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Investigating the Principles and Criteria of a Smart City (Karaj City as a Case Study)

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Abstract

The world's population is growing at an unprecedented rate, and cities are at the forefront of this trend. Unfortunately, many cities, especially in developing countries, are facing significant crises. However, there is a solution that can transform urban life effectively and efficiently: smart cities. By providing residents with quick, easy, and affordable access to essential services, smart cities can improve the quality of life for millions of people. Governments around the world are already investing in this promising new approach to urban development, and you can join the movement towards a smarter, more sustainable future for our cities. Let's work together to create a better world for ourselves and future generations. The city of Karaj has experienced rapid growth in population and structure over the last few decades. As a result, it's crucial to understand the significance of smartening cities and providing high-quality services to citizens. The present research has identified the most important components that contribute to the smartness of cities, including technology, quality of environment and life, environment, transportation, economy, governance, social and human capital. The findings reveal that the city of Karaj has an average status for most of the smart city indicators. However, with better education, culture, and infrastructure, these indicators can be improved significantly. Therefore, it's essential to prioritize the development of these factors to make Karaj a smarter city that provides the best quality services to its citizens.

Keywords: smart city, sustainable urban development, smart building, karaj city

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تحقیق در مورد اصول و معیارهای یک شهر هوشمند (شهر کرج به‌عنوان مطالعه موردی)

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چکیده

جمعیت جهان با سرعت بی‌سابقه‌ای در حال رشد است و شهرها در رأس این روند قرار دارند. متأسفانه، بسیاری از شهرها، به‌ویژه در کشورهای درحال‌توسعه، با بحران‌های قابل‌توجهی روبرو هستند. بااین‌حال، راه‌حلی وجود دارد که می‌تواند سبک زندگی شهری را به شکلی مؤثر و کارآمد تغییر دهد؛ شهر هوشمند. با فراهم کردن دسترسی سریع، آسان و مقرون‌به‌صرفه به خدمات ضروری، شهرهای هوشمند می‌توانند کیفیت زندگی میلیون‌ها نفر را بهبود بخشند. دولت‌های سراسر جهان، از این رویکرد جدید و پرامید شهرسازی به شکل گسترده حمایت نموده‌اند. شما نیز می‌توانید به جنبشی بپیوندید که به‌سوی یک آینده هوشمندتر و پایدارتر برای شهرهای ما منجر می‌شود. با هم کار کنیم تا یک جهان بهتر برای خود و نسل‌های آینده ایجاد کنیم.

شهر کرج در چند دهه اخیر، رشد سریعی در جمعیت و ساختار را تجربه کرده است؛ بنابراین، درک اهمیت هوشمندسازی شهرها و ارائه خدمات با کیفیت بالا به شهروندان، امری حیاتی است. تحقیق حاضر به شناسایی مهم‌ترین عناصر دخیل در هوشمندسازی شهرها، ازجمله فناوری، کیفیت محیط و زندگی، محیط‌زیست، حمل‌ونقل، اقتصاد، حکومت، سرمایه اجتماعی و انسانی می‌پردازد. یافته‌ها نشان می‌دهد که شهر کرج، وضعیت متوسطی برای بیشتر شاخص‌های هوشمندسازی دارد. بااین‌حال، با آموزش، فرهنگ و زیرساخت‌های بهتر، این شاخص‌ها به‌طور قابل‌توجهی بهبود می‌یابند. در همین راستا، ضروری است که توسعه این عوامل را در اولویت‌های خود قرار داده تا کرج را به یک شهر هوشمند تبدیل کنیم و بهترین خدمات به شهروندان ارائه گردد.

کلیدواژه‌ها: شهر هوشمند، توسعه شهری پایدار، ساختمان هوشمند، شهر کرج

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1- Introduction

As a complex and living system, the city has a social, economic, and physical identity that economic, social, cultural, and physical components play a role in determining. Cities inherently face complex and wide-ranging challenges (Akhavan, 1401). Urban growth is happening at an unprecedented speed all over the world, and its external effects on the environment and society are evident, which can be mentioned in waste management, lack of resources, air pollution, traffic, aging infrastructure, etc. (Faramarzi, 1401). This rapid urbanization and a huge gathering of residents has led to chaos and disorder and has caused the city to lose its necessary efficiency, dynamism and ability to meet the needs and desires of citizens, create prosperity, security, etc. Also, at present, cities consume 57% of global energy and account for 52% of greenhouse gas emissions, which indicates the huge contribution of cities to climate change, air and environmental pollution, etc. Also, this growth causes urban infrastructures to endure pressure beyond their capacity and suffer from adverse consequences. These consequences will be more terrible for developing countries including Iran (Akhavan, 1401). According to the estimates and forecasts made regarding the growth of the urban population, by 2025 the world's population will double and will be something close to more than 5 billion people, and this means the beginning of problems such as population concentration, pollution, marginalization, etc. With the increasing population growth in cities and the subsequent increase in problems and issues caused by urbanization in various dimensions, the need to create and use a city management platform with an intelligent approach is felt (Nasab, 1401). Urban planners all over the world are trying to provide models with an integrated look at all aspects of urbanization in order to meet the expectations of today's world and to deal with the challenges and sustainable development of cities, one of the models and concepts is the development of the smart city.

Research hypotheses

- The first hypothesis: making cities smarter will reduce environmental crises, traffic, etc.
- The second hypothesis: making cities smarter increases people's participation and, as a result, the city's dynamism.
- The third hypothesis: Karaj city has the components of a smart city.

The necessity of implementing the plan

The social and economic developments of countries create new conditions in terms of city management, especially in social and governmental dimensions. Global studies and experiences show that in today's megacities, which face complex and extensive issues related to urban development planning and management, it is necessary to identify and manage smart solutions by creating an interactive space between citizens and advanced information and communication technology tools. Today, governments and organizations need a suitable and up-to-date way of working in this field to solve urban problems and increase the quality of the services they provide. Intelligence and its related concepts are an effective step in this field and solving its problems. Meanwhile, the web and internet networks have a special place in smart cities and citizens who do many of their daily tasks through the web. Smart cities will be able to turn citizens into active and participatory elements in the city, speed up, save time and energy increase the quality in the provision and distribution of urban services improve the quality of life of citizens, and create the basis for citizens' satisfaction with governments and provide organizations.

Background and research literature

Table 1. Review of research background

Researcher	Title	Target
Hamed Akhavan	Investigating and identifying the components of a smart city.	Investigating and identifying the components of a smart city.
Masihullah Isfahani	An overview of the smart city (case study of Singapore)	Review of the smart city and its features.
Razieh Farshid	Analysis of the content of global smart city studies in dealing with the covid 19 pandemic.	Review and analysis of smart city and covid.
Mohammad Kamel Nasab	An overview of the theoretical foundations of the smart city and its role in urban management.	Determining the components and dimensions of the smart city.
Mehsa Farmarzi	Evaluation of smart city components in order to improve urban services.	Localization of smart city model in Iran.
Mehsa Farmarzi	Analysis and investigation of factors affecting the smartness of cities (case study: Tabriz city)	Investigating effective factors for intelligentization in Tabriz city.

Research objectives

- Identifying the factors of smartening the city
- Applying smartness in cities
- Investigating the ability of Karaj city to become smart

2- Methods and techniques

According to the nature of the subject, the type of this research was descriptive-analytical and applied.

In order to collect the required data and information, library and field methods were used, and to collect field data, a questionnaire designed by the researcher was used according to the research hypothesis.

The data obtained from the questionnaire have been reviewed and analyzed in the form of descriptive statistics (frequency, mode, average, table and graph) in the SPSS software

Statistical Society

The statistical population of this research includes all the residents of Karaj, who have been selected as a sample population using Cochran's table of about 150 people or households. The sample selection method is the spatial random method.

The components of the smart city and its relationship with urban services evaluated in this research were prioritized in the following order: technology, quality of environment and life, urban planning, environment and sustainability and energy, transportation, economy, governance, social solidarity.

3- Findings

Cities face complex and interconnected challenges that need a systematic approach to be addressed. That's where the concept of smart cities comes into play. Smart cities, based on information and communication technologies, are rapidly emerging in various countries. The benefits of these cities are immense as they enable us to tackle problems more efficiently and sustainably. With the advent of intelligent networks and communications, people and organizations are also moving towards becoming smarter. It's time for us to embrace this change and invest in making our cities smarter.

When crises occur like infectious diseases, natural disasters, etc., which lead to the absence of the presence of people and other organs except the organizational and essential ones, the smartness of the city helps us a lot, and the lack of infrastructure causes the work and the government to lag behind.

Definitions

1- Smart city: The idea of the smart cities formed in the early 1990s and indicates that urban development is increasingly dependent on technology, innovation and globalizatio (especially from an economic perspective) over the past decade (Faramarzi, 1401). The term "smart" is a common phrase in urban policies that has emerged recently and refers to the intelligent use of information technology to improve the efficiency and effectiveness of urban infrastructure and services (Akhavan, 1401). The first used of smart cities term was in the United States of America, where information and communication technology supports social participation, reducing the digital divide, and access to services and information.The smart city has been an excellent place for economic, industrial development, etc. which issues such as traffic, energy consumption, pollution, land destruction, updating and optimizing urban infrastructure, improving the quality of life addressed through an innovative and systematic approach. Based on the communication and exchange of information with the aim of optimizing urban management processes (Esfehani, 1401).

2-Sustainable Development: Sustainable development is a process in using resources, guiding investments, directing technological development and institutional changes, compatible with current and future needs. Sustainable development, which has been played up since the 1990s, is an aspect of human development in relation to the environment and future generations. The goal of human development is the cultivation of human capabilities. Sustainable development is introduced as a process that requires improvement and progress.

Features of the smart city

Based on the latest developed theories of urban management based on information and communication technology, the smart city has the following six main criteria:

1- Smart economy
2- Smart management
3- Smart people
4- Smart transportation
5- Smart environment
6- Smart quality of life

Table 2. Smart city indicators (Javadzadeh Aghdam et al., 2014)

Smart economy	Smart transportation
The spirit of innovation, entrepreneurship, economic images and signs, fertility and productivity, workforce flexibility, international space creation, transferability	Local, national and international access, access to information and communication technology infrastructure, sustainable, innovative and safe transportation systems.
Smart management	Smart environment
Participation in decision-making, social and collective services, transparent management, political perspectives and strategies	Attractiveness of natural conditions, pollution, environmental protection, sustainable management of resources
Smart people	Smart quality of life
The level of quality and competence, dependence on the windy period of life, ethnic, racial and social majority, flexibility, creativity, internationality, participation in life.	Cultural facilities, health and hygiene conditions, personal safety, housing quality, educational facilities, tourism attraction, social integration

According to other studies, components such as: Smart business, Smart tools, Smart education and Smart infrastructure are also considered to be the characteristics of a Smart city:

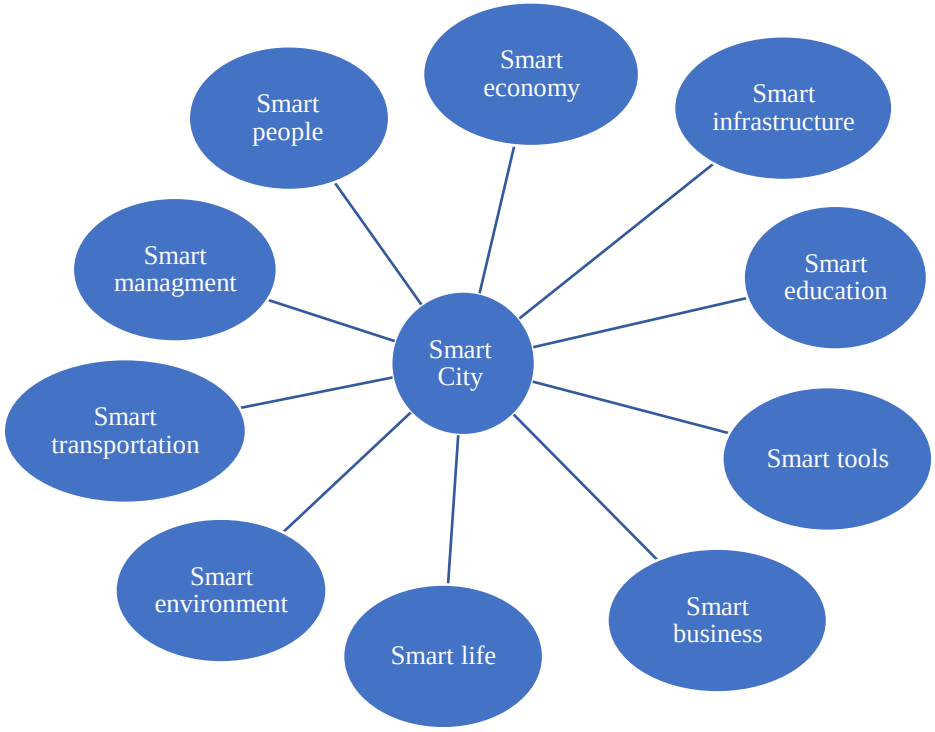

Figure 1. Smart city and its features

1- Smart economy: Economy in a smart city is one of the main components that is also influential in other areas of a smart city. A sustainable and Smart economy requires Smart facilities in every city, including infrastructure and communications that provide the fields of smartness in transportation, energy consumption, security and health (Faramarzi, 1401).

2- Smart management: The integration of inner-city and outer-city government is called intelligent management. Services and interactions, public integration, private city, civic and social organizations can function effectively and purposefully as one organization. The basic tool to reach this goal is information and communication technology (infrastructure, hardware and software) which is activated by intelligent processes(Faramarzi, 1401).

3- Smart people: A smart city is people-oriented City that creates many opportunities to exploit human capabilities and achieve a creative life. The concept of a Smart city is having electronic skills, working in the field of active information and communication technology, having access to education, human resources and managing potentials through inclusive comprehensives that improve and foster creativity. The element that differentiates a digital city from a smart city is the existence of Smart people. Smart people are defined based on their skills and level of education (Faramarzi, 1401).

4- Smart transportation: In fact, they are integrated, logical and covering information and communication technology systems. For example, sustainable, safe, and connected transportation systems can include trams, buses, trains, subways, cars, bicycles, and pedestrians in the context of using one or more modes of transportation. Transportation system users may provide real-time information or participate in long-term planning (Faramarzi, 1401).

5- Smart environment: Smart environment means Smart energy, including renewable energy, energy networks, active information and communication technology, measurement, control and monitoring of pollution, renovation of buildings and facilities, green Buildings, green urban planning such as increasing the efficiency of devices, reusing and replacing devices, which serves the above goals and in general the principles that sustainable cities are based on (Faramarzi, 1401).

6- Smart life: The Smart life includes: lifestyle, habits, behavior and consumption methods based on information and communication technology. The Smart life is a healthy

and safe life with diverse cultural facilities, good quality housing and amenities. It is also related to social cohesion and social capital with high levels.

Table 3. Examining the criteria and indicators of the smart city components (Salehi Panahi et al., 1401)

Characteristic	Criteria	Indicators
Smart economy	The spirit of innovation	- The percentage of the gross national product allocated to research and development - Employment rate in specialized and professional sciences - The percentage of registered inventions compared to the number of citizens
	Entrepreneurship	- Self-employment rate - The percentage of new jobs created
	Active and productive economy	- The amount of gross domestic product per employed person
	Labor market flexibility	- The unemployment rate - The amount of part-time employment
	International position	- The number of companies with international brands - The percentage of passenger air transport - Air freight percentage
Smart management	Participation in decision making	- The number of representatives of the city in relation to the population - The amount of political activities of city residents - The importance of political issues for citizens - The share of women representatives in the Council
	Public and social services	- Children's share in using kindergarten - The cost of staying in the city - Level of satisfaction with the quality of schools
	The transparency of governance	- The level of satisfaction with the fight against corruption
smart people	Education level of citizens	- The number of academic centers - number of students - The number of people with higher education - Level of proficiency in foreign languages
	Desire to learn throughout life	- The amount of study hours - Percentage of participation in training courses - Percentage of participation in language learning courses
	Social and ethnic pluralism	- The rate of foreign communities and ethnicities
	Flexibility of citizens	- The degree of flexibility in accepting a new job

Characteristic	Criteria	Indicators
	Creativity of citizens	- Contribution of people working in creative industries
	Being interested in your city/intellectualism	Number of voters in city council elections - The percentage of migration of the environment - Level of knowledge about city laws
	Participation in social life	- Number of voters in city council elections The amount of participation in voluntary affairs
Smart transportation	Access to facilities at the local level	- The ratio of public transportation network to the number of citizens - Satisfaction with access to public transportation - Satisfaction with the quality of transportation
	Access to international facilities	- International access such as different countries, different companies and...
	Access to information and communication technology infrastructure	- Smartphone and access to applications
	New, stable and safe transportation system	- Share of green mobility (individual non-motorized traffic) - Safe traffic using affordable cars
Smart environment	Natural conditions and environment	- Amount of sunny hours per day - The amount of green space
	Environmental pollution	- The percentage of suspended particles in the air - Rate of respiratory diseases
	Environmental Protection	- The amount of individual efforts in nature protection - The amount of thinking about nature protection
	Sustainable resource management	- Optimal use of water, electricity and gas
Smart life	Cultural facilities	- Percentage of cinema attendance - The percentage of visits to museums - Percentage of theater attendance
	Health conditions	- Life expectancy rate - Ratio of hospital beds to citizens - The ratio of doctors to the number of city residents - The level of satisfaction with the quality of the health system
	Personal security	- Crime rate - Mortality rate - The level of satisfaction with personal safety

Characteristic	Criteria	Indicators
	Housing quality	- The percentage of compliance with the minimum housing construction standards - Average number of people living in each area - Level of satisfaction with the housing situation
	Educational facilities	- The ratio of the number of students to the number of residents of each region - Level of satisfaction with the educational system - The level of satisfaction with the quality of the educational system
	Tourism and tourist attraction	- Number of attractive tourist places - The number of nights of tourist accommodation
	Social cohesion and unity	- The level of preparedness against poverty - Poverty rate

Components of a smart city

According to the latest reviews, the components of the Smart city include:

- Smart house or building: A Smart house is one of the most important factors in reducing energy consumption and conscious participation in energy consumption management. a Smart House with capabilities such as intelligent heating and cooling control, intelligent lighting control, natural light control can significantly save energy consumption (Anoushepour, 1390);
- Smart technology: In a smart city, The presence of new and Smart technology is essential. There is a direct connection between a Smart city and Smart technology. (Farmerzi, 1401);
- Smart health and healthcare: The Smart health means providing health and medical and health needs of citizens through communication technologies and providing online medical services. (Shafi'i, 2014);
- Information and communication infrastructures: Information infrastructure is considered the most important indicator for determining the level of development of countries and plays a significant role in playing the role of a Smart city.

The dimensions of the smart city

Many researchers have divided this concept into several characteristics and dimensions in order to clarify what makes a smart city. Researchers emphasize the importance of organic integration of different systems (transportation, energy, education, health and treatment, buildings, physical infrastructure, food, water and public security) in creating a smart city. Researchers who support this integration of the Smart city often believe that in a dense environment like cities,no system can function in isolation. In order to draw the characteristics of a smart city, they introduce the following four dimensions:

First: It is related to the use of a wide range of digital and electronic technologies for a cyber, digital, information or knowledge-oriented city.

Second: using information technology to transform life and work.

Third: Embedding information and communication technology in urban infrastructure.

fourth: guiding information technology and people's communication with each other in order to increase innovation, learning and knowledge.

Advantages of Smart City

One of the advantages of the smart city in the field of compression is the use of existing substructure, preservation of agricultural land or forest around the city. The smart city has many useful indicators like:

- Creating high-speed internet facilities for people living in the city
- Creating permanent educational environments for people of different ages
- Providing services in one step for citizens in order to improve the quality of life of the citizens of a city
- Creating commercial competition and creating opportunities in electronic services and the emergence of electronic commerce
- Creating opportunities for electronic competition among citizens of a city
- Establishing communication between departments and organizations of a city
- Encouraging people to participate to save time and money for people living in a city
- Reducing noise pollution and reducing fuel consumption in order to reduce traffic inside and outside the city
- Increasing the efficiency of employees in organizations and easier access for people to investigate administrative corruption
- The possibility of using facilities and conditions by all people even in remote areas (Faramarzi, 1401).

4- Knowing the scope of study

Geographical location

Alborz province with an area of about 5258 square Km, is located between 35 degrees 31 minutes to 36 degrees 21 minutes north latitude and 50 degrees 10 minutes to 51 degrees 30 minutes east longitude. Alborz province is located between the central Alborz fold ridge and the western edge of the desert plain,so the the Alborz's weather is mainly affected by the altitude factor. According to the latest national divisions of Alborz province, in terms of administrative divisions, this province has six cities, 29 villages and 332 inhabited villages.

One of these cities is the city of Karaj with an area of 220 square kilometers. The City of Karaj is located at a distance of 36 kilometers northwest of Tehran.

City population

According to the 2015 census, the population of Karaj city is equal to 1,592,492 people, which reaches 1,973,470 people including the population living in the suburbs. The population growth in Karaj city was up to 7.4%, which is the highest population growth rate among Iranian cities. The population growth in Karaj city was up to 4.7%, which is the highest population growth rate among Iranian cities.

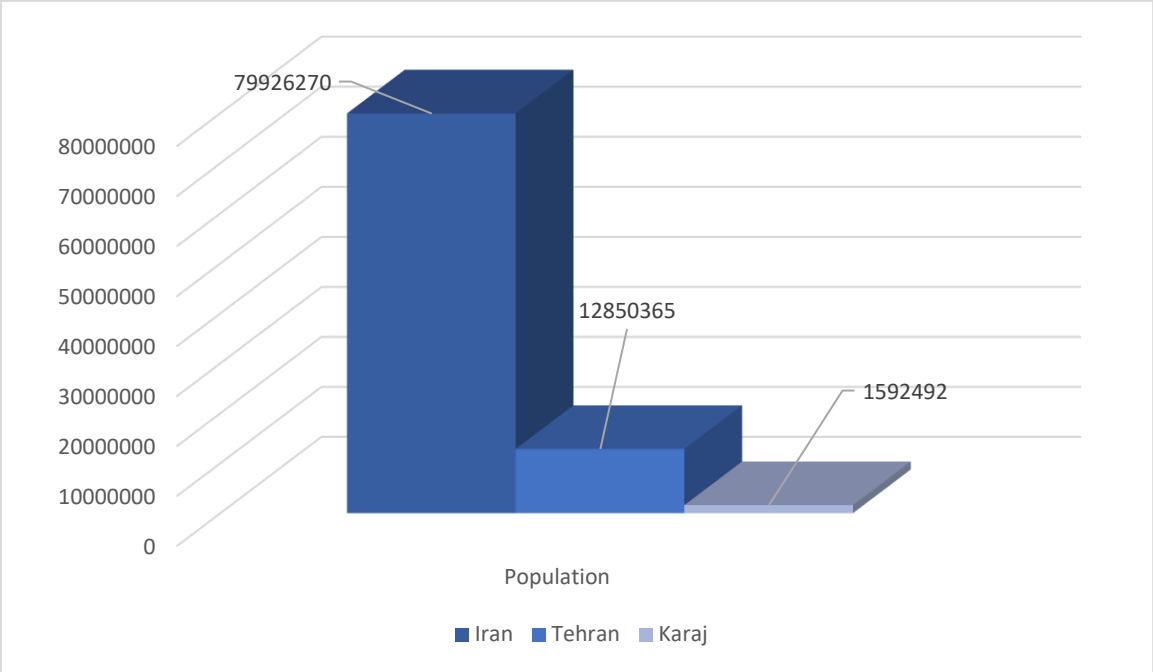

Figure 2. Graph of the population of Iran and Tehran compared to the population of Karaj

Investigating the components of the smart city in Karaj

In order to investigate the existing factors in Karaj city and the possibility of smartening this city, a question sheet with a Likert scale was designed and distributed among a number of people (about 150 people who were identified according to Cochran's method). Analysis of the question sheet information has done by using the SPSS program.

The questions designed in 7 sets, which are the components of the smart city (which include):

1- Quality of life and environment, 2- Environment, 3- Social and human capitals, 4- Economy, 5- Governance, 6- Transportation, 7- Technology.

Table 4. Components, measurement indicators for smart city

Component	Questions n	Numbering of questions	score
Quality of life and environment	10	1-10	4871
Environment	6	11-16	2804
Social and human capitals	3	17-19	1525
Economy	3	20-22	1510
Governance	3	23-25	1560
Transportation	2	26-27	1018
Technology	3	28-30	1478

Question sheets analysis

Question sheets were distributed and collected in Mehrshahr, Golshahr, Azimieh and Mohammad Shahr neighborhoods of Karaj respectively.

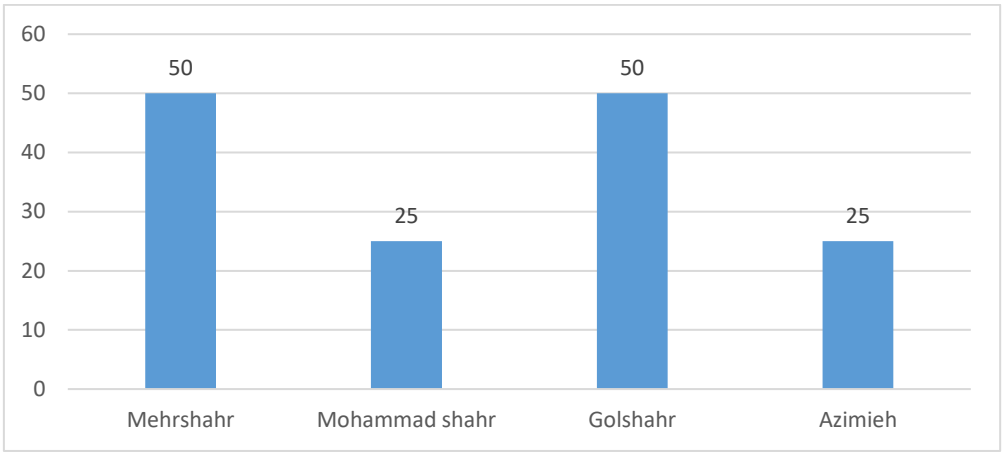

Figure 4. Distribution chart of questionnaires by neighborhood

According to the questionnaire survey, among 150 people, 72 were men and 78 were women.

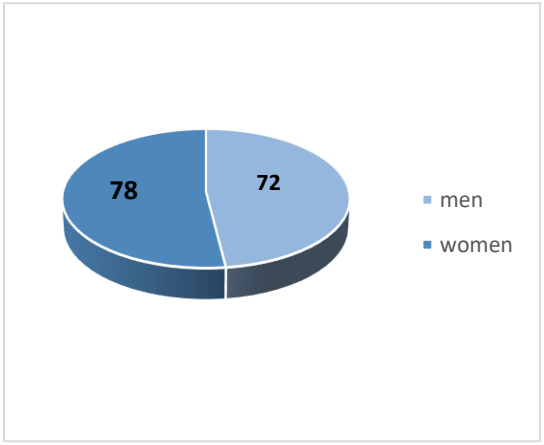

Figure 5. Chart of gender analysis in the questionnaire

The education of the people of the statistical population is bachelor's degree, sub-diploma, diploma, doctorate and master's degree with the percentages of 32.2, 26, 20.7, 14, 6.7 respectively.

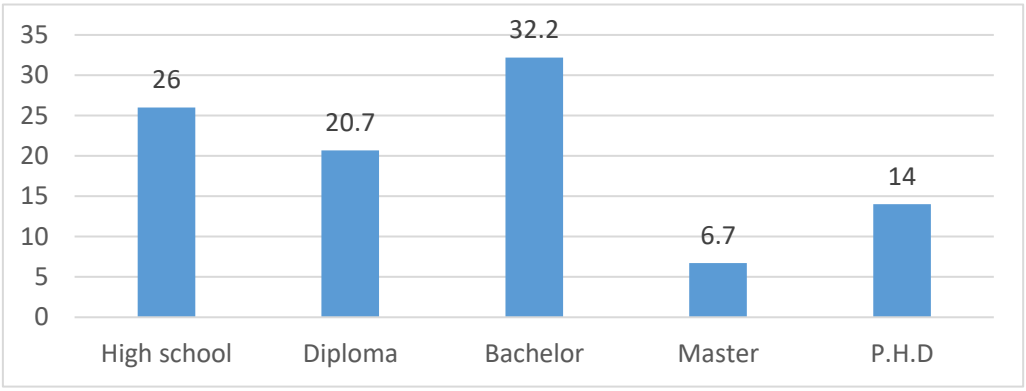

Figure 6. Education analysis chart in the questionnaire (in percentage)

Most of the people in this statistical community were employees, and then students, housewives, students, and freelancers, respectively.

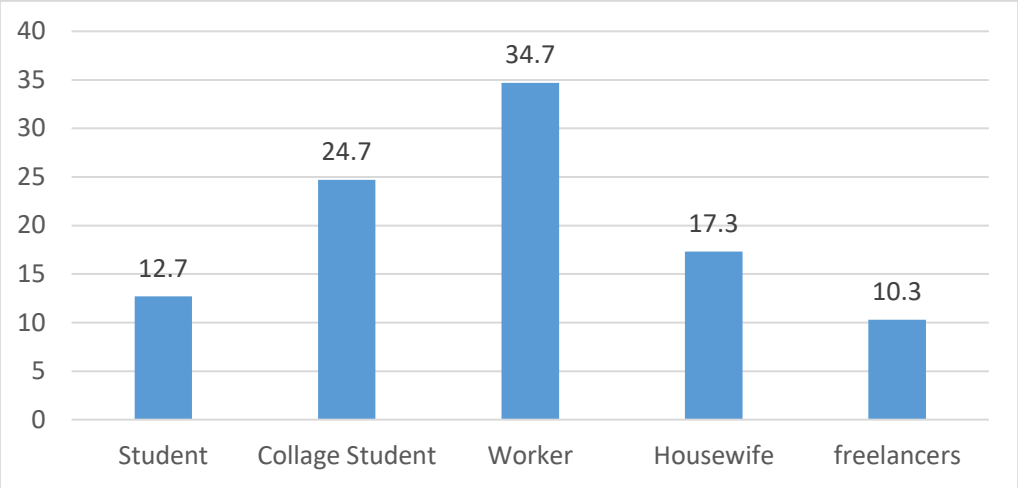

Figure 7. Chart of job analysis in the questionnaire (in percentage)

Regarding the amount of income of people in the society, 46% have normal income, 36.7% have good income and 17.3% have low income.

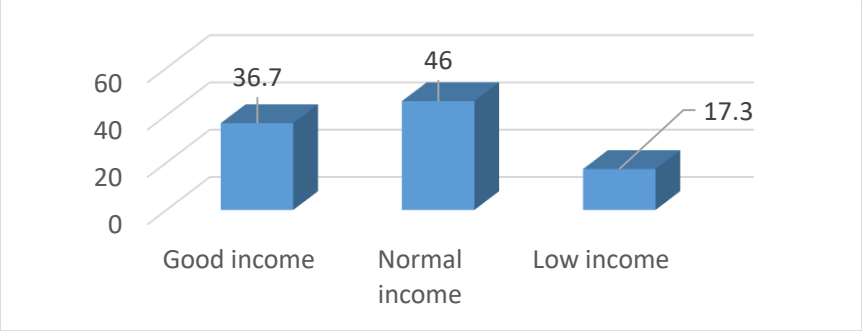

Figure 8. Chart of income analysis in the questionnaire (in percentage)

The age category of 30-40 years old with 36 people accounted for the largest number of people, followed by 50 years and above with 34 people, 40-50 years old with 31 people, 20-30 years old with 26 people and finally 15-20 years old with 23 people in this statistical population.

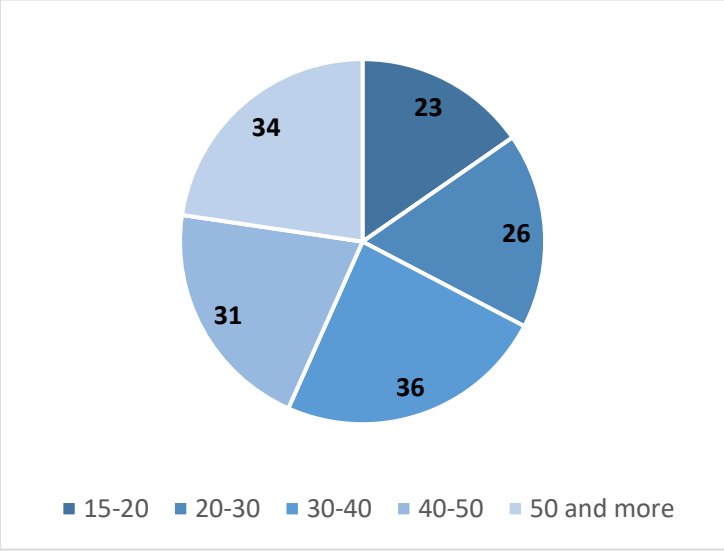

Figure 9. Chart of age analysis in the statistical population (in terms of people)

Descriptive Statistics

In order to describe and explain the statistical methods used in the analysis of information and the results obtained from the research, the findings are presented in 2 separate sections with the Same titles. In order to analyze the information of the questionnaire with a 5-point Likert scale, according to the ranking of the measurement scale, all the answers have been considered with a small score as follows:

Table 5. 5-point Likert scale

Very low	Low	Moderate	High	High very
1	2	3	4	5

After collecting the questionnaires, we grade each question according to the scores in the SPSS.

The mentioned process has completed for all indicators, The score of each has determined. After calculating the score of each index, the impact of each on city services should be determined. Determining the degree of desirability allows the researcher to choose with a higher measurement power.

According to the obtained results, quality of life and environment have the highest score, followed by environment, social and human capital, economy, governance, and technology with equal scores, and finally transportation with the lowest score.

According to the points of each index and the scores of the degree of desirability, we give a score to each index:

Table 6. Investigating the quality of smart city components in Karaj

Component	Indicator	Average	Quality status
Quality of life & environment	Providing services	3	Moderate
	Social justice	3	Moderate
	Comfort and well-being	3	Moderate
	Security	3	Moderate
	City Services	3	Moderate
The environment	Drinking water situation	3	Moderate
	Decreasing air pollution	3	Moderate
	Reducing environmental pollution	3	Moderate
	Reduce commuting, avoid traffic	3	Moderate
Social & human capital	Cultivation and education	3	Moderate
	Reduction of municipal costs	3	Moderate
Economy	Eliminate face-to-face visits and paperwork	3	Moderate
	Save money	3	Moderate
	Economic justice	3	Moderate
Governance	The need for Internet access security	3	Moderate
	The amount of security required in doing things	3	Moderate
	Increasing people's participation	3	Moderate
Transportation	Increasing speed and satisfaction	3	Moderate
	Reduce trips and check accessibility	3	Moderate

Component	Indicator	Average	Quality status
Technology	Internet access quality	1	Very Low
	Intermittent internet problem	4*	Very Low
	Knowledge of electrical tools	4	High

*Here, score 4 should get the desired quality; But a score of 4 means that: most people suffer from a definite problem with the Internet and are dissatisfied with this issue, so exceptionally in this index, a score of 4 takes a very unfavorable situation.

4- Conclusion

According to the table above and the status of the quality indicators, it can concluded that due to the unfavorable quality of the Internet (which is considered one of the main pillars for the smartening of the city), the smartening of the City of Karaj needs to go through a long process.

We used Pearson's correlation test to find the correlation between indicators and components. Pearson's correlation test used to test the relationship between education and components, gender and components, and age and components to see if there is a significant relationship between them. This test done with a level of 0.05 (95% confidence); That is, the Significant level in this test is equal to 0.05:

Pearson's correlation test showed There is a correlation between the level of education and the components of the smart city ($r=0$). There is a correlation between age and economy, governance, transportation and technology ($r<0.05$). But, there is no correlation between gender and the components. Not seen ($r>0.05$).

In this way, education with the sub-components of quality, capital, economy, governance, transportation and technology is significant at the 5% level. Also, the relationship between 5 sub-components with education is positive, which means that the amount of these components increases with the increase of education, and the relationship between technology and education is negative, which means that the higher the education, the lower the amount of this component.

There is no significant relationship between gender and sub-components.

There is a significant relationship between age and the sub-components of economy, governance, and transportation at a positive 5% level, but there is a negative relationship between age and technology.

5- Sugestions

According to all the investigations carried out in this research, we offer suggestions for creating a smart city in Karaj:

1- The first suggestion is to create the proper platforms and infrastructures for the smart city.
2- Increasing internet bandwidth and its acceptable speed without any problem.
3- Increasing internet services and appropriate software such as: Snap, Tapsi, Digikala, etc.
4- Cultivating the Smart city in schools and national television networks
5- Creating a suitable route for Smart transportation such as Smart buses, monorail, etc.
6- Increasing Smart public fleet services such as Smart taxis.
7- Making smart national cards widely so there is no need to use cash or swipe a card to pay the fare or buy a ticket.

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