

# TeMA

Journal of  
Land Use, Mobility and Environment

Cities need to modify and/or adapt their urban form, the distribution and location of services and learn how to handle the increasing complexity to face the most pressing challenges of this century. The scientific community is working in order to minimise negative effects on the environment, social and economic issues and people's health. The three issues of the 14th volume will collect articles concerning the topics addressed in 2020 and also the effects on the urban areas related to the spread Covid-19 pandemic.

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THE CITY CHALLENGES AND EXTERNAL AGENTS.  
METHODS, TOOLS AND BEST PRACTICES

## THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

3 (2021)

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The cover image is Rue de Rivoli - an emblematic street of Paris connecting Bastille to Concorde – that since May 2020 has been reserved for bicycles and pedestrians, Paris, France, Saturday, Nov. 6, 2021.

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## REVIEW NOTES – Economy, business and land use

# Sustainable development in cities: a review of frameworks and indexes

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### Abstract

Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always following a rigorous scientific in-depth analysis. This section of the Journal, Review Notes, is the expression of a continuous updating of emerging topics concerning relationships among urban planning, mobility and environment, through a collection of short scientific papers. The Review Notes are made of four parts. Each section examines a specific aspect of the broader information storage within the main interests of TeMA Journal. In particular, the Economy, business and land use section aims at presenting recent advancements on relevant topics that underlie socio-economic relationships between firms and territories. The present note tries to clarify the concept of sustainable city from a practical perspective rather than from a theoretical one. It does that by describing some of the most widespread framework in defining urban sustainability.

### Keywords

Urban sustainability; sustainability indexes; sustainability framework

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## 1. Introduction

The issue of sustainability has become central in the research agenda of a great number of scientific disciplines. The concept of sustainability is deeply intertwined with the economic development. In other words, in the modern society in which we live no economic development is possible without making it sustainable. This aspect is applicable also to urban development as this review notes are extensively trying to enquire. Sustainability in cities is becoming a central issue in the policy agenda, given the rapid growth of city population and the consequent environmental and social problems related to it (Chen & Zhang, 2020; Guida & Carpentieri, 2021; Martínez-Bravo et al., 2019). For example, several cities are designing plans to decrease their dependence to fossil energy towards renewable ones, even if this transition is not free from obstacles and challenges (Mazzeo, 2019). In addition, climate change poses new risks and challenges to which cities should reply by developing adaptation plans (Ministero dell'Ambiente, 2018). Literature about public policy, indeed, agrees on the fact that, in order to embrace a sustainable transition, administrations should support “*radical transformations in technologies, markets and institutions towards sustainability goals*” (Truffer & Coenen, 2012, p. 3). The concept can be declined in the three spheres of economic, social and environmental sustainability, and it is a shared opinion that an effective sustainable development should take in consideration all of the three aspects without neglecting one of them. However, organizations - both public, private, and administrative - may set priorities related to their needs and characteristics that could skew activities towards one of the three pillars. For example, private companies working the energy sector may tend to give priority to activities oriented towards environment preservation and climate change. Similarly, urban areas may be more efficient in implementing one of the three pillars of sustainability. Previous studies have extensively described what is sustainability for cities and what are the aspects to be implemented in order to set up an effective sustainable development strategy (among others, Bianconi et al., 2018; Mori & Christodoulou, 2012; Sodiq et al., 2019; Tira, 2020). Moreover, in recent years, several organizations have tried to assess the advancements of urban areas on the sustainable development disentangling it into the three pillars, by developing sustainability indexes. They are effective tools composed of several different indicators that measure economic, environmental and social performance. In doing so, the indexes provide useful instruments that underline what are the specific topics – and the related activities – material to the sustainable development of cities. Indeed, by monitoring the advancements on indicators provided by these frameworks, urban areas can develop more effective sustainable development strategies. In this review note, I try to describe some of the most important city sustainability frameworks in order to clarify what are the most important aspects considered by the scientific and policy community when describing how sustainability can be assessed for urban areas. In particular, this short paper focuses on three guides that provide indications to develop city sustainability indexes: the *Reference Framework for Sustainable Cities*, and the report called *Indicators for Sustainable Cities* provided by the European Commission. Furthermore, this work also comments the *Sustainable Cities Index* provided by the listed company Arcadis in 2018.

## 2. Sustainability indexes and indicators

Before unveiling the indicators provided by the sustainability indexes, it is appropriate to understand what should be the priorities for the sustainable development of cities. The Reference Framework for Sustainable Cities (RFSC) provides an interesting scheme for understanding that. The RFSC is an initiative developed by the French Ministry in charge of housing and urban development, the Council of European Municipalities and Regions, and the CEREMA, a public body that supports national and local authorities towards sustainable development. It has the support of several partners included the European Commission. The RFSC provides a framework for assessing the sustainability of cities that enriches the scheme of the triple bottom line. In

addition to the economic, environmental and social pillars, indeed, the framework suggests two further dimensions on which to evaluate urban sustainability: the spatial dimension and the governance dimension. The five dimensions group a total number of 30 topics that are represented in Tab.1.

Sustainability dimension	Topic
Spatial	Develop sustainable urban planning and land use
	Ensure spatial equality
	Encourage territorial resilience
	Preserve and enhance urban, architectural and cultural heritage
	Promote high quality and functionality of public spaces and living environment
	Develop alternative and sustainable mobility
Governance	Ensure an integrated territorial strategy
	Foster sustainable administration and financial city management
	Implement a process for assessment and on-going improvement
	Increase citizen participation
	Strengthen governance in partnership
	Facilitate capacity building and networking
Social	Ensure social inclusion
	Ensure social and intergenerational equity
	Build a supply of housing for everyone
	Protect and promote health and well-being
	Improve inclusive education and training
	Promote culture and leisure opportunities
Economical	Stimulate green growth and the circular economy
	Promote innovation and smart cities
	Ensure connectivity
	Develop employment and resilient local economy
	Encourage sustainable production and consumption
	Foster cooperation and innovative partnerships
Environmental	Mitigate climate change
	Protect, restore and enhance biodiversity and ecosystems
	Reduce pollution
	Adapt to climate change
	Manage natural materials resources sustainability and prevent waste
	Protect, preserve and manage water resources

**Tab.1 The dimensions of the sustainable city (source : [www.rfsc.eu](http://www.rfsc.eu))**

This framework supports local administrations to design their sustainable development plans that should be then evaluated on a number of indicators. It has been developed to summarize the several frameworks designed at European and global level creating an integrated scheme for urban development. In other words, it provides the synthesis of some of the most spread sustainable urban policies, giving precise indications about how to develop a sustainable urban environment. Based on this framework it becomes easier to understand the indexes and indicators provided by other organizations to quantitatively and qualitatively assess and monitor the progress made. The indexes also provide a tool for a benchmark among cities. There exist several urban sustainability indexes, but most of them are mainly concentrated on the level of environmental sustainability and green infrastructures, sometimes avoiding issues related to climate

change adaptation, sustainable governance or sustained economic growth. The document *Indicators for Sustainable Cities* of the European Commission provides an overview of such indexes. Out of the 14 indexes described, six are mainly referred to the environmental sphere and in particular to the issues of pollution and resource use. On the other side, is not common to find indicators related to the climate change adaptation and adjustment, the governance and sustained economic growth. In this sense, one of the most holistic indexes is the *China Urban Sustainability Index*. It is still skewed on environmental concerns, but also takes into account other social and governance factors. In Europe, the most complete tool is probably the one provided by the European Foundation for the Improvement of Living and Working Conditions. This framework indeed, identifies the following indicators: *global climate, air quality, acidification, ecosystem toxification, urban mobility, waste management, energy consumption, water consumption, nuisance, social justice, housing quality, urban safety, economic urban sustainability, green public space and heritage, citizen participation, unique sustainability*. These indicators really reflect the commitment towards sustainability from all the relevant perspectives and not just from the environmental one, as most of the other indexes do. According to the RFSC, thus, this scheme can be considered a good one to assess and monitor the sustainable development of cities.

Finally, an interesting perspective is the one provided by the private company Arcadis that has developed a composite index based the triple bottom line: social (people), environmental (planet) and economic (profit) sustainability. The index is interesting because it provides a ranking of several cities worldwide, thus providing examples that may clarify how cities rank in sustainability indexes. The index is described in the following green box.

#### **Sustainable cities index - Arcadis**

Developed in 2018, the index explores the perspective of citizens. It is divided into the social, economic and environmental spheres of sustainability, and rank 100 cities at global level. The social pillar reflects social mobility and quality of opportunity and life. The environmental pillar describes management of energy use, pollution and emissions. The economic one, assesses business environment and economic performance. To each city is assigned a score for each of the three pillar, and the total performance of the three together makes the final sustainability score. The social sub-index is composed, in turn, of 10 indicators: *affordability, education, health public transport, digital, income inequality, work-life balance, crime, demographics, cultural offerings*. The environmental sub-index is composed of 11 indicators: *energy, air pollution, greenhouse gas emissions, waste management, water and sanitation, green spaces, bicycle infrastructures, electric vehicle incentives, environmental exposure, negative emission technologies, natural disaster monitoring*. Finally, the economic sub-index is composed of: *employment, economic development, ease of doing business, transportation infrastructure, tourism, connectivity, University technology research*.

It is interesting to note that for each pillar the first three cities have common characteristics. The first three cities in the social pillar are Edinburgh, London and Paris: three of the most attractive European cities for private investments. The top three in the environmental sphere is composed of Stockholm, Frankfurt and Zurich, three northern European cities smaller than the ones ranked first in the social pillar. Finally, the economic pillar sees Singapore, London and Hong Kong in the first three position. As for the social pillar, also in this case the three positions are related to three of the biggest cities in terms of investment attractions worldwide.

In the end, the index identifies four cluster of cities: the balanced innovators, the pos-industrial opportunists, the evolutionary cities, the fast-growing mega cities.

This index thus provides a useful framework and a detailed list of indexes to assess the level of sustainable development of a city and also introduces a cluster differentiation that unveil the main challenges faced by cities in each cluster, and thus the priorities that need to be set.

### **3. Discussion and conclusions**

In this review note I have tried to clarify the concept of urban sustainability by describing some of the most important frameworks and indicators that provide support to sustainable development plans of cities. Most of the frameworks are skewed on the environmental sphere, which is perfectly understandable given the relevance of climate change challenges (Shirgir et al., 2019). Nevertheless, this paper argues that a holistic view is necessary to tackle sustainability from different perspective that also take into account social,

economic, governance and land use factors (de Luca et al., 2020; Li & Yi, 2020; Sáez et al., 2020). In this sense, I argue that the RFSC framework is very useful and relevant as a guide that provide a complete reference framework for cities. Given the lack of a totally shared view, however, an overview of the several existing indicators could help cities in designing clear strategies and also to identify clear indicators to assess and monitor their level of sustainable development.

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