Bachelor Thesis

The social aspects of the local smart transformation in Romania and the introduction of the smart city concept in the city of Cluj-Napoca

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Abstract

Smart cities have been in the public perception for a while now and city administrations have attempted to implement the concept in their urban strategies in multiple ways. Empirical data shows that there has been more attention on the digitalization of the services offered by the city rather than focusing on creating an environment where the perspective of all the social actors is considered and the needs of the people living in the city are taken into account. The social perspective of the smart transformation has been neglected which created an impression that the development concept is not suitable for all the urban settlements. The aim of the research is to explore the concept of the smart cities from a social perspective and to analyse the ingredients present in Cluj- Napoca, a city from Romania in the light of the six dimensions of the Smart City Wheel put forward by Boyd Cohen. After interviewing the social actors from different subsystems and understanding the community engagement practices of the municipality, it has been found that the smart transformation is suitable for Cluj-Napoca, if the local government will start to invest more in tackling the digital divide in the city.

Introduction

The high rates of urbanization and the growing internationalization of cities globally has introduced new challenges for the leaders of the urban areas. People from diverse backgrounds sharing residence, an equal service delivery for the inhabitants and addressing the social and spatial challenges of urban life are just a few of the many issues cities encounter (Reuter, 2019, p. 4). One of the most popular trends to tackle the urban challenges faced by the cities was the implementation of the smart city model, along with the promises of the sustainable development trajectory introduced by the Brundtland Report in 1987 (UN GeneralAssembly, 1987). By merging the aspects of the two theories, many scholars put forward definitions of the newly invented urban areas, many of them combining the elements of the Internet Communication technologies (ICTs) with economic growth, a high quality of life and a wise management of natural resources (Monfaredzadeh & Krueger, 2015).

Even though the sustainable development trajectory handles the economic, social, and environmental perspective of development equally important, recent studies have shown that when it comes to smart city implementation, cities often fail to pay attention to the social sustainability side as well. According to Kempin Reuter (Reuter, 2019), cities more and more become disconnected from the people and the urban dwellers have no longer ways of expressing their will when it comes to decision making about urban planning or social allocation. Besides the inappropriate urban design, segregation, community disruption, violence and social polarization are also the results of an inadequate implementation plan that forgets marginalized communities and their socioeconomic welfare (Bouzguenda et al., 2019).

This calls for an equal attention on all the aspects of sustainable development and all the dimensions of smart cities when projects get implemented. Bouzguenda et. al. pointed out in their article that the importance of the social side of sustainable development in the urban areas has attracted less attention in the previous years. In terms of scientific literature as well, there are more publications focusing on the technological aspects of smart cities than on the policy and community aspects (Bouzguenda et al., 2019). It is a growing tendency to look at technological solutions as a fix for our political, economic, and social issues, but the current urban planners forgot that most of our urban problems are not technological in nature. Overlooking these important aspects of the global challenges that we are facing might result in enhanced socio- economic divisions and in a top- down implementation of innovation and development (Reuter, 2019).

There are differences identified between the implementation status of the smart city model around the world. If one looks only at the developing countries, the differences arise already between the western European and the centre and eastern European countries, the former Communist bloc (Ibanescu & et al., 2022). The shift from the socialist system to the capitalist economy at the end of the 1980s brought so much change and challenge in these countries with rising issues like unemployment, production decline and the lack of job security that economic and social questions gained priority in front of the environment, (Serbanica & Constantin, 2017). When most of the western world started to tackle the need of change in behaviour, urban planning and production processes, the countries that recently shifted to market economy had to deal with elevating their society from poverty which resulted in a huge drawback in their smart transformation. Therefore, the lack of integrated smart initiatives, still often makes the city leadership look for immediate solutions for arising social problems rather than looking at the long-term smart development strategies (Ibanescu & et al., 2022).

Taking the example of Romania, an eastern European country, it tends to have a significant amount of smart city projects initiated. The local authorities and the private sector first started tackling the issue of smart city implementation around 2010, after the economic crisis. Ever since, many of the larger or mid-range cities from the country started working on different projects, however the first successful outcome was reached only in 2021 at Cluj- Napoca (Ibanescu & et al., 2022).

Given that Romania does not have a long history with smart city projects, there is also a knowledge gap identified about the social structure of the big cities, which would be very important to discover to see where the city ecosystems need to invest more to put forward a balanced transition into

smart cities. Smart city projects have multiple dimensions, however this research aims to investigate if the ingredients of the social structure of cities contain the needed formula for a smart city with a special emphasis on the social welfare and life quality of the different individuals and communities in Romania. To find valuable results, the research needs a more targeted viewpoint, so the focus will fall on Cluj-Napoca, the most successful city in terms of smart city initiatives in Romania.

The research question is:

"How successful is the municipality in administrating the collaboration of the social actors in Cluj-Napoca when integrating the social perspective into the smart transformation of the city?"

Deepening it down, there is also a set of sub- questions identified:

"What is the role of the different social actors in this transition?";

"How is the professional expertise of the different actors taken into account when designing the urban transition?";

"To what extent is the need of the different social groups taken into account when implementing new technologies within smart city initiatives?".

The methodology of the paper consists of a case study research, along with three professional interviews conducted to get an in-depth insight about the roles of the social actors. The interview subjects come from different subsystems of the city ecosystem, representing the municipality of Cluj-Napoca, the academic sector and the civil sphere.

Cluj- Napoca has an active population of approximately 325,000 people and it is in the north-western part of the country. The city is also hosting a significant population of students and there is also a highly entrepreneurial atmosphere with many tech firms arising from Cluj Napoca ("Cluj-Napoca," Wikipedia).

The next section of the paper will provide a profound understanding of the theoretical information connected to smart cities, offering meaningful connection between the different frameworks. The methodology section will give an explanation of the operationalization of the research, describing the methods for the literature review, for the data collection and the data analysis. The data analysis is based on the insights from the theory section, dividing the important information into six categories. Following this, a discussion will be provided based on the scientific data gathered in the research and the paper will be finished with the conclusion, when the answer for the research question will be provided and the recommendations for further research will be offered.

Theory

Why smart cities?

While in the 1950 only 30% of the global population lived in cities, in the second part of the twentieth century there has been an important milestone reached in the life of the human population (Yin et al., 2015). In 2008, for the first time the global urban population became larger than the population of the rural areas. With this step, the importance of responsible urban development became even more pressing. Nowadays, more than half of the human population lives in cities and this number grows yearly with an approximate addition of 73 million people. Statistical projections indicate that by 2050, almost two thirds of the world's inhabitants will be living in urban settlements (*Human Settlements*, United Nations).

Besides being hubs for human activities, cities also serve as centres for the fulfilment of economic, environmental, and societal needs (Yin et al., 2015). With so many people living in cities, the urge to elevate urban planning to a more futureproof and responsible level is also rising. The United Nations defines cities as "hubs for ideas, commerce, culture, science, productivity, social, human and economic development" (*Human Settlements*, United Nations), where the transport systems, waste management, disaster risk reduction, education, capacity building and access to information are just a few examples of the many social issues that come together and wait for a long-term solution. In the past years the process of urbanization has indeed improved the quality of life of the residents, also providing the regional territories with a better economic situation and more jobs, however the new challenges and problems cannot be neglected in the discussions (Yin et al., 2015). The larger population and the increased economic output caused the rising of both environmental and social issues in cities (Yin et al., 2015), that creates wicked challenges for the city administrations.

One possible approach to find long term solutions to the rising urban problems is the implementation of the smart city model. The concept drew the attention of the national and local governments, companies, universities, and non- governmental organizations, all of them trying to come up with their own interpretation of the urban development model (Yin et al., 2015). Moreover, many scholars around the world have attempted to define the concept as well. According to Bouzguenda et al., a smart sustainable city aims "to meet the needs of the present inhabitants without compromising the ability of others or future generations to meet their needs, and thus, not exceed local or planetary environmental limitations, and where this is supported by ICT" (Bouzguenda et al., 2019). Another angle in defining smart cities was taken by Monfaredzadeh and Krueger, stating that "a city is smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance"(Monfaredzadeh & Krueger, 2015, p. 1113). Harrison et al. put forward the definition of smart cities as "instrumented, intelligent and interconnected cities" (Harrison & et al., 2010). The administration of a city must focus on understanding the perspective of its citizens in the context of designing services that tackle the challenges and the needs of the inhabitants (Ceballos & Larios). According to Ceballos et. al., the aim to provide a good quality of life for the citizens of an urban settlement is one of the fundamental values of a smart city (Ceballos & Larios).

The theory also needs a more targeted approach for successful implementation that offers a measurable aspect as well. The smart city wheel discussed by Giffinger et. al., provides a clear understanding of the different aspects of the concept and the responsibilities the social actors need to take upon when working in a city environment. The smart city wheel brakes down the smart city model into six main dimensions, namely *smart people, smart economy, smart governance, smart mobility, smart life, and smart environment* (Giffinger & Gudrun, 2010). The six characteristics also call for a well-balanced collaboration between the different social actors in cities, to make sure that all the important aspects of smart urban development are fulfilled. Figure number one provides a clear representation of how the six aspects come together into a whole.

Figure 1- The Smart City Wheel proposed by Boyd Cohen

Re-designed by Manuchis.
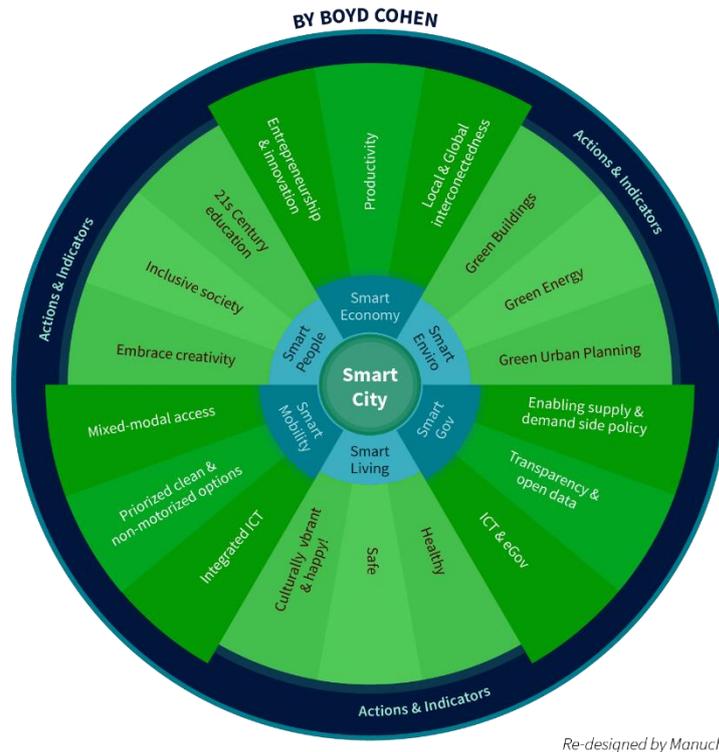
Source: (Cohen, 2012)

It is important to highlight the value of the combination of all the six aspects of smart cities in the implementation process, with the help of intersectoral collaboration. Neglecting any of the six dimensions may result in the situation described by Sikora-Fernandez in her research paper, emphasizing the likelihood of these projects to be driven by the supply and not the demand of the communities they are meant to serve (Sikora-Fernandez, 2018). In many cases, the emphasis falls heavily on the technological advancement of the cities, leaving behind the aspect of just and inclusive social development and the importance of environmental awareness in the design of smart cities. This information serves as the basics of the analysis part since I am going to use the Smart City Wheel framework to analyse how is Cluj- Napoca able to coordinate between its technological advancement and the inclusive social development of the city.

A smart city should be a place where there is a simultaneous combination of the increased collaboration between economic and social actors (smart people), the monitoring and enhancing process of the infrastructure (smart mobility), the provision of more efficient services to citizens (smart governance), the encouragement of innovation based business models (smart economy) and the responsible and environment friendly urban planning (smart environment) facilitated by data and information technologies (smart life) (Ahvenniemi et al., 2017).

The role of stakeholders and technology in smart cities

Building an inclusive and information-based society can be a great challenge for the actors who are involved in the innovation processes. As it was mentioned by the Department of Economic and Social Welfare of the United Nations, a city existing nowadays should be able to successfully shape the transport system, waste management, education and all the other aspects that comes with a smart society. However, for city administrations to be able to manage all these different functional aspects successfully, the use of modern technologies such as big data, open data and internet of things is unavoidable (Oliveira & Campolargo, 2015).

As new ways of knowledge and data sharing occur, the transition towards a digital society becomes inevitable, creating a significant impact on the existing human connections and one the people

who are not prepared to become a digital citizen. The internet-based technologies force their users to move beyond traditional boundaries of human life, creating a need to incorporate in their lives both the physical space that is bounded and the constantly expanding cyberspace (Choi et al., 2017), which can be a very contradictory element for some of the people. The loss of inter- personal, and physically binding social interactions puts the citizens in the need for a sense of belonging and identity, resulting in urgent need for local, long- term social inclusion and integration strategies (Oliveira & Campolargo, 2015). But the solution does not only require the need for city administrations to shape the urban life accordingly, but it also entails a new perspective for the inhabitants of the city, people who are willing and capable to try to become disconnected from the restrictions of places and are more critical and globally aware of the processes that make them transition into a digital citizen (Choi et al., 2017).

Creating a city ecosystem with inclusive and efficient services, environmentally friendly solutions and growing social welfare requires the public and private actors to work together and co-create the future they want to live in (Ben Letaifa, 2015). Smart city management requires a more complex approach than traditional city management. While the later consist of urban planning, smart city management means coordination between different social actors, interacting in different subsystems, integrating the ICT ecosystem (Ben Letaifa, 2015). Therefore, it is very important that there is a functional and well- balanced collaboration between the different social actors who are involved in reshaping our cities with the aim of creating an inclusive social system that is sustainable for all the different people living in the city.

Smart and sustainable cities

Besides the smart city model, the notion of sustainable development has gained an important role in the public perception. Also seen in the definitions of the smart cities, there is an equal emphasis on the aspect of sustainability and the usefulness of Internet Communication Technologies (ICTs) to solve societal issues. After the fast industrial development in the end of the 19th century, growing pollution and the overpopulated urban areas offered the people living in cities a poor and unhealthy life (Tony Manzi, 2010, pp. 25-26). The combination of this with the rapidly degrading environment and the many endangered species around our living areas, resulted in a growing awareness about the interrelation of the natural environments and the human population (Tony Manzi, 2010, pp. 25-26). This also initiated the new approach of sustainable development, emphasizing the importance of the economy, environment, and social justice. The Brundtland report describes the concept as economic development that meets the needs of present societies, without compromising the future generations from meeting their own needs (UN General Assembly, 1987, p. 16).

There are three main pillars identified by the theory of sustainable development: environmental, economic, and social sustainability. For smart cities it is important that they can create a balance between all the three pillars, however for this research the relevancy falls on the social perspective of sustainable development.

In the context of smart cities, the most important aspects of social sustainability are effective community engagement practices (Bouzguenda et al., 2019), and an efficient social infrastructure that consists of people and their relationships (Monfaredzadeh & Krueger, 2015). A smart city should be able to offer education and training, culture and arts and business and commerce, encouraging its inhabitants to engage in life- long learning, creativity, social and ethnic plurality, and participation in public life. In cases when the urban development plan puts the development of ICT technologies in front of the social capital, it risks the slower urban development because of the lack of educated labour force (Ben Letaifa, 2015). However, in the context of growing social capital, it is not only about investment in the citizens of the urban areas, but also the strategic approach of the city administration to recognize and exploit the human potential, resulting in a creative ecosystem (Nam & Pardo, 2011). Besides all this, another very important aspect of smart cities is the social inclusion of different urban residents in public services to decrease the disruption between the social groups (Monfaredzadeh & Krueger, 2015).

With social equity being one of the most important traits of social sustainability, the information age that we live in the present poses a great ethical dilemma of how the use of the ICTs can contribute to an inclusive society (Beavers, 2001). According to Floridi, the emergence of new digital technologies also comes with an increase of digital divide which ultimately disempowers and generates dependency in society. The conclusion of Floridi in his article is that we need to focus on building a society that is based on information and is inclusive for all (Beavers, 2001). Building an inclusive society might come with even higher efforts for the city administration of Cluj- Napoca because of the different development trajectory that the city experienced during communism between 1947 and 1989. The centralised policies for urban planning were often not sufficient to tackle social inequalities rising on the local level, creating disruption among the citizens.

The situation in the former communist countries

There are inconsistencies rising between and within the administrations worldwide. In the Central and Eastern European countries one can identify a lot of aspects of urban development that has been approached differently in the communist regime. The destruction of the living environments after the second World War called for action in rebuilding the cities, however that happened in a different manner in the Soviet countries (Serbanica & Constantin, 2017). In Romania the focus fell on building large housing estates, with low quality materials to serve the purpose of the emerging industry and the concentrated effort of the communist state to attract people to the city from other parts of the country, to reshuffle the population. In the case of Cluj- Napoca, the geographical location of the city also plays a role in the different development trajectory. In the beginning of the communist era, most people living in the area were Hungarians. The plan of the new administration to reshuffle the population and increase the proportion of Romanians living in the region was successful, with 56% of the citizens from Cluj being Romanian in 1966, however the transition was not smooth. The city became physically and socially divided into different sectors, based on industrial, residential, professional, and academic activities, posing severe obstacles in front of the residents to live together peacefully.

The fall of the communist regime initialized deurbanization, a phenomenon that was identified in most of the former USSR countries. The process started shortly after the shift for a market economy, when the urban planning became decentralized, and the local administrations did not have enough knowledge to strategically shape the cities transition to the capitalist life (Sikora-Fernandez, 2018). The cities started to shrink because of the large amount of people who left abroad in search of a better life. Besides this, the suburbanization also started, due to the lack of funds and investments into the buildings and facilities in the city centres. People started to move to the outskirts of cities, leaving the central areas underdeveloped (Sikora-Fernandez, 2018).

In the case of Romania, the inconsistencies among the regions of the country are quite intensified. Local researchers have taken up the question if sustainable development can be measured in Romania and their findings also underlines that the administration of the country tends to be very inconsistent in these practices. The outcome of their research indicated that only six of the forty- one counties from Romania have been able to reach a higher score in sustainable development. There are also huge differences identified between the western and eastern, and the north-western and south-eastern parts of the country (Benedek et al., 2021). Cluj- Napoca is located in the north- western part of the country, being one of the most successful cities in this regard.

The state of smart city development in Romania and Cluj- Napoca

Romania has a short history with Smart City projects, the start of the first initiative dating back only to 2017 (Vegacomp, 2022). Ever since, 144 cities have decided in the country to start piloting and delivering projects that are smart city oriented, in all the six areas of smart development (smart governance, smart mobility, smart environment, smart economy, smart people and smart life). In total, there has been 1001 smart city projects identified in the country, 470 of them being successfully implemented already (Vegacomp, 2022). Broking these projects down to categories, one can see that the smart people dimension was only covered only 35 times throughout the years, while smart mobility

(the most popular one) 322 times (Vegacomp, 2022). Smart governance on the other hand was the second most focused on aspect, with 238 projects happening in the field. The statistical data shows that the reality is often different from the theoretical projections of the reports of the country.

Figure 2- Smart city scan Romania 2022
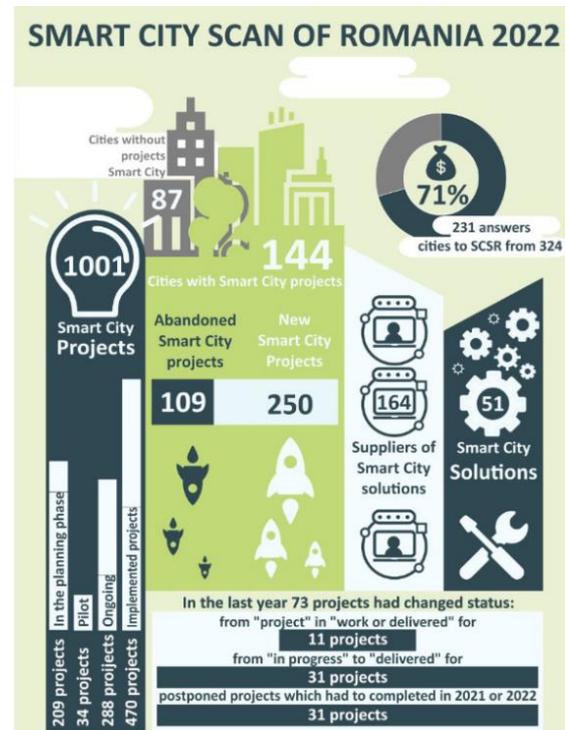
Source: (VegacompConsulting, 2022)

The National Targeted Smart City Agenda of Romania highlights that city administration should have to consider all the dimensions of smart cities, combining them to better face the local and regional challenges (*A targeted Smart Cities Agenda*, 2020, p. 3). The national report also offers an overview of the underlying factors for all the dimensions of smart transformation, based on the framework of different scholars in the field. The smart people dimension is measured by the level of qualification, affinity to lifelong learning, social and ethnic plurality, flexibility, creativity, open-mindedness and the participation in the public life of the citizens (*A targeted Smart Cities Agenda*, 2020, p. 4). For smarter governance, it is very important for the administrations to enable participation for the citizens in the decision making, to enhance their social services, to have a transparent governance procedure and to communicate their political strategies and perspectives (*A targeted Smart Cities Agenda*, 2020, p. 4).

In the last few years, the leading cities have been constantly fighting for the first position in the list of urban areas with the most smart city projects, and in 2022, Cluj-Napoca ended up on the top of the list with 63 smart city initiatives (Vegacomp, 2022). Out of the six dimensions of smart cities, smart mobility has been the most tackled aspect of development, with 23 pilots, still ongoing and already finished projects. Smart living has had the second highest ranking in the number of initiatives (13 projects), followed by smart governance with 12 projects and by smart environment (8 projects). The last two places are taken by the smart economy projects (5) and smart people projects with 2 actual initiatives (Vegacomp, 2022).

The city of Cluj-Napoca has an impressive number of smart initiatives over the last six years, however, according to the statistics, the smart people dimension is neglected by the city administration. On the other hand, the city is a suitable subject for analysis, because statistical data of the EuroStat shows that the Metropolitan area of the city is the area with the fastest economic development in the European Union between 2000 and 2017 (Cluj-Napoca, 2021, p. 3). As the city's Integrated urban

development Strategy highlights it as well, this fast economic development did not influence the region positively, but it also created some negative consequences. Among other, people from Cluj highlighted chaotic urban development, pollution, and increased costs of life as negative side effects.

Oliveira et. al., describes in their paper the importance for the city administrations to focus on smart solutions, but restructuring the concept based on the needs of the citizens (Oliveira & Campolargo, 2015). They introduce the Human Smart City concept, putting more emphasis on the "provision of a smart environment for smart living of people, with smart governance and economies, favouring innovation and the exploitation of all human capital available" (Oliveira & Campolargo, 2015, p. 2338). Focusing on creating a healthier and happier environment for the inhabitants of the city calls for the need of the implementation of ecosystems of urban innovation, in the form of Urban Living Labs that facilitate co-design and co-creation of social and technological innovation between the citizens and the social actors (Oliveira & Campolargo, 2015).

Methods

The aim of the research is to discover what are the components of smart transition that are present in the city of Cluj- Napoca, to be able to design an urban strategy that fills the existing gaps. There is also emphasis on how the different social actors work together on the design, and implementation processes of the smart city projects in Romania. The smart city projects have many different aspects in the life of an urban settlement, however the aim of the research is to find out more about the extent to which the stakeholders consider the perspective and needs of the civil society when strategizing, designing, and delivering smart solutions. The selection of the country was based on the little amount of empirical knowledge that has been produced so far about the state of the smart city implementation in the eastern part of Europe. Besides that, Romania also has a significantly different development trajectory than all the other countries from the global north, since up until 30 years ago, it was part of the Communist bloc. Being part of the former Soviet Union has shaped the city landscapes and the citizenry in the country in a different way, also posing different social issues on the agenda of public administrators. While most of the western cities put a lot of emphasis on the digital transformation of the urban areas, in Romania there might arise fundamentally different variables that influence the status quo of the development process. The goal of the research is to identify these variables and analyse them, exploring if the basic theoretical approach of the smart cities can be generally used on every part of the world, or the administrations should be more careful when deciding which development model to follow.

The social and scientific relevance of the problem is more important than relying only on the data discussing the demographics or other statistics like the variation of impact indicators over time. Therefore, understanding the situation requires deeper insights than the countable aspects or the trends around the topic, which can be carried out with the help of the case study method and by conducting interviews.

The methodological approach of this paper has been heavily influenced by the research question and propositions of the paper and by the inconsistencies highlighted in the theory section. Since there are major differences among the counties of Romania, it would be very hard to conclude anything on the country level. Therefore, to be able to find quality data about all the aspects of smart city development that are relevant for the research, the chosen approach was case study, focusing on a single city in Romania, Cluj- Napoca. Cluj- Napoca is the most successful city in both the smart city and the sustainable development trajectory ("Cluj-Napoca, Un Viitor Oras Smart în Transilvania? |ARSC," 2017). Focusing on the different processes and on the collaboration between the social actors from Cluj- Napoca is expected to set an example of what is possible in the country, highlighting the deficiencies and needs for further research.

Cluj- Napoca has been an influential city in its geographical location for a long time. Already in the 16th century, after the autonomous principality in Transylvania, Cluj became the capital city of the region and throughout the years it was influenced by Hungarians, Germans, and Romanians. The memories of the Austro- Hungarian empire are also well- preserved and together with the signs of the communist era, the city offers a diverse experience to its visitors and inhabitants (Oreshina, 2015). After the second World War the city became part of the industrialization that happened in the entire country under the new regime of the communist state, that also entailed the constant influx of Romanian newcomers from other regions and villages. The city needed to follow the "ideological concept" of the authorities and the aim of the city development was to give Romanian and communist character to the urban landscapes (Oreshina, 2015).

According to the SAGE dictionary of social research methods, the case study method is "an approach that uses in-depth investigation of one or more examples of a current social phenomenon, utilizing a variety of sources of data" (Keddie, 2006, pp. 20-22). A case study can involve one or multiple cases (Keddie, 2006, pp. 20-22), and the main aim of the research is to describe a relevant and existing social phenomenon (Yin, 2018). There are three different types of case studies that can be used for different purposes: descriptive, explanatory, and exploratory case studies. The descriptive case study aims "to describe a phenomenon (the "case") in its real-world context" (Yin, 2018). The purpose of the explanatory case study is to "explain how or why some condition came to be (e.g., how or why some sequence of events occurred or did not occur)" (Yin, 2018, p. 351). While the exploratory case study is used "to identify the research questions or procedures to be used in a subsequent research study, which

might or might not be a case study." (Yin, 2018, p. 351). Considering the aim of this research, the descriptive case study will be the best approach to find the answer for the research question.

The data collection can be separated into three phases.

In the first phase of the research the important theories and the already existing empirical knowledge was identified under the form of a literature review. The topic of smart cities can be approached from many different perspectives, therefore attention has been allocated to the social dimension of smart city planning, that being the focus of the research. The literature review consisted of searching for journal articles and choosing the ones relevant for the aim of the research. The search for relevant empirical data started with publications about smart city models and the different dimensions of this development model. After identifying what are the potential issues that might arise in cities from the social perspective, the search gained a new direction to find out more about the correlation of the sustainable development agenda and the smart cities. Besides that, there has been emphasis on the importance of the inter- sectorial collaboration among the important stakeholders of the city to find out more about the ontological foundations of collaboration in smart cities. Moreover, another important aspect of the first phase of the data collection was the situation in the former communist countries. All the chosen research articles have been imported into Atlas.TI to undergo of an inductive coding process, deriving the codes from the data that seemed to be relevant for the research. Following the coding, I was able to identify the theoretical foundation for my paper. Table 1 gives an overview of the codes identified after the first part of the data collection.

Table 1- The codes identified after the literature review

Code	Occurrence
Aspects of social sustainability	11
Cluj as a smart city	2
Criticisms of the 'social sustainability' concept	1
Eastern European situation	17
Environmental sustainability	5
Issues with smart cities	2
Models that dominate the discussion about sustainability	2
Origin of sustainability	1
Role of tech in smart cities	4
Role of the stakeholders	14
Smart city	34
Smart people	8
Sustainable cities	11
What is the problem?	2

Note: The table demonstrates the first set of codes of the analysis, gotten from the analysis of the journal articles relevant for the theoretical background.

The second phase of the data collection was focused on Romania, more closely on Cluj- Napoca. It was important to identify all the aspects of the smart city projects that are already happening to be able to form a clear picture about the social dimension of the topic. The process entailed the identification of research articles conducted locally by universities and professionals, reading the news articles published about the different projects, collecting video materials reported from the city and gathering the plans and procedures proposed by the municipality of Cluj- Napoca and the private actors who help carry out these projects. The aim of this second part of data collection was to get to know the situation in Cluj- Napoca better and to already start connecting some of the theoretical background obtained from the first part with the elements present in the public administration of Cluj- Napoca. It is important to mention that I did not focus on individual projects proposed by the municipality of Cluj, but I steered the data collection towards the overall public and private perception of the urban innovation. The reason why the research did not focus on the analysis of the smart city projects from Romania is because the emphasis falls on the opinion of the public, from a multidisciplinary perspective.

Diving into the reality of Cluj through news media and policy documents served as a great initial understanding of the situation, however it also created a lot more questions to be answered. Finding the answers to these questions were the third part of the data collection process, through interviews with social actors from Cluj- Napoca.

Bridging the scientific findings with the real-life situation served the basis for the interviews. The reason for choosing interviews as a data collection method is to be able to get answers for the "how"-s and "why"-s of the processes that are already in place. The interviews were semi- structured and approximately one hour long. According to Robert K. Yin, one very important aspect of case study data collection is the ability to ask good questions (Yin, 2018, p. 121). Since there are many aspects of the social pillar of the smart city initiatives, asking good questions was important for this part of the data collection. To get the answers for the questions, I conducted three interviews with professionals working in different fields of urban development, which provided very useful insights for the research. All of them have been professional interviews and the interview subjects preferred to have their names mentioned in the paper, in the quality of professionals from Cluj- Napoca.

The first interview subject was Oana Buzatu, the spokesperson from the municipality of Cluj who is also in charge of the Citizen Information Centre. She is responsible for coordinating 30 people from the front offices of the municipality and she has a long history of working as a public official, being part of the first steps that the administration took to create a more fundamental development strategy for the city.

Secondly, I also talked to a Dr. László Péter, sociologist and academic at the University of Babeș- Bolyai Cluj. He gives lectures about societal challenges for the students and he also started to engage more actively with sports from a sociology perspective .

The third interviu subject was Norbert Sajó, founder of the non- governmental organization Solidaris. The mission of the organization is to provide help and care for people in need who live in urban areas. They have a telephone helpline that can be dialled free of charge, they also offer summer camps for children from disadvantaged families, but they also coordinate a charity depot and a shelter (*Solidaris*).

Initially, an interview with a private sector representative has also been part of the operationalization strategy of the research, however due to different circumstances that could not happen. Two out of the three interview subjects are also citizens living in Cluj- Napoca, so the discussions conducted with them had insights about the living situation in Cluj as well. Table 2 provides an overview of the interviews and their thematic orientation within the topic of smart cities.

Table 2- An overview of the conducted interviews

Interview subject	Role within the social ecosystem of Cluj- Napoca	Thematic approach of the smart city question	Duration of the interview
Oana Buzatu	Spokesperson of the municipality of Cluj- Napoca; leader of the Citizen Information Centre	The focus of the interview fell on understanding the steps taken by the municipality to coordinate the development of the city and to lay down the fundamentals of smart transformation. After the interview, I got a lot of insights about the procedures and approaches that has been taken to enhance on the municipality's community engagement practices.	56 minutes and 47 seconds
Dr. László Péter	Sociologist and academic at the University of Babeș- Bolyai Cluj	The interview provided me with an in-depth understanding of the historical and sociological aspects of the development of the city, along with some trends that are present in the social structure of the city nowadays.	57 minutes and 45 seconds
Norbert Sajó	Founder of the non-governmental organization Solidaris	Within the context of this interview, we discussed the different needs of the communities who are considered to be underserved within the context of Cluj-	44 minutes and 46 seconds

Napoca. The interview also provided me with insights about how the concept of the smart cities might not be useful for these populations.

Note: The table gives an overview of the interviews that have been conducted within the scope of the research, along with the thematical orientations and the duration of them.

The analysis strategy of the research is content analysis, with the help of the software ATLAS.ti. The analysis consists of a deductive coding based on the theory of smart city wheel, a framework proposed by Boyd Cohen in 2012. The smart city wheel provides an analysis criteria for the level of success of combining the different aspects of urban life in smart city projects. The report on the Targeted Smart City Agenda of Romania also highlighted the need for cities to consider all the dimensions of smart city management and to combine them efficiently to best address the local challenges (*A targeted Smart Cities Agenda*, 2020). Based on this, there have been six codes identified for the analysis and the collected data has been coded according to these. The focus of the research is on the social aspect, so the coding does not consider smart mobility and smart environment, because there is no time to profoundly discover those topics as well. Instead of them, the two other aspects are the role of stakeholders in the smart transition and the socio- histoical development of the region, because these are considered as important factors in a social system. Besides these, smart economy, smart people, smart governance, and smart life were the aspects of smart development that the analysis have been based on. Table number two gives a summary of the codes used in the analysis, along with the conceptualization of them and the number of occurrence for each of the codes.

Table 3- The codebook for the analysis of the gathered data

Code	Conceptualization	Occurrence
Economic factors (Smart economy)	The economic background of the region and the different events that shaped the current existence of innovation-based business models that can be found in the context of Cluj-Napoca.	13
Social infrastructure (Smart people)	These are mainly the sociological aspects of the population living in the city, including the factors that have been shaping the demographic situation and the role of the intersectoral collaboration. In the case of the research, also information related to the educational background of the population has been identified under this code.	28
Community engagement practices of the administration (Smart governance)	These are the information that provide an understanding of the different initiatives, strategies, and approaches of the local administration to offer more efficient services to the citizens and to better coordinate the social structures living in the city.	29
The impact of digital technologies (Smart life)	This code identified the innovative projects containing internet communication technologies that have been implemented in the city ecosystem, in connection with their impact on the life of the citizens and the city dynamics.	21
Role of stakeholders	To be able to create human settlements that are fulfilling the need of all the communities living there, considering the perspective of the social actors is very important. The code aims to identify the power dynamics within the city and the social actor's role in the smart transition.	23
The different historical trajectory of the region	Being part of the former Soviet Union has influenced the population living in the city significantly. The code entails the identification of the sociological trends that happened throughout the years that might have an influence on the current state of smart development in the city.	26

After the codebook has been created, all the data that has been gathered throughout the research phase (policy reports, scientific articles from the region and the interview transcripts) was imported into ATLAS.ti and the coding began. I first read through all the documents and identified in forms of quotations the bits of information that might be relevant from the perspective of my research. After this step, I scanned through the quotations and started to organize the information into sets of codes.

When all the quotations have been assigned to a code, the data have been cleared because in some cases, the different sources talked about the same phenomenon. In the process of clearing the data it was considered that the phenomenon might be the same, however the approach of the different stakeholders might offer an insight for the research. The outcome of the coding process can be read in the analysis part of the paper.

Analysis

The growing urban populations and the number of societal challenges our humanity is facing made the administration of the cities more complicated for local governments. Smart city administration could be one of the solutions for our problems, by introducing coordination between social actors and the integration of the Internet Communication Technologies in the city ecosystem (Ben Letaifa, 2015). However, the process of transiting to a new way of working requires a lot of planning and collaboration, with a lot of aspects to be considered in the urban structure. In the case of Cluj- Napoca, this challenge is further enhanced by the different development trajectory of the country.

The different historical trajectory of the region

The historical background and the geographical location of the city has had a great influence on its current state of smart development and on the life of its inhabitants. The people from Cluj have been living in divided social groups, without effective community engagement practices from the side of the administration because of the national strategy to reshuffle the populations and give the cities higher Romanian and communist influence. After the fall of the Soviet Union, the situation at Cluj did not improve too much, mainly because of extreme right wing, nationalist administration, led by the mayor of the city, Gheorghe Funar. Between 1992 and 2004, the conflict on the level of population, between Romanians and Hungarians became even more enhanced which did not enable the collaboration between the different sectors and in a time when the city should have been focused on the transition to a market economy, this issue resulted in a lot of drawbacks (Péter, 2022). The anti- capitalist character of the local government also stopped every international company to set foot in the city, resulting in no significant economic development (Péter, 2022). Before 2004, Cluj- Napoca has been a perfect counter example for efficient smart governance model offered by Ceballos et. al. in their paper, according to which a city administration should have been able to understand the needs of the citizens when designing services for them (Ceballos & Larios). The provision of more efficient services for people who lived in dualism was very difficult, further weakening the fundamentals of the smart governance dimension in the context of Cluj. Therefore, for the perspective smart people as well, this historical background offered a very week environment for development since innovation could not be embedded and efficient infrastructure between people and relationships could not be formed.

Economic factors, the role of stakeholders and the community engagement practices of the administration

During the communist regime, Cluj was never truly an industrial city, because of the strong academic and administrative sphere living there. We can see that later, this was an advantage for the administration compared to other Romanian cities because shortly after the loss of the Funar administration Cluj- Napoca started to develop significantly on multiple levels. Being the city with the fastest economic development in Europe until 2017 (Cluj-Napoca, 2021) was partly because of its status during communism and the demographics and of Cluj- Napoca, which is still different from other major cities in Romania (Péter, 2022). The change of the economic situation at Cluj started to attract companies to the region, especially the IT sector, which was a strategic move of the new city administration (Péter, 2022), because they realized that chaotic urban development will not be sustainable in the future, so they started investing in the social infrastructure of the city.

It was in 2009 when the municipality tried to systematically better use the resources of the city (Buzatu, 2022). After the initiative of the current mayor, Emil Boc, the municipality started a co-creation process with the important social actors of the city environment, overseen by the Public Administration department of the University of Babeş Bolyai. Based on a common core methodology they divided the tasks among the working groups and each group had a high level professional as their coordinators, from different sequences of the society (Buzatu, 2022). The main goal of this process was to identify the needs of the people living in Cluj and to lay down the fundamentals of a better community engagement practice (Cluj-Napoca, 2021). This initiative provides evidence that the new administration of the city was already a lot more mindful about the complex approach that a smart city management

requires. With the co-creation of the first urban strategy of the city, they created an environment, where the different social actors were able to interact with each other, even though they were part of different subsystems within the city ecosystem (Ben Letaifa, 2015). The powerful IT sector also underlined this transformation from the traditional city management to smart city management because the opportunity of integrating the ICTs as well was given for Cluj- Napoca. With the quickly growing IT sector and the large pool of academics living in the city, the citizens also required the administration to start engaging in participatory planning and to integrate different technologies in the city ecosystem (Buzatu, 2022). The new strategy provided a bottom- up approach for the city, containing the opinions of the different social actors (Buzatu, 2022). The combination of the type of citizenry Cluj had, with the new approach of the city administration also enabled the urban landscape to change fundamentally (Péter, 2022), opening the ways in front of the smart city concept to enter the public and private perception in the urban area.

Between 2008 and 2012, Emil Boc, the mayor, has been away from the city because of his career as prime minister of Romania. After his return to the municipality, he initiated a more euro- centric vision in the development strategy of the city and a more targeted approach has been put in place to access European fundings (Buzatu, 2022). The newly acquired budgets enabled the city to invest heavily in the quality of life of the people living in Cluj, the most visible aspect of this period being the improvements of the mobility and the public transport infrastructure (Péter, 2022). The city took the mission of creating a good life quality for all the citizens (Buzatu, 2022), which underlines again the fact that there is correlation between the smart city concept and the urban development agenda of Cluj-Napoca (Ceballos & Larios).

It was this time, when the National Sustainable Development Strategy (Celac & Vadineanu, 2018) has been developed by the central government of the country, which also shaped the local vision. The National Institution of Sustainable Development has elaborated in the context of Romania on all the 17 Sustainable Development Goals put forward by the United Nations, goal number 11 being the relevant one in case of urban settlements. The most important aim of the country with this strategy was to boost the potential of the citizens, by addressing issues of healthcare, education, and labour fairness (Celac & Vadineanu, 2018). We can see that the emphasis here once again falls on the social perspective of the planning, however the national strategy within Sustainable Cities and Communities does not provide guidance in this for the local administrations because at the end of the chapter they have no targets for smart cities, even though the topic has been mentioned multiple times.

Good infrastructure, better public transport, possibilities for higher education and the supply of well- paying intellectual jobs were already creating a tempting atmosphere for the younger generations at Cluj- Napoca and the city started to become the home of a diverse and dynamic community (Buzatu, 2022). The stronger European perspective from the mayor initiated the introduction of tools developed by the Joint Research Centre to enhance the collaboration of the municipality with the locals (Buzatu, 2022). Emil Boc was also a teacher at first, so his professional orientation visibly created a an openness for learning and a sensitivity towards the ideas and standpoints presented by the academia (Buzatu, 2022; Péter, 2022). They started to work on strengthening the trust within the city, both between the municipality and the social actors and in between the stakeholders. It is important to recognize another strategic move of the local administration, because due to the history of the country with the Soviet Union, the public trust in the population has been very low for a long time. For the dimension of smart people and smart governance, the aspect of public trust is very important, because it serves as the base for collaboration between the social actors and a better community engagement. One of the outcomes of these local dialogues was the start of the project Com'OnCluj in 2015, a participatory budgeting process for the youth living in Cluj, offering them the opportunity to apply with small scale teamwork based projects with the aim of improving the quality of life of the local communities (*Com'On Cluj-Napoca 2022*). Besides the Com'OnCluj project, the city has been able to incorporate practices that are very useful in the light of smart transformation, such as the creation of clusters in different industries, the foundation of a consultancy that offers help for the young entrepreneurs in the innovation and IT sector and an initiative of creating Urban Living Labs in the city to facilitate participatory urban

planning (Cluj-Napoca, 2021). These achievements provide a solid foundation for the Human Smart City concept discussed by Oliveira et. al., that ensures a efficient use of all the human capital available for creating a smart living environment for people with smart economic and governmental practices (Oliveira & Campolargo, 2015).

The social infrastructure and the impact of digital technologies

After 2016, the new urban strategy of the city has been more focused on the implementation of the smart city concept, but back than the municipality also fell for the mistake that has been made by many more cities worldwide, that they were convinced that innovation could only be technology related (Buzatu, 2022). They started to use the concept of smart cities more freely in their communication with the city and critical voices started once again rising, expressing their vision that the city was still far away from being a smart city, and the municipality should not use this concept without reasons (Buzatu, 2022).

This highlights the power of the citizenry in Cluj- Napoca, which involves an important, yet contradictory aspect in the context of the research. The city has an advantage on the level of smart people because of the large number of young professionals living in Cluj, who created a perfect environment for technological innovation, which was one of the reasons why the city managed to be the leader in smart transition from Romania. However, the pool of citizens can be also a disadvantage for the city in the smart transition because the presence of the professional layer of the society does not automatically mean that the city no longer accommodates people who are not equipped with the knowledge a digital citizen needs. According to the report of the Targeted Smart City Agenda of Romania, the country is one of the last ones in rankings in Europe in the question of digital literacy, with one person out of five Romanians who have never used the internet so far (*A targeted Smart Cities Agenda*, 2020). The older generation, especially above the age of 65 has oftentimes low digital skills, but in Cluj- Napoca, 16.5% of the population belongs into that category (Cluj-Napoca, 2021). From the perspective of smart people, the population with low digital skills and with little or no affinity to life-long learning (Ben Letaifa, 2015) creates a disruption in the city ecosystem that becomes very complicated to manage from a governance perspective. The strong influence of the IT sector and the youth required modernizations in the city created a clear geographical and digital divide between the age groups (Péter, 2022). A great example for this is the public transport and the ticketing infrastructure of it. With the more connected lines of transportation, the municipality also introduced the possibilities to buy tickets online and they started to exchange the traditional ticket offices with digital solutions because they are more efficient from multiple perspective, only that they require digital skills. This is identified as a barrier for the smart governance processes of the city because there are too large differences between the social classes in the city and it is impossible to provide efficient services for all of them. Smart life, which entails the data and information driven technologies can still not be introduced at Cluj, until there is no structured way to accommodate all the different social groups in the equation. This fact presents a practical manifestation for the theoretical concept presented by Floridi in his article about te emergence of digital technologies, that also create dependence in society because of the digital divide that comes with them (Beavers, 2001).

Besides that, the IT sector and the Creative industries in the city also resulted in an increased cost of life at Cluj- Napoca, which does not accommodate the people who do not earn within this economic class (Péter, 2022). According to Norbert Sajó, there is still a large amount of people living in the city who are not prepared for the impact that digital technolgies have on us (Sajó, 2022). Technology and modernization can be very attractive from the nowadays standards of urban settlements, they also work as magnet, attracting people there, but also taking away their energy and social skills (Sajó, 2022). In a smart city, there is less time for social interaction and people are increasingly becoming victims of the large amount of information that they get as an impulse every day. The concept of smart cities might be a trending concept among the younger generations, but it has a very strong filter for a specific target group, because the dynamics of digitalization are too fast for the majority of the population (Sajó, 2022). At Cluj- Napoca and more generally on the level of Romania, the lack of proper education is a binding

variable in the case of older generations, because these people are not equipped with a foundation on which one could start building the knowledge that a digital society requires (Sajó, 2022).

The presented disruption in the society served as an oppression in the smart transition of Cluj-Napoca. This aspect of the society living in the city has been discovered by the administration and in the last three years they started to create a more inclusive strategy (Buzatu, 2022). They moved away from the goal of increasing the quality of life of the citizens to the new perspective of offering an urban environment, where the people choose not to leave, or to come back after a certain amount of time. This process also entailed the recognition of the fact that in order to provide inclusivity, the city can only develop in the rythm of the slowest, which also means that the smart transition is no longer an incentive of the municipality (Buzatu, 2022). This shift in perspective has been proven by the Integrated Strategy of Urban Development of the city as well, published in 2021, as there is no targeted section for the smart city agenda, they only talk about the concept in the section of future digitalization projects (Cluj-Napoca, 2021). It is interesting to see that after the local government encountered an obstacle that did not have an easy solution and required more profound community engagement practices, they chose not to go on the path of smart transformation, but start focusing on a future which does not entail a smart city. As already proven, in many aspects of the smart transformation and the building of an inclusive social infrastructure, the city is able to present the neccesary ingredients and has an advantage compared to other Romanian cities. Not trying to solve the issues created by the digital divide would mean that there is a wasted opportunity for the city to claim its status within the ecosystem of global cities.

Conclusion

The paper discovered the theoretical background of the smart city development, focusing on the needed elements in the social structure to create an environment that facilitates smart transition. After posing the research question, the relevant theories have been presented to underlie the findings of the research. The framework of Boyd Cohen has been chosen to be the analytical foundation of the data that has been gathered through desk research and semi- structured interviews with relevant social actors from Cluj- Napoca. The important insights have been identified and grouped according to the smart city wheel theory, without considering the aspect of smart environment and smart mobility, these two dimensions being out of the scope of the research. Besides the four smart dimensions, the socio-historical background of the region and the role of the stakeholders in the city administration have been considered instead.

The economic needs of the city are in place because it was able to foster innovation and development in a short time, regardless of the not favourable conditions beforehand. This was partly facilitated by the pool of intellectual population living in the city, working in the academic, IT, administrative and creative sectors who enabled and developed an innovative city ecosystem. This population also pressured the city administration to start organizing the people and their relationships more effectively, resulting in the flow of a constant supply of new workforce, because the open- minded and westernized character of the city serves as a magnet not only for the Romanian youth but also for large international communities, who started living in Cluj around 2019.

On the other hand, the advantage that Cluj had with the intellectual layer of its citizens was challenged by the other end of this axis, because the city obviously still accommodated communities who were not part of this social structure of innovation and digitalization. Groups like the elderly people, or the financially less privileged ones found themselves once again in a divide that has not been only social in its nature. The developing city and the new role of internet communication technologies in the ecosystem has changed the landscape of the urban settlement, resulting in locations that could only accommodate parts of the social groups. The digital illiteracy of one fifth of the population created a layer in the city who suddenly had a very hard time handling their day-to-day tasks, moving around in the city, or arranging their administrative tasks. This is still a present problem in Cluj, enhanced by the factor of the very expensive housing market that means that the people who are not able to earn up to the standards of the leading industries in the city are not able to afford a good quality of living in Cluj- Napoca.

The newly inaugurated digital divide posed a big challenge in front of the local government, who despite all the functional advantage that it had after 2004 decided to move away from the agenda of the smart transformation, hoping to leave behind the issues of digitalization as well. The municipality is still in the process of understanding the positive and negative aspects of modern technologies and changing their mindset to accommodate the ICTs in their working process. This proves that they only tried to tackle the issues rising with digitalization with stating that becoming a smart city is no longer the aim of Cluj- Napoca but keeping the implementation of the digital technologies is still important in their future strategies. Based on this, there is a gap identified in the readiness of the municipality to coordinate between the high demand of the resource intensive private sector, the pressure of one part of the population to constantly innovate in the city and the need of the other part of the population to offer them decent living conditions and well- being. However, opposing the smart transition does not take away the existing problem of digital divide.

Their Integrated Development Strategy has no dedicated section for smart city planning, however the concept is still mentioned when they summarize the future projects that require digitalization in the city. This fact shows a backwards growing tendency, because in comparison to the initial professional approach of the municipality to identify the needs of all the layers of the community, they now decided that not prioritizing smart transition could be a solution for the growing digital divide. Choosing not to follow the concept of smart city however does not mean that the city will not focus on the further implementation of the internet communication technologies in the city ecosystem, because that is

clearly on their agenda according to section number 8 in their development strategy (Cluj-Napoca, 2021, pp. 1026- 1051). Instead, it will just result in an even enhanced issue around the problem of digital divide because there is no longer framework that could provide a transdisciplinary perspective for innovation, ensuring the needs of all the different stakeholders in the city.

Based on the presented findings of the paper, the answer for the research question can be articulated. The economic background of the region and the different events that shaped the current state of the city provide a good environment for innovative spirit, productivity, entrepreneurship and innovation-based business models, a factor that is an important provider of development. Connected to this good economic habitat, the dimension of smart life is also an aspect of smart transition that could be achieved in Cluj-Napoca, if the municipality manages to work with the weaker aspect of smart people. The community engagement practices of the local administration have been proven efficient in multiple cases, allowing for participatory decision making, effective social services and a transparent governance, however the digital divide seems to be a barrier that the local government did not find a solution for yet. The socio- historic events of the region is one of the factors that makes the issue of digital divide so enhanced in Cluj- Napoca, which can be a direction for the city administration on where to start tackling the problem. The need of the social groups is partly considered, with layers of the society for whom the city provides a perfect lifestyle with dynamic social life and digital innovation, but we could see that the more disadvantaged populations in this case tend to be neglected. Lastly, the professional expertise of the social actors is efficiently used in the creation of the development strategies and future plans of the region and there is a mutual collaboration between the social actors and the municipality.

The findings and the methodological aspects of the research created a good base for the analysis of the social structure of the other cities in Romania as well, because the above-mentioned inconsistency in the country provides a profound analysis for all the different cases. The result of the paper also provides the local administration of Cluj- Napoca with a new perspective of looking at their problems, emphasizing the fact that a successful city administration needs to be able to pay equal attention on all the six dimension of the smart transition and city life. In the lack of this finding, it is understandable that the local governments are intimidated by the concept of smart cities, because in the moment a dimension gets neglected, wicked problems like digital divide can arise, further pressuring the missions of the cities.

Within the time frame and the scope of the research there was no space to further discover the causing factors and the different implications of the digital divide. As a call for further research, there is a scientific need to further elaborate on the causal foundations of the forming digital divide. From a strategic perspective for the municipality of Cluj, a general recommendation is to start creating more sensibility towards the communities who do not enrich the community too much on an economic and innovative level but are still basic part of the population. By neglecting the perspective of these people, the city will never be able to beat the issue of societal division, and it will eventually result in a decline despite the initial successes of the city. In the case of Cluj- Napoca, it is even more important to start working with this issue, because we can see a double phenomenon forming in the city, creating well identifiable geographical locations in the city where the population cannot merge or mingle. This means that the unfolding problem is not only digital or social in nature, but it is a combination of the two.

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