

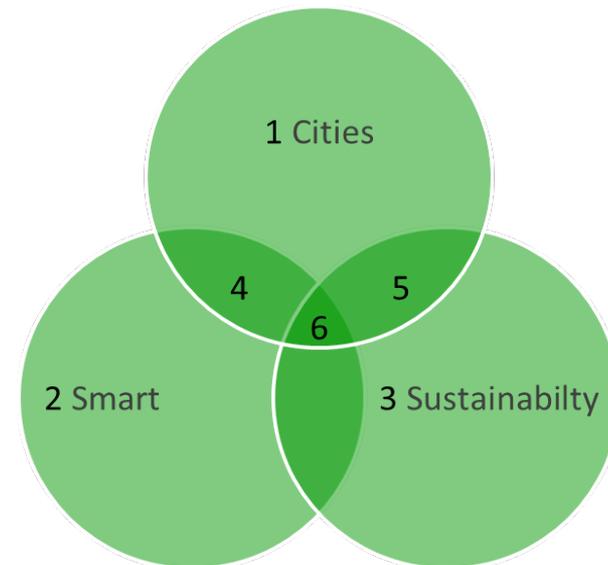
CARPEssence

Smart and Sustainable City Definitions

Agenda

In this chapter, we will provide basic definitions about

1. Cities
2. Smart
3. Sustainability
4. Smart Cities
5. Sustainable Cities
6. Smart and Sustainable Cities



Remark: all definitions on the following slides are exemplary suggestions, as many other definitions exist.

City definition 1/2

According to M. Hammond, the city-state was a creation of the Greek genius. It was diffused throughout the Greco-Roman world, and withered with the decline of ancient culture in the early Middle Ages.

“A city is a community whose members live in close proximity under a single government and in a unified complex of buildings, surrounded by a wall. ”

“... the city may further be described as a community in which a considerable number of population pursue their main activities within the city in non-rural occupations.”

“The city is a community which extends at least its influence and preferable its control over an area wider than that simply necessary to maintain its self-sufficiency. “

Source: Hammond, M. (1972): The City in the Ancient World, Cambridge, Mass.

City definition 2/2

Another important and recognised definition is provided by Alan S. Berger which states that...

... a city is a relatively large, dense, permanent settlement of heterogeneous individuals and groups of individuals organized to perform, or to facilitate the performance of, locality-relevant functions in an integrated manner and to ensure integration with the social system of which the city is a part.

Source: Berger, Alan S. (1978): The City: Urban Communities and Their Problems

Due to the considerations of social aspects in Berger's definition, this one is seen as the working definition in Essence.

Smart definition

The prefix “Smart” can be defined in several ways. In this course, the following working definition is given.

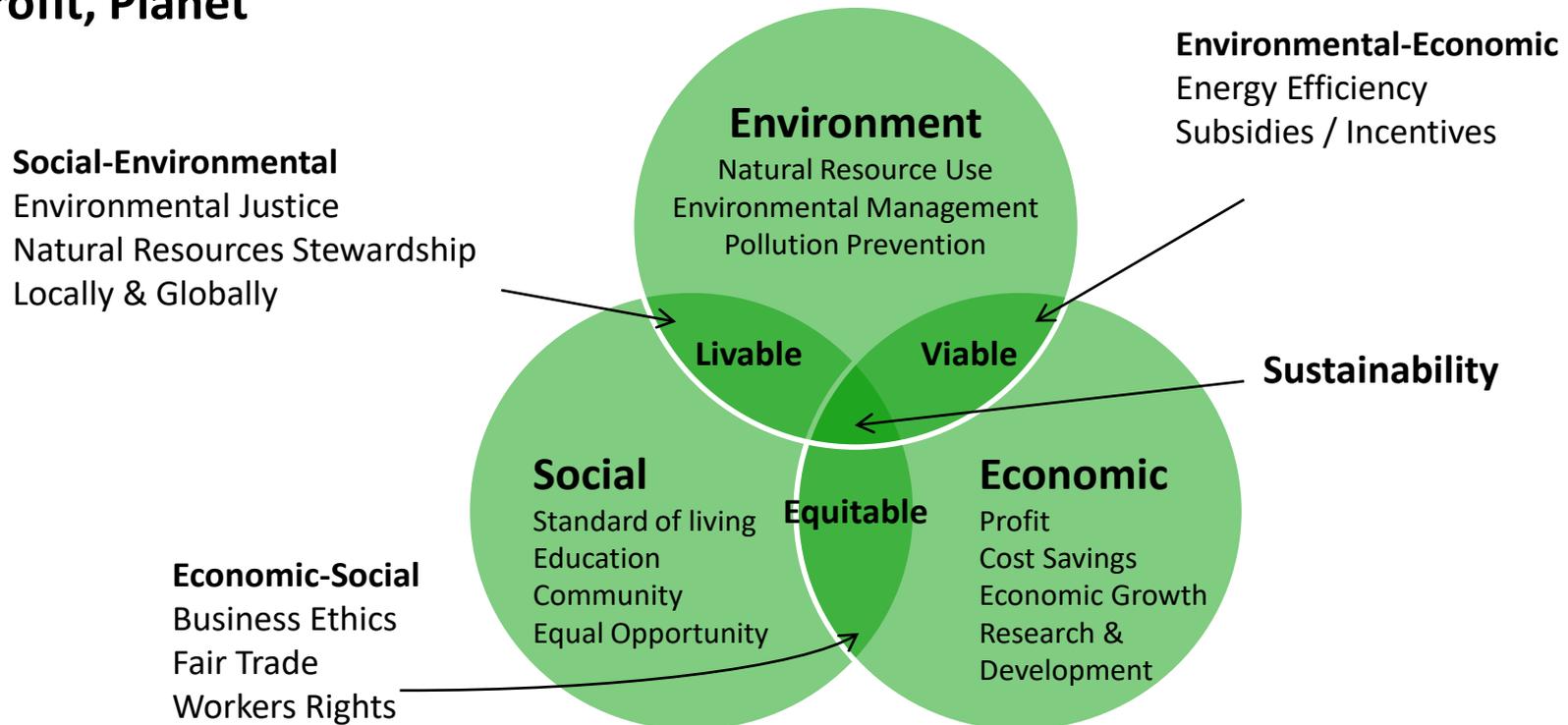
“The word “smart” is seen here as an instrumental rather than a normative concept. Moreover, smart is understood here as a feature rather than a sign of performance. [...] As an instrumental concept, smart is seen as a prefix denominating an empirical category of products, services and product service systems in which ICT play a major role.”

Source: Höjer, M.; Wangel, J.: Smart Sustainable Cities: Definitions and Challenges

In other words, we see smart as an instrument that uses advanced Information and Communication Technology.

Sustainability definition

Sustainability can be described as the match of environment, social and economic aspects, also known as the triple bottom line “PPP”: People, Profit, Planet



Source: Georges A. Tanguaya, Juste Rajaonson, Jean-Francois, Lefebvre, Paul Lanoie: Measuring the sustainability of cities: An analysis of the use of local indicators, p408
 Sandra I. Rodriguez, Matthew S. Roman, Samantha C. Sturhahn & Elizabeth H. Terry (2002): Sustainability Assessment and Reporting for the University of Michigan's Ann Arbor Campus, p.8

Smart City definition (1/3)

The term smart city describes a vague concept. It is often used, but the definitions are not always consistent. In the following, some definitions are presented. Smart cities are...

- Smart cities are “...places where information technology is combined with infrastructure, architecture, everyday objects, and even our own bodies to address social, economic and environmental problems”

Townsend, A.: Smart Cities – big data, civic hackers and the quest for a new utopia. Norton & Company, New York (2013)

- We consider “A city to be 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”

Allwinkle, S., Cruickshank, P.: Creating Smarter Cities – An Overview. Journal of Urban Technology 18(2), 1-16 (2011)

Smart City Definitions (2/3)

- Smart Cities “are characterized by a pervasive use of Information and Communication Technologies (ICT), which, in various urban domains, help cities make better use of their resources.”

Source: http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/industry-facts.pdf

- “A ‘Smart City’ is intended as an urban environment which, supported by pervasive ICT systems, is able to offer advanced and innovative services to citizens in order to improve the overall quality of their life”

Source: Caragliu, A., del Bo, C., Nijkamp, P.: Smart Cities in Europe. In: Proc. of Central European Conf. in Regional Science, CERS, Kaschau, Slovak Republic (2009)

- “A city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership”

Source: Piro, G., Cianci, I., Grieco, L.A., Boggia, G., Camarda, P.: Information centric services in Smart Cities. The Journal of Systems and Software 88, 169– 188 (2014)

Smart City Definition (3/3)

- “A Smart City is a place where the traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses”

European parliament: Mapping Smart Cities in the EU. Policy Dep A: Economic and Scientific Policy. IP/A/ITRE/ST/2013-02 (2014)

- Smart cities are “effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens”

Source: [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOLITRE_ET\(2014\)507480_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOLITRE_ET(2014)507480_EN.pdf)



Definition Overlap of Smart Cities

In addition to that, a considerable definition overlap of Smart Cities to others concepts exists, for instance:

- ‘Intelligent City’
- ‘Knowledge City’
- ‘Sustainable City’
- ‘Talented City’
- ‘Wired City’,
- ‘Digital City’
- ‘Eco-City’.

Source: DIRECTORATE GENERAL FOR INTERNAL POLICIES. POLICY DEPARTMENT
A: ECONOMIC AND SCIENTIFIC POLICY: Mapping Smart Cities in the EU

Sustainable City Definitions

A Sustainable City is difficult to define due to various reasons:

- “There is no accepted definition of a sustainable city, and as it happened with the concept of sustainable development, many interpretations exist of which characteristics a city should present to be considered sustainable, and many are the criteria and indicators developed to assess them.”

Chiesura, A.: The role of urban parks for the sustainable city, 2002

- “The main problem of cities sustainability is the fact that they are not self-sufficient. They need the hinterland resources. Due to industrialization, urbanisation and globalisation, an increasing share of goods is produced further away. The issue of system boundaries and consumption-based accounting is relevant.”

Höjer, M.; Wangel, J.: Smart Sustainable Cities: Definitions and Challenges

Sustainable City definitions

According to that, a sustainable City is defined as followed:

- “One in which its people and businesses continuously endeavour to improve their natural, built and cultural environments at neighbourhood and regional levels, whilst working in two ways which always support the goal of global sustainable development’

Haughton, G. and Hunter, C., 1994. Sustainable Cities. Jessica Kingsley Publishers, London

Ecocity definition

Also, there is a considerable overlap with the following Ecocity definition:

- “An Ecocity is a human settlement modeled on the self sustaining resilient structure and function of natural ecosystems. The ecocity provides healthy abundance to its inhabitants without consuming more (renewable) resources than it produces, without producing more waste than it can assimilate, and without being toxic to itself or neighboring ecosystems. Its inhabitants’ ecological impact reflect planetary supportive lifestyles; its social order reflects fundamental principles of fairness, justice and reasonable equity.”

Ecocity Builders and the International Ecocity Standards advisory team, 2/20/10, Vancouver, Canada,
<http://www.ecocitybuilders.org/why-ecocities/ecocity-definition/>

Smart, Sustainable City definitions (1/3)

- “We believe a city to be 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.”

Meijer, Albert, and Manuel Pedro Rodríguez Bolívar. "Governing the Smart Sustainable City: Scaling-Up the Search for Socio-Techno Synergy." T EGPA 2013 (Edinburgh, September) Permanent Study Group on E-Government, 2013, Web. Last accessed 8 Feb. 2014. https://www.scss.tcd.ie/disciplines/information_systems/egpa/docs/2013/BolivarMeijer.pdf

- “Hitachi's vision for the smart sustainable city seeks to achieve concern for the global environment and lifestyle safety and convenience through the coordination of infrastructure. Smart Sustainable Cities realized through the coordination of infrastructures consist of two infrastructure layers that support consumers' lifestyles together with the urban management infrastructure that links these together using information technology (IT).”

Hitachi. "Smart Sustainable City Overview." Last accessed 9 Feb. 2014. <http://www.hitachi.com/products/smartcity/vision/concept/overview.html>

Smart, Sustainable City definitions (2/3)

- “A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living built on the smart combination of endowments and activities of self-decisive, independent and aware citizens.”

Giffinger, R. *et al.*: "Smart Cities Ranking of European Medium-sized Cities."
Centre of Regional Science, Vienna UT, Oct. 2007. Page 10. Web. Last Accessed 8 Feb. 2014.
http://www.smart-cities.eu/download/smart_cities_final_report.pdf

- “Effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens.”

[http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOLITRE_ET\(2014\)507480_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOLITRE_ET(2014)507480_EN.pdf)

Smart, Sustainable City Definitions (3/3)

- “A Smart Sustainable City is a city that meets the needs of its present inhabitants without compromising the ability for other people or future generations to meet their needs, and thus, does not exceed local or planetary environmental limitations, and where this is supported by ICT.”

Höjer, M.; Wangel, J.: Smart Sustainable Cities: Definitions and Challenges

- “A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects.”

<http://www.itu.int/en/ITU-T/focusgroups/ssc/Pages/default.aspx>