THE INFLUENCE OF SMART CITY DEVELOPMENT IN ROMANIA ON THE FINANCIAL MANAGEMENT OF LOCAL AUTHORITIES

Ioana Marinela (Gavriluță) Turtă*
1) Alexandru Ioan Cuza University of Iași, Iași, România.

Abstract
Smart City's role is to improve urban life through sustainable integrated solutions and address city-specific challenges in various policy areas, such as energy, mobility and transport, and ICT, which must also be effectively implemented. Smart City relies on the use of information and communication technology (ICT) to sustainably develop urban spaces and limit the negative effects of urbanization. Globally, there is a trend to promote the concept of Smart City as a solution for urban areas in efficient and sustainable development, without affecting the environment.

In Romania, Smart City has become a concern for local, urban and rural administrations, in the context in which at European level there are non-reimbursable funds for such projects. In Romania, Smart City and the projects that have the role of making an administration to be Smart are in their infancy.

The purpose of this article is to highlight the advantages of Smart City development in urban administrations in Romania and the influence on the financial management of local authorities. Urban spaces in Romania face certain difficulties, both in terms of development (economic, infrastructure), but also pollution. The paper will highlight the stage of development of Smart City and how it influences the financial management of local governments, where such projects are implemented. The paper is descriptive, by correlating the information highlighted in the literature and data on projects submitted for Smart City by urban areas in Romania. The study analyzes the projects submitted by the main urban areas in Romania in 2020 for their development as Smart City, according to the website https://steinbeis-romania.com, thus highlighting the concern of local governments for their development as Smart City.

Keywords.
Smart City, local public administration, financial management, development.

JEL Classification
G32, H83, R51, R58.

* Corresponding author, **Ioana Marinela (Gavriluță) Turtă** - gavrilutaioana@yahoo.com.

Introduction

Smart City is a solution for urban areas to be sustainable, and for urban spaces to be Smart City it is necessary to identify financial solutions. An important role for the development of Smart City is the public and private partnership, being a solution for financing projects for this purpose. At European level, there is a partnership that provides grants for smart cities and communities (Schaffers et al., 2012). Smart City is considered the solution for modernism and adaptation to the needs of society, sustainable development of urban areas (European Commission, 2015). There are numerous studies in the literature that address either the topic of Smart City, public or private partnership, or both, and case studies are highlighted (Ahuja, 2016; Ye, 2018).

The public-private partnership is an opportunity for collaboration between public institutions and the private sector to develop Smart City for communities. The functionality of this partnership is constrained by the existence of clear legislation and conceptual understanding. For example, in Romania the legislation came into force in 2018, although at European level this concept has been regulated since 2004.

The development of Smart City-type cities has resulted from a reduced quality of life, economic losses and damage to the health of the population. At the global level, initiatives have been sought to respond to the needs of urban spaces, but especially to be effective in the trend of increased urbanization (Briciu et al., 2020). Administrations, despite finding solutions, have encountered difficulties in obtaining funding and implementing initiatives. The general idea of cities that want to become Smart City is that they need to develop infrastructure and develop projects in this segment. The main obstacle of urban areas to develop Smart City is related to financial resources. In this regard, the cities sought the support of private and non-profit partners to promote "smart" projects with an impact on the city. In Europe, at the level of the European Union, it is a concern to support the development of urban areas such as Smart City, through projects that are for industry, banks, small businesses, etc.

This study will focus on the implementation of projects that have the role of developing Smart City in Romania and how it influences the management of local communities. Communities that develop projects to create a space in Smart City bring about certain changes in the financial management of local authorities. Depending on the receptivity of local authorities and the private environment, public institutions have the opportunity to modernize through Smart City projects. The development of an urban space in Smart City is a combined effort of all local actors, public institutions, local entrepreneurs, citizens, the beneficiary being the local community.

In the present paper, the studied area is Romania, and the methodology included studying the literature, identifying the influence of Smart City development on the financial management of local authorities and interpreting data about Smart City in Romania, by highlighting the opportunity of financial management. The projects submitted by the local public administrations for the development of Smart City projects were centralized from the report “Smart City Radiography in Romania”, 5th edition, 2020, on the website https://steinbeis-romania.com. The study will highlight the fact

that in the territorial administrative units where Smart City projects are developed, the premises for improving financial management are created. Local public institutions have the opportunity, through the development of Smart City projects, to support the implementation of modern financial management and to support the public-private partnership, as a solution for the simultaneous development of private and public environments.

1. Review of the scientific literature

The literature is extensive both for contextualizing the conceptual framework for "Smart City", "financial management of local public authorities" or for "public-private partnership". Smart City is an alternative to sustainable urban development. The concept of "Smart Cities" and how it contributes to the development and improvement of the socio-economic activities of society is found in many studies, either academic or conducted by the authorities in order to access funds or align urban areas to modern standards. Building smart cities is possible by identifying solutions, and sustainable development is one of the key elements of smart cities. Solutions for building smart cities are based on several important and complementary areas: city administration, education, health, infrastructure, etc. The concept of smart city has been introduced to highlight the importance of information and communication technologies (ICT) in the last 20 years (Schaffers, 2012). In the literature, the term smart city is used to specify the ability of a city to respond as quickly as possible to the needs of citizens and to adapt to sustainable development.

Smart cities take into account the quality of life and development of the city, which are influenced by transportation, government services and education, public safety and health (Choenni, 2001). Therefore, when analyzing "Smart City", several aspects must be taken into account, from the main areas of activity, to the quality of life and sustainable development. In the literature, the authors Choenni (2001), Dirks (2010) and Giffinger (2007) consider transport to be the most important area for starting to transform a city into a smart one. This area envisages the use of modern transportation technologies. Intelligent transport systems are the best example of harmony between the development of the city and modern technologies. Smart City is used by various authors in the literature as an opportunity for citizens' education (Begawan (2010), Caragliu (2009), Choenni (2001) and Schaffers (2012). Smart cities are an important part of the future educational process. The educational goal of smart cities is for them to develop harmoniously, by consuming as little resources as possible. An intelligent education system (Dirks, 2010) is based on three elements: interconnection (a technological education for sharing resources), instrumentation (accumulating the necessary data) and intelligence (making decisions that improve the learning process).

In other studies (Dirks, 2009), the term smart city refers to the relationship between the city government or public administration and its citizen. Modern smart governance often refers to the use of new communication channels for citizens, e.g. “E-government” or “e-democracy” (Dirks, 2009). The health system is the other area that stands out as a

good solution for a smart city and this involves the use of modern technologies to achieve better results (Choenni, 2001).

The smart city is based on the infrastructure of the physical telecommunications network, consisting of wired, wireless, along with any servers and routers needed to operate the infrastructure. An important role is played by applications, which facilitate operations in the city, such as traffic control, etc. Such applications are provided by many vendors using the infrastructure provided. There are a multitude of smart cities worldwide, which can be role models for those looking for solutions to become "Smart City". They are at different levels of development, and urban evolution is based on modern technologies.

Dirks (2009) pointed out that sensors are used to gather climate information, social media posts, digital images and videos, transaction logs, and mobile phone GPS signals to name a few. This data is called big data. Knowledge and innovation are determined by the investment in data management, research, education, development, creativity, transmission.

Regarding the Smart City approach, there is a concern for them because there are huge changes in cities, in the context in which about 54% of the world's population lives in cities. Smart City is often associated with the digitization of urban services, which is one of the characteristics that makes it a smart city. Digital technologies are used to increase the movement and efficiency of resources. Smart City is an urban image that includes the sustainable city, the resilient city, and the smart city.

Regarding the conceptualization of management, it should be noted that Henry Fayol first formulated the functions of management in 1916, which can be defined using five infinitives: predict, organize, command, coordinate and control. Financial resources are planned to provide important public services. Transparency is one of the important features of the financial management of local authorities. The local government needs a strong tax administration so that the interests of the citizens are reflected in local programs, policies are conducted in a sustainable way from a fiscal point of view and resources are not lost through inefficiency, wasteful or corrupt operations (Shah A., 2007). Local communities, which are represented by local councils, the mayor or local governments, should seek to increase the well-being of their citizens by providing consistent public services, in line with their needs. If local authorities fail to provide services, pay for their provision responsibly, or protect the resources obtained to provide these services, the well-being of communities will be jeopardized.

There is an advantage in the local management of local communities, highlighted by the fact that decisions can be influenced by citizens, by involving them in the decision-making factor, following specific programs. This can only be applied at the local level, not at the regional or national level. Thus, the involvement of citizens and direct participation in the tax process improves the relationship of citizens with local authorities and increases their level of involvement.

Local governments can benefit from financial resources for community development such as attracting private or institutional investors. The involvement and attraction of

private investors implies the use of public-private partnerships, but this applies depending on the legislative facilities in each state. The public-private partnership at the local level is not promoted, so it does not have the same scope, complexity and value as those at the central level (Campbell, 2011). In some areas, the public-private partnership is a solution, as in the German municipalities, where they have been involved in investments through public-private partnerships amounting to 3 billion euros, which represents 3% of the gross fixed investment of communities, and in Austria 58% of local authorities are involved in public-private partnership projects (Schaffhauser-Linzatti et al., 2004). In various forms, the public-private partnership is used in most states, and local authorities use it both for the provision of public services of local interest and for the construction, maintenance or operation of infrastructure works.

The use of the two concepts, Smart City and the financial management of local authorities, for the development of local communities highlights the transparency, which ensures visibility in terms of public spending for projects. When making a PPP (public-private partnership) with the public administration, the legislation in force and the necessary costs are taken into account, so as to identify the private partner with the lowest cost. The PPP model for Smart City development is promoted worldwide. For example, in China, the PPP model refers to the cooperation between government and social capital, in which social capital includes private enterprises, profitable state-owned enterprises, and foreign enterprises (Ye, S.D., 2018).

The World Bank has conducted studies on PPPs and Smart City development based on them. Thus, it says that PPPs are usually medium- and long-term agreements between the public and private sectors in which some of the needs of the public sector must be provided by the private sector, with a clear agreement on common objectives. The complexity of the concepts also highlights the fact that there is a wide variety of PPPs, from working groups, formal organizations, corporations and even direct subsidies from public entities to private corporations.

The success of Smart City projects through PPPs requires the identification of viable solutions for service delivery. In this sense, there are opinions of various specialists who consider that the adaptation of PPP for Smart City is a benefit. For example, Makhubo (2015) believes that "PPPs for Smart projects need to be innovative and not be like traditional PPPs. Differences and specialties must be identified". At the same time, Calia (2015) from the Mario Boella Higher Institute in Italy states that the main difference between SMART PPPs and traditional PPPs is the different evolution and changing pace of the proposed solutions and services. This feature is potentially critical due to the rapid adaptation of the processes and services they require, but it is also an opportunity, as public-private agreements can cover a shorter period of time and show healthy competition and transparency in the relationship between administration and citizens.

The European Union is supporting the increase in the use of public-private partnerships in the Member States, so it has implemented a set of innovative financing instruments aimed at experimenting with new ways of combining public and private financing to

contribute to economic growth. Their use is beneficial because they can attract private investment in areas where the financial risk would be too high to make the investment attractive, but these areas are part of the European Union's priorities. Information on innovative financing instruments is provided in several European Union documents, such as the Europe 2020 Strategy, which states that the aim is to increase the mobilization of innovative financing instruments.

2. Research methodology

The study aims to analyze the status of projects submitted by the main urban areas in Romania in 2020 for their development as a Smart City, according to the website https://steinbeis-romania.com. In 2020, 87 cities in Romania have submitted projects to become Smart City. The areas for which projects have been submitted are: Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living, Smart Governance. Following the analysis of the specialized literature and based on the information regarding the projects submitted for Smart City, the main advantages for the financial management of the local authorities will be highlighted through the implementation of such projects.

The analysis carried out within the framework of the paper is descriptive, through the correlation of the information highlighted from the specialized literature and from the data regarding the projects submitted for Smart City by the urban areas in Romania.

The analysis carried out within the framework of the paper is descriptive, through the correlation of the information highlighted in the specialized literature and in the data regarding the projects submitted for Smart City by the urban areas in Romania. The main stages for conducting the study were:

- ✓ studying the specialized literature;
- ✓ identifying the influence of Smart City development on the financial management of local authorities
- ✓ interpreting the data about Smart City in Romania, by highlighting the opportunity of financial management.

The paper focuses on the scientific knowledge of the topic, the review of the specialized literature and highlighting the improvement of the management of the Romanian public authorities through the development of Smart City type projects, based on case studies from the specialized literature.

3. Results and discussion.

The role of the public-private partnership in approaching and implementing the concept of Smart City

Local governments must meet the many needs of citizens in order to have a good quality of life, so they use various public services or systems, which include light management services, traffic and transport organization, waste and water management, administrative policies, security, energy sustainability and information services. The emergence of smart cities came out of necessity, because the usual ones used many

services for the community, which generated high costs and did not offer an improvement in the quality of life, so PPP is an effective model for the development of Smart City. Even if funds, investments are needed to create Smart City, they can be made through PPP, which also supports the private environment.
The use of PPPs for Smart City development represents the use of renewable energy, ICT and sustainability resources. Smart City is developed through infrastructure projects and more, which aim at quality of life and must take into account the following indicators:
• air quality,
• water, green,
• waste selection,
• energy consumption,
• urban mobility.
• logistics.

PPP used in Smart City starts with key features such as smart governance, smart mobility and smart energy as an educational and communication tool for citizens' opinions, technology that supports social media and others can be used when influencing policy decisions, including functions in cities, urban spaces, water, waste, (Ahuja A., 2016). PPP has a particularly important role to play in making Smart City, as it involves both local authorities and private partners. PPP implementation often has difficulties due to legislative shortcomings, but following the model found in other states, they can be adapted.

PPP contracts for Smart City can be established in a variety of areas: for large-scale infrastructure projects with a SMART component (for example, a transportation project with management software and / or a participatory application), the installation of a sensor network or the development of Open Data policies or smaller projects, such as the development of smartphone applications to improve the collection of taxes or other needs of residents. Globally, cities are increasingly including the idea of being "Smart" as a component of a wide range of public services: from water and waste management, public transport to municipal revenue collection. Locally, Smart projects will generate projects with large technology providers as well as small and medium-sized local businesses or start-ups, or engage in a technical partnership with local universities or research centers.

An important role of PPPs in Smart City is that they may involve comprehensive reforms of public procurement law and procedures or can be based on relatively informal information arrangements such as memoranda of understanding. Therefore, Smart City PPPs should not be considered specific and rigid type of PPPs, but rather understood as flexible institutional arrangements between the public body and private actors that are based on the introduction of technological innovations in more conventional municipalities.

Smart partnerships differ from general PPPs, so they are often small-scale projects involving infrastructure and technology solutions rather than large-scale physical

infrastructure. As a result, Smart City PPPs are often based on conventional PPPs, adding an element of Smart technology to infrastructure projects. This is why PPPs that are used in urban spaces and contribute to the development of Smart City are often not visible.

Examples of good practice encourage the choice of PPP for Smart City because it is a financing solution, but it has some barriers:
• perception of high risk when investing in innovative solutions and energy efficiency measures;
• long-term delays before reaching maturity / profitability;
• limited capacity for public funding.

PPP adds value to projects because it capitalizes on expertise and private resources, while maintaining strategic control over the project or service, ensuring the transfer of skills from private to public partner by training people involved in projects, encouraging innovation, especially when supply encourages competition (the private company will be more willing to propose innovative solutions to win a bid when diversified competition).

PPPs are used to improve the efficiency of public services as follows:
•Costs and performance ratio are optimized through the principles of "no remuneration without results on the one hand and the acquisition of a management governance style on the other hand (simplification of procedures, knowledge transfer, staff training, modernization of management information tools and systems and general improvement internal control processes).
•Ensuring good project performance, especially when it comes to improving and accelerating service delivery.
•Encouraging local economic development.

The role of PPP for Smart City is to develop the local economy, by involving local actors, which allow faster implementation of the project and a better impact for the population, as well as job creation by mobilizing local banks, resources and companies.

Transforming cities into Smart Cities through public-private partnerships (PPPs) has become an important mechanism for achieving this. Its main advantages are: it allows faster delivery of services to the population, guarantees the necessary continuity of suppliers, offers public authorities a guarantee of quality and reliability of services.

PPP is used for Smart City development because it stimulates work between local authorities and private partners, which aim to improve the quality of life of the population by providing quality services. The application of PPP within Smart City stimulates the harmonious development of the local economy by involving local public and private actors.

Case study on the influence of Smart City in Romania

Smart City has become a concern for local urban administrations in Romania, especially since European funds are non-reimbursable, and the global trend is to encourage cities to be smart. The general context offers both theoretical studies and examples of good

practice in order to be able to develop Smart City in Romania. Even if there are trends in Romania to develop projects that offer urban areas the opportunity to fit into this context, at the moment they are at the beginning.

Smart City must have an integrated vision of local government in this regard, which is in line with the goal of improving the quality of life of the community. Globally, Smart City is growing at an accelerated pace, with an estimated annual growth rate of 20% by 2025, when the market is estimated to reach $ 2 trillion, according to several sources, including Smart Cities World (OECD, 2020). By 2025, it is estimated that 50% of Asia's smart cities will be Chinese, while Europe will have the largest investment in Smart City projects in the world. India aims to reach the top 100 smart cities by 2022 (OECD, 2020).

A study conducted by IESE, Cities in Motion Index, from 2019, analyzes 174 cities in 80 countries, according to 10 main indicators and respecting the ISO 37120 standard, and shows that Bucharest is on position 103 and estimates that Europe will have 300 Smart Cities in 2020. There are about 1,000 cities in the world with a population of over 500,000, but not all of them have started to become Smart Cities, despite the fact that urbanization is accelerating.

In Romania, it has started to be a competition between cities to implement projects that give them the status of Smart City. In Alba Iulia there was a pilot project, which ended with a Smart City development strategy and projects with European funds, which also included Smart City components. The components that define Smart City are complex, and in Romania they are taken in turn to be developed into projects. For example, the development of infrastructure and Open Data are a priority, according to the Digital Cities Challenge report.

A challenge in the next period is the implementation of strategy design by administrations. Several Smart City strategies have been implemented in Romania, starting with 2009, but some without too many results. In fact, one of the problems in Romania, at the level of local administration is that it implements development plans in various fields, such as SUMP (Sustainable Urban Mobility Plans), but which are similar from one city to another.

An important aspect of Romania is that Arad and Iași have Smart City strategies completed in the implementation phase, supported by the Intelligent Cities Challenge, along with 39 other European cities:
• AR @ Digital: Open. Educated. Innovative. The Digital Transformation Strategy for the city of Arad - July 2019,
• Iasi, a growing digital housepower of skills and entrepreneurship - July 2019.

For example, an important thing for local governments is the implementation time and the management of projects and funding obtained. For example, the Netherlands is the 3rd in Europe in the top of the most innovative countries, according to the Global Innovation Index (GII) published by INSEAD in August 2019. Romania needs to overcome bureaucracy and change mindsets in all environments, both public and

private, leading to a significant speed of project implementation and efficient management. In March 2018 the number of Smart City projects in Romania was 216, with a market valued at 30 million Euros, in 2020 there were 594 Smart City projects and a market valued by multiple sources at over 120 million Euros, which shows and confirms a substantial growth of the Smart City market in Romania.

Given the complexity and need for the development of Smart administrations, in Romania there are two smart communes - Ciugud in Alba County and Luncavita in Tulcea County, as well as in the first Smart County: Cluj - Smart Territory followed, at intent level, by Ilfov County. At the same time, it is the first fully digitized public institution in Romania, at the Urban Mobility Directorate of Sector 4.

The list of cities entered in the Smart City race is evolving rapidly. In 2020, 87 cities have submitted projects to develop Smart City. In table 1 are presented only the top 10, according to the information on the website https://steinbeis-romania.com., Which have the most projects submitted for the development of Smart City.

Table no. 1. Projects submitted for smart cities in 2010

No.	City	Total Projects	Smart Economy	Smart Mobility	Smart Environment	Smart People	Smart Living	Smart Governance
1	Alba Iulia	106	24	17	8	8	24	25
2	Cluj Napoca	54	4	20	7	3	12	8
3	Timișoara	26	5	9	1	1	6	4
4	Arad	19	2	5	1	5	1	5
5	Iași	19	2	5	1	0	7	4
6	Brașov	18	1	6	1	1	3	6
7	București - Sector 4	18	2	7	0	0	5	4
8	Oradea	17	1	8	1	0	4	3
9	Sibiu	16	5	5	0	0	2	4
10	Piatra Neamț	15	1	6	2	0	3	3
	Total projects 10 municipalities	308	47	88	22	18	67	66
	Total projects cities Romania	594	84	188	42	29	121	140

Source: https://steinbeis-romania.com/

Analyzing the top 10 smart cities in the country, we can see the distance of Alba Iulia with 106 projects, followed by Cluj Napoca with 54 projects and Timisoara with 26

projects. In the local administration there is a concern for Smart City projects and infrastructure, being a competition to become the first Smart City in Romania. Smart City project management requires dedicated specialists and jobs such as Data Manager or Smart City Infrastructure Manager, which is a first step towards streamlining city development and achieving smart goals.

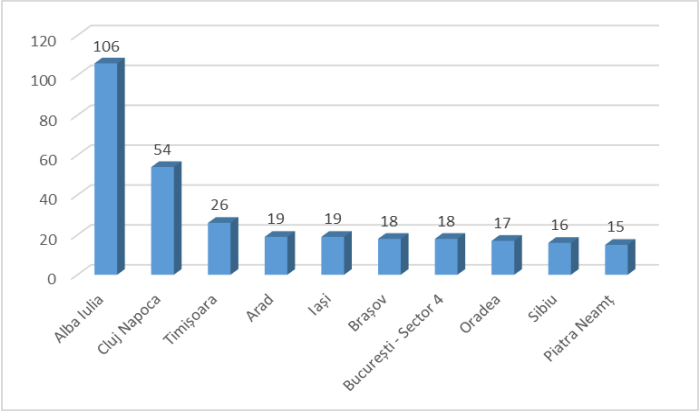

Figure no. 1: Distribution of projects for Smart City in the top 10 cities in Romania in 2020

Source: https://steinbeis-romania.com/

In 2020, a total of 594 projects were registered in 38 areas in Romania to develop Smart City. Most projects are for "Smart Mobility", 188 projects, which means 32% of the total projects, followed by "Smart Governance" with 130 projects, 22% of projects and "Smart Living" with 121 projects, 20% of projects (figure 2). It is observed that at the level of public administrations Smart City is approached in terms of mobility and governance can be achieved through public-private partnerships and can meet the main needs of citizens, namely mobility and digitalization. By developing Smart City projects following access to European funds, public administration management must be efficient, meet strict criteria to implement projects and not lose funding.

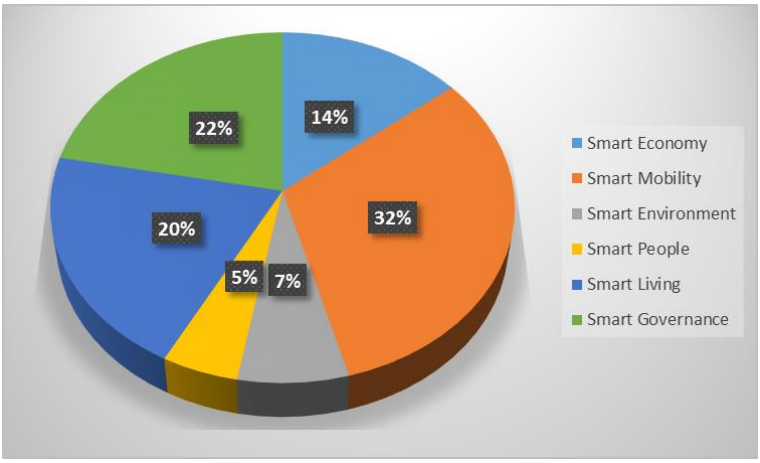

Figure no. 2: Distribution of projects in 38 urban areas in Romania on specific Smart City domains

Source: https://steinbeis-romania.com/

Conclusions

The development of Smart City through the use of PPP is a long-term solution, in which the society develops harmoniously through the involvement of public and private factors. Public-private partnerships have several advantages, which are also applied to smart cities, including the efficiency of meeting community goals. "Smart Cities" are encouraged to be developed at European level through non-reimbursable funding opportunities, and PPPs are an effective way to access funding.

The literature highlights that PPPs do not apply equally in all states, at European level it is not a common application guide, each state adopting its own rigors. Therefore, it is possible that the different way of the legal framework is the reason why in some states PPP is applied at an advanced level and in other states at a beginner level.

The evolving trend of urban spaces forces them to analyze the opportunity to develop "Smart City". Although this concept is complex, the authorities, following the analysis, can start to develop smart cities by applying PPP and by domains, depending on the problems facing urban areas. The role of Smart City is to address a wide range of city issues by involving local authorities on the one hand and private or central authorities on the other. The homologation of an urban area as a Smart City presupposes the simultaneous fulfillment of several conditions, which together lead to the provision of quality services to the community and an improved life at the urban level.

In Romania, Smart City is in an incipient stage, being a pilot project in Alba Iulia in 2018. Currently, strategies are being implemented, which must be implemented in Arad and Iasi, but there are several urban spaces that initiate and implement projects of various sizes, which are specific to smart cities.

Urban spaces in Romania face a poorly developed infrastructure for most areas, transport, health, education, which makes it difficult to move to Smart City. The administrations' efforts to close the infrastructure gaps and at the same time implement projects that are for digitization or the use of information technology to provide services to the population have the final result in transforming these spaces into Smart City. The development of Smart City can be achieved in Romania, as in other states, through the public-private partnership, which in this way supports the local economy and integrates the private environment in the development of communities.

The development of Smart City in Romania has several advantages for local public administrations that submit projects in this regard. First and foremost, the use of public-private partnerships is encouraged. Choosing a PPP to manage and fund Smart City projects allows local governments to:
• Improve finances by diversifying access to finance, without increasing indebtedness;
• Benefit from public management that ensure increased transparency and cost identification, payment planning and improved ability to design projects conventionally.
• identify PPP risks in the development of Smart City which are related to political issues within the administration, which may hinder the development of projects.

Another advantage for local governments that is developing as a Smart City is highlighted by the fact that financial management is transparent, which is to the advantage of both the administration and the citizens.

The accomplishment of this work has certain limitations, among which the highlighting in the reports about the Smart City projects in Romania about the advantages that the local administration benefits from in terms of financial management. These aspects are identified in the literature, but it is difficult to indicate in Romania on case studies that financial management has been improved only due to these projects. The implementation of Smart City development projects influences the improvement of financial management. Another limitation of the research is that there is no detailed information about the completed projects for the development of Smart City, which leads to a continuous monitoring of the topic until the information is available. In this case, the premises for the development of the study are created in which to analyze the proposed projects and those completed for the development of Smart City and the authorities involved in the development of these projects (public, private or civil society).

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