

# **Planning of Smart & Sustainable Cities**

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### Introduction

#### 1.1 Concept of sustainability

It is estimated that by 2050, 66% of the global population will be residing in cities, compared to ~54% residing now (UNEP, 2018). This implies that 2.4 billion people will be potentially added to the global urban population. There are numerous definitions of a smart city in the literature, many of which are of different nature.

Their diversity ranges from the elements a city must cover in order to be considered intelligent, to the resources it must use and what properties it must have. and what are the goals, purpose and scope of the smart city. Although the term is increasingly used across a wide variety of sectors, this plethora of application areas within smart city definitions has created confusion among urban decision-makers who are working to define public strategies to facilitate the transition to smarter cities (Albino et al) This transition is seen as essential by policy makers and is reflected in the setting of the eleventh UN Sustainable Development Goal (SDG), which aims to make cities inclusive, safe, resilient and sustainable (UN, 2018). Only the European Commission has provided a budget of almost one billion euros for smart city projects for the period 2014-2020 (EIP-SCC, 2013).

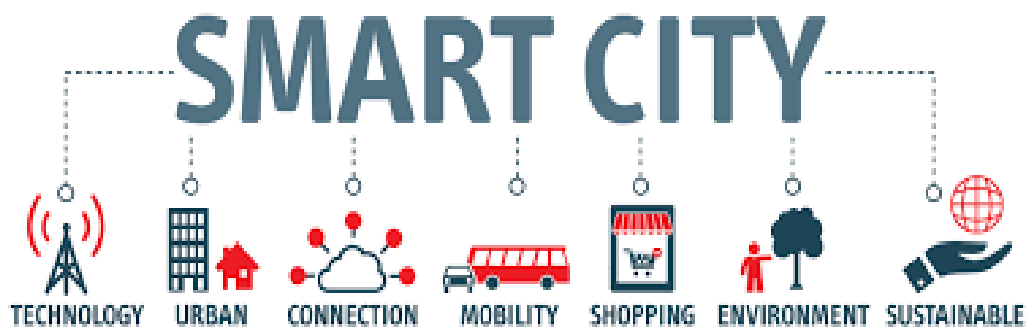


Fig 1.1

## 1.2 Sustainability as One of the Strategic Goals of Smart Cities

The confusion of scope is growing, the confusion of scope is becoming increasingly alarming, and will have an impact on value creation and public benefits. Starting from the correlation between the 11th related to the extension of the scope of sustainability addressed in the definitions of Smart City and what its function. This study provides a comprehensive overview of the literature on the role of sustainability in smart city definitions. only for the promotion of science and practice, but above all in the decision-making processes of public decision-makers.

These characteristics encompass the three dimensions of sustainability: environment, economic and social (Lehtonen, 2004), whereby the environment takes the ecological aspect into account and includes the preservation of the natural environment (flora and fauna) as well as natural resources and energy. production-based economy the social dimension encompasses equity, community autonomy, the well-being of citizens and the satisfaction of basic human needs, while the economic dimension encompasses the economic vitality and diversity of urban areas. be sustainable in terms of social justice, preservation of the natural environment and its resources, economic vitality and quality of life. Urban sustainability seems to be one of the predominant topics in the literature on smart cities.

## Chapter 2

### **Literature Review**

#### 2.1 Smart Sustainable Cities: Definition and Challenges by Mattias Höjer et al

Smart Sustainable Cities is an additional concept. Smart technologies can be used in cities without contributing to sustainable development. Smart technologies can also be used in places other than cities for sustainable development. Only in combination. The three aspects, if smart technologies (ICT) are used to make cities more sustainable, one speaks of Smart Sustainable Cities (CSS). In fact, the concept of Smart Sustainable Cities is not relevant for all actors and perspectives. From a sustainability perspective, one could argue, for example, that the question of whether a city uses ICT or not is unimportant insofar as it becomes more sustainable, so that the concept of a sustainable city would suffice. From this perspective, it could be argued that the industry works with smart solutions, while the aspect of sustainability is not their concern, so the concept of the smart city is appropriate and sufficient. These points of view are valid, but from a more holistic perspective, the concept of smart and sustainable cities is necessary precisely because of the two previous points of view. Linking the concepts of sustainable cities and smart cities can also raise awareness among planners, IT companies and policymakers about the potential of using ICT to promote urban sustainability. The concept of Smart Sustainable Cities can be used as a common framework or vision to develop new collaborations, business models and ways of urban development, which in turn underscores the need not to be stuck with Smart and Sustainable Cities but rather a proactive approach of the stakeholder networks, of governance and policy innovations.

#### 2.2 Sustainable cities: Research and Practice challenges by Katie Williams

##### 2.2.1 Do we know what 'the sustainable city' is?

Guy and Marvin pointed out: "...In the sustainable city debate, a diverse and broad stakeholder group can be distinguished, and everyone has a competing viewpoint on the development of sustainable cities". Present an overall picture (although some people would say that), because each of them is just a part of the

"everything" complex that makes up the city. However, we must also acknowledge that these diverse paths require a certain coherence of the purpose, otherwise the "conflicts and contradictions" reported in this way in the thinking and practice of sustainable urbanism will continue without a conceptual "anchor". The core of the sustainability discourse, the careful use of environmental resources and inter- and intra-generational justice still serve us well; However, as we all know, understanding and operationalizing these concepts in different time and space frames are issues that will undoubtedly be the focus of many debates over the next decade.

#### 2.2.2 Do we know how to bring about 'sustainable urban development'?

I suggest that the challenge for the next decade is to really overcome this dualistic thinking. With this or that approach, we will not make much progress in sustainable urban development. The major urban challenges we face in areas such as climate change, energy, poverty, health, housing and transport require an integrated approach. We must continue to improve our understanding of technical and social change. But we also need a much stronger one.

We have to understand how social contexts and processes enable the development and use of sustainable technologies and how technologies can shape us. Guy and Marvin conceptualize a research challenge as: "Mapping the diverse constructions of the sustainable city, understanding the changing social contexts that create them, and building an understanding of the multiple logics that arise to reorganize societies, relationships, resource flows and urban ones. Achieving this requires deepening specialist knowledge in some areas, respecting and understanding different research approaches and traditions, as well as completely new methods. Working methods. It also requires various partnerships and coalitions, perhaps between scientists, social scientists, politicians and the public; and it requires an open mind.

### 2.3 Toward a Definition of Sustainability. Sustainable Ecological Systems by Allen, T., and Hoekstra, T. W.

The significance of organising the dimensions on which a machine is being assessed in phrases of sustainability. Achieving sustainability on a worldwide scale calls for special sort of moves than on an city scale. There isn't anyt any unmarried best-mounted definition in phrases of sustainability withinside the city scale nonetheless there's a commonly-used set of traits of city sustainability. These consist of intergenerational equity, intra-generational equity (social, geographical, and governance equity), conservation of the

herbal environment, massive discount of using non-renewable resources, financial energy and diversity, autonomy in communities, citizen well-being, and gratification of essential human needs

#### 2.4 The environmental-social interface of sustainable development, By Lehtonen, M.

These characteristics include the three dimensions of sustainability: ecology, economy, and society, where the environment considers the ecological aspects, including the protection of the natural environment (plants and animals), natural resources and energy. The production-based economic and social dimensions include equality, community autonomy, citizen well-being, and the satisfaction of basic human needs, while the economic dimension includes economic vitality and urban diversity. The sustainability of cities seems to be one of the main themes in the smart city literature, but to what extent does this concept embed an understanding of smart cities, and to what extent are they sustainable, while maintaining social justice, protecting the natural environment.

#### 2.5 The political and economic implications of the smart city By Ponting, A.

Smart town definitions are heterogeneous in nature, as there seems to be neither a predetermined template, nor a one-length fits-all definition of what the time period clever town encompasses. As such, definitions address one of a kind views of clever town improvement starting from the adoption of Information and Communication Technology (ICT), consumer communication, e-governance and equitable improvement to schooling and sustainability. In addition to versions in content, sustainability-orientated definitions gift a discrepancy withinside the prioritization of sustainability as a clever town aim. In a number of the definitions provided, sustainability is seemed as one of the number one desires of clever town, at the side of liveability. Respectively, about one 0.33 of the definitions provided, function sustainability as one of the secondary desires in clever towns at the side of liveability, green use of assets and governance. Few definitions provided sustainability as a tertiary aim, diminishing its significance withinside the clever town agenda. The number one aim in tertiary definitions is the pleasant of lifestyles and governance.



## 2.6 Smart Cities: Ranking of European Medium-Sized Cities By Giffinger, R et al.

Smart towns are defined as resilient and inclusive towns constructed collaboratively, that use extraordinary sorts of era and statistics to be able to gain a higher high-satisfactory of lifestyles for all their residents. They may be regarded as towns acting properly on six characteristics: environment, economy, mobility, people, residing and governance. They derive from knowledge-extensive innovative techniques which have as a aim the development of the socio-financial, ecological, logistic and aggressive overall performance of towns and rely upon a aggregate of human, infrastructural, social and entrepreneurial capital. These investments in human, infrastructural (shipping and ICT) and social capital sell sustainable financial boom and an awesome high-satisfactory of lifestyles, thru participatory governance and with the aid of using intelligently handling herbal resources.

## 2.7 Smart cities of the future By Batty et al

The components that have been proposed as administration, education, health care, public safety, real estate, transport and public services. In describing the vision of Smart London, it was viewed components as integrated systems through various focuses on connecting local labour and financial markets and local governments to education, health care, transportation and public services. Smart cities will use communication and sensor functions built into the city's infrastructure to optimize electricity related to transportation and other daily logistics operations with the aim of improving the quality of life. These technologies offer a space for the interaction between citizens, authorities, companies and other actors in order to be actively involved in the design and planning processes.

## 2.8 Building the Smart City by Deloitte

While the above definitions are drawn from scientific literature and government articles, similar issues can be observed in definitions by industry actors' Smart cities use scalable solutions that use ICT to increase efficiency. Technology is used as a means to improve all aspects of city operations and the services offered to citizens. Inform decision-making while creating networks of partnerships between governments, corporations, non-profits, community groups, universities and hospitals. From a different perspective, sees the Smart City as a city with a clear and transparent structure of its urban systems that are simple, responsive and adaptable. In this city, citizens are encouraged to connect with their broader ecosystem and deal with it together. Several non-sustainability-oriented definitions describe smart cities more critically and examine their origins and their promise. Smart urbanism, from which smart cities emerged, has been specifically described as "a loosely connected set of confluences between data, digital technologies and urban

locations and processes" while the "continuous sales promise is that of digitally supported data". urban environment driven, continuously recognized, responded and integrated. The smart city itself has also been described as a concept that became popular in early 2010 as to how technological advances and current data can enable more efficient city management, but it has been established in the 'public consciousness as the concept marketing of global technology companies seeking an opportunity, digital transformation and new Selling technologies in the systems of large cities .

## 2.9 Smart Cities: Digital Solutions for a More Liveable Future. McKinsey

The excellence between digital or intelligent cities and smart cities seems to be the prevalence of the human component within the latter. Indeed, varied sources in the literature, read property in smart town as a preponderantly social scope supported that a sensible city includes the economic integration of physical, digital and human systems in the designed infrastructure so as to form a sustainable, prosperous and inclusive future for its inhabitants. This stress on the habitability and inclusivity of the urban environments particularly underlines the social nature of sensible cities. Via the employment of digital intelligence, tools are designed that save lives, forestall crime, and cut back the illness burden. These will save time, reduce waste, and even facilitate boost social connectedness. In different words, smart cities try to boost city services and concrete management for the citizens, by making a socially advanced environment. the last word goal of those processes is to improve the property and liveability of town. Through these definitions, it can be discovered that the mixture of human capital with technology can have an effect on urban services, town services, native actor interaction, and quality of life, so rising the social side of urban environments. The known literature enclosed few definitions that focus alone on the economic aspect of property sensible cities

## 2.10 Concluding Remarks

This comprehensive literature review known variety of rising themes in good city definitions. property familiarised definitions usually specialize in the mix of sentimental capital, corresponding to human and social capital, and onerous capital, a city' physical infrastructure, so as to deliver a sustainable, inhabitable and economical city.

On the opposite hand, non-sustainability-oriented definitions sometimes highlighted the importance of ICT utilization to expeditiously mix resources which will create town a lot of interconnected, intelligent and liveable.

holistic approaches coated all dimensions of sustainability, the environmental, the social and therefore the economic one, and bestowed a balanced purpose of read on what a wise town ought to be. Most environmental and social familiarised definitions specialize in however smart cities integrate technology with governance to enhance the standard of life and scale back the environmental impact of urbanism.

Conversely, the few economic oriented definitions projected the mix of onerous infrastructure and soft capital with the aim of making competitive cities and boosting property economic development. a bent of the definitions to downplay the importance of economic property within the implementation of the smart city vision are often observed. this is often opposite to the present implementation plans and therefore the fantastic rate of growth of the smart town market.

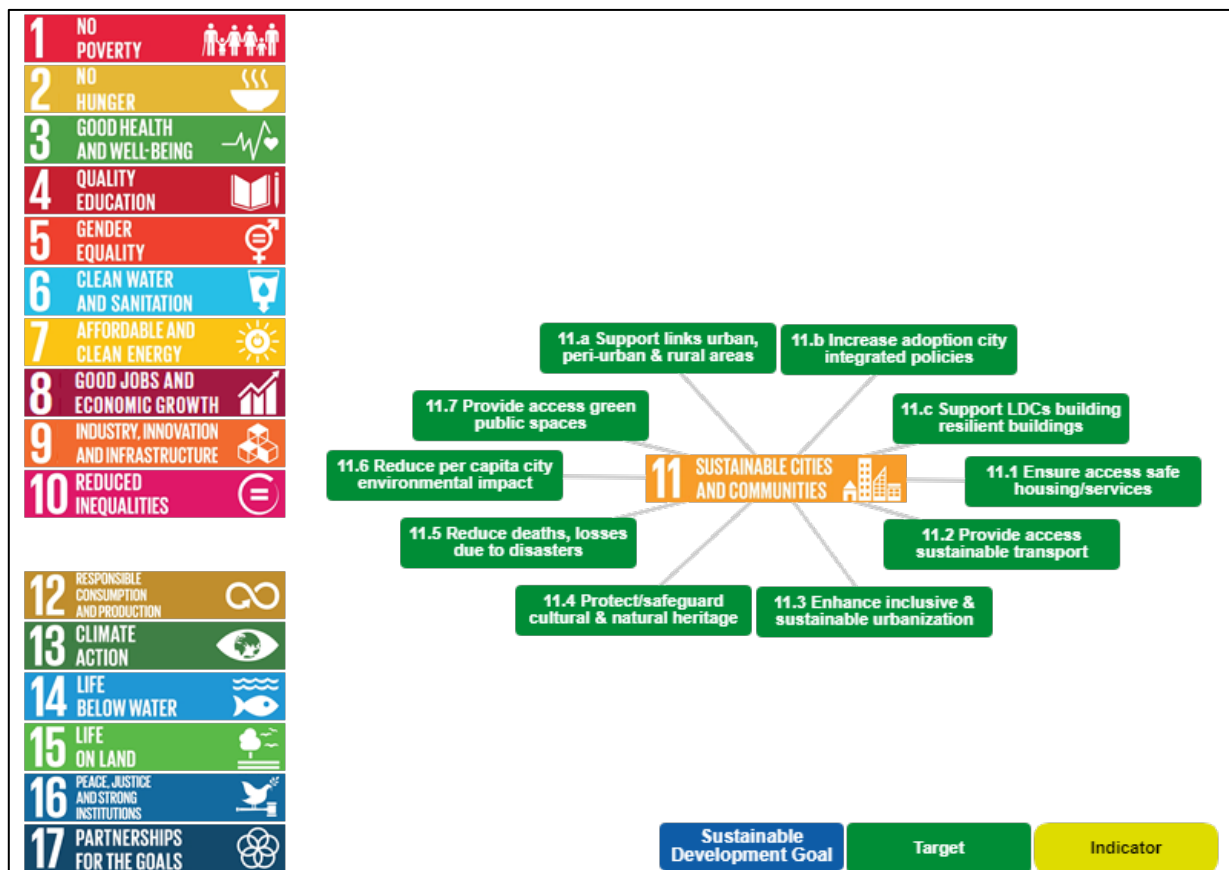


Fig 1.2

### **Methodology and Discussion**

- 3.1 The aim of this study is to provide a comprehensive overview of the role of sustainability in the literature on smart city definitions. based on organizational and government reports, as well as documents and reports prepared by industry actors. Each type of definition was obtained after a different process.

The scientific definitions were compiled in a five-step process: searching a database by keywords, selecting the language, selecting the sector, selecting the 50 most cited articles, and identifying the original, non-repeated definitions. Definitions were identified in searched articles by inserting relevant keywords into Elsevier's Scopus database. The review process found that most of these articles repeat and reuse the same definitions either individually or in combination. For this review, the definitions selected from the articles were original, non-repetitive, and not based on combinations by other authors.

- 3.2 A list of smart city organizations was obtained from the United States' list of associations. Organization of Smart Cities, coordinated by the Organization for International Economic Relations (OiER) and the United Nations Economic Commission for Europe (CEPE). Not all organizations had produced documents and reports that clearly defined the smart city. they were found, evaluated and, in accordance with the above, the original definitions were recovered. was compiled from a combination of the industry partner database of the United Smart Cities organization and the Future Cities Catapult industry database, which is now called Connected Places Catapult. and Skills (BIS) For most industrial companies, no definitions could be found in their open access resources, while many of the definitions presented were repetitive / non-originals. Reports prepared by industrial partners were checked and original definitions included. recovered. Definitions that seemed to repeat themselves were discarded in order to generate an optimized / focused data set.

3.2.1 The analytic method evaluated the definitions retrieved according to:

- Whether sustainability, defined in this context as the coexistence of social equity, conservation of the natural environment, economic vitality, and quality of life in the urban environment, is considered as one of the smart city goals;
- Which dimensions of sustainability, environmental, social, or economic, are taken into account;
- How sustainability goals are prioritized. Prioritization was assessed according to whether sustainability appeared as a primary, secondary, or tertiary goal, where primary was indicated as of fundamental importance, secondary as important but not fundamental goal and tertiary a goal of less importance compared to the other two categories. Although subjectively classified, the three level of priority offer an indication on the centrality of sustainability in smart cities definitions.

3.3 This study identified 43 definitions in the literature, the majority of which come from academia (16 definitions), while 14 were found in organizational/governmental reports and 13 in documents from the industry. The next section presents an overview of the definitions, followed by a more detailed examination of the variances in sustainability oriented and non-sustainability-oriented definitions. Subsequently, the dimensions of sustainability, namely the environmental, economic, and social dimension, as well as the prioritization of sustainability as a smart city goal in the definitions, are presented.

### **Conclusion**

- ▶ Sustainable architecture produces benefits: social, ecological, and economic. Sustainable urban planning allows reducing negative impact on the environment, minimizing the natural resources consumption and increasing the utilization of renewable resources and wastes and their minimization, reducing operational costs
- ▶ Accordingly, some specialists like landscape architects, architects, engineers, urban designers and planners play a significant role in achieving sustainable development in cities and countries and in creating appropriate conditions for higher quality of life
- ▶ There is lots of work doing by the planning and design disciplines to find an appropriate way to figure out the environmental problems caused by urban development. As our cities grow up and cover territories in city periphery green areas now become a part of the city pattern and our daily life. To the beginning of 21-st century the success reached in the field of planning of viable cities and regenerations city territories has opened a new way for projects of green architecture.
- ▶ As a response to the points of interest identified and analysed based on the existing literature, a new definition is proposed above. This definition is adjusted to address some of the most significant issues raised above and presents the key points that the smart city vision should consider, with a focus on holistic sustainability, inclusiveness and respect to localities and their inhabitants.

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