

**M. M. KASHIRIPOOR****CREATIVE SOLUTION CONCEPT FOR URBAN STRUCTURE  
SUSTAINABILITY DEVELOPMENT****(For example: Architecture and planning structure of Iranian small cities)****КРЕАТИВНЫЕ РЕШЕНИЯ ДЛЯ УСТОЙЧИВОГО РАЗВИТИЯ ГОРОДСКОЙ СТРУКТУРЫ  
(На примере архитектурно-планировочной структуры малых городов Ирана)**

*Special urgency for small cities in Iran represents developing problem guiding principles of transformation and development of architectural and planning structure, as well as applied technique of its evaluation in accordance with the requirements of sustainable development. This article describes leading forms of urban development settlements and identifies common principles which influence on sustainable urban development.*

*The objective of this article is to assert sustainable development theories which meets city planning structure and develop a sustainability concept for Iranian small cities. This will be done through studies that were influenced by addressing a rethinking in order to emphasize adapting new trend of sustainable development which focused on city planning structure, and suitable for Iranian small cities condition. Thus, the main tasks of study could be formulated as follows: define Iranian small cities planning structure features and problems; study recent sustainability documents and related urban development forms and principles; comparative analysis; and finally suggest a creative solution for architectural and planning structure for Iranian small cities condition.*

*The research used the method of analysis of latest international scientific literature and documents related to urban development sustainability in order to evaluate, compare and achieve a proper solution for Iranian small cities structures sustainability. It should be noted that such kind of analysis would be done only after analyzing and identifying the features and problems of the planning structure of Iranian small cities.*

*Results of study: The article reveals recent sustainable urban development forms and its interpretations in modern urban development theories; demonstrates Iranian cities structure features; Iranian cities general plans problems; urban forms and design principles for achieving the goals of sustainable urban development for conditions of Iran.*

*The scientific novelty of research is to study recent urban sustainable development forms and principles which related to urban structures; and suggest an appropriate and suitable concept for Iranian small cities development sustainability.*

*Особую актуальность для малых городов Ирана представляет нахождение решения проблем, определяющих принципы преобразования и развития архитектурно-планировочной структуры, а также прикладной методики ее оценки в соответствии с требованиями устойчивого развития. В данной статье описываются ведущие концепции градостроительного развития поселений и выявляются общие принципы, влияющие на устойчивое городское развитие.*

*Цель статьи – утвердить теории устойчивого развития, которые соответствуют структуре городского планирования, и разработать концепцию устойчивости для иранских малых городов. Это будет сделано с помощью исследований, на которые повлияло переосмысление, чтобы подчеркнуть адаптацию новой тенденции устойчивого развития, сосредоточенной на структуре городского планирования и подходящей для иранских малых городов. Таким образом, основные задачи исследования можно выделить следующие: определить особенности и проблемы планировочной структуры малых городов Ирана, изучить последние документы по устойчивому развитию и соответствующие концепции и принципы городского развития, провести сравнительный анализ, и наконец, предложить креативное решение архитектурно-планировочной структуры для условий малых городов Ирана.*

*В исследовании использовался метод анализа последней международной научной литературы и документов, связанных с устойчивостью городского развития, для оценки, сравнения и достижения правильного решения для устойчивости структур иранских малых городов. Надо отметить, что такой род анализа использовался только после анализа и выявления особенностей и проблем структуры планирования малых иранских городов.*

*Результаты исследования. В статье раскрывается актуальная устойчивая городская форма и ее интерпретации в современных градостроительных теориях, демонстрируются особенности структуры иранских городов, проблемы генеральных планов иранских городов, градостроительная концепция и принципы проектирования для достижения целей устойчивого городского развития в условиях Ирана.*

*Научная новизна исследования заключается в изучении современных концепций и принципов устойчивого развития городов, связанных с городскими структурами, и предложении соответствующей и подходящей концепции устойчивого городского развития для малых городов Ирана.*

**Keywords:** *sustainable development concept, architectural and planning structure, sustainability principles, Iranian small cities, urbanization*

**Ключевые слова:** *концепция устойчивого развития, архитектурно-планировочные структуры, принципы устойчивости, иранские малые города, урбанизация*

## Introduction

Regarding United Nations International Conference on Environment and Development (Rio de Janeiro, 1992) sustainable development of society is aimed at ensuring balanced between its three fundamental factors: social, economic and environment. Although in new era two new factors (management, technology) added to previous factors, many countries (including Iran) approved their sustainability strategic plan. But realization of this plan requires significant material and financial costs and, no less important, new thinking of the transition to new forms and methods of managing the settlements development. Therefore, the process of transition to sustainable development of settlements will be long enough. The most important means of transition to sustainable settlements development are:

- creation of a system of legislative and regulatory documents;
- improving government and monitoring system;
- development and implementation of programs for long-term planning and forecasting the settlements development;
- creation of a reliable and affordable system of information support for urban development;
- improving the system of training and re-training of specialists in government, scientific, design and teaching personnel in the field of urban planning.

Historical analysis of the Iranian city reveals different plans for the development of cities, which reached as a result of the cycle, stage of urbanization and urban planning legislation from 1907 to 1984. Urbanization in Iran received numerous changes in a very short time (from 1907 to 1984) in its foreign, domestic policy and economy from the change in the Shah dynasty; the development of the oil industry; two world wars; Islamic revolution in 1979 and 8 years of war with Iraq. The level of urbanization in Iran is now 75 % and the forecasts shows that by 2050 it will be about 85 %. If we add to these conditions the following information that population growth in the last century

in Iran has increased more than 8 times and the level of urbanization in the last 60 years has increased more than 10 times, we can see the scale of the problem that the government is facing for urbanization and the process of urban development and city expansion.

Iranian cities and their architecture have their own problems and characteristics. Urbanization continues in Iran and cities have their own migrations problems from village to cities until now. This term very sensitive and critical in big and mega cities (like Tehran, Mashhad, Esfahan, Shiraz, Tabriz etc.). Urbanization process charts shows 5.5 % growth during the past 10 years (2006-2016).

If the major cities of Iran dedicated to extensive research, small towns insufficiently studied. However, this type of settlement is the most interesting from the point of view of sustainable development, because they preserve traditional crafts, methods of planning and development. In this situation one of the most important questions related to urban transformation and development plans which meets modern requirement and trends (sustainable development).

Hypothesis and main *purpose of this research* served as assumption that, sustainable development concept study and its interpretations in modern urban development theories could lead to methodological apparatus and leadership concept of predesign research for Iranian small cities.

The results of the study will be carried out in terms of the following tasks implementation:

- Iranian planning structure features and problems;
- recent sustainable development research includes forms (*compact city, eco-city, new urbanism, smart city and decentralized concentration*) and design principles (*compactness, integration, diversity, decentralization and originality*);
- comparative analysis and choosing the right solution;
- suggest a sustainable development concept for architectural and planning structure which appropriate for Iranian small cities condition.

Applied assessment methodology of architectural and planning structure would be developed

for this concept, including indicators revealing compliance with its requirements for sustainable development. In this way, general principles of sustainable development of the city are concretized for each component of the architectural and planning structure and it is possible to identify indicators for evaluate them.

### Research strategy and methodology

*Research methodology* would be used literature review; pattern recognition; identification and conceptualization methods for contribute the results of study. For this occasion, main stages and methodology of this research are like as follows:

1. Literature review and analysis method: latest scientific literature, interdisciplinary text and documents with a suitable thematic analysis related to sustainability, urban design and Iranian small cities problems.

2. Pattern recognition is the ability to see patterns in seemingly random information. The goal is to note the main patterns and concepts in the results of the first step. The second step looks for similarities or patterns in the sample and codes the results by concept.

3. Identification method: to recognize specific, problems and characteristic of Iranian urban forms (small cities), and its relation to sustainable urban forms development (results of part one and two).

4. Conceptualization method: in order to find and suggest a suitable theoretical connection between the identified sustainability concepts and Iranian small cities urban forms.

### Main part (discussion)

The development of industry and its concentration in urban areas at the end of XIX - beginning of the XX century brought to an aggravation population growth and territory problems. That made optimal approach searching problem to their planning that now more important than it was ever before. Major achievements in the study of urban planning development and urban construction principles related to urban planning theories, developed in the second half of the XIX and early XX centuries, particularly in E. Howard, F. Gibberd, P. Abercrombie works who formed modern understanding of small towns planning organization [1, 2]. Street network of city got free curved shape in accordance with the Camillo Sitte ideas, defending medieval aesthetic of urban environment [3]. New technique for urban planning became a group of organized houses around of dead-end street. This technique, which has been subsequently spread building of suburban settlements, not only provided the expressive planning, but also allows to iso-

late building from the busy main streets, creating a more secure living condition.

The next milestone in cities development has become a decentralized concept. The growth of large industrial centers was accompanied by a lack of suitable building land and led to appearance of the city expansion development plans concept beyond his own administrative territory and emergence of urban agglomerations.

Architecture and planning structure plays an important role in defining development directions of planning design documentations (Master plans and detailed planning projects). The main components of architectural and planning structure are: form of city plan, street network structure, planning skeleton filling including built-up and free territory for different purposes. Performed up to present architectural heritage research of Iranian small cities illuminate questions and do not effect on characteristic features of their plan, such as form of plan, streets network and mutual arrangement of functional zones [4]. At the same time process of urbanization continues in Iran and population of small towns increased by migrants from rural areas. Under these conditions, the actual problem is development of urban projects, meeting modern requirements.

Urban projects in Iran, in which transformation of urban planning and buildings takes place, are general (master) plan, guidance plan and detailed plan [5]. Before developing these documents, we must solve questions about identification and protection of national and regional characteristics of planning and building, as issues of city development and transformation in accordance with socio-economic requirements of inhabitant. Although specialized literature provides guidance on formation of the city, the problem of assessing planning structure of the city from the position of new urban concept is not solved academically yet. At the same time since the end of last century urban planning theory is developed under influence of sustainable settlements development concept, which received recognition in many countries of the world. Official reaction of this process starts from Brundtland Commission report, "Our Common Future" in 1987 [6]. However, applied research for sustainable development of small towns in the aspect of improving their planning and building are virtually absent. The first step to improve planning structure of small towns is improving its concept of architectural and planning structure which can help to establish a balance between tradition and innovation in urban planning in Iran.

In order to determine the directions of the city's development in Iran, as well as to satisfy the city's needs in a timely manner, cities general plans, master plans and detailed plan being de-

veloped for a 15-year period and after some years from the date of approval, revision is needed for many cities. In many cities, governmental body and cities managers tries and want to solve fundamentally their cities projects but they don't know how? How they could follow their cities projects for a long time and didn't change it for many years? How could sustainable development help them in this area?

It's very interested for them which international effort and research could answer them for their fundamental question "How I could evaluate city's structure and choose the most sustainable of them? What do they do in a situation like this? Could they evaluate their cities sustainability?".

### 1. Iranian planning structure features and problems

Small cities in Iran include settlements with 2000 to 50 000 people. Most of more than two thousand small towns of the country make up agrarian profile city, in which working population employed in agricultural production. As a rule, these settlements basically are centers of rural settlement. They have administrative facilities centered, trade, cultural and domestic service. Architecture and planning structure under consideration is the result of spontaneous development under influence of local landscape and climatic conditions, national traditions and Islamic religion.

A special feature planned structure of historically established city in Iran is its separation into the traditional residential formation – Mahalle. Mahalle is a traditional quarter, consisting of a cluster of houses, concentrated around the center, which has traditionally located market, bath, neighborhood mosque and drinking water place (Persian: ab-anbar). Nahiye larger planning formation, consisting of several mahalle at its center is located market district, city bath, school, big mosque and caravanserai. A number of studies of architectural and planning structure of Iranian cities indicate that it is being transformed under European traditions influence in urban planning and new way of life, actively uses achievements of modern technology (automobiles, information technology) [7]. However, changes in planning and building of cities marked only for major Iranian cities conditions (like Esfahan, Mashhad, Shiraz, Tabriz and Tehran) which focus significant potential of historical and cultural heritage of the country. At the same time, we could say small towns of the country practically not been studied. Their planning and development are significantly different from big cities and changes a little differently. For example, if in big cities built large residential complexes, high-rise apartment buildings, in small towns there are no

such buildings. For small towns actual problem is preserving distinctive architectural and planning structure in terms of road network and transport, as well as the city's problems of adaptation to the modern requirements of population, sports development arising, public events, tourism and medical services.

The main factors determining characteristics of planning structure of Iranian small towns are: family coefficient is 4; low level of female employment in economy (11 %) [8]; private land ownership; Islamic religion effect in social life; lack of industrial production; city economy depends on agricultural sectors [9]; a high level of motorization (175 cars per 1 thousand inhabitants) and imperfection of urban planning legislation [10, 11, 12].

General plans study materials of 16 small towns of Iran revealed the following problems of planning and buildings [2]:

- historically features city planning not always considered, such as: form of the plan, inscription of road network, placement of community centers character and landscape features of the area;
  - some streets are so narrow (2-3 m), which do not correspond current standards in the country;
  - cross-section of many streets does not include sidewalks, bicycle paths and does not meet safe movement requirements of pedestrians and bicyclists;
  - ignored tradition and centers formation of mahalleh and nahiye before constructed residential structures planning in the second half of XX and beginning of XXI century;
  - landscape and recreational areas are practically missing, however, area along the river is not arranged well;
  - irregularity area development like empty territory that owned by private persons, coexist with densely built neighborhoods.
- National features of planning and development can be considered the following characteristics:
- high building density;
  - widespread use of single-family houses with plots;
  - linear development of trading functions along the main street;
  - dead-end street availability in a residential formation;
  - peripheral zone formation of the city areas for agricultural purposes.

Most of studied cities have a compact shape plan, which is caused by a flat relief, lack of barriers in front of mountains and forests. Street network system represented by combined or free scheme, which is caused by change urban conditions during long process of development. Private network narrow streets create a small blocks sys-

tem of various contours and needs to be improved or better organization. Most of surveyed cities do not have bypass roads for truck transport, and their transit road are through historic center or city center. Master plans materials of cities have shown absence of existing architecture and planning structure assessment methodologies. As a rule, the authors of urban development projects guided by current regulations and statistical data. This approach leads to outdated planning decisions such as increase territory of city, lack of recommendations for improving quality of planning structures and building. Thus, one of the most important urban development projects issues for Iranian small cities conditions is lack of a common concept of conversion problem, based on actual formation principles of architectural and planning structure of cities, as well as applied methodology of its evaluation.

Sustainability realization and urban policies could have done regarding governmental organizations and their cooperation in all scale of country. Connection between local scale (country of Iran) and abroad local scale (world scale) could have done regarding international cooperation and following international plan like "agenda 21" or UN sustainability projects and rules.

Using bottom-up and top-down method of sustainability in urban area could help not only for monitoring, but also for urban policies and their effective realization. For this occasion, it would be more effective if we could divide urban research into the following scale:

- *Micro scale* (city, nahiye and mahalle): we have Neighborhood Council in every residential area of Iran, from village and their "mahalle" up to capital of Iran (Tehran - megacity). In many places (like small cities of Iran), we have technical person or consulting persons with an academic degree in their council. Each city has their own municipality organization which they have a "technical office" with minimum one person with a related academic degree for their civil and urban design works.

- *Macro scale* (region, province and country): Governorate, Provincial Government and Ministry of Interior have their own technical office for civil and urban affair too.

On the other hand, ministry of "Road and urban affair of Iran" have their own responsibility for academic research, urban legislations, urban design projects and their realization; and they have "Supreme Council for Architecture and Urban Design" which consists of many high-level academic professors cooperated, monitor and check every step in the architecture and urban planning of the country.

We could see some governmental effort and documents for planning like "Iran's 20-year vision plan" which tries to explain Iran's development in various area such as: cultural, scientific, econom-

ic, political and social fields. But we should know that this document doesn't have any overlap with international sustainability development systems.

It seems we have a good base for sustainability process management, policies and monitoring for Iranian urban area but we don't have a good plan and legislation in governmental scale. The lack of a strategic plan, legislations and a guide for sustainable urban development is one of the most important subjects for today's sustainability step in Iran.

## 2. Recent sustainable urban development research

Sustainable development interpreted as an urgent task that must be addressed by all residents and city leaders in order to ensure a high quality of the urban environment, high quality of life, and a balance between the anthropogenic and natural environments. The main goals of sustainable development of settlements are: decent housing for all; health and active longevity; a job that is satisfying and provides sufficient income; healthy and safe environment, life in harmony with nature; personal and property safety and security; social stability, life surrounded by friends and neighbors; convenient accessibility of urban infrastructure; preservation of historical and cultural monuments, landscapes; high architectural and artistic level of settlements development.

As can be seen from the list of goals, all of them can be determined by the material components of the planning structure of the city (availability of housing, healthy living conditions, rational organization of functional zones, spatial accessibility to social infrastructure facilities, etc.). At the same time, there is no theoretical basis for the development of urban planning projects that fully meet the requirements of sustainable development [13]. In order to achieve a sustainable urban structure, we need to analyses it from two main point of view: *sustainable urban forms and sustainable design principles*.

### A. Sustainable urban forms

A common approach transformation of the city was concept of sustainable development in many countries. In 1992 at the UN Conference on Environment and Development held in Rio de Janeiro, global challenges of sustainable development have been identified and adopted program document "Agenda XXI", contains recommendations for heads of all countries in the world to develop their strategic territories based on sustainable development programs. To date, specialists in urban design field more uses term sustainable development. Although 59 evaluation methodologies for sustainable human development prepared

by now, only 10 % of the total numbers are in architecture and urban planning area. However, impact condition evaluation of the architectural and planning structure of city on its sustainable development has not developed yet. Increased public attention to ecology and environmental protection, energy efficiency design solutions and using renewable energy sources are key factors for sustainable development, which displaced focus from territorial growth of the city on its conversion quality under design project documentation.

Within overall direction of sustainable development framework in contemporary publications on urban design subject, highlighted several urban development forms. In most urban design directions studied abstract city, for the most part large cities, and small settlements remain outside field of view of scientists. Thus, modern urban development adaptation directions of Iranian small town require their critical analysis. Jabareen distinguishes four forms of urban concept (Neotraditional development, urban containment, compact city and eco-city). He also nominates seven design principles in order to achieve the goals of sustainable urban development. These principles consist of: compactness; sustainable transport; diversity; mixed land use; density; greening and passive solar design [14]. Addition to the above approaches, a direction exists such as "Decentralized concentration" [15, 16]. Smart city as a main direction of urban form concept in past two decade and today's following direction based on sustainable design would be add to this list too.

As part of the study, five main common sustainable urban forms (*compact, eco-city, new urbanism, smart city and decentralized concentration*) were studied, which allowing them to be used for the formation and reconstruction of the architectural and planning structure of cities.

**Compact city.** The idea of compact city arose in opposition to growth of large cities suburbs. It is believed that high density of buildings and population contributes to land preservation for agriculture, optimal for public passenger transport maintenance and decreases frequency of car use. Some authors point out, that considered city form leaves a smaller "ecological footprint" of society on the environment and reduces consumption of non-renewable resources [17]. Compact city model except high density of population and development, suggests a mixed land use and objects development like social and engineering infrastructure. Compaction residential structures, open spaces shortage, management difficulty and high cost of land are some kinds of disadvantages of this settlement form [2]. Addition to the above factors should be taken into account, that compact residence tradition is fundamentally different in various countries

and regions. Densely built-up city exposed devastation in case of natural and man-made disasters.

**Eco-City.** Defenders of ecological city idea (Green city, Eco-polis) have focused on environmental protection aspects and human existence in harmony with nature, while maintaining idea of public transport use, pedestrian accessibility and unauthorized transportation use. The main activities are focused on fight against carbon emissions, reduction in consumption of non-renewable resources, as well as increase of green areas.

**New Urbanism.** Named direction designed to revive idea of a traditional city with pedestrian priority movement. It originated in the United States as an alternative estate development expansion area in large cities suburbs. In contrast to the compact city concept, significant attention of New Urbanism assigned to planning structure, architecture and open spaces. Architectural and planning structure of the settlement dates back to historical examples of European architecture, with different person scale. Design guiding principle consists of optimal radius walking distance to the attraction objects – "Daily necessities of life are available in five-minute walk away". Walking area determines the amount of planning formations. Following ten basic principles of New Urbanism are well known: pedestrian accessibility; mixed land use; inter-connection streets network; diversified buildings; high quality of architecture; traditional structure of the neighborhood; high density; availability of ecological transport; sustainable development and life quality. Considered concept provided basis for a number of rating systems assessments of residential formations like LEED-ND and Smart-Code system design, which provides practical guidance on evaluation and design of architectural and planning structure of the city [18, 19].

**Smart city.** A city in which IT technologies are widely used (video surveillance systems, specially installed sensors, data from mobile operators, etc.) to ensure comfortable living conditions for citizens and optimize the management of urban infrastructure. In recent times, the requirements for the safety of buildings and the people in them, the optimization of the work of the engineering equipment of buildings, and the quality and reliability of the engineering and technical infrastructure of cities have increased significantly.

The creation of "smart cities" requires large financial costs, as well as "smart management" and "smart residents". Smart management consists in monitoring the operation of city services, the state of infrastructure, and optimizing the use of resources. Intelligent software allows real-time analysis of relevant information and prediction of possible problems. One of the main functions of the city authorities is to ensure the investment

attractiveness of the city, guaranteeing equal and transparent rules for doing business, and business projects implementing. The active introduction of smart technologies requires a sufficiently educated population as known as "Smart residents". Innovative technologies require adequate perception. In the modern world, a situation has developed where technologies do not appear in response to people's needs, but people adapt to technologies that are conquering the world.

A potential consumer of smart technologies needs to be explained what will be his benefit from their implementation. The authorities need to educate entrepreneurs, who need to be explained what and how they can invest in the infrastructure of smart cities, as well as consumers – why they, having paid more for smart and more expensive solutions at first, and then, they will pay less. It should be noted that technology is not an end in itself, but tools to improve the quality of life of citizens [1].

**Decentralized concentration.** An alternative to compact city development is a discrete or intermittent development which manifested itself in the satellite towns construction of large cities and embodied in theory of decentralization, extended by E. Saarinen. Intermittent development of the city connected with the development of vehicles, which led to transformation of public service system and emergence of a polycentric urban structure [2, 15].

## B. Urban design principles

Comparative analysis of the discussed city development forms shows the common principles, on which they are built. From all variety of principles, were chosen four most general, suitable principles for use by formation and reconstruction of architectural and planning structure of cities (compactness, integration, diversity, decentralization). We could add originality (identity) as the fifth principle, which should take into account as unique urban conditions and cities characteristics, and it should be used in designing architectural and planning structure [2, 4].

**Compactness.** Compact planning structure contributes to effective land use, rational traffic organization and uniformly distance of the city center from peripheral areas. Spatial compactness of building and public spaces promotes effective use of the built-up territory, as well as public open spaces, requiring a high level of landscaping.

**Integration.** In the modern urban planning, integration requirement is opposed to mono-functional use of areas and buildings. This principal cause to combination of various functional areas, their interpenetration contributes to the diversity of urban environment, approximation of labor application places to residence places, reduce public

transport mobility. Integration planning structure is also reflected in street network connectivity, providing convenient access to city for all modes of transport, including non-motorized - bicycle.

**Diversity** planning and building of the city is a necessary condition for its development sustainability and opposed to monotony, which appears in distributing simplified street network planning decisions, mono-functional use of territory, limited types of public spaces and buildings. The problem of building characterized by monotony, first of all, holds the largest land area in the city for residential areas.

**Decentralization.** In urban planning theory, planning structure of small towns refers to monocentric type. At the same time, development of cultural and consumer services system and requirements of approximation of its objects to residence places, suggest establishment of local service centers necessity at the level of neighborhoods group. In addition, such centers are typical for Islamic cities, including Iranian cities that traditionally have polycentric plan.

**Originality (identity).** Accounting cultural characteristics of region, attention to local traditions in architecture and urban planning is the latest addition principle to sustainable development. Image of the city, its recognition plan, public spaces and architecture, connection of all elements with cultural traditions of local population are components of sustainable urban development. Originality is the fifth principle, which should take account of unique urban conditions and cities especially, socio culturally especially conditioned at the level of city plan; open public spaces and buildings. It should be used as one of the key factors in design process of architectural and planning structure. Key aspects of city identity are presence of architectural monuments; history and culture; traditional and specific planning decisions; open public spaces and specific building methods [20, 21]. Uniqueness of small city formed inimitable spiritual atmosphere – "genius place" which depends on local architecture and landscape [22]. Originality provides preservation and development of socio-cultural characteristics of Iranian small cities.

## Analysis and results

Sustainable development of architecture and planning structure (SDAPS) which suitable for Iranian cities condition will obtain from influencing sustainability principles, their appropriate consideration on architecture and planning structure (APS), and specific overview and consideration of Iranian cities situation.

The planning structure of the city consists of a frame (linear elements – streets, rivers, etc.) and nodes (public centers located at the intersection

of planning axes - squares), as well as filling the frame - zones. We could allocate the natural components of the planning structure of the city too (rivers, forests, water surfaces and anthropogenic – created by humans). In the theory of urban planning, the patterns of planning development and settlements development are revealed, and criteria for the effectiveness of design solutions have been established. However, these criteria need to be clarified for the sustainable development concept.

In order to use the nominated principles (*compactness, integration, diversity, decentralization and originality*) for analysis of the architectural and planning structure of the city, offered their consideration at the following levels:

- Urban structure (street network, green corridors, functional zones);
- Open space (urban, recreational and undeveloped public spaces);
- Buildings.

Sustainable development concept of architectural and planning structure, involves multiple consideration from influencing of formation of architecture and planning structure (APS) principles and APS elements (urban structure, open space and buildings). In this way, isolated principles applied to specific elements of city. This separation allows us to put forward criteria for evaluation of architectural and planning structure. The proposed principles perfection of the APS and consideration concept are different from existing developments works, and it’s adapted to conditions of Iran (Pic. 1).

Conclusions

This research reveals main latest five sustainable urban forms (*compact, eco-city, new urbanism,*

*smart city and decentralized concentration*) and their interpretations in modern urban development theories. As a result of Iranian small towns study, author established features of their architecture and planning structure and identified necessity factors for a common approach to its development in accordance with the sustainable development principles. Study sources allowed determining five common principles of sustainable urban development. These principles are: *compactness, integration, diversity, decentralization and originality*. However, these principles practically cannot be used to designers. It is not always clear to which of the elements of planning and building structure of the city are intended. For this occasion, author suggested consideration of this principles (compactness, integration, decentralization, diversity, originality) at the following levels: *macro level (urban structure), meso level (open space), and micro level (buildings)* that are specified for use in design practice in accordance with sustainable development guidance.

In this way, general principles of sustainable development of the city are concretized for each component of the architectural and planning structure and it is possible identify indicators to evaluate them.

Novelty of this concept for Iran conditions consists in studied the open public space of the city, which is not considered as part of general plans and detailed planning projects. The proposed concept based on design principles of sustainable architectural and planning structure of small towns (compactness, decentralization, diversity, integration, originality). Each of these principles separately known in theory but they advocate a new scientific result within the advanced concepts framework, allowing more specific requirements for the architectural and planning structure of the city.

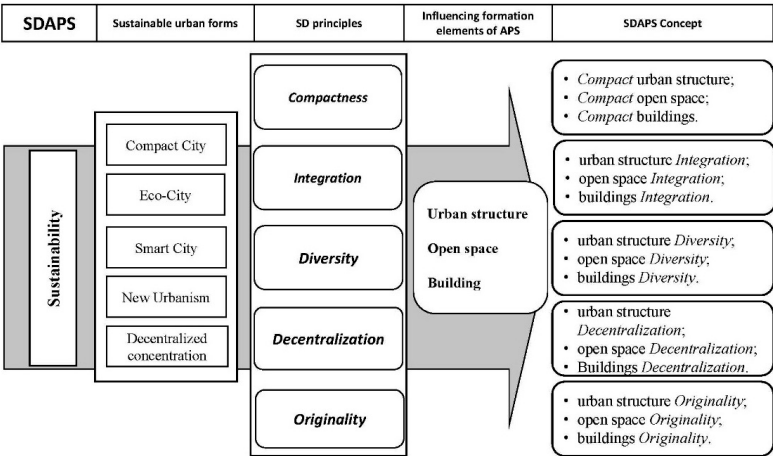


Fig. 1. Systematic process for obtain Sustainable Development of Architecture and Planning Structure (SDAPS) concept Terms symbol: SDAPS – Sustainable development of architecture and planning structure; SD – sustainable development; APS – architecture and planning structure



## Implications for practice and advancement of research

The results of the research could be used in design organizations under development of general and detailed plans; in practical activity authorities' administrations in the preparation of design assignments, programs and plans of formation and development of small towns; in educational process – in architecture course and degree designing preparation in the universities.

Proposed evaluation system of the architectural and planning structure of a small town allows to evaluate efficiency of its city-planning organization, and to determine the direction of its improvement in accordance with sustainable development concept.

The universality and simplicity of use of the developed recommendations allows to accelerate and simplify process of evaluating the architectural and planning structure of small towns, which promotes reasonable decision-making for their transformation during the development of urban planning documents.

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