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# Model of Smart Cities Based on Good Governance Factors

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***Abstract:*** *Smart City regarded as a strategy to reduce the problems generated by urban population growth and rapid urbanization, and this realized in the form of good urban governance with features such as accountability and transparency. The purpose of this study was to present a smart city model in Iran based on good governance factors (case study: Tehran city). The research method in terms of the purpose and implementation was applied and qualitative-quantitative, respectively. The statistical population of the present study in the first stage included academic experts and urban managers aware of urban intelligence and in the second stage (i.e. quantitative) urban managers in different Tehran regions (north, south, east and west). The sample size of the Delphi part consisted of 15 to 20 experts who were available to respond, and in the second stage (i.e., quantitative section), urban managers in different Tehran areas were numbered 100 individuals. In the first part of the research (i.e. qualitative), the available sampling of Delphi was utilized and in the second part (i.e., quantitative) the simple random sampling. The research tools included Delphi questionnaires (interview of experts) and quantitative questionnaires. SPSS and AMOS software were used to analyze the data. In the conducted study, the application of good governance theory differs from one society to another and the only general rule of good governance theory is to employ two mechanisms of accountability and competition to improve governance. The results showed that governance had a positive and effective role in smart city promotion. Furthermore, governance had positive effect on six indicators of smart city, smart people, smart economy, smart transportation, smart governance, smart living and smart environment.*

***Keywords:*** Smart city; Good urban governance; Urban managers; Tehran

## 1. Introduction

The issue of "Smart city" may seem difficult to fully understand, but the author has experienced some scientific and intellectual activities in finding the problem about smart cities in Iran. Such issues are associated with confusion and fatigue. It is often observed that students and researchers have some difficulties in interpreting such issues and are not even able to properly express the basis of their scientific research. Therefore, it will be much more difficult to find and formulate a problem than to solve it. To gain a quick understanding, we have separated the research problem into a theoretical and a social problem to allow the classification of important indicators of a smart city in Iran (with case study of Tehran). For this, we needed to accomplish the study based on descriptive-analytical and quantitative-qualitative methods. Additionally, in this study, our goal of good urban governance is the same governance that can only be achieved through the smartening of various facilities and services related to new technologies, which includes e-government, the efficiency agenda, mobile working, etc. The concepts implemented by government and stakeholders should focus on the improvement of the quality of living conditions. If in this implementation, the actions of planning, managing and financing be conducted in the best framework, then we can say that good urban governance has been done and while implementing these principles through new technologies, smarter governance can be achieved. Therefore, we in good urban governance, for attaining smarter governance, aim to reduce the cost of capital, encourage positive behavior, improve top-level decision-making, assure internal controls, enable better strategic planning, and attract talented directors.

In 2000, electronic cities in Iran were discussed for the first time. Different negative aspects in metropolis of Tehran, such as traffic, air pollution, lack of public security, cultural problems, problems of services and facilities, and etc. would have required smart solutions and development of this technology in Iran based on the factors. Therefore, the share of our study is that could be effective in implementing more efficient smart projects, especially Tehran, as winner of World Smart City Award 2019 in Barcelona.

In general, the research problem is: what are the factors as smart solutions and development of this technology in Iran in order of priority and how do we find it?

When researchers like Nam & Pardo [1] claimed their ideas about smart governance as a dimension of the smart city, shortly before that in Iran, Iranian researchers and officials at an international conference sought to investigate this technology in Iran's metropolises, especially Tehran as the most populous city in Iran and Western Asia, and the third-largest metropolitan area in the Middle East. Therefore, smart-building of Tehran was very significant for a country with many urban problems.

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Although some measures have been performed for smart-building in Tehran such as electronic banking services, electronic payments, electronic purchases, expanding use of credit cards, and applying Intelligent Transport System (ITS) studies and smart traffic systems, it seems that these services do not still satisfy the requirements of a smart city and the integrated management. Therefore, smart systems can promote life standards through offering online services to the citizens and in order to recognize deficiencies and promote smartness level the software models are very fast and alternative.

Although there is no agreement on the exact definition of a smart city, a number of main dimensions of a smart city have been identified through a literature review (Fusco Girad, 2009) ([2]). In reality, in a true smart city three terms of "digital city", "knowledge city", and "eco-city" must be integrated in a holistic and systematic way (Nam & Pardo, Fusco Girad, 2009 ) [1-2].

From Barns' (2018) [4] point of view the proliferation of smart city policies worldwide in recent years has seen digital infrastructure, urban data and software design play increasingly central roles in the contemporary governance of the city. In his research addressed the role of urban data platforms in supporting the delivery of smart city initiatives by city governments, with a view to establishing a typology for effective strategic investments in urban data interfaces aligned to governance objectives. His discussion aims to position urban data platforms as key sites for the development of new governance models for smart cities, and forums in which decision-makers, researchers, urbanists and technologists seek to test the potentials and pitfalls of data-driven methodologies in addressing a range of contemporary urban challenges.

Cities that are writing a smart city strategy for the first time usually create a separate strategy to start with. Smart city strategies have broad ambitions that are often hard to pin down. They typically cover the range of economic, social and environmental outcomes that most cities strive for. Over time, the emphasis of smart city strategies has shifted from ambitions to achieve efficiencies in service provision, to ambitions for higher quality of life for citizens and more sustainable living (Azzari, M., et al. 2018; Barns, 2018) [4,5].

However in some cities, for example in Helsinki, the core enabler of the strategy is an innovation ecosystem. In these cities, a thriving innovation ecosystem is seen as critical to drive the creation and adoption of smart city solutions. Supporting such an ecosystem is then the major component of these strategies. The 'smart city' rose to prominence in the public consciousness as a marketing concept from global technology companies that saw an opportunity to sell digital transformation and new technology into big city systems (water, energy, transport). 'Smart City' caught the imagination as smart phones and digital transformation spread across the world at a phenomenal rate. Smart city strategies generated through collaborative strategy formulation usually lead to the creation of an arm's length organization or public-private partnership to deliver it. This is the natural successor to the networks that convene to bring city stakeholders together during the collaborative strategy process (Azzari, M., et al., 2018; Barns, 2018; Yigitcanlar& Velibeyoglu, 2008) [4-7]. Apart from them, Kamolov& Kandalintseva (2020) [8], in order to determine the country's readiness for practical implementation of the smart cities, presented empirical data for proving the availability of formalized markers in the operation of management systems (state and municipal authorities), characterizing digital rate and indicating integration of goals, objectives, and organizational and budgetary resources. Their research results may be used by ICT firms, experts of audit, consulting companies, analytical groups, and state and municipal authorities

Actually, the concept of "Smart City" originated in a U.S. information technology company IBM, when CEO Sam Palmisano put forward this concept of smart earth in the roundtable in 2009. In 2010, 15 years after the Internet revolution, the information-gathering techniques, communication technology, and information database and virtual information could be integrated and collected in real time at anytime, anywhere and anyone. This technology concept is known as The Internet of Things (IOT). Afterwards, IBM's smarter planet concept was built on basis of the IOT technology, such as infrared sensors, global positioning systems, laser scanners and other information sensing devices (Kamolov& Kandalintseva, 2020; M. Ajza Shokouhi et al., 2016) [7,8].

In addition, a recent and interesting project has conducted by the Centre of Regional Science at the Vienna University of Technology. In this project six axes connect with traditional regional and neoclassical theories of urban growth and development. In particular, the axes are based-respectively- on theories of regional competitiveness, transport and ICT economics, natural resources, human and social capital, quality of life, and participation of societies in cities (Shokouhi et al., 2016; Caragliu et al., 2009). [8,9]

Leydesdorff and Deakin (2011) [10] wrote the triple helix model of smart cites to demonstrate how this model enables us to study the knowledge base of an urban economy in terms of its civil society's support for the evolution of the city as a key component of an innovation system. They considered three relevant dynamics: the intellectual capital of universities, the wealth creation of industries, and the democratic government of civil society. These dynamic spaces can be a place where knowledge plays a key role to regional innovation systems, creating the notion of "smart cities."

Thi Hoang et al. (2019) [11] used a systematic literature review method to examine decision-making methods, the possibility of communication between several stakeholders at different stages of projects, especially citizen engagement. In addition to analyzing citizenship issues, they concluded that the involvement of multi-stakeholders is not considered in most phases of smart city projects. In cases where they are involved, there is a lack of decision-making tools supporting the negotiation between stakeholders. Hence, from the view of them there is an opportunity for future work to focus on smart government supporting the involvement of stakeholders, especially citizens, in decision-making processes.

The role of governance in a Smart City not only focuses on adopting new technologies but also on improving the transparency in sharing data and decision-making. The contribution of stakeholders, especially citizens of the smart city is based on their ideas for the future development policy. Therefore, smart governance is also considered as participatory governance or citizen-centric governance. In a Smart City, Information Communication and Technology (ICT) play an important role for policy makers to collect data and govern the city in a better way with well-informed decisions and adequate policies. This leads to the data-led governance in a Smart City that is affected by the internet of things (IoT), sensors, and big data. Smart City governance is inherently complex, with the multi-context and multi-level ecosystem of various stakeholders who are often driven by conflicting interests (Ruhlandt, 2018; Thi Hoang et al., 2019) [11,12]. In particular, the following three objectives are expected to be attained: 1) critical assessment of smart city ranking index existence, 2) definition of an enabling technology supporting the action plans for strengthening multi-level place-based governance. This will be applied in the tourism context, 3) definition of strategies for good smart governance, with the purpose of providing recommendations to start or implement an institutional and development process leading towards smart city governance.

One of the terms introduced into public administration literature with a modern concept is good governance that was defined by the World Bank and IMF over the two past decades (ARUP, 2008; Thi Hoang et al., 2019) [11,13]. The main good governance purpose is to achieve sustainable human development, which emphasizes poverty reduction, employment creation, livelihoods, sustainable welfare, environmental protection and restoration, and women's growth and empowerment (Pourezzat, 2009; Kardos, 2012) [14,15]. Good governance has six indicators: protest and accountability, political stability and non-violence (Ernst&Hart, 2007; Ojo et al., 2015; Chatfield&Reddick, 2017) [16,17,18], quality of regulation (Austrian Development Agancy, 2011) [19] and corruption control (Guo&Lu, 2007; Avram, 2014) [20,21].

In developed smart cities, governments' role is to manage multiple mechanisms of urban development, provide well-organized and integrated strategies of local developments (Azzari et al., 2018) [4]. Lopes & Farooq (2020) [22] analyzed unpreparedness of actual Pakistan governance model to deal with challenges in this country and suggested a suitable and flexible governance model for Pakistan cities to become smarter and sustainable. Finally, they proposed a new governance model for Pakistan to be able to achieve the sustainable development goals stated in UN agenda 2030, through smarter and sustainable cities. Their work conclusion was that a two-tier smart governance model grounded in good governance principles such as effectiveness, efficiency, transparency, collaboration and openness, accountability, and pluralism, which driven by e-governance and e-government.

(Garau et al., 2020) [23] proposed a governance-centered framework for the comparative analysis of smart cities as a tool to measure and evaluate not only the urban fabric, in terms of physical, social and human capital but also its ability to use governance structures and relations for the societal well-being, combining efficiency and equity. The purpose of this project is, therefore, to drive the evolutionary process towards smart and inclusive urbanism through the adoption of a simultaneously multi-level and place-based governance approach to smart city policies and initiatives.

Good governance is designed to measure the performance of governments while most of the world's human population lives in cities and the human population in cities is subject to governance. In fact, the third millennium is the millennium of urbanization. The process of urbanization around the world has been increasing rapidly and in this leap, human development in the field of information technology has transformed human lifestyles in cities, and subsequently the strategy of urban management has also changed. Cities as a place where governments interact with citizens' desires and behaviors, today not only are places for living but also a place to test the ability of governments to optimally manage the demands of citizens. In this regards, the most recent urban management strategy has been proposed titled "Smart City". A smart city was considered with 6 dimensions of smart economy, smart transportation, smart environment, smart citizen, smart life, smart government (Jiffinger, 2007; Du&Qin , 2014; Navío&Anand, 2018) [24, 25, 26].

By comparing the indicators of the two strategies of good governance and smart city, we find that these two have a necessary relationship. In the sense that the pillars of protest and accountability, political stability and lack of violence, and the government effectiveness realize through (1) the good governance index in the context of the smart government pillar (emphasizing on participatory features in decision making and transparency of governance), (2) pillar of smart people (emphasizing on features, ethnic diversity), (3) pillar of smart living (emphasizing on unionism), (4) smart economy (emphasizing on the characteristic of international stability, strategic insight). Furthermore, the pillars of regulation quality, the rule of law and the control of corruption are indicators of good governance in all pillars of the smart city, especially the two pillars of smart economy and government.

The population and housing census data show that in the second half of century 21, the trend of urbanization in Iran has increased. In 2011, Iran's urban population exceeded 66% of the country's total population. The urbanization trend in Iran is expected to continue to rise, reaching 85% in 2052. This general discourse on smart cities indicates the great necessity of good governance in the Iran's smart cities, with increasing population.

It seems that if the policies of population growth to be implemented, the population concentration in the densely populated urban areas, especially Tehran and other metropolitan areas, will increase. The urban center with a high concentration of population in the central cities of the provinces and especially the city of Tehran has also been associated with a concentration of services, job opportunities, resources, investment, and overall unequal distribution of facilities and resources. On the other hand, in

parallel with the development of urbanization and social and economic developments of cities in Iran, there are failures that in many cases appear as acute problems.

In such circumstances, smart city is seen as a strategy to reduce the problems generated by urban population growth and rapid urbanization. This is accomplished in the form of good urban governance with features such as accountability and transparency. Good urban governance permits collaboration, information exchange, integration of services and communications, and the use of new communication channels, such as e-government or e-democracy, which are among the most important needs of the smart city. A number of studies have examined the requirements of realization for the smart city model based on good governance. For example, the study conducted by (Kardos, 2012; Eger, 2014; Rindermann et al., 2015; Caragliu et al., 2018) [15, 27, 9, 28] which showed that the preconditions for creating smart community, smart transportation, smart economy, smart living, smart environment and smart management are specialization of officials and alteration the processes of doing work in the municipal body. The success of a smart city is not only through capital and technology, but more importantly depends on community leadership and inter-group collaboration under good urban governance. Additionally, the research results some researchers (e.g., Jennings, 2010; Rindermann et al., 2015; Caragliu et al., 2018; Caragliu& Del Bo, 2018a) [29,27,9,30] showed that how cities are being made smart and why three components of people, institutional agents and infrastructures and three factors of intelligence, innovation and integration have been considered as key factors.

Furthermore, urban intelligence is created from integrating three factors of personal intelligence, collective intelligence, and artificial intelligence. Digital infrastructures and technologies, however, also act as facilitators of human and collective intelligence and play a key role in the intelligent process of cities and communities. Mutiara (2018) [31] also assessed the measures of smart government to identify conditions and situations of the e-government. These measures include: transparent governance and public access to information. The results of research showed that smart city is not synonymous with smart government. The smart city is advancing the smart government and also the smart government uses the smart city as the domain of action. Therefore, the smart city is a complementary component and part of the movements in smart governance. According to the aforementioned findings and studies, the requirements for realization of smart city in Iran based on good governance are considered as one of the most important and indispensable issues for the urban development in a smart society in its various dimensions.

The realization of such cities (smart city) in Iran, especially in its metropolitan areas and in particular in the city of Tehran, which have faced many problems, is possible within the framework of good governance model and its governing components in order to modernize the country's management of big cities. Therefore, this issue, as the subject of research, is one of the most important requirements, not only in the urban development, but also in the national development in the social, political and economic dimensions.

Different sections of this paper are as follows: In Section 2, theoretical foundations, the role of good governance in smart cities, are expressed. In Section 3, the good urban governance in Tehran under the realization of smart city is explained. Section 4 discuses on the research method and Section 5 on the research tools. Section 6 and Section 7 describe findings and discussions, respectively. Section 8 presents the conclusions.

## 2. Theoretical foundations

### *2.1 The role of good governance in smart cities*

Many cities have launched transformative projects and projects called Smart City Innovation to better serve their citizens and improve the quality of their lives that depend on the governance of these cities (Chourabi et al., 2013) [32].

Several cities have already benefited from the emergence of ICT, which has improved the governance of these cities. This ICT-based governance is known as smart governance. This broadly reflects a set of technologies, people, policies, practices, resources and social and information norms that interact to support the city's governance activities. According to Forrester, smart governance is the core of smart city plans and therefore represents an important challenge for smart city innovation (Caragliu et al., 2018; Caragliu& Del Bo, 2018a) [9, 30]. Smart governance is described as an important feature of the smart city that is based on citizen participation and public and private partnerships. According to Johnston and Hanson, "Smart governance depends on the implementation of smart governance infrastructures, which must be accountable and transparent". This infrastructure also facilitates authorized collaborations, information exchange, service and communication integration (Chourabi et al., 2013) [32].

The major constituent groups of smart governance are people, government, and NGOs. Accordingly, three categories of relationship (Caragliu et al., 2018; Chourabi et al., 2013) [9, 32] can be identified as: 1. government-citizen, 2. government-government, and 3. government-NGOs.

The research results of Anand & Navío (2018) [26] show that interest in smart cities worldwide has increased significantly since 2013. During these advancements, most popular features of cities such as sustainable, healthy, vibrant, green and resilient characteristics have been intelligent as compared to other traits. The idea of smart cities has changed from the earliest times when low-level ideas have evolved to incorporate the use of ICTs with digital, citizen participation and the direction of a sophisticated management system involving local offices, governmental offices, companies, citizens and institutions in the first decade of the 21st century. These ideas have reached a climax, with government agencies, companies, citizens and associations. All this popularity comes at a cost, and in this case, the expectations of citizens and their tendency to use clever expression method without any proper vision for strategic planning towards advancing these ideas in a smart city are important. In some other cases the opportunities to

use smart technologies to solve real problems that are important to citizens are lost, and instead addressed some other trivial issues. Optimistic advocacy for very popular government projects may help sell smart cities too much to the requesters. Therefore, the current generation of smart cities are confronted with numerous challenges such as legitimacy, citizen trust, financing, regulation, management and the urgent need to develop new solutions based on successful and effective partnerships between citizens, agents and institutions using sustainable, holistic and innovative business models and policies (Navio&Anand, 2018) [26].

As noted by Soderstrom et al. (2014) [33], the smart city model has been used as a brand until recently, and the vehicle is also used for company positioning, market capture, and technocratic weakening (reducing complex social and technical problems with the data needed to analysis). As Picon (2018) [34] points out that smart cities seem gradually support events, occurrences, and scenarios, and as a result, they emphasize imagery rather than reality. Events can be acquired and destroyed based on what they are in transition, while the basic infrastructures and relationships between the social and technical worlds are often not transient. This fixation and attachment to the image and its process can lead to a significant advocacy of "fixing" the appearance of problems rather than "resolving" fundamental issues and challenges. While many smart city critics focus on the specific structure of a particular concept or way in which technology is used to solve social problems, others focus on smart measurement methods through the development of indicators. According to Anand&Navío (2018) [26], the more fundamental need is to critically evolve 'intelligence in cities', the ways in which policies and models are integrated and prepared for new situations. Therefore, their potential role should be investigated in increase of citizen participation and welfare development.

Technologically, the combination of several socio-technical innovations such as IoT, mobile Internet access, smart phones, data analysis, free data access initiatives, and sharing economic models among others make the situations for interesting models in which citizens collaborate in the provision of services and research paths without the assistance of governments and local authorities (Anand & Navío, 2018) [26].

Since technology is an important element of smart cities, there are evolutionary changes in which almost all smart cities succeed in combining innovation on policy, leadership, and collaboration intelligently. While technology is still an essential area (but primary), it is actually defined as creating space for innovation and participation of citizens in solving urban problems, examples of which can be seen in the cities of Amsterdam, Barcelona and New York. Therefore, the definition of appropriate policies and the participation of citizens are the key to the success of smart city initiatives and the promotion of new digital citizenry where promotion and success are all-inclusive, transparent and open (Anand & Navío, 2018) [26].

**3. Good urban governance in Tehran under the realization of smart city**

Nowadays, the talk of urban development is spreading to the World Wide Web. New cities and towns are being built every day in cyberspace, whose materials are not clay, but computer bits. These electronic cities were known as virtual cities. At any given moment, thousands of people are using the facilities offered in these virtual cities to do their works from around the world, works like shopping, selling, traveling, resting, racing and even more. In the virtual city, information services are provided without any time and space constraints, the concept of city and government bound to office hours becomes a 24-hour city and government on 7 days of a week and citizens can benefit from municipal services during all minutes of the day. Cities are, in their general definition, the geographical centers for aggregating humans and setting up services, which is why urban layout and modern urbanization are so familiar to people. As a result, virtual cities can be a great model of all information and services available in real cities. These cities can be called electronic hubs that even depict individuals inhabiting in the alleys and back alleys on the computer screen (Azizi et al., 2011) [35].

The emergence of the virtual city primarily reduces "population mobility" as the most important issue in real cities and, secondly, enables simultaneous spaces without erosion and friction with a parallel geometry. In reality, having a two-space position in a city can indicate the real space and cyberspace are a kind of "control management for urban population movement". This type of management seeks to rationalize the process of population movement and provide a more relaxed, less costly, and safer city for citizens. This new space on the one hand was the output of hardware and software development that enabled the creation of "virtual reality" and on the other hand affected the "erosion of powers in the real world and the idea of living in another world" (Albino et al., 2015) [36].

Since virtual city users must primarily have "computer knowledge" and access to the Internet, the primary prerequisite for the emergence of virtual cities is to provide these two locations. In today's world with the advancement of science and technology, especially the widespread advancement in the field of ICT, we are confronted with a phenomenon called smart city that has many undeniable benefits, including its essential role in implementing provision 10 of the third Constitution Principle of the Islamic Republic of Iran. It is the creation of a proper administrative system and the elimination of unnecessary organizations. The goal is a city in which invested on the opportunities created by ICTs to enhance success and effectiveness. This city is a complex multidimensional concept that incorporates various elements and factors into those ICT contexts and is supported by governmental and private sectors (Mosannenzadeh&Vettoratob, 2014) [37].

Nevertheless, if the current status of Iran be studied in terms of smart cities, it can be found that even the metropolis of Tehran as the capital and most advanced city of the country is still far from the standards of a smart city (Hosseini, 2016) [38].

The very rapid changes in the technological age facilitated the necessary of coordinating among these changes and benefiting from the technology. Electronic governance is nowadays regarded as a powerful tool for accelerating and rapidly accessing good urban governance. Electronic governance and the use of public sector from the information and communication technologies is to

streamline service supply, encourage citizens to more participate in decision-making and increase the components of accountability, transparency and effectiveness in government.

One of the main obstacles facing urban management, especially in metropolitan areas, is the fragmentation of urban management in terms of policy, decision-making, planning, guidance and monitoring. The city is an open system, the each structure of which has its own functions. These functions are changing and evolving at anytime and anywhere, as well as reproducing. Certainly, it should be noted that the entire urban system is something beyond all the components of its structures, functions and performances. That means if the structures and performances of a city is separated and disintegrated, their reunion no longer symbolizes the city system. The problem that is most prevalent today in the field of urban management in developing countries, including Iran, is the multiplicity of different authorities responsible for the impact of existing laws. These laws, with the structure and framework of work that they define for themselves regardless of other institutions, while creating inconsistencies in the urban management system, create various problems. Consequently, they could cause public dissatisfaction by exacerbating the existing problems in the city. Therefore, in dealing with these problems via the current structure, there is no hope of recovery (Aryamanesh, 2018) [39].

When looking at the reasons of unsuccessful projects and true move of metropolitan municipality of Tehran towards sustainable development, it becomes clear that the municipal administrative and organizational structure does not have a transparent and accountable structure both internally and externally. Management is influenced by many variables and is rarely found in the decision making process of bachelor, teamwork, law enforcement, public interest, and so on. With all these challenges, citizens and social pressure require the municipality to take steps to develop the smarting operating and accelerate affairs access to usable and manageable information. But smart city is a city that relies on open data, information sharing, integrated and independent systems, transparency, privacy and accountability (Haghighi, 2018) [40].

In such circumstances, almost no one in the community of urban managers and scholars should doubt the usefulness and desirability of good urban governance accomplishment. On the other hand, the move towards urban smarting has become a new topic in various forms. Urban smart growth has many benefits, as listed in **Table 1**.

**Table 1**: Benefits of smart city

| Benefits | | |
|---|---|---|
| Economical dimension | Social dimension | Environmental dimension |
| -Decrease of development costs<br>-Decrease of development costs<br>-Supporting industries that depend on high environmental quality (tourism, agriculture, etc.) | -Developing transportation and mobility options, especially for non-drivers<br>-Social solidarity<br>-Setting up unique cultural industries (historical sites, commercial neighborhoods, etc.)<br>-Increasing physical activities and health | -Preserving green spaces and habitats<br>-Decreasing air pollution<br>-Increasing energy efficiency<br>-Reduces water pollution<br>-Reducing the effect of heat islands |

The very rapid changes in the technological age facilitated the necessary of coordinating among these changes and benefiting from the technology. Electronic governance is nowadays regarded as a powerful tool for accelerating and rapidly accessing good urban governance. Electronic governance and the use of public sector from the information and communication technologies is to streamline service supply, encourage citizens to more participate in decision-making and increase the components of accountability, transparency and effectiveness in government. According to the results of the research (Aryamanesh, 2018) [39], smart city should be considered as a powerful tool for access to good urban governance and, if not the only way, at least, one of the most limited and effective ways of achieving good urban governance. Urban smartening up indicators that could influence good urban governance in Tehran have been shown in **Fig.1**. The statistics and the information related to objective investigations confirm the validity of this claim.

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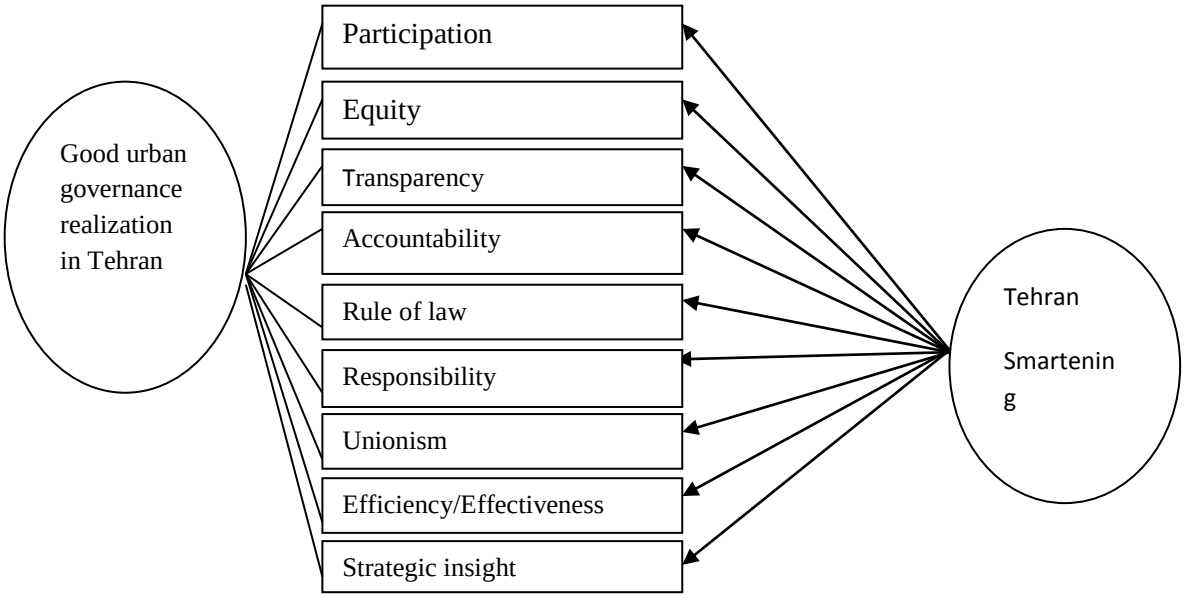


**Figure 1**: Urban smartening indicators for good urban governance in Tehran

Therefore, it is suggested that in order to achieve good urban governance as one of the foundations and principles of sustainable urban development in Tehran, as a model of urbanization in the Iran, urban management will be directed towards smart city. Tehran (ranked 24th in the *world* by the population of its metropolitan area) needs to have smart components including smart economy, smart transport, smart environment, sustainable citizens, smart lifestyle and smart office management. Of course, this move will be a gradual and step-by-step plan, and with the necessary infrastructures (e.g., legal, institutional, legitimate and cultural).

The results of the study by (Pourahmad et al., 2018) [41] also show that all the necessities that have led cities to smart approaches in the world are also applicable in Tehran, so that have acquired all the requirements of the highest score (Above 4 other than demographic changes with an average of 3.81). On the other hand, statistics and information on objective investigations also confirm this claim. The following diagram illustrates that in Tehran, all the following criteria are of great importance and necessity to move towards becoming smarter, namely, accelerated urbanization, other factors, economic incentives, environmental impacts, and the importance of demographic changes. This indicates that in the city of Tehran for moving to more intelligent environment must be attended to all the important criteria including (1) accelerated urbanization (due to high urbanization rate in Tehran, 93.85% urbanization), (2) other factors (raised because of low Internet penetration compared to global standards, issues and problems in the field of transportation and traffic, the increasing trend of the output of brains from the country and the need to pay attention to these assets, waste of resources and ...), (3) economic crises (high unemployment in Tehran, especially among the educated individuals), (4) environmental impacts (because Tehran being the most polluted city in the Iran) and (5) demographic changes (due to the ascending trend of population aging in Tehran in some areas with more than 12% of the total population) (**Fig.2**).

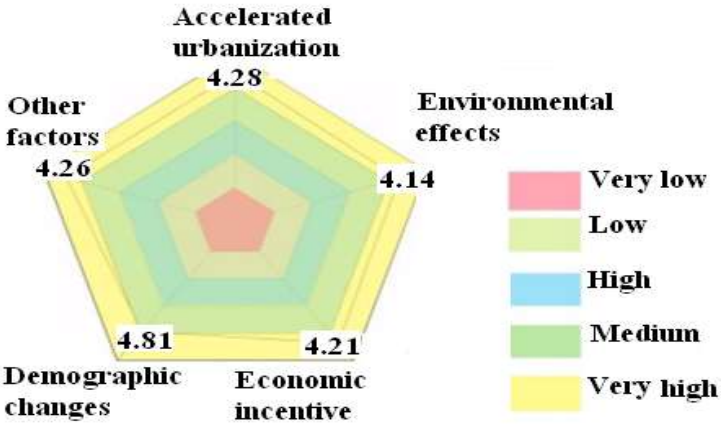


**Figure 2**: A schematic of the smartening requirements

Additionally, all the strategies and measures examined in the study conducted by Pourahmad et al. (2018) [41] from the experts' point of view (formulation and implementation of integrated policies, legislation and integrated perspective respectively) were of great importance for smart city of Tehran (**Fig. 3**). The high score of necessities, requirements, strategies and measures in their research demonstrates the accuracy of identifying criteria and the similarity of metropolitan challenges, issues and problems.

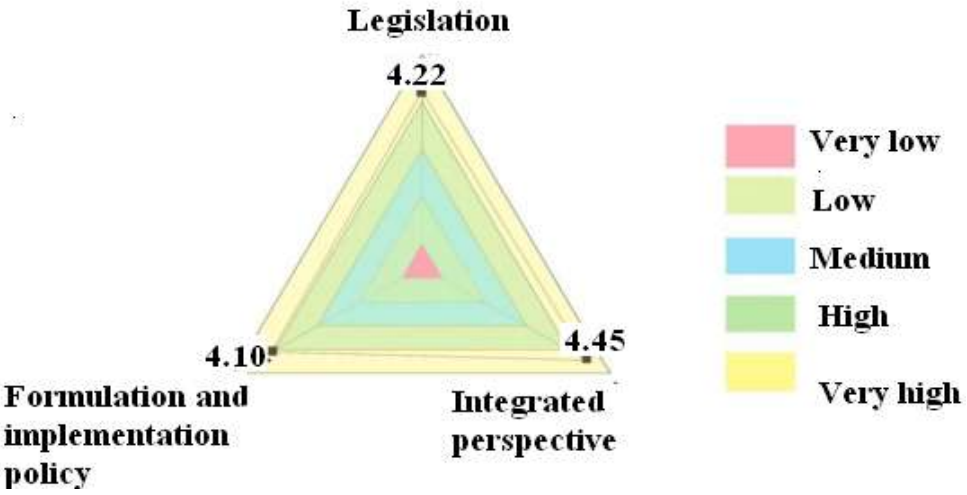


**Figure 3**: A schematic of smarting actions and strategies from the experts' view

In general, the results obtained by Pourahmad et al. (2018) [41] show that in relation to smart city, the following rules should be considered:

1. The infrastructures for the smart city are pivotal. Technology is an enabling factor for a smart city, but it's not most critical. The combination, interconnection and integration of systems and infrastructures are essential to make a city smart. The core systems are not discrete and have become a complex multidimensional network of diverse interconnected systems in a synergistic manner that delivers better and optimal performance.

2. Processes (how is a smart city made) are important in business definitions. A key part of smart city is the fundamental change in the way delivering services, and smart city delivery is not primarily about technology but about improving services.

3. Prospects are important for a better future. A smart city must anticipate smart economy, smart governance, smart mobility, smart environment, smart people, smart lives and their interaction approach. But having the perspective of being smart is not enough alone, but legislation, policy, and organizational change are needed. On the other hand, the infiltration of intelligence into each subsystem of a city is not enough to create a smart city, but these dimensions must be considered as an organic whole.

Therefore, according to the research conducted by Pourahmad et al. (2018) [41], to make Tehran smart it requires (1) necessary infrastructures, especially telecommunication infrastructure development in the first priority, (2) content production and applications tailored to the needs of citizens (subject to update) in the second priority and (3) attention to human capabilities (especially digital literacy) in the third priority in order to make equal use of them for reducing the digital divide and other issues and problems. In case of overlooking these issues in the long run it can be irreparable. As the world moves towards smart cities, citizens have to join these flows to engage and continue their lives in various dimensions and to play an active role. On the on hand, this can negatively impact the development of city, global and transnational opportunities and unsuccessful reproduction without providing the necessary requirements and grounds for deploying a smart city. On the other hand if it is not implemented properly and efficiently, it may marginalize segments of the population that cannot adapt to this new way of urban life.

In addition, it cannot jeopardize their ability to meet their needs within the city and make a kind of social polarization and digital divide. The key point is that cities must respond to the contextual changes in which they operate and what should be considered intelligent depending on the different conditions (text and context) such as political system, geographical conditions and technology diffusion. In fact, smart solutions simply cannot be duplicated and it needs to be valued for different contexts. In fact, there is no path to become smart, and different cities have adopted diverse ways that reflect their particular circumstances. Cities cannot easily copy good practices, but they must develop approaches that fit their circumstances. In the meantime, urban managers should not aim to solve all the problems of the city, but instead should strengthen the capacity of urban systems to deal with a wide range of problems. Therefore, given the importance of adopting the smart city paradigm for Tehran's urban management and the opportunities and benefits created, these problems have caused good governance to be achieved slowly through good urban management in Tehran.

**4. Research method**

In this study, the research method of researchers such as Pourahmad et al. (2018) [41] has been used. The research method in term of the purpose and implementation is applied and qualitative-quantitative. In the initial part, qualitatively, the Delphi method

is used. The statistical population of the present study in the first stage (in Delphi method) consists of academic experts and urban managers. In the second stage, quantitatively, statistical population includes urban managers from different districts of Tehran (north, south, east and west). The sample size of the Delphi part is 15 to 20 experts who are available and ready to answer. In the second stage (quantitative part), the urban managers from different districts of Tehran are 100 individuals. In the present study, in the first part (I.e., Delphi) was used the available sampling and as such in the second part (quantitative) the simple random sampling. In this study, method of structural equations and SPSS and AMOS software were used for data analysis.

**5. Research tools**

First, a comprehensive was review carried out on the documents and library resources such as books, student theses, reports of projects and plans, journals and scientific sites such as sciencedirect.com, SID, and Magiran.com. Research tools include Delphi questionnaire (expert interview) and quantitative questionnaire. Delphi questionnaire (expert interview) is a qualitative questionnaire designed for experts in three different versions. We extract basic factors for the Delphi part, while modifying bases of theory and backgrounds of research. The first version was a two-part series, consisting of exploring the factors from library studies and scholarly articles. Afterwards, using Likert spectrum, the effectiveness of pre-prepared indicators for good governance and smart city was asked. In the next inquiry the experts were required to mention the other factors to complete the model. In the second part of the questionnaire, those determinants of the factors were asked that could have measured the factors. After analyzing the results of the first qualitative questionnaire, the stated factors that were accepted by the experts together with the factors added to the second version of the qualitative questionnaire were utilized. Qualitative questionnaire of the first version has a similar structure to which in the second version. After analyzing the second version of the qualitative questionnaire, the third version of the qualitative questionnaire was made. The questionnaire included one-part form and the experts were asked to measure the factors with the indicators.

Quantitative questionnaire: This questionnaire was designed for urban managers in different districts of Tehran (north, south, east and west). The two-part questionnaire was derived from the final factors and indicators extracted from the qualitative questionnaires (Delphi part). The first part is the demographic of the respondents which consists of 5 questions and the second part measures the indicators with 37 questions.

**6. Findings**

The gender of the students in this research was 86% male and 14% female. Generally, 17 students were 25-35 years, 47 students 36-45 years and 36 students above 45 years. The number of undergraduate, postgraduate and PhD degrees were 12, 58 and 30 respectively. The most frequency was related to the individuals having more than 6 years of work experience, which were 98 persons.

**Fig. 4** show the structural research model, in the general state, where the estimated standard regression coefficients between the structural model variables are shown. A Summary of results obtained from fitting structural models in the general state and the component state are shown in **Table 2**.

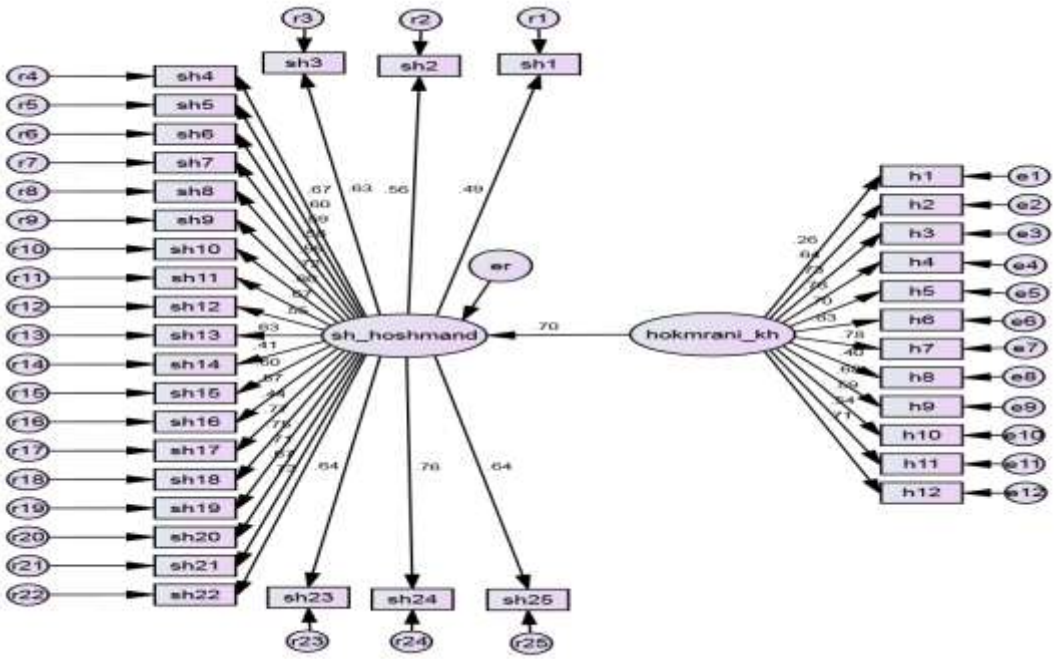


**Figure 4**: The regression coefficients of structural model in the general state

**Table 2**: The results of fitting in the general state and the component state

| The influence of good governance on: | Standard regression coefficient | T statistic | p-value |
|---|---|---|---|
| smart city | 0.70 | 2.37 | 0.018 |
| smart people | 0.65 | 2.64 | 0.008 |
| smart economy | 0.64 | 2.53 | 0.011 |
| smart transport | 0.66 | 2.55 | 0.11 |
| smart governance | 0.75 | 2.70 | 0.007 |
| smart life | 0.79 | 2.50 | 0.012 |
| smart environment | 0.71 | 2.55 | 0.011 |

Now, using the regression coefficients and the significant coefficients of the structural models in the general state, which their results of fitting described above, we examine the relationships:

• Overall Relationship: good urban governance on smart city influences urban managers in different districts of Tehran.

The results of Table 2 show that the regression coefficient between good governance and smart city among different urban managers in Tehran is 0.70 with test statistic value of 2.37 and p-value of 0.018, which its p-value is lower than t-value (0.05). As a result, the effect of good governance on smart city is significant (because its significant value is less than 0.05) and direct (because the value of regression coefficient is positive).

• First component relationship: influence of good governance on smart people among urban managers in different districts of Tehran.

According to the results of Table 2, the regression coefficient between good governance and smart people among urban managers in Tehran is 0.65, with test statistic value of 2.64, and a p-value of 0.008, which its p-value is less than the t-value (0.05). As a result, the impact of good governance on smart people is significant and direct.

• Second component relationship: influence of good governance on smart economy among urban managers in different districts of Tehran.

According to the results of Table 2, the regression coefficient between good governance and smart economy among different urban managers in Tehran is 0.64 with test statistic value of 2.53 and p-value of 0.011, which its p-value is lower than the t-value (0.05). Therefore, the impact of good governance on the smart economy is significant and direct.

• Third component relationship: influence of good governance on smart transportation among urban managers in different districts of Tehran.

According to the results of Table 2, the regression coefficient between good governance and smart transport among different urban managers in Tehran is 0.66 with test statistic value of 2.55 and p-value of 0.011, which its p-value is lower than the t-value (0.05). As a result, the impact of good governance on smart transportation is significant and direct.

• Fourth component relationship: influence of good governance smart governance among urban managers in different districts of Tehran.

According to the results of Table 2, the regression coefficient between good governance and smart governance among different urban managers in Tehran is 0.75 with test statistic value of 2.70 and p-value of 0.007, which its p-value is lower than the t-value (0.05). As a result, the impact of good governance on smart governance is significant and direct.

• Fifth Component Relationship: influence of good governance on smart living among urban managers in different districts of Tehran.

The results of Table 2 show that the regression coefficient between good governance and smart life among different urban managers in Tehran is 0.79 with test statistic value of 2.50 and p-value of 0.012, which p-value is lower than the t-value (0.05). As a result, the impact of good governance on intelligent life is significant and direct.

• Sixth component relationship: influence of good governance on smart environment among urban managers in different districts of Tehran.

According to the results of Table 2, the regression coefficient between good governance and smart environment among different urban managers in Tehran is 0.71 with test statistic value of 2.55 and p-value of 0.011, which its p-value is lower than the t-value (0.05). As a result, the impact of good governance on the smart environment is significant and direct. In general, it must be concluded that good governance has a positive impact on the smart city and its components.

**7. Discussions**

Based on the results obtained from the quantitative part of this study and the positive impact of good governance on smart city the following actions should be accomplished:

(1) Good governance mechanisms for urban and provincial managers and officials should be described and applied in order to utilize and benefit the characteristics of this type of governance in their organizational behavior. (2) Urban managers must regard the votes and opinions of the general public and get the unity and collective agreement with the public. (3) Transparency of affairs

and oversight of the works should be more. (4) Noticing to the rule of law and citizen participation in administrative affairs and social justice. (5) Responding to the critical analyses and suggestions of community. (6) The increase of efficiency and effectiveness in the personal works and employees of the organization. (7) Strengthening the spirit of responsibility at work. (8) Economic management of the affairs according to the financial and economic conditions of the institutions and organizations of the country. (9) Providing security in the city and a major fight against all kinds of corruption. (10) Delegation of the authority to local authorities

## 8. Conclusions

In this study, the trend of susceptibility and effectiveness of smart city and good governance in Tehran metropolitan management was investigated. While presenting the results of the model and expressing the quantitative status of the variables and components of the research, we concluded that good governance has a positive and effective role on smart city and six indicators of smart city, that is, smart people, smart economy, smart transportation, smart governance, smart living and smart environment. Therefore, the creation and strengthening of partnerships between three sectors of government, civil institutions and private institutions will lead to the proper and efficient administration of public affairs and issues and create a positive interaction in economic, political and administrative dimensions. Emphasizing issues such as the right of opinion and accountability, political stability, government efficiency, quality of law and order, rule of law, and corruption control could (1) give citizens the most services, (2) develop and renovate communities to promote well-being, (3) preserve cultural and natural resources with higher quality, (4) distribute costs and benefits fairly, (5) increase ecological integration in the short and long terms, (6) increase quality of life through the development of a range of transport, employment and housing options in a financial valid method. The results from the quantitative part are in line with those of, Meijer (2007), Anthopoulos& Reddick (2016), Mutiara (2018) and Jacques-François (2019) [42, 43, 31, 44].

Furthermore, as we said, our main idea of this study was to present a smart city model in Iran based on good governance factors, therefore, we needed the process by which can obtain quantitative findings. For this, we considered the variables of smart city, smart people, smart economy, smart transportation, smart governance, smart living and smart environment. In operational part, we used SPSS and AMOS software for representing the concept or ideas of study as defined by variables. Finally, we observed and measured the positive and effective role of good governance in smart city promotion. Additionally, according to the figures was visualized the extent to it each variable is well-founded and corresponds to the real events. According to the results of this study, the application of good governance theory differs from one society to another and the only general rule of good governance theory is to employ two mechanisms of accountability and competition to improve governance.

## References

1. Nam, Taewoo, & Theresa A. Pardo. “Conceptualizing Smart City with Dimensions of Technology, People, and Institutions”. The Proceedings of the 12th Annual International Conference on Digital Government Research. College Park, MD, USA, 2011.
2. Fusco Girard, L., & Nijkamp, P. “Cultural tourism and sustainable local development”, Aldershot: Ashgate”, 2009.
3. Partridge, H. “Developing a human perspective to the digital divide in the smart city”, In Proceedings of the Biennial Conference of Australian Library and information Association (Queensland, Australia, Sep 21-24). Available at http://eprints.qut.edu.au/1299/1/partridge.h.2.paper.pdf, 2004
4. Barns, S.” Smart cities and urban data platforms: Designing interfaces for smart governance”, City, Culture and Society, vol.12, 2018, 5-12.
5. Azzari, M., et al. “Smart city governance strategies to better move towards a smart urbanism”, In International Conference on Computational Science and Its Applications (pp. 639-653). Springer, Cham, 2018, (particularly pp. 639-653).
6. Yigitcanlar, T., & Velibeyoglu, K. “Knowledge-based urban development: The local economic development path of Brisbane”, Australia. Local Economy, 23(3), 200, 195-207.
7. Kamolov, S., & Kandalintseva, Y. “The study on the readiness of Russian municipalities for implementation of the “smart city” concept”, In Ecological-Socio-Economic Systems: Models of Competition and Cooperation (ESES 2019), 2020, 256-260.
8. Shokouhi, M. Ajza , Naghibi Rokni, S. N., Alizadeh, H.,& Ahmadi, A. “Evaluation of Smart City Criteria in Ahvaz City, Iran”, Int. J. Architect. Eng. Urban Plan, 26(2), 2016, 141 -149.
9. Caragliu, A., & F. Del Bo. C. F. “Smart innovative cities: The impact of Smart City policies on urban innovation”, Technological Forecasting & Social Change, vol. 142, 2018, 373-383.
10. Leydesdorff, L., & Deakin, M. “The triple-helix model of smart cities: a neo-evolutionary perspective”, Journal of Urban Technology, vol.18, no.2, 2011.
11. Yen Nguyen Thi Hoang. “Measuring Service Quality in the Context of Higher Education in Vietnam”, DOI: 10.33301/2013.15.03.05, 2013.
12. Robert Wilhelm Siegfried Ruhlandt. “The governance of smart cities: A systematic literature review”, Elsevier , Volume 81, 2018, 1-23
13. ARUP. Smart Cities. “Informatics specialists from Arup’s IT and Communications Systems team”, 2010.

14. Pourezzat, P. "The Importance of Linguistic Justice for Continues Revision of Good Governance", Universitatii Bucuresti, Analele. Seria Stiinte Economice is Administrative.
15. Kardos, M. "The reflection of good governance in sustainable development strategies", Social and Behavioral Sciences, vol. 58, 2012, 1166- 1169.
16. Ernst, D.,& Hart, D. M. "Governing the global knowledge economy: mind the gap", Atlanta Conference on Science, Technology and Innovation Policy, 2007.
17. Ojo, A. Curry, E. Janowski, T., & Dzhusupova, Z. "Designing next generation smart city initiatives: the Scid framework. In transforming city governments for successful smart cities", Springer International Publishing, 2015, 43-67.
18. Chatfield, A. T., &Reddick, C.G. "A longitudinal cross-sector analysis of open data portal service capability: The case of Australian local governments", Government Information Quarterly, 2017.
19. Austrian Development Agency, 2011.
20. Guo, X., & Lu, J. "Intelligent e-government services with personalized recommendation techniques", International Journal of Intelligent Systems, 22(5), 2007, 401-417.
21. Avram, Mathew M. "Introduction To Clinical Section", (1st ed.), 2014.
22. Lopes, N. V. M.,& Farooq, S. " Smart city governance model for Pakistan. In Smart Governance for Cities: Perspectives and Experiences", Springer, Cham. (particularly the conclusions section), 2020, (pp. 17-28).
23. Garau, C., Desogus, G.,& Zamperlin, P. " Governing technology-based urbanism. The Routledge Companion to Smart Cities", (particularly the paragraph: From smart cities 1.0 to smart cities 2.0: what about the governance?), 2020, 159-162.
24. Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler Milanović, N.,& Meijers, E. " Smart cities Ranking of European medium-sized cities", Vienna, Austria: the Centre of Regional Science, 2007.
25. Du, Y. Y.,& Qin, X. "Multi-strategy web service discovery for smart government", In Applied Mechanics and Materials, vol. 536, 2014, 625-631.
26. Navío. M. j.,& Anand P.B. " Governance and economics of smart cities: opportunities and challenges", Telecommunications Policy, 42(10), 2018, 795-799.
27. Eger, J. "Smart growth, smart cities, and the crisis at the pump a worldwide phenomenon", I-Ways, 32(1), 2018, 47-53.
28. Rindermann, H., Kodila-Tedika, O. .,& Christainsen, G. "Cognitive capital, good governance, and the wealth of nations", Original Research Article Intelligence, Vol. 51, 2015, 98-108.
29. Jennings, P. " Managing the risks of smarter planet solutions", IBM Journal of Research and Development, 54(4), 2010, 1-9.
30. Caragliu, A. .,& Del Bo, C. "The economics of smart city policies", Scienze Regionali, 17 (1), 2018a , 81–104.
31. Mutiara, D. "Smart Governance for Smart City. Friendly City, From Research to Implementation".
32. Chourabi, H. , Taewoo, N. , S. Walker, J.R. Gil-Garcia, S. Mellouli, K. Nahon, T.A. Pardo,& H.J. Scholl."Understanding Smart Cities: An Integrative Framework" , Proc. of HICSS, 45th Hawaii Conference, 2018, 2289–2297.
33. Soderstrom, O., Paasche, T.,& Klauser, F. "Smart cities as corporate storytelling", City, 18(3), 2018, 307–320.
34. Picon, A. "Urban infrastructure, imagination and politics: From the networked metropolis to the smart city", International Journal of Urban and Regional Research, https://doi.org/10.1111/1468-2427.12527, 2018.
35. Azizi, M., Neda Aghaee, Ebrahimi, M. ,& Ranjbar, K. "Nutrition knowledge, the attitude and practices of college students", Physical Education and Sport Vol. 9, N. 3, 2011, pp. 349 – 357.
36. Albino, V. Beradi, U.,& Dangelico, R.M. "Smart Cities: Definitions, Dimensions, Performance, and Initiatives", Journal of Urban Technology. 22(1), 2015, 3-21.
37. Mosannenzadeh, F.,&Vettoratob. D. "Defining smart city: Conceptual frame work based on key word analaysis", Journal of Land Use, Mobility and Environment, ISSN 1970-9889, e- ISSN 1970-9870, 2014.
38. Hosseini, S .H. "Analysis of good urban governance indicators with emphasis on citizens and managers (case study: Torbat Heydariyeh City)", Journal of Urban Studies, Vol. 20, 2016.
39. Aryamanesh, A., 2018. "The role of urban intelligence in achieving optimal governance in Tehran", Civilica, Payashahr Journal, 1(9), 2018.
40. Haghighi, H. "Limitations and challenges in the getting smart of Tehran city", https://kargosha.com, 2018.
41. Pourahmad, A., Ziyari, K., Hatami, N., Hossein, P.,& (Pashah Abadi), Sh. "Smart City: The Needs and Requirements of Tehran City for being Intelligent", New Researches in Human Geography, 2018,1-22.
42. Meijers, E. "Smart Cities: Ranking of European Medium-Sized Cities", Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology, 2007.
43. Anthopoulos, L. G.,& Reddick, C.G. "Smart City and Smart Government: Synonymous or Complementary?", In Proceedings of the 25th International Conference Companion on World Wide Web , 2016, 351- 355.
44. Jacques, F. "Urban, Rural, and Regional Economics. Economics of Agglomeration", Thesis, 2019, DOI:10.1093/Acrefore/ 9780190625979.013.152.