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# RETHINKING SMART AND SUSTAINABLE URBAN DEVELOPMENT IN DEVELOPING CONTEXTS: LESSONS FROM KURDISTAN PROVINCE, WESTERN IRAN

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**Abstract**
The percentage of people who live in cities is currently 54% and is projected to increase to 66% by 2050. Due to the acceleration of rural migration and the current concentration of money in urban areas, this percentage in Iran's northwest cities is greater than 62%. With a focus on the Kurdistan area, this paper's objective is to analyze the main factors influencing sustainable cities in Iran's Northwestern cities. The implemented approach is descriptive-analytical, based on library research and software analysis in the scenario wizard and Mic Mac frame. Using the snowball and Delphi sampling techniques, a continuous sample of 70 people with the appropriate executive and scientific knowledge and experience about smart cities was chosen, and their opinions were sought out at various points throughout the research. The current study's findings indicated that urban sustainability in Iran's northwest cities was undesirable and that many smart urban development indicators needed a higher viability percentage. With two iterations of data analysis, the stability index of urbanization status in the study area shows 96.7%, indicating the high accuracy of the current study. In contrast, metrics like recycling accessibility (98), spatial sustainability (96), and strategic urban planning (94) are more beneficial in developing smart sustainable cities in northwest Iran. Finally, some solutions are presented to increase the capacity of smart urban sustainable development in the study area.

**Keywords:** Smart Cities, Sustainable Development, Northwestern Cities, Futures Studies. Urban Sustainability.

## 1. Introduction

Approximately 3% of the earth's population resided in urban areas in 1800 AD. By 1900, that proportion had risen to 14%; by 2016, nearly 65% (3 billion) of the world's population performed likewise. The percentage of people who live in cities is currently 54% and is projected to increase to 66% by 2050. Due to the current acceleration of rural migration and the concentration of capital in urban areas, this number is greater than 62% in the northwest Iranian cities (Heydari & Bakhtar, 2018). Rapid urbanization has thus led to issues in metropolitan areas, such as environmental pollution, transportation congestion, and a lack of infrastructure solutions that can survive the stress created by significant population expansion in confined places, according to the United Nations (UN, 2019). Hardware development, infrastructure building (such as roads, water and sewage systems, and electricity), and software solutions (such as smart city technologies) have all been used to address urbanization-related issues. The most alluring of them are thought to be the smart city solutions. They are more affordable and quicker to configure than hardware, and they effectively leverage existing infrastructure thanks to information technology (IT) (Marchiori, 2017). As a result, most developed nations have introduced intelligent city solutions in recent years to solve issues related to urbanization (Hartama et al., 2017).

To achieve the objectives of the urban system and make structural and functional changes, the participation of the government is crucial in centralized nations (such as Iran). As a result, the government is essential to the design and operation of cities, which has facilitated the

centralization and growth of urbanization and urbanism (Pilehvar et al., 2011). Urban sustainability may seem like just another buzzword, and cities and towns may seem to be the last areas to start changing; however, future studies for communities will offer motivating illustrations of sites that have undergone significant modifications in the direction of sustainability and describe whether other places can follow in their footsteps (Lee & et al., 2022). Since it started to acquire widespread recognition in the early 1990s, sustainable development has significantly influenced the evolution and design of cities regarding the numerous aspects of sustainability. In addition, it has reopened the discussion of urban design (PWC, 2018). It has inspired an entire generation of urban practitioners to investigate the enormous opportunities and intriguing potentials that could be enabled and the considerable benefits that could be attained from designing and planning sustainable urban forms (compact cities and eco-cities).

In other words, shapes for human habitation can achieve the required level of sustainability and facilitate the urban environment (Lin, 2007). It can be accomplished by steadily increasing their contribution to the goals of sustainable development in terms of cutting back on material consumption, cutting back on power use, cutting back on pollution, cutting back on waste, and enhancing equity, integration, the standard of living, and well-being (van Noorloos & Kloosterboer, 2017). Therefore, it is possible to conclude that smart, sustainable cities, as a holistic and integrated framework to urbanism, represent an example of sustainable urban planning and development, a strategic approach to achieving the long-term goals of urban sustainability—with the support of cutting-edge technologies and their innovative applications. As a result, becoming one of the creative sustainable cities is a prime example of urban sustainability. This idea refers to a desirable (normative) state in which a city attempts to maintain the equilibrium of the socio-ecological systems by adopting and putting into practice sustainable development techniques as a preferred (normative) trajectory (Bibri & Krogstie, 2019). Given their connection and equal importance, the city's physical, environmental, social, and economic systems must be improved to be sustainable over the long term. According to (Bibri), to achieve this long-term strategic objective, it is necessary to "promote links between scientific research, technical breakthroughs, institutional practices, and policy design and planning regarding sustainability." Solving environmental, economic, social, and physical challenges requires a long-term, transdisciplinary, and system-oriented perspective. Backcasting as a scholarly and planning approach to future research is fundamentally based on these requirements (Clarkson et al., 2020).

This system enables and contributes to developing, implementing, evaluating, and improving the models of intelligent, sustainable cities by emphasizing practical treatments for incorporating and enhancing urban systems and coordinating and coupling urban domains using cutting-edge technologies aligned with the sustainability vision. The rate of urbanization has led to an imbalanced tendency in less developed and emerging nations. As a result, growth and development policies have made room for structural and functional changes by centralizing cities and capitals. In addition to population movements, particularly rural-to-urban migrations, this tendency has sparked imbalance and inequality in urban and urbanized systems, leading to economic polarization and reliance, the polarization of capital, and class separation. According to some experts, understanding the role and status of government in urban development and progress is a crucial component that sheds more light on cities in developing and established countries (Shokuie, 1995). Urbanization and urbanism are essential factors in Iran's developing spaces and geographic regions. The origin and development of rural and urban areas could be seen as corollaries of these two phenomena (Shokuie, 2006). Therefore, this essay's primary goal is to analyze the fundamental factors influencing

sustainable cities in Northwestern Iranian cities, focusing on the province of Kurdistan, using a futures studies approach within the framework of the backcasting trend. Therefore, the following are the primary research questions:
1. What factors are most crucial for developing smart sustainable cities in northwest Iran?
2. What are the most crucial situations for smart sustainable cities in Iran's northwest?
3. What recommendations can be made to enhance environmentally friendly urban development in northwest Iran?
Finally, along with a review of the research's theoretical literature, its metaphysical analysis is also discussed, and by introducing the scope of the study and its characteristics, the most important findings of the research are expressed in the frame of applied approaches. In the end, along with the conclusion and discussion, the essential operational strategies that can be presented are stated. Therefore, it is possible to present such an analysis that conducting this research is necessary in terms of nature, application and methodology, and classification of the levels of smartening and development.

## 2. Literature review and theoretical background

Long-term regional and urban evolutions have produced the idea of great urban development (UN, 2011). As a result of the modernization process, it has been altered to meet the requirements and demands of the public as well as economic, social, and environmental factors. Being a general concept, urban development,therefore , depends on concurrent successes in areas like rapid economic growth, the accumulation of vast technical knowledge, the achievement of spatial balance at the local, regional, and national levels, the establishment of social and economic welfare, the promotion of people and groups' cultures, and ongoing efforts to modernize society and improve social and economic relations (Saeedi, 1998). The examination of smart urban development and underdevelopment involves several ideas, including the urban sustainability theory, modernization sociologic theory, and smart urban growth theory, which explain smart urban development at the global and national levels (Heydari & Bakhtar, 2018).

### 2.1. Urban Sustainability

The term "sustainability" was first used in urban environments in 1980 in the publication "World Conservation Strategy" by the International Union for the Conservation of Nature (IUCN). However, the publication's influence on governmental policy is little (Heydari & et al, 2018). The United Nations-sponsored World Commission on Environment and Development publications like "Our Common Future" or "The Brundtland Report" from 1987 filled this gap. The 1992 Rio de Janeiro Earth Summit served as the most recent catalyst for the idea of sustainability (Daei, 2020; Alavi, 2022). To attain this goal, the Brundtland Report focuses on six areas: population and human resources, food security, species and ecosystems, energy, industry, and cities. It places particular emphasis on cities in emerging nations, like those in northwest Iran, where there are far more unemployed people than there are professionals, and there is significant social disparity (UN, 2020). In this regard, various sustainable evaluation methods, such as indicators to aid policymakers, have arisen over the previous few decades. Building integrated sustainable systems has benefited the most from indicator-based strategies (Hiremath et al., 2013).
In practice, some of the indicators might not be applicable, especially in developing nations. Therefore, the indicators should be practically applicable, as stated by Visvaldis et al. (2013). Similarly, due to the lack of data, some indicators cannot be employed. Finally, it's crucial to remember that cities cannot maintain themselves on their own. For the provision of resources,

the removal of waste, the generation of pollutants, and the inadvertent use of ecosystem services, they are dependent on regions outside of their borders (Bithas and Christofakis, 2006; Camagni et al, 1998; Visvaldis et al., 2013). As a result, projects on "urban sustainability" have traditionally concentrated on technological fixes for a more effective urban metabolism. The sustainability of a city has traditionally also been concentrated on sustainability effects taking place inside the city's administrative boundaries. Combined, these two methods lead to a scenario where only a portion of the issues and potential solutions relating to sustainable urban development is recognized. However, a rising proportion of the items consumed in the city are produced further away as a result of the processes of industrialization, urbanization, and globalization. As a result, a city's environmental impact cannot be confined to the urban metabolism within the city limits because the environmental effects of consumption occurring in a city are dispersed over the globe. To properly appreciate the idea of sustainable cities, it is necessary to adopt a global viewpoint in which sustainability evaluations and urban planning decisions are made while taking into consideration the wider effects of local action or inactivity (Tavana, 2012).

**2.2. Sustainable Smart Cities**

Smart cities are defined as resilient, inclusive, and jointly constructed cities that use various forms of technology and data to improve the quality of life for all of their citizens (Evergreen, 2018). According to Giffinger and Pichler-Milanovic (2007), they can be thought of as cities that excel in six areas: environment, economy, mobility, people, living, and government. They are a result of knowledge-intensive creative tactics that rely on a combination of human, infrastructural, social, and entrepreneurial capital to improve the socioeconomic, ecological, logistical, and competitive performance of cities (Kourtit and Nijkamp, 2012). Through participation in governance and the wise management of natural resources, these investments in human, infrastructural (transport and ICT), and social capital support sustainable economic growth and a high standard of living (Caragliu et al., 2011). According to definitions that did not include sustainability as one of its strategic aims, a smart city is one that uses ICT to produce more interactive and effective utilities and vital infrastructure components (Azkuna, 2012).

Administration, education, healthcare, public safety, real estate, transportation, and utilities were identified as these components. In other words, smart cities work to make their residents' lives better by fostering a highly developed social environment. The ultimate purpose of these procedures is to increase the city's viability and sustainability (Toppeta, 2010). By combining human capital and technology, it is possible to influence urban services, city services, local actor interaction, and quality of life, which enhances the social component of urban environments (Heydari & Tavakoli, 2012). In light of the foregoing discussion, we have decided that the Brundtland definition will serve as the foundation for our initial definition of sustainable smart cities: A "smart sustainable city" is one that "meets the demands of its current residents without compromising the ability of others or future generations to satisfy their needs," which means it "does not exceed local or global environmental limitations," and "where this is assisted by ICT" (Toli & Mordagh, 2020).

The idea of smart, sustainable cities does not apply to all actors and viewpoints. For instance, it may be argued from the standpoint of sustainability that whether a city uses ICT is mostly irrelevant as long as it grows more sustainable. Consequently, the idea of a sustainable city would be sufficient. And from the standpoint of the ICT sector, it might be argued that because the sector focuses on smart solutions but not sustainability, the idea of the smart city is appropriate and sufficient. Both of those points of view are accurate; however, from a more

comprehensive angle, the idea of smart sustainable cities is required because of the two points of view (Rezaei, 2022). The review of the literature reveals that there are numerous techniques used in backcasting. It has also been said that it is challenging to locate reports on backcasting techniques. This prompts a more thorough examination of various backcasting strategies. The words "backcasting approach" and "backcasting methodology" are used and distinguished in the literature (Stween & Akerman, 1994; Phdungsilp, 2011). As a result, backcasting approaches the challenge of discussing the future from the opposite direction; it is "a method in which the future desired conditions are envisioned, and steps are then defined to attain those conditions, rather than taking actions that are just a continuation of present methods extrapolated into the future.

## 3. Study Area

One of Iran's western provinces, Kurdistan Province, is 28203 square kilometers in size and shares more than 230 kilometers of border with west Azarbaijan, Zanjan, Hamedan, and Kermanshah provinces. It also borders Iraq. Geographically, the province lies between 34° 44 min and 36° 30 min north latitude and 42° 31 min to 48° 16 min east longitude (Weather Organization, 2012).

**Table.1. The Rank and Population of Kurdistan Province Cities**

| Rank Area ($KM^2$) & Population) | City | County | Population (2022) |
|---|---|---|---|
| 1 | Sanandaj | Sanandaj | 743 /452 |
| 2 | Saqqez | Saqqez | 250/364 |
| 3 | Marivan | Marivan | 200/148 |
| 4 | Baneh | Baneh | 150/264 |
| 5 | Qorveh | Qorveh | 120/141 |
| 6 | Kamyaran | Kamyaran | 65/025 |
| 7 | Bijar | Bijar | 62/578 |
| 8 | Divandarreh | Divandarreh | 35/0263 |
| 9 | Dehgolan | Dehgolan | 32/365 |
| 10 | Kani Dinar | Marivan | 15/236 |
| 11 | Armardeh | Baneh | 6/000 |
| 12 | Saheb | Saqqez | 4/500 |

Source: Research findings adopted Statistical Center of Iran (2025); Heydari & Bakhtar, 2018.

Kurds make up the overwhelming population in the approximately defined geo-cultural area known as Kurdistan, which has historically served as the foundation for Kurdish culture, language, and national identity. Iran's Kurdistan province, which has a population of 1/7 million and a roughly 98,000 $km^2$ territory, is located in the country's northwest. This province shares a border with both Iraq and Turkey (Kurdistan Governor, 2018; Tavakoli & Heydari, 2012).

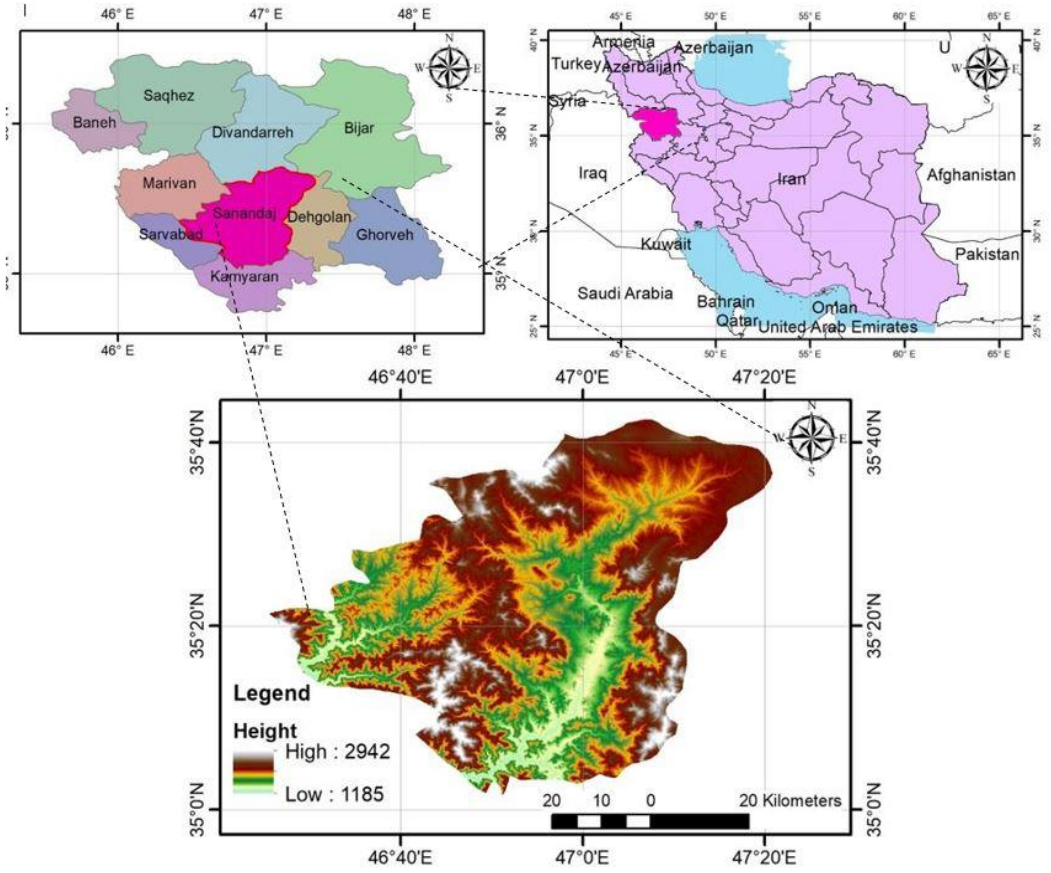


**Fig.2.** A view of the study area. Source: Heydari et al, 2025.

In terms of its strategic location within Iran's urban and geographical complex, the Kurdistan Province can be stated to hold a unique position in terms of smart urban growth indicators. Therefore, the primary goal of this research is to examine urban development indicators in the Kurdistan province.

## 4. Material and Methods

In terms of its goal, the current research is an applied study, and in terms of its technique, it is a descriptive-analytical study. It was also carried out using a quantitative methodology in the snowball and Delphi approach. Based on sampling techniques, a statistical sample of 50 persons with the requisite executive and scientific knowledge and experience about smart cities was chosen, and their opinions were sought at various points throughout the research.

**Table.2. Distribution of sample statistical on subject**

| | | |
|---|---|---|
| Academics | University Professors | 5 |
| | Ph.D. Students | 1<br>5 |
| Executive managers | Former Managers | 5 |
| | Current Managers | 1<br>5 |
| Experts | 10 | |

The cross-impact matrix analysis method, which is frequently used for strategic planning and evaluation of urban sustainability in terms of smart urban growth, has been applied in the current study due to the usage of future studies methodology.

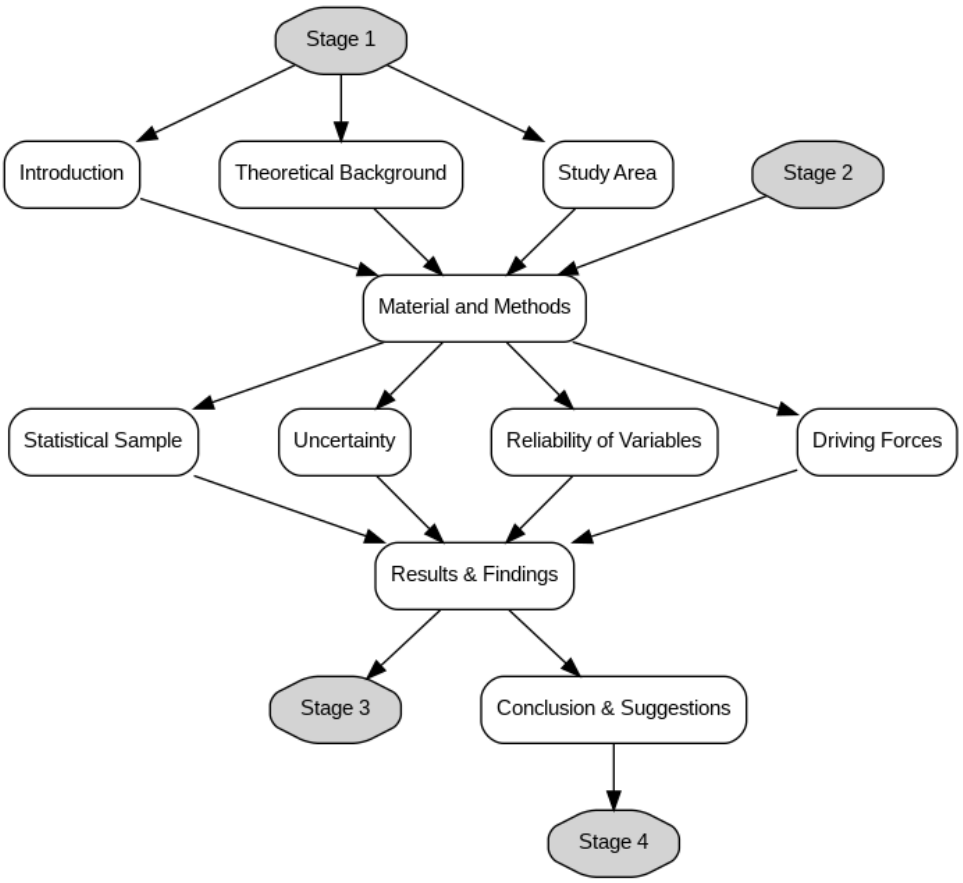


**Fig. 3.** Flowchart of the methodology. Source: Research findings (2025).

descriptive-analytical Numbers between 0 and 3 represent the strength of the correlation between study variables. The numbers 0 and 1 indicate little impact, and 2, and 3 indicate a strong impact. The number 3 indicates the most impact. P also stands for potential impact. As a result, if there are n variables detected, an n*n matrix is created that details how each variable affects the others.

**Table.3. Sample questionnaire to identify uncertainty and impact factors**

| Uncertainty | parameters | Impact |
|---|---|---|
| p 3 2 1 0 - 3 2 1 0 - - - | | |

Source: Research findings (2025).

Also, the validity of the research tool was confirmed by experts and university professors, and the reliability of the questionnaire was measured by double rotation and repetition, the level of reliability reached 100%, which improved the status of urban tourism indicators in Kurdistan province with Mic Mac software.

**Table.4. The level of reliability of variables in the applied software's**

| Impact | Dependence | Rotation |
|---|---|---|
| 1 | 98% | 98% |

| | | |
|---|---|---|
| 2 | 100% | 100% |

Source: Research findings (2025).

A very good level indicates the accuracy of the selection of the research model for processing data and information that has been collected.

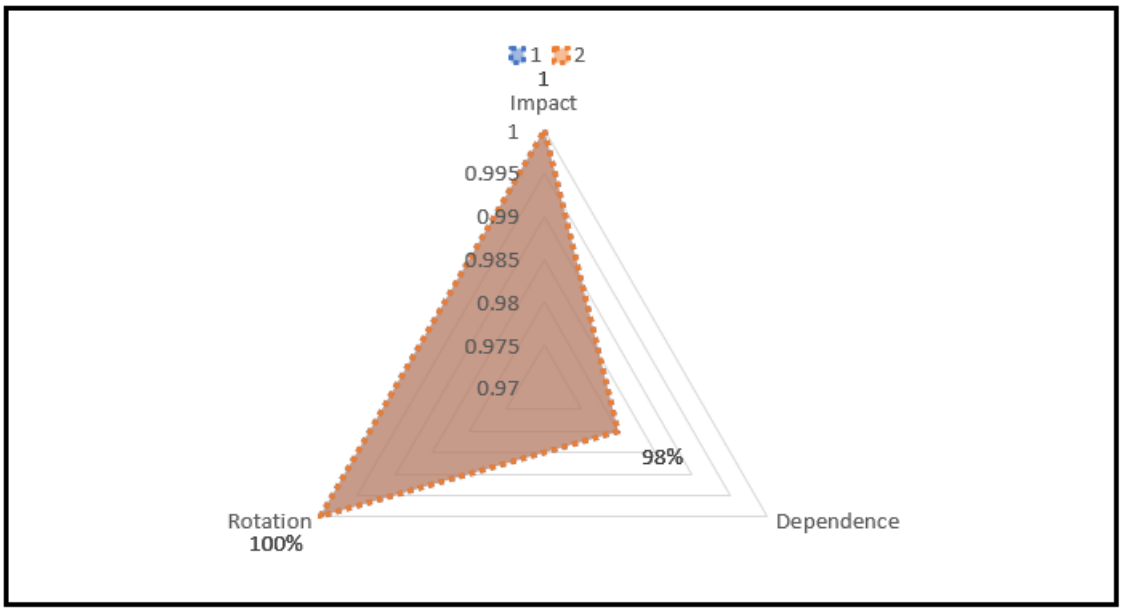


**Fig.4.** The level of reliability of variables in the applied software's. Source: Research findings (2025).

## 5. Findings

According to the study's descriptive findings, there were only 20% women and 80% men in the elite and expert samples that were chosen. Respondents in the age ranges of 25 to 30 years (0.4%), 30-35 years (30%), 44 to 35 years (21.6%), 35 to 45 years (77.6%), and 45 to 55 years and older (0.4%) were included in the research samples. The analytical results of the study on smart, sustainable cities are described and given in the sections that follow.

### 5.1. General Matrix of Sustainable Smart Cities in the Kurdistan Province

The data were first entered into the Mic Mac software, and the results were then examined by the output results of this software. This was done after summarizing the matrix evaluation, the main characteristics of which may be seen in Table (5). The matrix has a fill rate of 96.25%, indicating that the elements chosen to have a significant influence on one another. This matrix has 1540 measured relationships, 60 of which had zero number associations, indicating that the elements had no interaction or influence on one another. 173 relationships were ranked as having little influence on one another, 557 relationships were ranked as having a moderately significant impact relationship, and 810 relationships were ranked as having a very significant impact relationship. They had a lot of influence and were quite dependent on them. Finally, their number P was 0, which denotes the factors' indirect relationships.

**Table.5. General properties of the studied matrix**

| Parameters | Amount |
|---|---|
| Matrix size | 40 |
| Number of iterations | 2 |
| Number of zeros | 60 |

| | |
|---|---|
| Number of ones | 173 |
| Number of twos | 557 |
| Number of threes | 810 |
| P | 0 |
| Total | 1540 |
| Fill Rate | 96.25% |

Source: Research findings (2025).

### 5.2. Status of urban sustainability in the Kurdistan

The respondents rate the urban sustainability in the province of Kurdistan as being at a moderate level. In this question, which offers four excellent, good, medium, and strong responses to describe the level of smart urban development, 39% of respondents said the situation was moderate. Eight (14.5%) of them gave the Kurdistan province's smart city indicators a good rating, while ten (20%) said the indicators were in a bad status of development.

**Table.6. The Status of urban sustainability in the Kurdistan**

| **Sustainable smart cities** | **number** | **%** |
|---|---|---|
| excellent | 8 | 16 |
| good | 11 | 22 |
| moderate | 21 | 42 |
| weak | 10 | 20 |
| total | 50 | 100 |

Source: Research findings (2025).

Because the residual value for this model is equal to 12.211 and the value of the regression statistic is 10.316, and because the number of residual squares is less than the total number of squares of regression, this indicates that the model has high explanatory power for explaining changes in the dependent variable and predicting them from the independent variable. In this model, the value of F is equal to 80,794 and its significance is equal to 0.000, which is less than the significance level of 0.05 and is significant, indicating that the independent variable's dimensions have a good chance of changing the dependent variable if it is explained.

**Table.7. Total squares, degree of freedom, mean squares, and significance level of regression**

| --- | Total S | S Avg | F | significance level |
|---|---|---|---|---|
| regression | 12.316 | 2.579 | 80.794 | 0.00 |
| residual | 10.211 | 0.033 | | |
| Total | 22.527 | --- | | |

Source: Research findings (2025).

According to what can be seen in Table (8), the beta level in this model for the independent variable was 0.687, which indicates the high impact of the independent variable on the dependent variable.

**Table.8. Non-standardized regression coefficient, t-statistic, and significance level of regression**

| | **Non-standardized coefficient** | **regression** | **Beta** | **T** | **S level** |
|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Fixed coefficient | 0.584 | --- | 2.068 | 0.001 |
| Urban Sustainability | 0.658 | 0.687 | 17.941 | 0.000 |

Source: Research findings (2025).

### 5.3. Identify the key driving forces of research

The futures studies approach was applied using a Mic Mac and the scenario wizard program to continuously discover the main factors influencing the state of sustainable smart cities in the Kurdistan province. According to the restrictions of the Mick Mac program, a specific code is allocated to each of the study criteria to summaries the signs. To summaries the indicators by the study limits, each research criterion is given a unique code for this purpose.

**Table.9. Calculated dimension in the identification of drivers**

| C | Dimension |
|---|---|
| A1 | Managerial-strategic |
| A2 | Legal and policy making |
| A3 | Financial-economic |
| A4 | Sociocultural |
| A5 | Institutional |
| A6 | Transparency and accountability |
| A7 | Recycling |
| A8 | Smartening |
| A9 | Participation |
| A10 | Technology and media |

Source: Research findings (2025).

The sum of the matrix numbers is determined in the following. The efficiency of the variable will be demonstrated if the sum of the rows found in the matrix is more than the sum of the columns. In the matrix, the numbers in the rows represent the influence, and the numbers in the columns represent the reliance. As seen in the table below, the first (A1), second (A2), fourth (A4), fifth (A5), sixth (A6), and seventh criterion (A7) all have obtained row values that are more than the sum of the column numbers, demonstrating the independent variable's stronger efficacy.

**Table.10. MDI Matrix**

| N | Variable | rows | columns | V Type |
|---|---|---|---|---|
| 1 | Managerial-strategic | 17 | 15 | Independent |
| 2 | Legal and policy making | 21 | 19 | Independent |
| 3 | Financial-economic | 16 | 16 | Independent |
| 4 | Sociocultural | 20 | 16 | Independent |
| 5 | Institutional | 20 | 19 | Independent |
| 6 | Transparency and accountability | 19 | 19 | Independent |
| 7 | Recycling | 21 | 18 | Independent |
| 8 | Smartening | 17 | 22 | Dependent |
| 9 | Participation | 18 | 20 | Dependent |
| 10 | Technology and media | 18 | 23 | Dependent |
| Total | | 187 | 187 | |

Source: Research findings (2025).

By considering table (10), the direct impact-dependence diagram of urban sustainability in the Kurdistan province will be as follows.

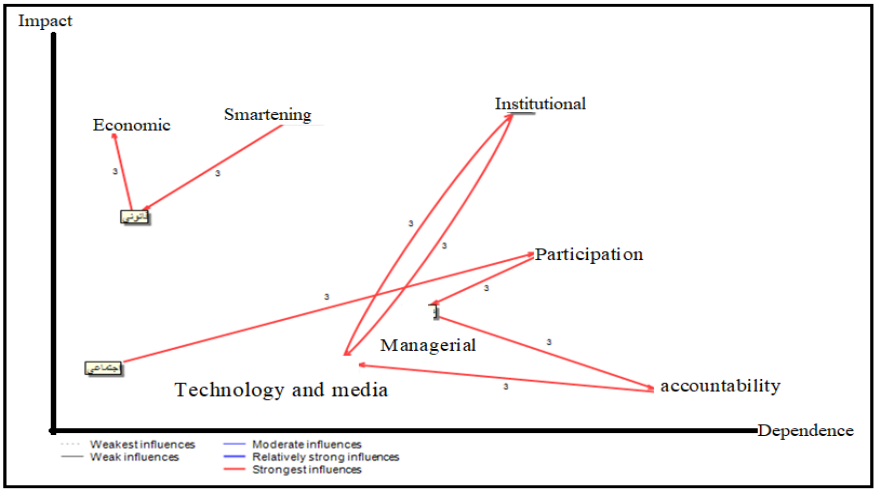


**Fig.5.** The direct impact-dependence diagram of urban sustainability in the study area.
Source: Research findings (2025).

The indirect impact of variables on each other is reached by the mic mac software to the powers of 2, 3, 4, 5, etc., and based on this, these effects are measured. Among these, the variables of media and technology (9344), economic aspects (8961), and smartening (8826) had the highest impact on other research variables, respectively.

**Table.11. MDII Matrix**

| N | Variable | Rows | Columns |
|---|---|---|---|
| 1 | Managerial-strategic | 8218 | 7402 |
| 2 | Legal and policy making | 8645 | 7842 |
| 3 | Financial-economic | 9949 | 8961 |
| 4 | Sociocultural | 8049 | 7828 |
| 5 | Institutional | 8171 | 7731 |
| 6 | Transparency and accountability | 7860 | 7880 |
| 7 | Recycling | 8571 | 8625 |
| 8 | Smartening | 8242 | 8826 |
| 9 | Participation | 7380 | 8170 |
| 10 | Technology and media | 7524 | 9344 |
| | Total | 187 | 187 |

Source: Research findings (2025).

By considering table (11), the indirect (MII & potential) impact-dependence diagram of urban sustainability in the Kurdistan province will be as follows:

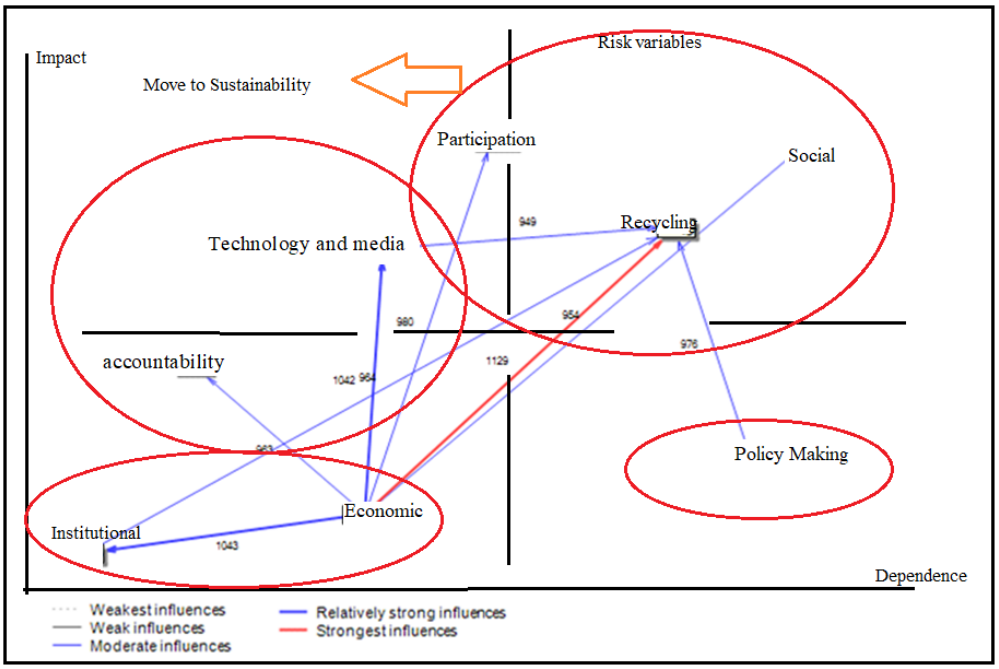


**Fig.6.** The indirect (MII & potential) impact-dependence diagram of urban sustainability in the Kurdistan province. Source: Research findings (2025).

### 5.4. Scenarios on Sustainable Smart Cities in Kurdistan Province

Scenario axes are created during the regionalization phase, and the decision to use them is supported. Scenario axes are the lines that separate the ultimate scenarios from them. Six managerial, legal, and policymaking, transparency, economic, institutional, and infrastructure factors were also proposed as the most influential and unpredictable indicators. These factors were identified as research-influential variables. In the Kurdistan Province, the following four scenarios are the primary ones for the development of smart cities:

1. **Scenario 1: The implementation of sustainable and intelligent urbanization:** In this case, the level of political decision-making and urban policymaking is optimal. Additionally, the province of Kurdistan will benefit significantly from the indices of openness, responsibility, organizational performance, and financial and managerial infrastructure.
2. **Scenario 2: In case (2), sustainable and smart urbanization is successfully implemented:** Political decision-making and urban policymaking are at a decent level in this scenario regarding smartening. Additionally, the province of Kurdistan will have adequate financial and managerial infrastructure and metrics of accountability, transparency, organizational performance, and financial stability.
3. **Scenario 3: Scenario (3), which maintains the current level of sustainable and intelligent urbanization:** In this scenario, political decision-making and urban policymaking are at an in-between and dumb posture in the direction of smartening. Additionally, the research area's measures of openness, responsibility, organizational performance, and financial and managerial infrastructure won't be very pleasing.
4. **Scenario 4: Disaster scenario about smart and sustainable urbanization:** Political decision-making and urban policymaking in the direction of smartening are currently in a very unsatisfactory state. Additionally, the study area's accountability, transparency, organizational effectiveness, and financial and managerial infrastructure metrics would all be impoverished.

## 6. Conclusion

Only 3% of the world's population resided in urban areas in 1800 AD. By 1900, that proportion had risen to 14%; by 2016, nearly 65% (3 billion) of the world's population did so. The percentage of people who live in cities is currently 54% and is projected to increase to 66% by 2050. Due to the current acceleration of rural migration and the concentration of money in urban areas, this number is greater than 62% in Iran's northwest cities. Rapid urbanization has thus led to issues in metropolitan areas such as environmental pollution, traffic congestion, and a need for infrastructure upgrades that can resist the strain brought on by a significant increase in population in small, closely packed regions. Considering this, rapid urbanization has led to issues in metropolitan areas, such as environmental pollution, traffic congestion, and a lack of infrastructure upgrades that can resist the strain brought on by a rapid increase in people in confined regions. Therefore, numerous theories that explain smart urban development at the global and national levels, such as smart urban growth, urban sustainability theory, and modernization sociologic theory, are considered in analyzing smart urban development and underdevelopment. In terms of age, respondents in the research samples ranged from 25 to 30 years old (0.4%), 30-35 years old (30%), 44 to 35 years old (21.6%), 35 to 45 years old (77.6%), and 45 to 55 years and beyond (0.4%). The matrix has a fill rate of 96.25%, demonstrating the significant interdependence of the components chosen. The 1540 measured relationships in this matrix had a total of 60 zero-number relationships, which indicates that the factors had no influence on or were not influenced by one another. One hundred seventy-three relationships ranked first, indicating that they had little influence on one another; 557 relationships ranked second, suggesting that they had a moderately strong relationship; and 810 relationships ranked third, indicating that the relationships' key factors were essential and that they were highly dependent on one another.

## 7. Suggestions

Finally, several suggestions are made for improving the potential for sustainable urban growth in the research region:

- Increase the development of benevolent urban policies.
- Improve the study area's smart urban development's openness and accountability.
- It enhances the financial and economic frameworks for Kurdistan's smart cities.
- In the region of Kurdistan, efforts are being made to realize favorable and somewhat favorable situations for urban sustainability.

The need for strategic transformation thinking, taking advantage of existing capacities in the field of smart city planning, regional parallel development, improving the urban policies in the study area, and other such measures are among the approaches that can enhance the status of smart cities development in Kurdistan province to move from the current situation to relative stability.

## 8. Declarations

### 8.1. Conflict of Interest

The authors declare that they have no conflict of interest.

### 8.2. Funding

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