REVIEW ON SMART CITY CONCEPT

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Abstract - *Smart city is an application of Internet of Things (IoT) notion. Unceasing growth of population and urbanization have intensified innovative ways to handle urbanization impact on environment, citizen lifestyle. The recent deployment of wireless sensor networks in Smart City infrastructures has led to very large amounts of data being generated each day across a variety of domains, with applications including environmental monitoring, healthcare monitoring and transport monitoring. The factors which differentiate policies for the development of smart cities, in an effort to provide a clear view of the strategic choices that come forth when mapping out such a strategy. Smart cities suggest a domain that attracts an increasing scientific, political and economic attention. However, this domain is still confusing, since various parties define or apply alternative perspectives. the consideration that tourism, for the size it has assumed and for its role in the economies, can be considered an "urban phenomenon"; as such, it needs adequate governance processes, politics and tools in order to reduce impacts on the organization of cities and urban livability in general. Smart cities are emerging fast and they introduce new practices and services which highly impact policy making and planning, while they co-exist with urban facilities. To characterize and prioritize various urban areas of a city should be used a set of indicators. These indicators help us to establish the evolution and the grade of prepare of cities to smart society. This represents a starting point in formulating objectives and strategies for smart city development.*

Key Words: **Smart city, Development, *urbanization*, Internet of Things, sensor networks, Cloud computing, governance**.

1. INTRODUCTION

Smart city concept emerged as an application domain of IoT. Among various concepts that utilize ICT in urban environments i.e. digital city, green city, sustainable city, intelligent city, etc. smart city stands out owing to its holistic vision. In other terms, smart city act as a composition of other forms of urban environment management strategies.

The characteristics and features are described in a simple manner to understand the gist of smart city notion. Moving on to more technical details, generic architecture of a smart city is described after thorough examining among proposed smart city architectures. Smart city is a system that facilitates interoperability among various sub systems to improve the QoL of urban citizens. Henceforth, to acknowledge the importance of the composition, a major

component that builds a smart city is described elaborately. The literature survey identified that the realization of smart city highly relies on expedite data processing, ubiquitous accessibility, and platform dependent interoperability among devices. Real-world implementations of smart cities are presented towards the end of the article along with some latest statistics. Even though, a smart city has become a buzzword in modern world, it still faces some serious challenges and issues due to prodigious data processing demands and heterogeneity of connected smart things.

1.1 Combining Cloud and sensors in a smart city environment

Intends to shift the boundaries towards a Cloud of sensors and the like, where sensors and actuators not only can be discovered and aggregated, but also dynamically provide as a service, applying the Cloud provisioning model. Having in mind the (agreed) user requirements, it is thus possible to establish Sensors and Actuators as Service providers. The SAaaS envisages new scenarios and innovative, ubiquitous, value-added applications, disclosing the sensing and actuation world to any user, a customer and at the same time a potential provider as well, thus enabling an open marketplace of sensors and actuators.

This requires an ad hoc infrastructure that has to deal with the management of sensing and actuation resources provided by both mobiles and SNs, addressing the volatility of mobiles through volunteer-based techniques, in a SAaaS perspective. A possible area of application of such idea could be the IoT. To this purpose, it is necessary to deal with things, exploiting the well-known anthologies and semantic approaches shared and adopted by users, customers, and providers to detect, identify, map, and transform sensing resources. In this article, we identify and outline the roadmap to implement this challenging vision. A high-level modular architecture has been defined, identifying blocks to deal with all the issues herein discussed. Such architecture offers data gathered from many heterogeneous SIs to Internet clients in a uniform way, by using an abstraction layer designed according to the specification of the SWE standard. To support different types of sensors, the interaction with heterogeneous sensors has been accomplished using the Contiki Operating System.

1.2 Smart City Architecture and Building Blocks

An acceptable definition of "Smart City" within the European sub-continent is that "A city can be defined as 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory governance". Based on the above definition and the study conducted by the Smart-Cities working group, Europe, Smart City can be identified along six main dimensions namely; Smart Economy, Smart People, Smart Governance, Smart Mobility, Smart Environment and Smart Living.

These six areas are further characterized by defining factors such as:

• Smart Economy includes factors around economic competitiveness such as innovation, entrepreneurship, trademarks, productivity and flexibility of the labour market as well as the integration in the (inter-)national market.

• Smart People is not merely described by the level of qualification or education of the citizens but also by the quality of social interactions regarding integration and public life and the openness towards the "outer" world.

• Smart Governance comprises aspects of political participation, services for citizens as well as the functioning of the administration.

• Smart Mobility relates to aspects of availability and accessibility of information and communication technologies and modern and sustainable transport systems.

• Smart Environment is described by attractive natural conditions (climate, green space etc.), pollution, and resource management and also by efforts towards environmental protection.

• Finally, Smart Living comprises various aspects of quality of life as culture, health, safety, housing, tourism etc.

2. Smart City Strategy on an Existing City

The new versus existing smart city discourse stress the importance of collaboration among public and private actors, and most importantly the engagement of the city's people, in order to design socially sustainable and livable smart cities. the most important advantages of applying a smart city strategy on an existing city are:

• Opportunity of employing open innovation techniques and a bottom-up approach (crowd sourcing, user engagement, living labs, open data, etc.) to accelerate the innovation process.

• An ecosystem of stakeholders is already present, allowing for innovatory ways to collaborate and secure funding.

• Smart city revenue sources now tend to extend from products to services (namely platforms and applications), eliminating the need for large investments on smart city infrastructure.

The most important disadvantages of applying a smart city strategy to an existing city are:

• Complex ecosystems of people, institutions and stakeholders require extreme effort to organize and discipline.

• An existing city's infrastructure could be old and outmoded, hindering the realization of the smart city vision

• Besides becoming 'smart', existing cities have many problems that must be addressed and which compete for a share of the city's recourses. Therefore, it is not possible to address all aspects of a smart city; the strategy has to be highly selective and based on a laborious prioritization process.

Understanding the 'actually existing smart city':

The proliferation of new forms of data whether collected from sensors embedded in the built environment or gathered from social media platforms has offered up new opportunities for understanding urban processes which, in according to the rhetoric of smart cities, will differentiate places and make them more competitive. In short, these new sources of data and new ways of analyzing, visualizing and understanding data have reconfigured the social and spatial processes of urban governance and economic development. Data now occupies a central place in urban governance, acting as a kind of master signifier or obligatory passage point through which all other functions must position themselves (Callon, 1986). Data is now both the modus operandi and raison d'etre of this latest form of urban governance. This new mode of data-driven urban governance is comprised of both relational and territorial elements, reflecting that contemporary urban governance is both connected to global flows of people, ideas and money (that is, relationality) as well as grounded in particular places in both their genesis and effect (that is, territoriality) (McCann, 2011; McCann and Ward, 2010). By reviewing both the relational and territorial dimensions of the actually existing smart city, we highlight the means by which this new urban policy model has diffused, while also understanding how these ideas have affected material changes in existing places.

The smart cities' topic is still largely under exploration. The smart city landscape is shaped under local characteristics, priorities and the needs of cities, in addition to global market forces and available technology. A comprehensive effort to provide a clearer view of the strategic choices with spatial

reference that may play a fundamental role in the design of a smart city strategy. The advantages and disadvantages of each strategic choice were presented, distilled after a comprehensive review of recent smart city literature. These different paths emerge as dual or multi-faceted, leading to a range of decisions that radically differentiate the outcome of the smart city. Which available option is best is open to discussion. Different strategies have been implemented in variations through smart city projects globally. Indeed, several proposed or applied smart city strategies lie somewhere in-between the extremes of the available strategic choices.

Smart City viability's realization:

Smart city is a "booming" phenomenon, while the term smart city is rather confusing regarding its meaning and use. An investigative review of 31 cities identified eight classification technological approaches, five of which are still active, while most of the investigated cases have experienced updates from their initial approach. In this sense the smartness achievement remain closely relied to the capacity of promoting cities (it's cultural heritage, its historical resource, its monuments, etc.) rather than to provide for adequate measures enabling the city to contain tourist fluxes according adequate town planning design. Difficulties in availability of tourist data, even though open and big data era is already started, hamper any control on tourism phenomenon and its dimension in urban areas, especially referred to fluxes activated by occasional events or periods. The characteristics of smart tourism destination that have been listed in the previous pages represent the attempt of individuating some "fields of application" that could permit to reach urban smartness for the whole system.

Smart cities are "booming" and various important cases can be faced worldwide, which can be classified in various approaches and can be evaluated according to their sophistication. All alternative approaches deliver emerging types of services to the local communities with the use of physical and of virtual resources. Urban planning supports sustainable local growth, it consists of four dimensions that were recognized according to the European Regional Policy Framework, and their context was described. More specifically, smart city's service layer aligns and contributes to all the urban planning's dimensions and various e-Services support sustainable local growth. On the other hand, planning's dimensions can be affected by smart city's stakeholders via participatory policy making, while the smart city's infrastructure has to be recognized and capitalized.

The use of modern technology efficiently in our urban areas is an important part of modernization, growth and sustainable development. Our society today is more organized, smart and the information is situated in the center of it. In our age the cities development depend on the use of more and more smart solution. For sustainable growth of society is essential to use efficiently the modern technology and natural resources.

3. CONCLUSION

Internet of Things (IoT) resulted from the evolution of conventional networks that connect zillions of connected devices. Smart city has developed into the spot focus in last few decades, due to dramatic urbanization all over the world. Performing city operations with aid of ICT made cities efficient in various aspects. A remarkable point of contact for both sensing environments and Clouds is the Internet of Things (IoT), where basic physical items can be further distracted according to thing-like semantics. Indeed, the outlined infrastructure could be the workbench on top of which such an abstraction would be implemented. Smart Living comprises various aspects of quality of life as culture, health, safety, housing, tourism etc. The Smart City concept operates in a complex urban environment, incorporating several complex systems of infrastructure, human behaviour, technology, social and political structures and the economy. Smart cities represent a conceptual urban development model based on the utilization of human, collective, and technological capital for the improvement of development and prosperity in urban agglomerations. The power of the smart city imaginary to capture the minds of corporations, policymakers and average citizens makes it an important means through which cities are being constructed in the 21st century. While we remain critical of the smart city model, both as it is offered up by large technology corporations and as it has actually been implemented in cities like Louisville and Philadelphia, we also highlight the alternative possibilities opened up by these new forms of data-driven governance. The implementation of a smart city is based on sets of projects, which address these predefined priorities and objectives. However, these various smart city cases did not keep their initial forms and they have updated –even more than once- to different directions and objectives, a fact that questions the strategic purposes, the effectiveness and the viability of a smart city. Tourism as an urban activity that can transform urban organization. The connection between tourism and urbanity is complex: the city is the physical place where tourist needs and inhabitants needs intersect. This means that cities must to face different demands by offering adequate services and facilities. Smart cities appeared in late 80s as a means to visualize urban context and they evolve fast since then. Today, the enhancement of digital content and services in urban areas, it incorporates pervasive computing and face environmental challenges. The smart city means to infuse intelligence in all activities for improve the quality of work and of life, to reduce cost and to improve the efficiencies.

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