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# SUSTAINABLE DEVELOPMENT OF URBAN SERVICES

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Rapid urbanization processes and the continuous growth of urban population are causing an increasing pressure on urban systems and services worldwide. Ensuring efficient, accessible, and environmentally friendly urban services has become a pivotal precondition towards maintaining a relevant life quality and achieving sustainable cities. The system of urban services (including transportation, utilities, housing, waste management, etc.) plays a central role in supporting economic efficiency, social equity and environmental balance.

In this context, sustainability requires a balanced approach integrating environmental protection, economic efficiency, social inclusion and effective governance. Meanwhile, urban areas face a number of interconnected challenges: environmental pollution, aging infrastructure, unequal access to services, weak institutional coordination, etc. Addressing these issues requires integrated planning, smart technologies, as well as inclusive and long-term policymaking frameworks.

This paper studies the process of sustainable development of urban services, analyzing their theoretical and conceptual framework, key sustainability principles and the main challenges. It also examines the existing issues and best practices on the case of Yerevan, highlighting both problems and ongoing initiatives towards ensuring sustainable urban services.

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***Keywords*:** system of urban services, sustainable urban development, sustainable development of urban services, urban sustainability.

**Introduction**. With more than half of the world's population living in urban areas, the process of rapid urbanization and urban development keeps holding a pivotal place and significance in the overall context of contemporary human development in general. Moreover, a continuous growth of urban population is forecasted for the future decades, resulting in around 2/3 of the total population of the world living in cities and towns by the year 2050.

It goes without saying that such kind of intense and even explosive urbanization will cause an enormous pressure on the system of urban services (SUS). The SUS is aimed at ensuring the proper functioning of cities and includes a variety of services, such as: public transportation, waste management, recreational, housing,

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utility and sanitation services, social and public services, etc. Therefore, sustainable development of urban services (SDUS) becomes an absolute necessity, ensuring their functioning in a way that minimizes the possible environmental impact, promotes economic resilience, and ensures overall and equal access.

The main aim of the paper is to shape a comprehensive understanding of the main directions, priorities and challenges of sustainable development of the SUS. Accordingly, the following objectives were identified:

• to discuss and summarize the main framework of urban services;

• to analyze the essence of SDUS in the context of urban sustainability;

• to identify and discuss the issues and best practices of SDUS in Yerevan, Armenia.

The general research framework is sustainable urban development (SUD), while the particular (specific) framework includes sustainable development implications and challenges in urban services.

**The Main Outcomes of the Study.**

***Understanding the Framework and Contemporary Significance of Urban Services.*** In contemporary urban studies, the socio-political and socio-cultural relations of the urban population have become a priority issue. In the modern world, the city is perceived as a complex and complicated social and socio-cultural organism [1].

Therefore, the modern concept of a city or an urbanized area should be based on a holistic approach, discussing the city as an integrated system of interconnected functional components which can be identified and classified in different ways. However, the variety of sub-systems can be merged into 2 main groups: life-sustaining sphere and socio-cultural sphere.

Meanwhile, urbanized areas are described by a special internal environment, named urban environment or urban settings.

An urban setting can be defined broadly based on population density, concentration of administrative bodies and infrastructure and a diverse set of livelihood and income generation activities. In an urban setting, the forms of livelihood and income generation activities are diverse and are not bound for agricultural production like rural areas. If the area fits some (if not all) of these basic characteristics, it can be considered as urban [2].

Taking into account the complexity of urban environment, its following main components can be identified:

• *Natural environment*: both primary and man-made (through gardening, landscape design, etc.) natural areas.

•*Social environment* (population, social relations, urban lifestyle and identity).

• *Institutional environment* (urban governance).

• *Constructions and architecture*.

• *Functional environment* (infrastructure, services, urban economy).

In the framework of aforementioned theoretical approaches, the SUS (consisting of transportation, recreational, waste management, utility, social and public services provided day-to-day to urban residents) has a pivotal importance in terms of sustaining the overall process of normal functioning of cities, as well as ensuring relevant levels of comfort and life quality.

The word "system" in this case clearly indicates the necessity of discussing different types of urban services in the context of their mutual connections for better results and efficiency: in other words, integrated and complex services can be seen as the most perspective vision of development of urban services.

Along with being a crucial component of cities as systems, urban services belong to the service sphere as well: a broad and comprehensive system of various types of services (the so-called "3rd sector of economy") aimed at satisfying human needs in general. The SUS is greatly connected to the term "critical infrastructures", which has got a significant popularity and importance since early 2000s in the U.S. and EU.

Critical infrastructures are those material resources, services, information technology systems, networks and infrastructure assets that, if damaged or destroyed, would cause serious repercussions on the crucial functions of society, including the supply chain, health, security and the economic or social well-being of the state and the population. According to the U.S. Patriotic Act of 2001, critical infrastructures include "systems and goods, both physical and virtual, so vital to the nation that their malfunctioning or destruction would produce a debilitating impact on the security of citizens, on the economic security of the nation, on national public health and on any combination of the above" [3].

Obviously, there are overlaps between critical infrastructures and urban services. For instance, water and electricity supply systems at a certain city level belong to both urban services and critical infrastructures.

However, the main difference between the two concepts basically refers to their functional features and impact scale. Particularly, the possible consequences in case of operational failure of critical infrastructure will have a severe national or societal level impact. In case of urban services, disruption impacts may be comparatively more local, painless and quite manageable.

Understanding the main ideas of urban services and related concepts, the next section of the paper will be focusing on the meaning and main challenges of implementing sustainability principles towards the planning and development of the SUS.

***Sustainability of urban services in the context of sustainable urban development.*** As mentioned, urban services are part of service sphere in general. Therefore, SDUS should be based on the fundamental principles of sustainable services: an outcome of the process of sustainable development of service sphere.

Based on the main pillars or dimensions of sustainable development, the following main criteria of sustainable service sphere can be identified:

• *Environmental safety*: providing services based on environmentally friendly approaches and technologies, developing green and eco-friendly urban services sphere, as well as improving environmental quality through digitalization of services including an overall use of smart and IT-based technologies;

• *Economic profitability*: implementation of efficient and smart business models in service sphere, ensuring a fruitful private-public cooperation, etc.;

• *Social equity and inclusion*: services should be affordable and achievable for different social groups through relevant pricing and other policies. Meanwhile, service jobs should contribute to poverty and unemployment reduction, increasing life quality, etc.

• *Good governance*: practicing relevant institutional and managerial approaches towards efficient and sustainable development and functioning of service sphere.

The aforementioned general principles of sustainable service are entirely applicable in urbanized areas. Meanwhile, a great number of sustainability challenges in the SUS are being emerged.

In Tab. 1, a number of these challenges and their relevance to particular aspects of sustainable development are shown, according to the following groups and types of urban services, such as: transportation, utilities and sanitation, housing, water and electricity supply, e-governance and digital services, etc.

*Table 1*

*Urban services challenges in the context of sustainable development*

| The main aspects of sustainable development | Urban services-related challenges in terms of sustainability |
|---|---|
| Environmental | • Public transportation congestions and emissions, leading to greenhouse gas emissions and air pollution;<br>• Fossil fuel dependency (in electricity production, transportation and heating);<br>• Aging and outdated energy infrastructure;<br>• Waste generation and inadequate recycling, processing and management, resulting in pollution and health risks;<br>• Water scarcity and aging pipelines (water loses);<br>• Inadequate sanitation. |
| Social | • Water scarcity and aging pipelines (water loses);<br>• Inefficient and aging transportation infrastructure;<br>• Inequitable access to transportation services, especially in urban neighborhoods;<br>• Energy poverty;<br>• Inadequate sanitation;<br>• Lack of affordable housing;<br>• Unequal access to digital services. |
| Economic | • Limited financial sources and reliance on short-term funding instead of long-term sustainable development programs;<br>• Insufficient level of public–private partnership in terms of mobilizing financial resources, promoting innovations and infrastructure improvements. |
| Political and institutional | • Barriers towards e-governance, digitalization of services and implementation of smart city approaches;<br>• Functional fragmentation of agencies and lack of integrated (system) approaches;<br>• Low level of public participation and involvement. |

*Source*: own draw.

In order to ensure the proper level of sustainability of urban services, the following main requirements of sustainable development policymaking, planning and governance should be put into practices: inter-institutional cooperation, inclusive and participatory approach, network-based decision making and multi-stakeholder engagement, broad-based management and dialogue [4].

Therefore, integrated approaches can be considered as the most optimal methodology for ensuring sustainability of urban services and addressing sustainability challenges: i.e. establishing integrated frameworks combining technological innovation, inclusive policymaking, and resilient infrastructure planning.

According to holistic (system) approach, SDUS should be discussed in a more broad and general context, such as *sustainable urban development (SUD).*

SUD can be defined as development that meets the needs of a community without compromising the ability of future generations to meet their own needs. It prioritizes economic, environmental and social sustainability. Sustainable development aims to ensure that cities are livable and supportive of economic, social and ecological resilience in the face of a changing climate [5].

The place of SDUS in the context of urgency of SUD (and urban sustainability, respectively) is clearly identified within the social equity and inclusion aspect: providing affordable housing, access to basic services, and opportunities for decision-making, decreasing poverty and assisting vulnerable population [6].

In terms of relevant implementation framework and platform for both SDUS and SUD, the Sustainable Development Goal 11 (SDG 11, Sustainable Cities and Communities) can be seen.

With the main aim of making cities and human settlements inclusive, safe, resilient and sustainable, SDG 11 is focusing on sustaining urban services signifcantly, such as: affordable housing, accessible and sustainable transport systems, integrated and sustainable settlement planning and management, reducing environmental impact, access to safe and green public spaces, etc. [7].

In order to shape a more comprehensive understanding of contemporary SUD and SDUS, the multi-dimensional and diverse connections of urban sustainability and smart urban approaches should be taken into account. Continuous implementation of smart (basically, ICT-based) approaches in urbanized areas is a pivotal push factor towards ensuring SUD and SDUS in particular. Therefore, the mixed concept of “sustainable smart cities” has emerged.

The UN Economic Commission for Europe and the International Telecommunication Union defined smart sustainable cities as innovative cities that use ICTs to improve quality of life, efficiency of urban operation and urban services, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental and cultural aspects [8].

Summarizing this part of the paper, it should be stated that SDUS plays a central role in achieving SUD. Particularly:

a) efficient public transport systems reduce traffic congestion, lower greenhouse gas emissions, and improve air quality;

b) Sustainable water supply and wastewater management protect natural resources while ensuring public health and resilience;

c) Recycling-based waste management systems minimize negative environmental impact and reduce landfill use;

d) Energy-efficient urban infrastructure and integration of renewable energy solutions decrease carbon footprints of urbanized areas and contribute to energy security;

e) Affordable housing services promote social equity and inclusion;

f) Smart urban planning and digitalization improve urban services, governance, and citizens' engagement.

Accordingly, sustainable management of urban services supports economic growth, environmental protection, and social well-being, forming the foundation for truly sustainable cities.

***Challenges and Perspectives of SDUS in Yerevan, Armenia.*** With almost 60% of the total urban population of Armenia (and around 1/3 of the total population of the country), Yerevan has a leading share in the service sphere of Armenia

As of 2024, the share of Yerevan in the total volume of services in Armenia was around 86.5% [9]. In case of certain urban services, Yerevan makes up around 84% of the volume of passenger transportation of the country, 88% of health and social services, 38% of natural gas supply, 54% of water supply, etc. [10].

Nowadays Yerevan faces a variety of interconnected challenges that cause additional difficulties towards ensuring SDUS. One of these issues is institutional fragmentation: divided responsibilities among multiple agencies and stakeholders, leading to weak coordination in planning and implementation processes. Meanwhile, outdated infrastructure (dated back to the Soviet era in many cases) no longer meets the demands of a growing urban population and current urban development criteria in general. In terms of water losses, water management remains a priority issue. Similarly, waste management system is lacking more recycling and sorting mechanisms. Air pollution is another major issue, basically caused by heavy traffic and intensive construction activities.

In terms of water losses, water management remains a priority issue. Similarly, waste management system is lacking more recycling and sorting mechanisms. Air pollution is another major issue, basically caused by heavy traffic and intensive construction activities.

Not underestimating the recent processes of modernization of public transportation system of Yerevan, a number of problems still keep being crucial, such as congestions, increasing emissions, necessity for route network diversification, etc. It goes without saying that the city needs more investments in modern infrastructure and maintaining affordable urban services particularly for vulnerable groups of population.

The aforementioned challenges are deeply interconnected, and require integrated planning, institutional improvements and a long-term investment in smart and sustainable urban infrastructure.

In Tab. 2, several general initiatives and activities towards SDUS that have been successfully implemented in Yerevan since the last decades are shown and discussed:

*Table 2*

*Examples of SDUS initiatives and activities in Yerevan, Armenia*

| Initiatives and activities | The aim and relevance in terms of SDUS |
|---|---|
| Green City Action Plan (in cooperation with European Bank | Assisting economic and social development of Yerevan, mitigation of negative environmental impact, increasing the quality of environmental actives and improving the life quality. |

| | |
|---|---|
| for Reconstruction and Development, EBRD) | The action plan can be served as a general methodological and practical background for an overall practicing and implementation of green and sustainability approaches in the SUS of Yerevan. |
| Unified geoinformation system (GIS): the Geoportal | Promoting the further digitalization of various urban services, increasing their accessibility, quality, etc. In general, accessible and IT-based services have a crucial importance in the context of sustainable development and sustainable service development. |
| Local Open Government Partnership (LOGP) initiatives | Developing a policy based on the principles of open government (transparency, accountability, inclusiveness, innovativeness) involving civil societies, NGOs, and active citizens. The LOGP initiatives are related to political and institutional aspect of sustainable development and can be aimed at shaping a comprehensive institutional, regulatory and practical framework for SDUS. |
| Participation in International Council of Local Environmental Initiative (ICLEI), now: Local Governments for Sustainability | Sharing experience and skills, getting to know with the best practices and implementation perspectives at international level. |
| Sustainable Energy Development Action Plan (SEDAP) | Defining integrated organizational, economic and technological measures and funding mechanisms, aimed at achieving higher energy efficiency, reducing energy consumption, decreasing greenhouse gas emissions, and improving urban environment in general.<br>Covering various urban services such as transportation, waste management, water supply and city lighting, the action plan can have a significant contribution to SDUS in Yerevan. |

*Source*: [11]; own draw.

Based on existing challenges and best practices of SDUS, the following main recommendations for future activities and initiatives can be suggested:

- working out and implementing sustainable development goals at local level, as a general framework for SUD and SDUS in Yerevan;
- ensuring spatially equal and proportional urban development and development of the SUS;
- strengthening further cooperation in the framework of SUD international networks;
- promoting green urban economy, jobs and services;
- ensuring relevant urban planning and functional zoning;
- further digitalization of urban services and implementing smart approaches;
- continuous practicing of good urban governance principles.

**Conclusion.** SDUS keeps being a crucial component of overall sustainable development. It is essential in the context of environmental stability, social equity and economic resilience.

Meanwhile, as mentioned, SDUS is a fundamental milestone towards achieving broader goals of urban sustainability in general, especially in the context of rapid urbanization and increasing pressure on natural environment and urban systems. Urban services play an essential role in maintaining the normal and long-term functionality and resilience of cities. Therefore, sustainability of urban services

requires a balanced implementation of environmental, economic, social, and institutional approaches.

At the same time, there are numerous challenges towards SDUS: from environmental issues such as pollution and resource inefficiency, to social inequalities, financial constraints and institutional fragmentation. These challenges are complex and multi-dimensional: thus, requiring integrated, inclusive and future oriented strategies, holistic and system-based solutions, good governance frameworks and active involvement of different stakeholders.

The case of Yerevan, the capital of Armenia illustrates both difficulties and opportunities in the process of SDUS.

While the city faces issues such as outdated infrastructure, inefficient service systems and environmental pressures, important steps toward SDUS through strategic initiatives, digitalization and international cooperation have been taken. Along with future initiatives and activities, these steps should be continued and improved for better outcomes of SDUS in Yerevan.

Overall, achieving a relevant level of sustainability of urban services requires a future-oriented development vision, integrated urban planning and continuous investment in urban innovations, smart city solutions and infrastructure. Strengthening multi-institutional and inclusive coordination and corresponding local policies with global sustainability frameworks is essential for ensuring effective urban services that contribute to improved life quality and a long-term SUD in general.

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Տ. Ա. ՍԱՐԳՍՅԱՆ

# ՔԱՂԱՔԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԿԱՅՈՒՆ ԶԱՐԳԱՑՈՒՄ

## Ամփոփում

Բուռն ուրբանիզացման գործընթացները և քաղաքային բնակչության շարունակական աճն ամբողջ աշխարհում մեծացնում են ճնշումը քաղաքային համակարգերի և ծառայությունների վրա: Արդյունավետ, հասանելի և էկոլոգիապես անվտանգ քաղաքային ծառայությունների ապահովումը դարձել է կյանքի որակի պահպանման և կայուն քաղաքների ձևավորման կարևոր նախապայման: Քաղաքային ծառայությունների համակարգը (ներառյալ տրանսպորտը, կոմունալ ծառայությունները, թափոնների կառավարումը և այլն) առանցքային դեր ունի քաղաքներում տնտեսական արդյունավետության ու զարգացման, սոցիալական հավասարության և բնապահպանական հավասարակշռության ապահովման գործում:

Այս համատեքստում կայունությունը պահանջում է հավասարակշռված մոտեցում՝ ի մի բերելով ու համակարգելով շրջակա միջավայրի պահպանությունը, տնտեսական արդյունավետությունը, սոցիալական ներառականությունն ու արդյունավետ կառավարումը: Միևնույն ժամանակ, քաղաքային բնակավայրերը բախվում են մի շարք փոխկապակցված խնդիրների՝ շրջակա միջավայրի աղտոտում, մաշված ու հնացած ենթակառուցվածքներ, ծառայությունների անհավասար հասանելիություն, ինստիտուցիոնալ թույլ համակարգում և այլն: Այս խնդիրների լուծումը պահանջում է համակցված պլանավորում, «խելացի» տեխնոլոգիաների կիրառում, ինչպես նաև զարգացման ներառական ու երկարաժամկետ քաղաքականության մշակում:

Տվյալ հոդվածն ուսումնասիրում է քաղաքային ծառայությունների կայուն զարգացման գործընթացը՝ վերլուծելով դրա տեսական-հայեցակարգային հիմքերը, կայունության հիմնական սկզբունքները և առկա հիմնական մարտահրավերները: Քննարկվում են նաև Երևան քաղաքում առկա խնդիրներն ու լավագույն փորձը՝ ընդգծելով ինչպես առկա դժվարությունները, այնպես էլ իրականացվող նախաձեռնությունները՝ ուղղված կայուն քաղաքային ծառայությունների ապահովմանը:

Т. А. САРГСЯН

# УСТОЙЧИВОЕ РАЗВИТИЕ ГОРОДСКИХ УСЛУГ

## Summary

Процессы бурной урбанизации и непрерывный рост городского населения оказывают возрастающее давление на городские системы и услуги во всем мире. Обеспечение эффективных, доступных и экологически безопасных городских услуг становится ключевым условием поддержания качества жизни

и достижения устойчивого развития городов. Система городских услуг (включающая транспорт, коммунальные услуги, жилищное обеспечение, управление отходами и др.) играет центральную роль в обеспечении экономической эффективности, социальной справедливости и экологического баланса городов.

В данном контексте устойчивость требует сбалансированного подхода, объединяющего охрану окружающей среды, экономическую эффективность, социальную инклюзивность и эффективное управление. В то же время городские территории сталкиваются с рядом взаимосвязанных проблем: загрязнение окружающей среды, изношенная инфраструктура, неравный доступ к услугам, слабая институциональная координация и др. Решение этих проблем требует комплексного планирования, внедрения “умных” технологий, а также инклюзивной и долгосрочной политики.

В данной работе исследуется процесс устойчивого развития городских услуг, анализируются их теоретико-концептуальные основы, ключевые принципы устойчивости и основные вызовы. Также рассматриваются существующие проблемы и лучшие практики на примере города Еревана с акцентом как на существующие трудности, так и на реализуемые инициативы по обеспечению устойчивых к внешним воздействиям городских услуг.