people make a smart city. To be smart people should possess some characteristics also the concept of the national Planning Commission and Department of Urban Development and Building Construction have their own indicators to to meet viz. Inclusiveness, Education, Health, Creativity, Security. Which also possess their own characteristics and some of them are: Percent of families having internet access, using smartphones their Literary rate, Education status, access of Iot and Digital devices and its implementation, along with Percent of individuals who at least once a year get a health checkup and have health insurance also a percent of manpower in creative industrial business and their security essence.

Smart Governance: smart citizens of the smart city will be questionable and free to ask and speak up to the government and in that context, the public services are needed to be answerable, transparent and inclusive as well as it should be serviceable to people in an efficient way. Following their own indicators of specific characteristics as in: Information and technology infrastructure, online services, transparent and open government along with identity where Number of Wi-Fi hotspot per kilometer of area and homes with internet access, digitized citizens using e-services, i.e. E-tender, e-permit, e-attendance, aware and active citizen using open data provided by the government, GIS map system. Along with one recognizing the comparative advantage of the city, identified for its social and economic development gets included.

Smart Economies: Economics plays a very vital role in making a city smart. With which the economic activity should be reliable and the micro as well as the macroeconomics should lead to smart behavior and practice. Fort his NPC has also its own Indicators and their own characteristics, which are: innovation and entrepreneurship, productivity and job creation, GDP per capita and Green business which possess the characteristics like: Provision of E-registration facility for the new industry and business also the facility of ATM and vending machine facility. With Employment information number and Number of programs related to

green businesses.

Smart Infrastructures: Smart infrastructure is the essential component of the smart nation in a straight way, the most essential prerequisites for the smart city can be considered as the infrastructure. Proper provision of transport facility, green and free area, proper drinking water, communication system etc. makes the citizen's life proper and lively. And some of the basic indicators that are needed to have a Smart infrastructures are: Transportation, Energy, Housing, social, green, along with security infrastructure. These indicators of Smart infrastructures also have their own characteristics, for instance: Proper facility for pedestrian and cycles lanes, with e- parking system, Provision of street lights, hydroelectricity and green energy with basic needs like proper drinking water, electricity facility. Also, a clean and green city with open and greenhouse areas with numbers of rivers and lakes.

In comparing the NPC's idea of smart city with "The Smart city Wheel" Cohen 2012 the smart cities smartness are placed in different six dimensions like smart people, smart economy, smart governance, smart environment, smart mobility, and smart living. The advancement according to these dimensions along with the indicators comprising them indicates the level of smartness in a city. A Smart Economy is characterized by a High Productive economy and Innovation in producing goods and services. Likewise, reducing pollution, traffic congestion, transfer costs, and Increasing people safety and transfer speed distinguish Smart Mobility. The use of ICT in improving government service delivery and citizen's inclusion in developing and implementing policy fulfills Smart Governance. Smart Environment is marked by Incorporating green buildings, green energy, green urban planning, and reducing carbon emissions. Inclusive societies that are well educated and aware of their potential in leading the city towards appropriate development suggest Smart people whereas Vibrant and thriving culture with proper facilities increasing the quality of life identify Smart Living where the basic two components like: Smart mobility and smart living are missing which plays a very vital role in making a city smart.
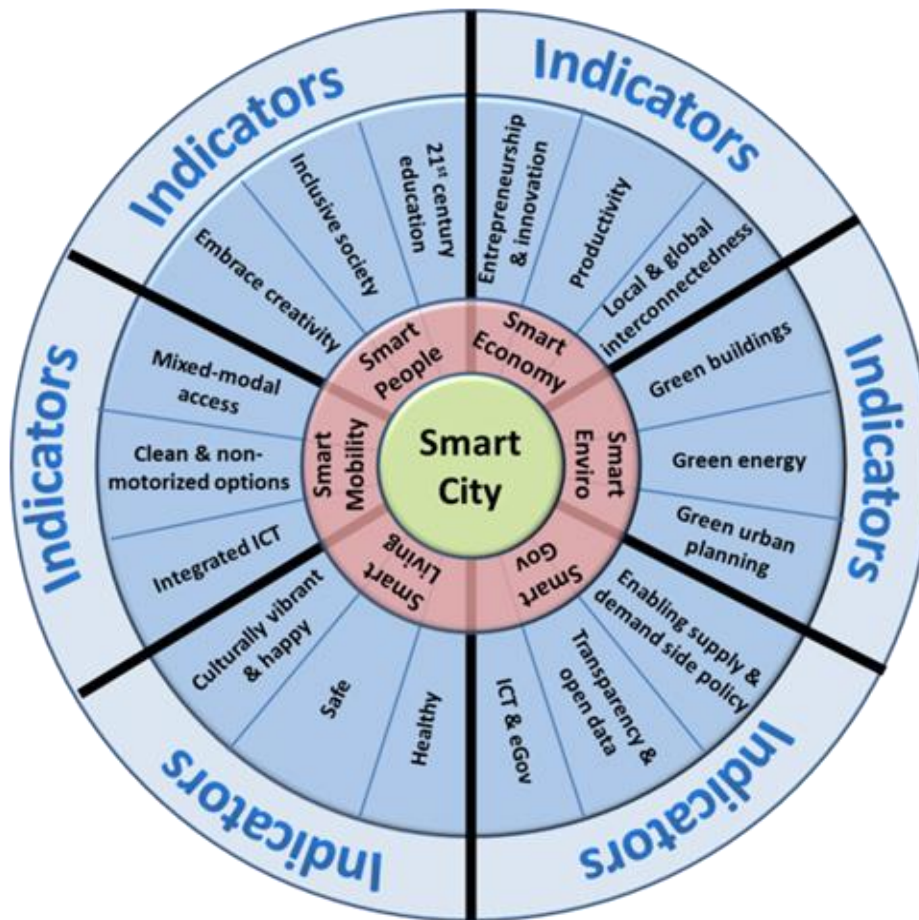
Fig: '' The Smart city wheel '' Cohen 2012 (Source: enterrasolutions.com)

3. Some Practices in international SMART CITIES

With the advancement in technologies Cities around the world are becoming smarter. They are implementing initiatives to promote greener and safer urban environments, with cleaner air and water, better mobility, and efficient public services. These initiatives are supported by smart technologies, such as the Internet of Things (IoT) and Information and Communication Technology (ICT) that provide the technical framework to implement smart city projects. The economic factors play a significant role in enhancing smart city development. Some of the best practices of smart cities in the world are:

3.1. Bengaluru

The city of Bengaluru is one of the greatest IT hub all over the India and also lies at the top spot on Asia and World. The city vision is for 'LIVABLE BENGALURU' through 'Connected, Vibrant and Healthy Communities' that is sustainable on three fronts- Environment, Economy and Equity. The strategic focus and blueprint highlights a conscious directive for sustainable choice, informed decisions through continued civic participation in city management and services and building on public private partnership for infrastructure projects in the city. Bengaluru is one of the fastest growing cities in the country. This rapid growth has strained the existing city's infrastructure, unchecked urban sprawl creating disconnect with historic identity and city assets lying in neglect. Bengaluru's ABD proposals aim at creating a safe, healthy, well connected and vibrant city Centre built around the three planning principles of Environment, Economy, and Equity. The selected area proposed for development is of 5380 acres (21.8 sq. km.) and comprises of the CBD and adjoining neighborhoods'. Seven projects have been identified with the goal to improve livability and identity of the city through, Efficient and integrated mobility, Informed & inclusive community, Improved urban services, Safe and secure city Centre, Clean and green environment, Enriching culture and heritage, Active public participation.

3.2. Hanoi City

The decision to transform Hanoi into a smart city turned logical as it is the capital of Vietnam. Furthermore, Hanoi is a thriving city. In a pWc (Price water house coopers) report, Hanoi was identified as one of the fastest growing cities in the world in terms of gross domestic product (GDP) growth. The Hanoi Department of Information and Communications has outlined four

key areas as the foundation of Hanoi's smart city transformation by 2030 health, education, transport and tourism.

As part of its urban transportation plan, Hanoi has implemented an "iParking" app in selected districts. The app helps users search for vacant parking bays in the city and allows them to pay for parking through their mobile devices. In the education sector, 2,700 schools and universities are being integrated into an online system where school reports and enrolment data can be easily accessible online. Work on developing other has already begun in 2017 and going on gradually.

3.3. London

London is named as one of the most popular smart cities in the world. London has launched a set of initiatives called Smarter London Together. These initiatives aim to make London "the smartest city in the world". The project promotes user-centered design, data sharing, connectivity, digital leadership and skills, and collaboration between public services and the private sector. The growing population of London, estimated to reach 10 million by 2030, is putting pressure on transport, energy, healthcare, and pollution management. To address this issue, the mayor of the office of London is turning to smart city solutions and is developing projects in collaboration with startups, academics, and residents.

3.4. New York

Looking at the other world top-ranked city New York, Link NYC is providing free super-fast Free Wi-Fi, phone calls, device charging, and a tablet for access to city services, maps, and directions. It's a unique communications network. Cyber NYC is the city's strategic investment to dominate cyber security. It aims to grow New York City's cyber security workforce, help companies drive innovation, and build networks and community spaces. My NYCHA mobile app and web portal allow public housing residents to manage services online. Residents can submit, schedule, and manage work tickets online. They can also subscribe to alerts for outages in their developments, view inspection appointments, and pay their rent. Significantly, New York's data report - Open Data for All- provides free public data published by various local agencies. This tool opens data for people to make a difference in their communities.

3.5. Barcelona

Ranked as the world's leading smart city (according to Juniper Research), Barcelona is using sensors, smart street lights, and smart parking e- parking and e-hailing system of

technologies to improve the flow of traffic. Barcelona is also known for its sustainable energy usage and smart use of energy (for example, motion-activated LED lights are widely used). The city is saving water and using data about water consumption from smart meters also have a provision of Digital tracking and payment system for the waste disposal along with Body worn camera, Disaster early warning system, Gun shoot detection sensors in place to place in a security system of smart city.

3.6. Singapore

The city has deployed a vast number of sensors used to detect littering and smoking in forbidden areas. Also, Singapore is developing a platform called "Virtual Singapore". This is a 3D virtual map of the city used to test city-wide plans, such as evacuation plans. Smart systems including traffic lights and smart parking help to effectively manage traffic, RFID card for water management system. MRT (Mass Rapid Transit) for nationwide connectivity. ITS (Intelligent Transport System) also GPS camera system installed on roads and vehicles with ERP (Electrical Road Pricing) system which gives the information about the road and parking status, beside this there is also a provision on LTAC (Land Transport Authority) which use surveillance camera to look after the road accidents and also a EPC(Electronic police center) for online police information and avenue.

4. Initiatives of Pokhara Metropolitan City.

It is a topic of great interest to the general public to know about the progress on smart city development of their region. The Nepal government introduced the concept of 'Smart City' for the first time in 2012, only 22 years after other mega-cities in the world embraced it. Not only the government, but also the political parties, especially during the time of local level election, had promised the people to make each municipality a smart city if they won the local level election.

Again, after entering into a federal system in 2015, the Constitution of Nepal has provided legislative, executive, and judicial power to each order of the government (federal, state, and local) for better delivery of public service to its citizens. After these changes, very interesting discussions of smart city, smart Nagarpalika have started.

In the context of PMC, some of the work regarding smart city has been started as the list provided below:

a. Agreement with the IT Venture of Japan for two years, has been completed which aimed to work under the development of transport infrastructures with greenery on the occasion of world carbon forum, 2019.

b. The Metropolitan City has intensified the communication of information through its website, where the citizen can easily get the information and data needed, also know about the practice, plans and policies of the city.

> Waling metropolitan city has digital e governance framework where a citizen have a facility to make a commendation, tax payment, vital registration process online using digital signature along with citizen complaints and services information through the smart waling mobile app.

d. PMC has a provision of online application names "Pokharametro" which is directly linked

to the website where a citizen can get a facility of online citizen charter and social security service.

e. The metropolis also has introduced a public library with Radio Frequency Identification system (RFID) naming "Deepshika Library" at Bhandardhik, Pokhara.

> One of the basic failure case of PMC in the idea of Smart City is their initiative to operate e-ticketing system in public vehicle which was started from August 18, 2019.

f. PMC has given a free internet service in various public places of pokhara, ie: Gandaki Hospital, Pokhara Airport etc.

g. Online incident registration provision has already started in every ward of PMC.

> Bharatpur Metropolitan City along with Birjung, Janakpur, Patan, Pokhara, Waling and many other had come up with COVID-19 response system user which included a facility of quarantine management, isolation management, contact tracing, live tracing etc..

h. The construction of model roads including drains, sidewalks, differently able friendly roads and bicycle lanes are under construction.

i. Asphalt road construction is in under construction process within the main areas of PMC, ie: Newroad, Mahendrapool, Ranipauwa, Hallanchowk etc under three divisions viz. Pokhara municipality, Province government and Department of Roads.

j. Installation of Security Cameras in different busy areas in cities was completed and still in progress to increase the number. For which PMC has come up with the budget of 50 lakhs in the fiscal year 77/78 and project with be monitored by district police.

> Lalitpur Metropolitan City has come up with a provision of cycle lanes in initiation to build cycle-friendly city from Kupandole to Mangalbazar.

> Rupa rural municipality of Kaski district has its own application which includes a basic features like: online registration service, e meeting system, village profile report

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k. 30 Digital waiting lounge with e-advertisement is built.

Above mentioned things were already implemented but there have been lots of promises and yet to start planning on smart development at Pokhara Metropolitan City. Some of the promises and visions planned but yet to initiate are as follows: -

a. The 'Pilot Project' of PMC in association with NRN is still in progress and has plans for a smart city as a top priority.

b. The Smart Public Bus Card system was initiated and put in practice but was eradicated due to some difficulties however study is going on to implement it properly again.

c. People with disability friendly walking streets are being made around the major places of the Pokhara. This aims to make the streets of Pokhara city feasible to all types of people.

d. Looking at parking as a main problem in city Centre areas like Mahindra Pool and Chilpledhunga PMC is initiating the approach to solve it smartly by the development of underground parking System operated by IoT.

5. Challenges for smart cities

Nepal is one of the developing countries which is slowly and gradually stepping forward toward technological development. It's been only 3-4 years since technology has entered in Nepalese administrations. With no prior experience in the smart approach, nobody can predict how the government will take forward the concept of a smart city. And it is obvious that the developing government has to face a lot of problems for any changes to make like:-

5.1. Budget constraints and financing issues

The financing capacity of the government is arguably one of the most pivotal engines of the smart city. Budget constraints indicates the ability of governments to develop smart cities, even though smart cities are projected to be more Cost-effective in the longer term. In countries like Nepal with multiple levels of jurisdiction on fiscal resource allocation, over-dependency on state and central governments for developmental funds also hampers the ability of local governments like PMC to generate their own revenues through taxes and revenue to finance a mega-project like a smart city.

5.2. Lack of investment in basic infrastructure.

Despite advocating for the smart city agenda, some developing countries are still held back by the lack of investment in basic infrastructure. Basic urban infrastructure, such as having proper water drainage and sewerage systems, are requisite for any city to thrive, but some cities still face a shortfall in providing these services . Likewise, In PMC, smart city adoption is held back by the lack of provision and maintenance in basic infrastructure, which result in uneven development and low-quality infrastructure particularly in the slum areas.

5.3. Lack of governance frameworks for smart city.

Lack of governance frameworks and regulatory safeguards is another major barrier identified in Smart city development in developing countries. As PMC is working on smart city development for socioeconomic gain, there is essentially a lack of clear governance frameworks specifying the policy objectives, development strategies, regulatory norms, and

evaluation models of smart city development.

5.4 Lack of inclusivity Environmental concerns.

One of the most challenging aspect PMC have to grapple with in smart city development in developing countries is the various environmental issues that could ensue from the massive development that smart cities have brought. These issues tend to result from the sudden ecological stress imposed on the environment due to the large migration from rural to urban areas to take advantage of the opportunities arising from smart city development. The sudden rise in a city's population means lack of capacity in the municipal government to manage household solid waste management. This could be a major concern for the beautiful PMC before adapting smart development.

5.5 Lack of citizen participation, Technology illiteracy and knowledge deficit.

Last but not least, technology illiteracy and knowledge deficit among the citizens could pose an obstacle to PMC in realizing its smart city vision. The technology illiteracy of citizens can hinder the uptake of technology, the scaling up of technology adoption as the implementation require a large user base comprising a high number of technology-literate citizens. The knowledge deficit in the use of technology and the slow rate of technology penetration has undermined the operational efficiency of smart city development and hampered the speed of information mobility to the citizens. PMC consists of different class of people with different literacy rate. Hence this should be the major concern to make every people adapt on the system.

6. Ideas that can be implemented.

What do the urban communities of Singapore, New York, Tokyo, and London share practically speaking? They spent more than $1 billion of every 2020 on different city development activities. Furthermore, it's no big surprise why: Cities are at present home to the greater part—55%—of the total population; that number is expected to go up to 68% by 2050. There are huge amounts of extraordinary instances of savvy city arrangements set up the world

over as of now. Some of the best ideas that we can implement as well are as follows: -

6.1. Smart Waste Management Systems

With waste production in cities increasing, municipalities are trying to find ways to form their collection processes more efficient. Instead of using predefined routes and a hard and fast collection schedule, waste management workers believe sensors placed in waste receptacles to live fill levels and notify them when bins can be emptied.

6.2. Smart control Systems

Traffic delays don't only waste time, they also waste money. The population and usage of private vehicles are skyrocketing rapidly nowadays. As a result, an increasing number of city governments are leveraging IoT solutions in hopes of providing some relief and getting equipped with smart traffic signals within the coming years. Sensors at the intersections determine traffic volume and adjust stop-and-go times to support the amount of vehicles present. For example, The Heathrow pod system, developed by Ultra global part, is a zero-emission rapid transit system connecting terminal 5 with the business car park. The system consists of 21 public pods, eliminating the need to use the bus, and thus cutting emissions.

6.3. Smart Street Lighting

Many cities are upgrading their street lighting in additional ways than one—they're both switching to LEDs and implementing connected lighting solutions. This smart city IoT use case has multiple benefits, from increased energy efficiency to reducing energy and maintenance costs. Smart lights can automatically adjust their brightness supported periods of inactivity; they will also transmit maintenance information for quicker response times. For reference, the town of Miami has more connected street lights than the other city within the world; it saves 44% on energy annually compared to the quantity paid previously for traditional streetlights.

6.4. Smart Parking

Lots of developing cities are facing problems in the management of vehicle parking with an increasing number of private vehicles. With the help of GPS data from drivers' smartphones (or road-surface sensors embedded in the ground on parking spots), smart parking solutions determine whether the parking spots are occupied or available and create a real-time parking map. When the closest parking spot becomes free, drivers receive a notification and use the map on their phone to find a parking spot faster and easier instead of blindly driving around

6.5. Smart Public Service or E-Governance.

E-governance is characterized as administration inside the government utilizing data and correspondence digital innovations. Common digital services range from filing tax returns to renewing a driver's license to applying for a license. Nearly any government form or service can be offered digitally with a development of a simple system software. Traditionally, taxpayer driven organizations have been conveyed face to face, by single office in various areas, and regularly utilizing paper structures. With computerized administrations, the government can convey data and administrations to residents whenever, anyplace, and on any stage or device.

6.6. Smart Environment Solutions

Environmental concerns are the most significant part of each smart city pathway. Savvy urban communities expect to decrease pollution and discharges, through smart metropolitan arrangement and transport management. IoT-driven smart city solutions allow tracking parameters critical for a healthy environment to maintain them at an optimal level. For example, to monitor water quality, a city can deploy a network of sensors across the water grid and connect them to a cloud management platform. Sensors measure pH level, the amount of dissolved oxygen, and dissolved ions. If leakage occurs and the chemical composition of water changes, the cloud platform triggers an output defined by the users. For example, if a Nitrate (NO_3-) level exceeds 1 mg/L, a water quality management solution alerts maintenance teams of contamination and automatically creates a case for field workers, who then start fixing the issue.

6.7. Smart Safety

For enhancing public safety, IoT-based smart city technologies offer real-time monitoring, analytics, and decision-making tools. Combining data from acoustic sensors and CCTV cameras deployed throughout the city with the data from social media feed and analyzing it, public safety solutions can predict potential crime scenes. This will allow the police to stop potential perpetrators or successfully track them

.

Conclusion

Idea of Smart city not just being a selling strategy in election and catchy word in lofty speech but is a dream of Nepal and Nepali citizen. Not just a country that makes appropriate use of information and communication technology (ICT) in establishing itself as a disaster resilient, eco-friendly, and people-centric city but also a provision of people connecting with people. A city should initiate itself to become a smart city- it should be citizen-centered for the public good and diversity, Accessibility and Inclusivity. A city needs to prioritize its issues and pick the necessary dimensions of the smart city to address its issues and should be planned and designed around the principles and values of the people who live there. The technology-enabled smart cities in developing countries can only be realized when concurrent socioeconomic, human, legal, and regulatory reforms are embedded in the long-term developmental trajectories of developing countries. Contextual conditions—including the state's social development, economic policy, and financial endowment; the technological literacy and willingness of citizens to partake in smart city development; and unique cultural factors—are important for smart city development in cities like PMC.

Beside that some parts of 'India" can be a perfect example for the idea that excessive use of ITC and IoT is not just a basic component of smart city where there is a provision of digital gadget for almost everyone but not have a proper toilet facility. In sum, the idea of smart city in the developing nation like Nepal should be human centric first, should focus on the other very basic essentials of the citizen then only the idea as "Smart city" can be thought and get worked on.

7. Recommendation.

The concept of smart city presents different opportunities to different countries. The developed countries seem to focus on the extensive use of ICT and the provision of e-services to make the lives of people more comfortable. The wide-ranging usage of e-commerce and e-governance, and the establishment of a connected city that is operated by real-time information systems are exemplary interventions of smart solutions in developed regions. Whereas, the developing regions are exercising smart technological solutions to challenge their issues gradually one at a time.

In the context of PMC following are the major things to focus during smart development pathway:-

7.1. Selecting own indicators and focus on them.

For smart development to be sustainable a city should initiate itself to become a smart city- it should be citizen-centered. It is first imperative to distinguish the sectors where a city needs to become smart .The level of development and infrastructure should decide what kind of smartness is needed in a city. PMC needs to prioritize its issues and pick the necessary dimensions of the smart city to address its issues. Focusing on the primary issues that a city is facing and trying to solve them smartly leads any city to progress in a sustainable manner. PMC should work on that way. For e.g. PMC being a capital of Tourism it could be one of the top priority to make smart tourism flourish. Likewise, increasing parking issues in city center should also manage it smartly as city is known for its beauty and less traffic pollution city.

7.2. Inclusiveness of basic components:

Concept note regarding the smart city Nepal, 2073 highlights the basic 4 components of smart city they are: Smart People, Smart Governance, Smart Infrastructure and Smart Economy whereas the Smart city will be incomplete without the "smart mobility" and "Smart living". Smart city doesn't mean for a certain period of time, or just a strategy, but is a way of living for the citizen, so mobility is very essential component to make a city smart. From reducing pollution, traffic congestion to increasing people's safety, access of mobility is important, for the long term run of the other components and smart city concept. And smart living is

necessary because for the people to be smart there must be a smart living environment with the cultural facilities, Touristic Attractivity, housing quality and social Cohesion which is not mentioned in the governmental concept of smart city yet is very necessary for a city to be smart

7.3. Public service delivery from government to the community.

PMC has already initiated the smart way of managing public service delivery in smart way as they had already implemented a token system in the revenue collection and has moved ahead in the process of developing a mobile app to listen to the complaints of all the businesses, organizations, and places in Pokhara however, actual public service delivery between public and policy makers is still not in action. An ideal public service delivery system should be developed as soon as possible so that public could connect with policy makers directly and efficiently. This will make public participation easier in policy making and assisting government in various decision making.

7.4. Big Data feasibility to citizens.

In this age of artificial intelligence and machine learning data are the most powerful tool of decision making in every fields. Data could be of anything like data of public transportation usage, citizen's daily taste of life etc. This kind of data will help to improve and develop entrepreneurial ideas. Entrepreneurs and investors can invest on the field of interest to the local people in order to make every ideas successfully. Likewise data's easy access could help in knowing actual problems of the cities. Hence, A big data management system must be developed and start developing information through it and make decision accordingly.

7.5. Making citizens ready to use technology.

It is obvious that, the technology illiteracy of citizens can hinder the uptake of technology.

The scaling up of technology, adoption and the implementation require a large user base comprising a high number of technology-literate citizens. So PMC should focus on training campaign on various technological gadgets and systems so that user's will feel comfortable in participation and implementation before complete inauguration.

7.6. Promoting environmental sustainability

Finally, PMC should incorporate environmental sustainability as part of the policy narratives in smart city development. While many eco-cities in the world advocate for this vision, the actual results of providing an environmentally friendly, comfortable urban life that is inclusive of all segments of the population remain ambiguous. The lack of a consolidated policy framework on the wide scale utilization of renewable energy is one of the biggest barriers to achieving renewable energy. Hence Pokhara being a beautiful and growing city that have to work on making city eco-friendly with the development of smart bio chars.

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ABOUT US

Pokhara Research Centre (PRC) is a research based non- partisan organization based in Pokhara. Established in 2019, PRC focuses on socio-economic dimensions of domestic public policy research.

Guided by the motto of **" Economic Freedom with Good Governance "**, PRC is following the international principle of individual choice and liberty translated into equal opportunity of enterprise, rule of law and the democratic principle of free expression as a tool to design its programs and initiatives; creating positive impact at the province level, through policy reform; PRC works under three broad functional domain; Research, Training and Advocacy.

PRC's one of the flagship program Pre-Parliamentary Support Program (PPSP) aims to train youth of Gandaki Province in law-making and public policy. The primary role of a PPSP Fellow is to deliver extensive research support to their assigned MP for their parliamentary work. The organization is also focusing on other youth training program on free market, entrepreneurship and economic freedom in the region supported by Atlas.

The organization core values are; Creating public values, Evidence based policy making, the investment approach to public service delivery. PRC intervenes on areas viz. Enterprise Development, Economic Policy Reform, Governance & Advocacy and enhancing Public Service Delivery.

The organization has launched program such as Gandaki Discourse, Political Economic Discussion Series (PEDS), and Formation of Gandaki Leader Circle (GLC) dedicating it to establish itself as the state level policy think tank.

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