

Cities of the future, intelligence, vigilance

AmirHassan Assadiyan
Master of ICT Engineering
Municipality ICT Organization
Mashhad, Iran
amirha3@gmail.com

Somayyeh Poolayi
Master of Information Technology and Network Engineering
Sharif University of Technology International Campus
Mashhad, Iran
somayeh_ply@yahoo.com

Abstract:

Technology is critical to enable a City to efficiently and effectively serve the public. In addition, ensuring that people have access to the technology needed to take part in our society is critical to achieving personal growth, full civic participation, and equitable economic development. City services based on IT has undertaken several initiatives to enable more efficient and equitable use of technology in the City and to improve people's quality of life. Smart cities are not the vision of the future, but toward to innovative solutions, many of them are already active or expanding rapidly. City managers use to communicate and improve infrastructure, productivity, comfort and quality of life of residents and visitors. The purpose of this study was to analyze and evaluate the challenges facing people in smart cities around the world. The method of this research in the first place with the help of documentary or library method and review of related information sources in books, articles and information networks, the factors affecting the intelligence of cities and its indicators were identified. Also, using it, first the list of leading cities in the field of urban management based on information and communication technology was considered and then the key effective information was obtained and their evaluation was intelligently developed in the studied dimension and transferred to the next stages.

Keywords—Smart Cities, Smart Applications, Smart Governance

I. INTRODUCTION

"Intelligence of different sectors alone does not solve urban problems such as traffic," he said. "Only if we can establish a proper connection between these areas in a comprehensive system can we reach the smart city." The definition of a smart city is a way to intelligently solve urban challenges. Of course, our resources in cities are limited, and if we cannot have the right priorities to solve the challenges of the city, our actions in the field of smart cities will not be defined and we will not achieve good results. For this reason, we see in the world that the plans of each city for smartening are different from other cities and based on the challenges and characteristics of that city; Therefore, copying the methods that other cities in the world have taken in the direction of smartening does not make our cities smarter.

Citizenship apps have been developed in different countries based on private sector ideas and startup innovations in two different styles. In European countries, these apps are mostly managed by the private sector, but in East Asian countries,

superpowers are formed under the management of governments and provide various services to the people. In the first style, private collections will be merged after a while with the aim of further development and growth. In the field of urban opera, we also need this to happen in our country. Basically, why do people have to get a separate card in each city to use services like the subway? We need to connect databases in cities so that citizens can receive different services in all cities from a specific platform. In general, the needs of citizens can be divided into two categories; First the needs that the government faces and then the needs that the citizens face in urban activities. In other words, citizen software can be considered a virtual city in citizens' smartphones. When we talk about creating citizen software, we are dealing with a megaproject. There are two ways to implement such projects, in the first way we can provide a data platform in which different services that are providing services in different areas, are integrated in that platform. In the second route, we can provide both data infrastructure and various services. In addition to these two paths, another approach can be taken to implement this megaproject; in this way, urban management creates a data infrastructure and allows different businesses to interact with each other. In this approach, urban management is the only observer and encouragement of citizens to use these services. According to a study conducted in the field of citizen software, it can be said that a group of these software's serve in a specific city and online shopping, transportation, maps and navigation are the priority of their services. However, because of our studies, we have not been able to find comprehensive software that provides all the services in a particular city and is popular. Government software is another category of citizen applications that are mainly provided by municipalities and government agencies and are not very popular with citizens. Private software such as WeChat and Snap, called super-apps, are the third category of citizen applications. Super-ups are not ubiquitous worldwide and are more popular in parts of Southeast Asia. Dividing the development model of superheroes in the world into three categories, he described these models: Entering the field of fin-tech, extensive product advertising and focusing on a value proposition, are the three different models by which superheroes are developed.

The provision of real-time information about urban environments is important for running different helpful applications and services.

A brief overview of various areas of smart city applications is recapitulated in Figure 2. It is clear that the spectrum of application areas is very wide. For example, real-time travel

information is essential for applications which let people plan trips on public transportation. The user could have real time information about when the next bus or train is coming. Another example is an application, which collects and distributes real time information about where parking is accessible so drivers can promptly find free spaces. Access to suitable data represents an opportunity for developers to create applications. In this way, stakeholders can access wide online services, with portals for basic information, citizen services, business, and tourism, all based on a common infrastructure. Smart cities are deploying online services in different sectors of cities. [1-p3]

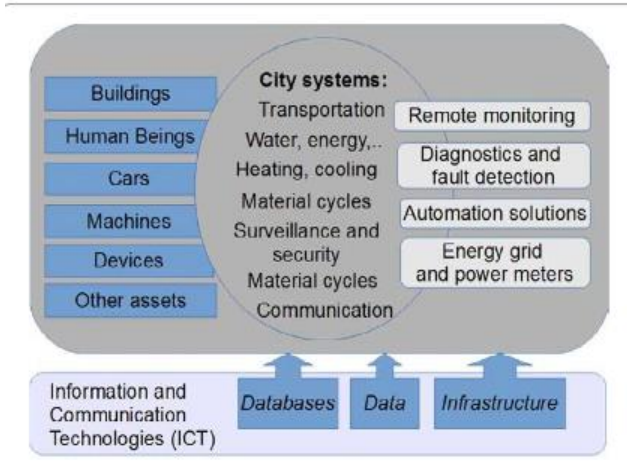


Figure 1: Data, City Systems and their relation to the sensing and control city subsystems.

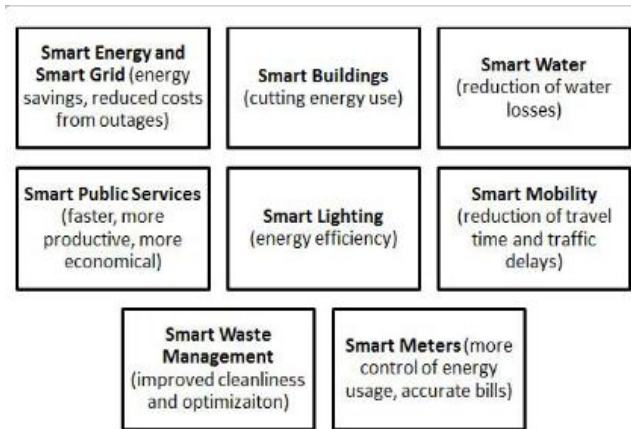


Figure 2: Areas of smart city applications

In the following, we will provide a technical review of a number of world-renowned applications in the field of e-government, which is the basis of our first studies in launching and customizing the domestic product:

II. COMPARISON OF SIMILAR STRUCTURES

A. Find It, Fix It

A smart app lets Seattle residents report urban issues.

With this application, users can easily take photos with their smartphone, send additional information in the form of text and audio file, and specify their location via mobile phone. Some of the services provided by the app:

- Abandoned vehicles: Citizens can report the presence of vehicles parked on a public thoroughfare.
- Bicycle or Scooter Subscription Number: Report a shared bicycle or scooter, report a parking problem or even maintenance
- Damage from natural disasters such as hurricanes: Drainage and drainage reports can also be reported.
- Dead animal: Request the collection of the bodies of dead animals.
- Mural Report: Report graffiti.
- Report illegal dumping: Report illegal dumping - rubbish, rubbish or debris - on public property, including roadsides, open streets and asphalt alleys.
- Excessive vegetation: Report excessive vegetation in public areas crossing the road or on city property.
- Parking Implementation: Inquire about parking issues.
- Holes: Report the presence of potholes or potholes.
- Driving Signs Maintenance: Report broken signs and traffic signs.
- Street light report: Report a street light outage or breakdown.



Figure 3: Find it, Fix it Application

B. BOS 311

Originally called Citizens Connect, it was launched in 2009 to facilitate the reporting of Boston citizens' problems. Users can report murals, dead animals, illegally parked cars, or schedule a garbage collection. This report is placed on a map that is also available in the program. Reports can be shared on social media and users can tweet @ BOS 311 to connect with the service. So far, users have submitted more than 1 million reports.

C. Snap Send Solve

A platform enables officials and citizens to identify and resolve local issues at the community level. Simply take a photo, using this program, the report is ready in 30 seconds and the issue is sent and resolved directly to the relevant authorities. Snap Send Solve is available throughout Australia and New Zealand.

Snap Send Solve enables users to report an array of events, including:

- Abandoned cars or vehicles
- Abandoned carts
- Animal issues
- Pits and doors of communication equipment
- Spilled waste
- Mural
- noise pollution
- Car parking
- Sidewalks and roads
- Playground equipment
- Street lights
- Street cleaning
- Trees
- wastewater issues

Moreover, if you want to report another issue or send it as a public request.

D. Fix My Street

With this app, you can report common street problems, such as potholes or broken streetlights, to councils across the UK. This program works online and offline.

This application allows British citizens to submit reports on urban issues to notify local authorities of problems such as potholes, broken lights, etc.

- Total reports recorded last week: 9,712
- Repaired items in the last month: 12,841

(This statistic is constantly changing. The above statistics are related to the moment of preparing this report.)

E. My Town

It is a smart city application that allows citizens to report problems directly to the government. This plan may include garbage collection, parking space, potholes, and streetlights being cut off, and so on. In addition, citizens have access to more than 30 different types of possibilities in this program and it has acceptable settings such as school and bus warnings, updates about road closures, water use restrictions, waste and recycling programs, waiting time In the hospital and other cases.

As an option, the program uses its "Hot Line" tool to release anonymous information to government officials or anonymous documents. My Town aims to enhance citizens' interaction with their communities. Typically, it allows municipal employees and elected officials to protect and respond to citizen feedback.

F. See Click Fix

Helps users report non-emergencies to government agencies.

The app allows the user to report non-emergencies, such as murals, burnt streetlights and potholes, along with geotags and photos to city officials. In addition to automatically redirecting reports to the appropriate email addresses, the app tracks reports and allows users to comment on the issue.

Relevant platforms, including sites and applications, cover more than 25,000 cities and 8,000 neighborhoods in the

United States and all international communities. The system has built its strongest networks in Auckland, California and Detroit. In August 2010, it also received a record 50,000 records from Sonora, Mexico.

By 2012, participating news organizations included the New York Times, the Toronto Star, the San Francisco Chronicle, the Miami Herald, and the Philadelphia Inquirer. See Click Fix News has sparked local government response. While the company still provides freely available tools to local media, its core business since 2012 has been serving local governments and their members.



Cities are structures of services and these services are things through which people interact within the city systems, together with other people. They often consume or transform resources and usually require some form of payment or exchange. Both universal and regional service providers offer to manage and run city applications and services. Many systems integrators and service providers are going beyond the defining, designing, developing and deploying offerings for specific smart city initiatives by integrating multiple initiatives or by proposing to accomplish and run them on behalf of city administrations or other stakeholders. Services delivered by smart cities should be easy to use, efficient, responsive, open and sustainable for the environment. Citizens and other stakeholders expect high quality public services that transform and enhance their daily quality of life. There is a pressure on cities to optimize urban services management, provide better and more efficient infrastructures and services, often for less cost. The general aim is to deliver higher quality services more efficiently, to achieve saving in staff time and costs of delivering services, and provide a safe, convenient, efficient service.

Advances in new technology are employed to improve city applications and services. There are communications, analytical and control technologies that permit transforming the way of doing things while influencing better policy and urban management. It is changing the entire way the service can be solved, combining the ICTs with city infrastructure and shifting the city systems solutions. Thanks to these technologies, there is the capability in the provision of services via digital communication, e.g. interactive services or automating the solution of services. Public infrastructure modeling present city services and the technological solution of services. Data are stored and forwarded by using the network backbone in order for use by service providers and in related applications. there is the prospect of "increased broadband capabilities, improved flexibility and easy deployment of scalable multi-service network architectures." The article concludes that the integration of broadband personal communications with device-to-device

However, these are not the only fields where the impact of smart cities has been limited. The paper provides an explanation for the low impact of various individual applications of smart cities and discusses ways of improving their effectiveness. We argue that the impact of applications depends primarily on their ontology, and secondarily on smart technology and programming features. Consequently, we start by creating an overall ontology for the smart city, defining the building blocks of this ontology with respect to the most cited definitions of smart cities, and structuring this ontology with the Protégé 5.0 editor, defining entities, class hierarchy, object properties, and data type properties. We then analyze how the ontologies of a sample of smart city applications fit into the overall Smart City Ontology, the consistency between digital spaces, knowledge processes, city domains targeted by the applications, and the types of innovation that determine their impact. In conclusion, we underline the relationships between innovation and ontology, and discuss how we can improve the effectiveness of smart city applications, combining expert and user-driven ontology design with the integration and orchestration of applications over platforms and larger city entities such as neighborhoods, districts, clusters, and sectors of city activities. [3-p1]

Finally, we review the content in four key indicators:

1) *Purpose*

By this paper, we try to investigate the potential contribution of smart city approaches and tools to sustainable urban development in the environment domain. Recent research has highlighted the need to explore the relation of smart and sustainable cities more systematically, focusing on practical applications that could enable a deeper understanding of the included domains, typologies and design concepts, and this paper aims to address this research gap. At the same time, it tries to identify whether these applications could contribute to the “zero vision” strategy, an extremely ambitious challenge within the field of smart cities.

2) *Design/methodology/approach*

This objective is pursued through an in-depth investigation of available open source and proprietary smart city applications related to environmental sustainability in urban environments. It is recommended the applications should be analyzed comparatively regarding (i) the environmental issue addressed, (ii) the associated mitigation strategies, (iii) the included innovation mechanism, (iv) the role of information and communication technologies and (v) the overall outcome.

3) *Findings*

The findings suggest that the smart and sustainable city landscape is extremely fragmented on both the policy and the technical levels. There is a host of unexplored opportunities toward smart sustainable development, many of which are still unknown. Similar findings are reached for all categories of environmental challenges in cities. Research limitations pertain to the analysis of a relatively small number of applications. The results can be used to inform policy making

toward becoming more proactive and impactful both locally and globally. Given that smart city application market niches are also identified, they are also of special interest to developers, user communities and digital entrepreneurs.

4) *Originality/value*

At the theoretical level, it offers a neat conceptual bridge between smart and sustainable cities debate. At the practical level, it identifies under-researched and under-exploited fields of smart city applications that could be opportunities to attain the “zero vision” objective.

communications and M2M will constitute a significant challenge.

A ‘smart city’ uses digital technologies to:

- engage more effectively and actively with its citizens
- enhance the city performance and the wellbeing of the citizens
- reduce operational costs and the city resource consumption
- generate new business opportunities and increase the attractiveness of the city
- and much more ...

The creation of smart cities will only be achieved with a holistic approach, supported by globally acceptable standards that enable fully interoperable solutions that can be deployed and replicated at scale.

With the flourishing and advancement of the IoT, the smart city has become an emerging paradigm, consisting of ubiquitous sensing, heterogeneous network infrastructure, and intelligent information processing and control systems. A smart city can monitor the physical world in real time, and provide intelligent services to both local residents and travelers in terms of transportation, healthcare, environment, entertainment, and energy. However, security and privacy concerns arise, since smart city applications not only collect a wide range of privacy-sensitive information from people and their social circles, but also control city facilities and influence people's lives. In this article, we investigate security and privacy in smart city applications. [2-p1]

References

- [1] Radovan Novotný*, Radek Kuchta and Jaroslav Kadlec, Smart City Concept, Applications and Services, Journal of Telecommunications System & Management, 2014
- [2] K Zhang, J Ni, K Yang, X Liang, J Ren, Security and privacy in smart city applications: Challenges and solutions, IEEE Communications, 2017
- [3] N Komninos, C Bratsas, C Kakderi, Smart city ontologies: Improving the effectiveness of smart city applications, Journal of Smart Cities, 2016
- [4] M Angelidou, A Psaltoglou, N Komninos, Enhancing sustainable urban development through smart city applications, Journal of Science, 2018
- [5] K Su, J Li, H Fu, Smart city and the applications, international conference on electronics, 2011
- [6] BPL Lau, SH Marakkalage, Y Zhou, NU Hassan, A survey of data fusion in smart city applications, Elsevier, 2019
- [7] H Menouar, I Guvenc, K Akkaya, UAV-enabled intelligent transportation systems for the smart city: Applications and challenges, IEEE, 2017
- [8] D Eckhoff, I Wagner, Privacy in the smart city—applications, technologies, challenges, and solutions, IEEE Communications Surveys, 2017
- [9] M Strohbach, H Ziekow, V Gazis, N Akiva, Towards a big data analytics framework for IoT and smart city applications, Springer, 2015
- [10] A Cimmino, T Pecorella, R Fantacci, The role of small cell technology in future smart city applications, Wiley Online Library, 2014
- [11] F Cicirelli, A Guerrieri, G Spezzano, A Vinci, An edge-based platform for dynamic smart city applications, Future Generation Computer, Elsevier, 2017
- [12] Calvin W. Goings, customer-service-bureau, Seattle City Hall, 2020
- [13] <http://www.seattle.gov/customer-service-bureau/information-and-resources>
- [14] <https://www.cityofboston.gov/311>
- [15] <https://www.snapsendsolve.com>
- [16] <https://www.fixmystreet.com>
- [17] <https://www.realtermenenergy.com/mytown-smart-city>
- [18] <https://www.seeclckfix.com>

somayyeh-poolayi