



**48º CONGRESO ESPAÑOL DE ACÚSTICA
ENCUENTRO IBÉRICO DE ACÚSTICA
EUROPEAN SYMPOSIUM ON UNDERWATER ACOUSTICS
APPLICATIONS
EUROPEAN SYMPOSIUM ON SUSTAINABLE BUILDING
ACOUSTICS**

HOLISTIC APPROACHES IN URBAN PLANNING AND IN THE ACOUSTIC DESIGN OF BUILDINGS

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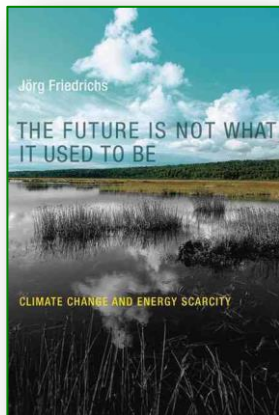
Adjunct Professor University of Florence
Acoustics and Physical Risks

Introduction



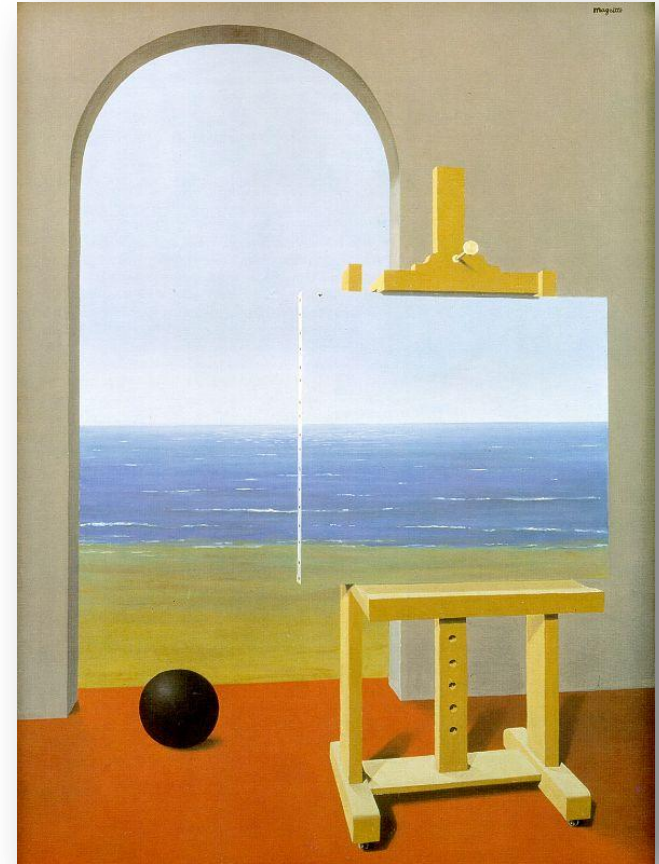
The future is not what it used to be

*Paul Valery (1937),
Paul Strand (1970)*



The future is not what it used to be

*Climate changes and energy scarcity
Jorge Fredrichs, MIT Press (2017)*



The human condition

*René Magritte – Oil on canvas
Simon Spierer Collection, Geneva, Switzerland*

Habitat

Habitat in Latin language means "he lives".

Habitat is the place whose characteristics can allow a given species to live, develop, reproduce itself.

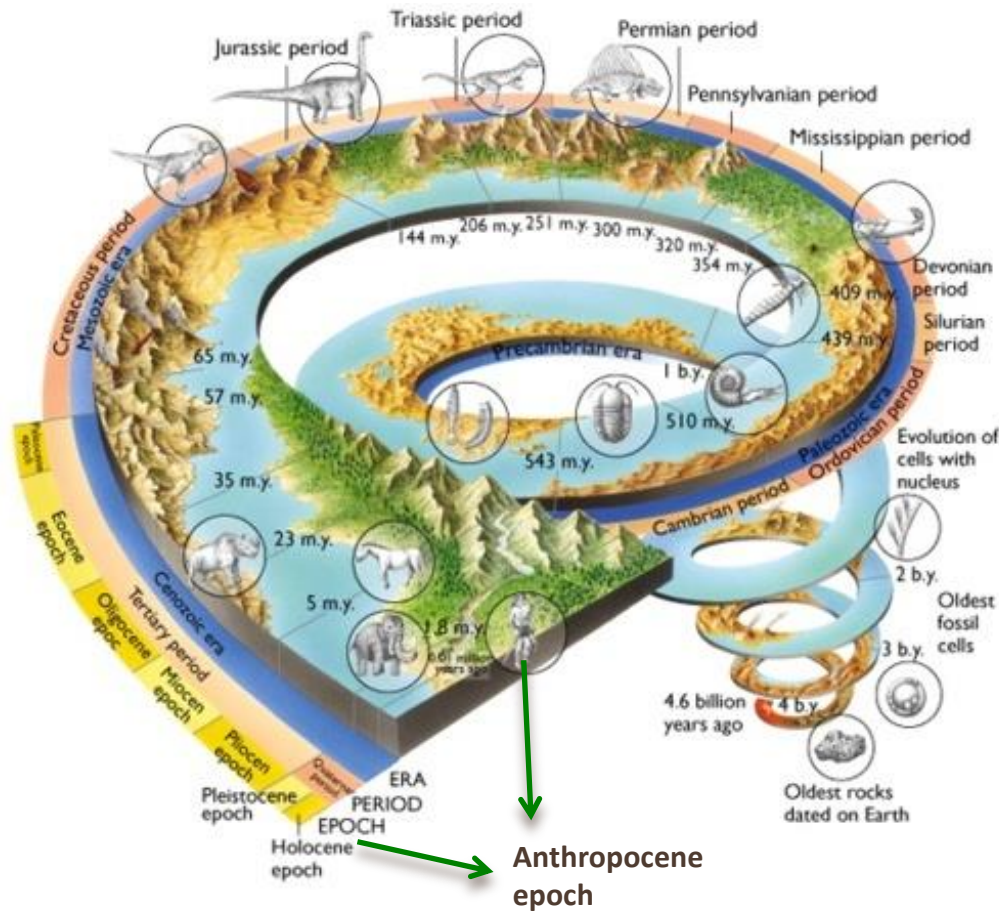
Habitat affects quality of life, depending on climate and demographic changes.



Habitat is related with ecosystems.

Anthropocene

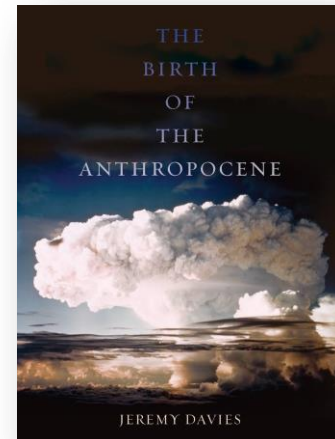
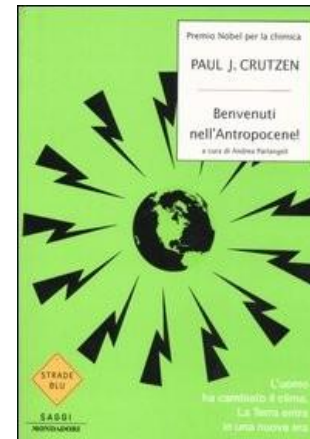
The Anthropocene is a new epoch dating from the beginning of significant human impact on the Earth's geology and ecosystems.



Holocene 11.700 years ago – 1950
 Anthropocene 1950 - today

Paul Crutzen, "Welcome in the Anthropocene", Mondadori (2000)

J. Davies, "The Birth of the Anthropocene", UC Press (2016)



The Karma of Anthropocene

In Indian religious and philosophical terminology, Karma is the fruit of the actions carried out by every person. When virtuous/non-virtuous actions are done, positive/negative karma are produced.

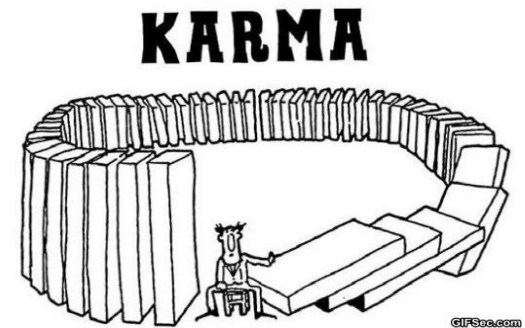
In Anthropocene Karma regards actions that influence the life of next generations and the condition of the planet

Negative karma

- higher temperatures,
- raising the sea level,
- ashes of fossil fuels,
- plastic wastes,
- atomic wastes
- extinction of animal species
- forest extinction
- **NOISE**
- **URBANIZATION**
produced substantial and irreversible changes in many areas of the planet

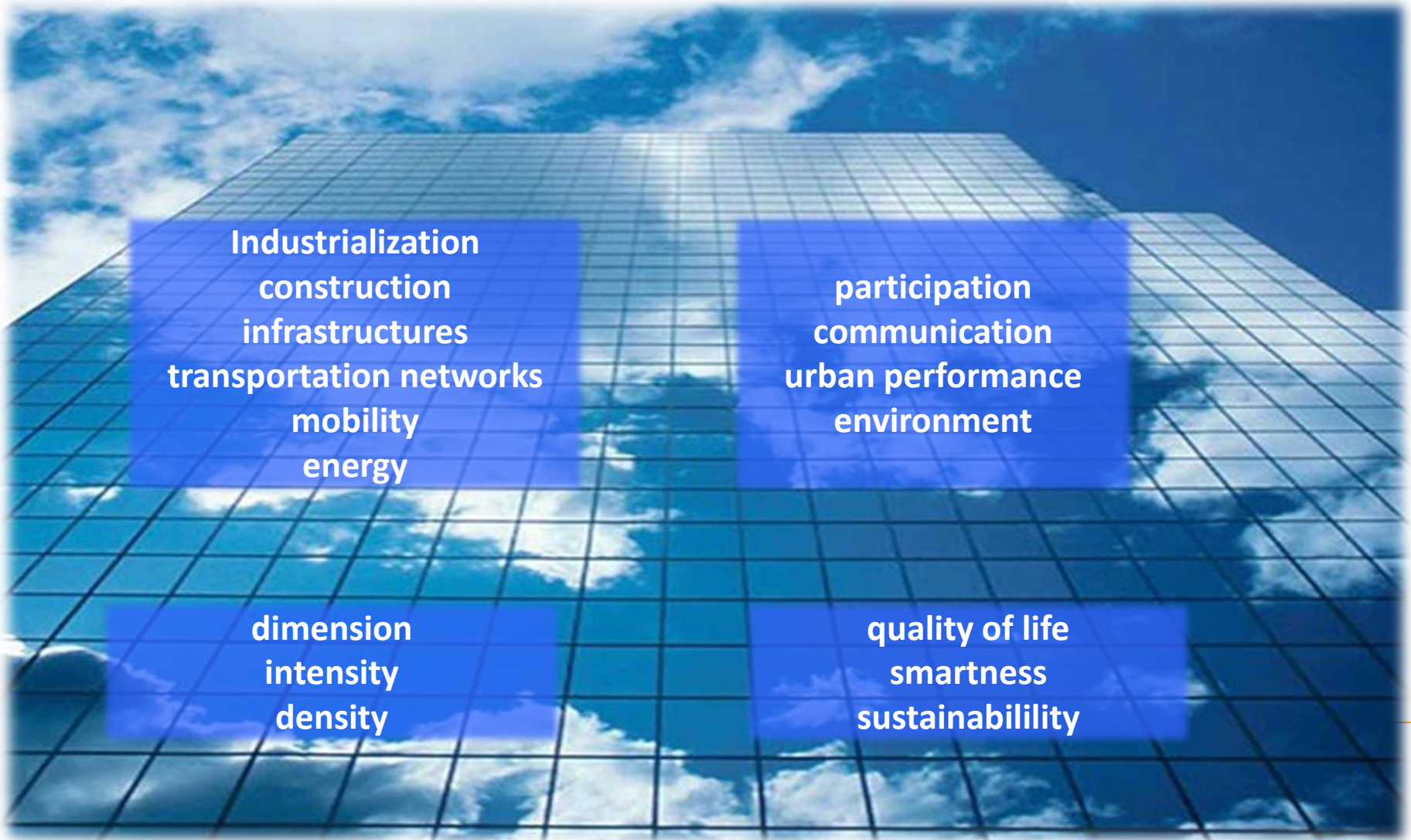
Positive Karma

- health,
- communication,
- technological progress in work,
- instruction,
- energy
- culture
- quality of life
- **COMFORTABLE SOUNDSCAPES**
- **SUSTAINABILITY**
can stop the planet's degradation and the discomfort of its inhabitants



Francesco Gabbani "Occidentali's Karma", (2017)

Urbanization



Keywords can change if a global comfort (holistic) approach is adopted.

The Holistic Approach

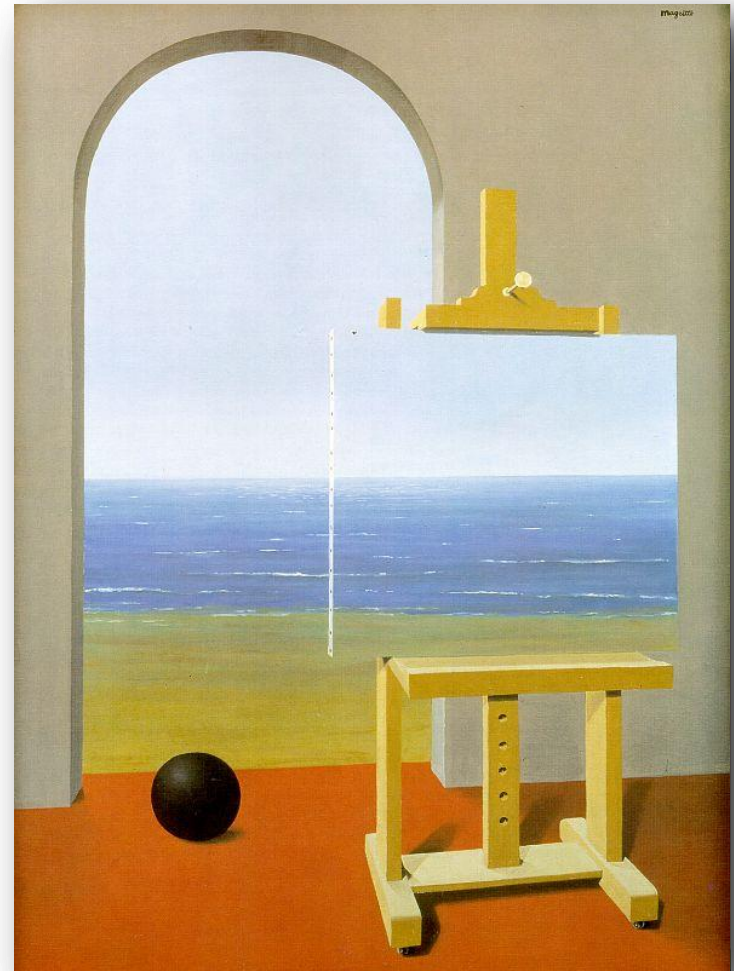
New landscapes and soundscapes

In landscapes and soundscapes of Anthropocene man-made elements and their sounds play a decisive and discriminating role in the scenarios, made of:

- buildings and infrastructures,
- noisy and (hopefully) quiet areas.

Landscapes and soundscapes are perceived as "world around us" and not "in front of us", They changes their nature from an object of contemplation, to living places, inhabited by the observers

Perception is multisensory and the sound component becomes a very important element of landscape use, landscape design and landscape control and preservation



The Holistic Approach

Plan and Design urban areas and buildings

The holistic approach consider a plan or a design relating to complete systems rather than with its parts.

The analysis of systems and the design of solutions consider the system as a whole:

- holistic medicine attempts to treat both the mind and the body,
- holistic ecology views humans and the environment as a single system
- Holistic designer of urban areas and buildings, moving from the concept of holism, try to apply to their designed works the idea that the whole is more than merely the sum of its parts.

In the frame of circular economy, holistic planning and design is also based on the attenuation of impacts: this corresponds to the use of materials characterized by reactive intelligence, as a coherent composition of natural and artificial materials which well adapts to the characterization of works in delicate contexts.

The Holistic approach

Acousticians going towards Global Comfort...

How and where ?

Developer of noise maps and noise action plans, acoustic planners and designer of actions and solutions for urban areas and buildings, should apply holistic approaches to:

- noise mitigation and reduction of annoyance,
- protection of existing and creation of new comfortable soundscapes in urban spaces,
- making possible the listening of good sounds.

In urban areas and urban buildings, where the negative karma are evident in the perceived surroundings of the observer, noise control and soundscapes design are crucial and the holistic approach shows particular effectiveness.

The approach is based on the principle of maximizing the pleasantness of places and the global satisfaction of people, considering sustainability like a positive karma that can stop the planet's degradation and the discomfort of its inhabitants.

The Holistic approach

Acousticians going towards Global Comfort, taking in account ...



LAYOUT E MATERIALS



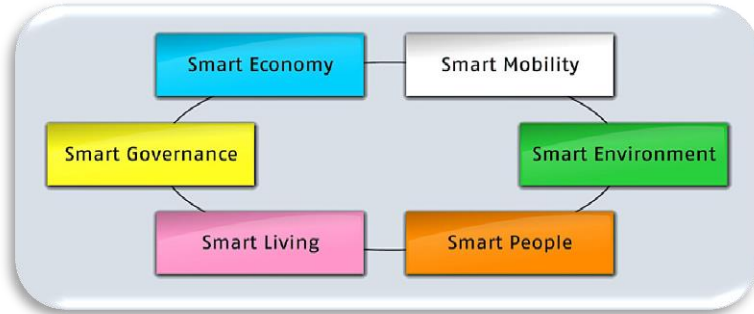
MULTISENSORIAL APPROACH



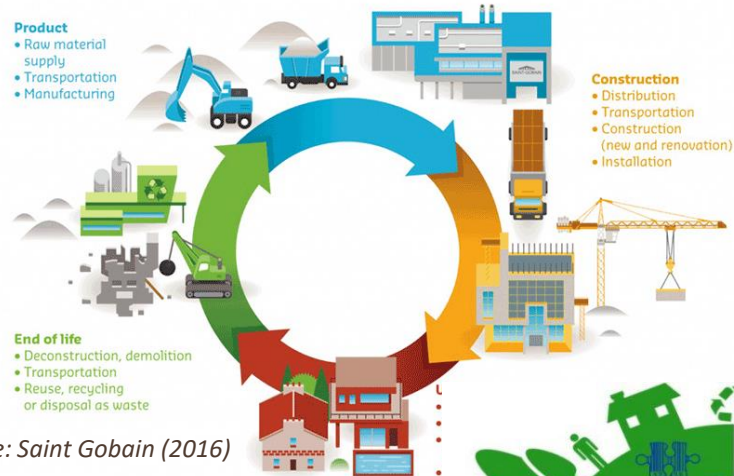
PARTICIPATION

Acoustics in the Global Comfort

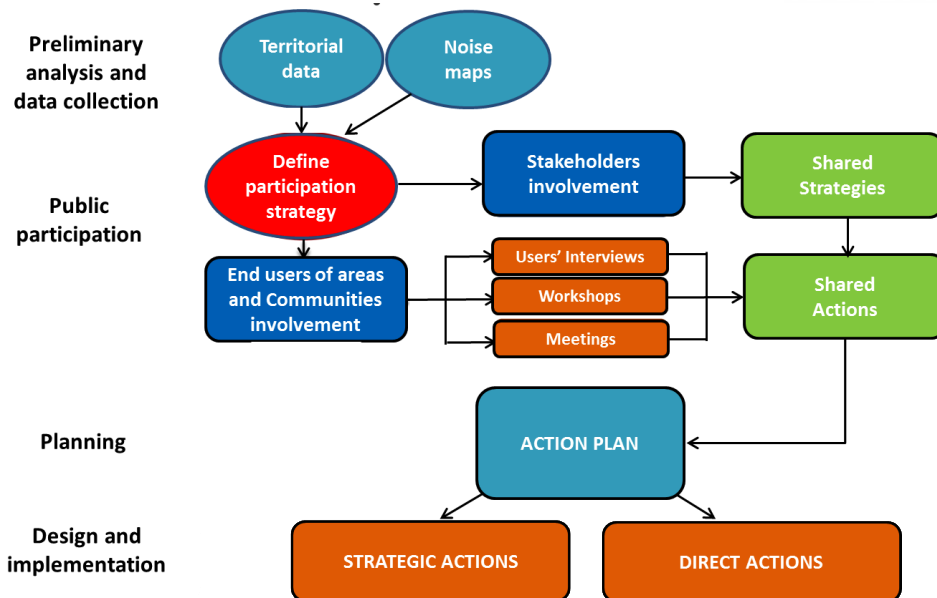
Holistic Chains and Wheels



THE LCA OF A CONSTRUCTION PRODUCT



Source: Saint Gobain (2016)



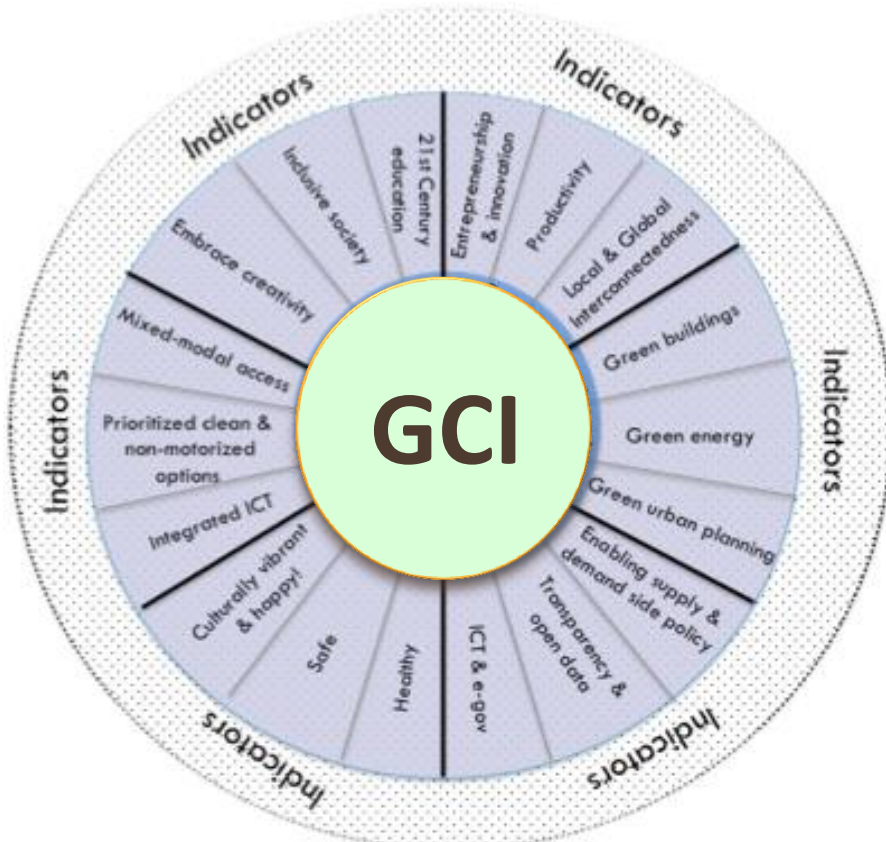
Source: Ellen Mac Arthur Foundation (2016)

Luzzi et al. "Importance of public participation in END implementation", InterNoise Hamburg (2016)

Holistic Design of Global Comfort

A set of variables representing **Smartness and Comfort** is defined

Variables represent indicators of measurable comfort categories and indicators of perceived pleasantness: Visual, Thermal, Acoustic, Safety, Security, Energetic, Cultural, Social, Welfare,...



$S_{i1}, S_{i2}, \dots, S_{im}$
specific comfort variables
for the sub-categories



GCI

Global Comfort Index

Holistic Design of Global Comfort

The relative indicators for the categories of smartness and comfort:

S_1, S_2, \dots

are calculated as:

$$S_i = F_i (s_{i1}, s_{i2}, \dots, s_{im})$$

where

$s_{i1}, s_{i2}, \dots, s_{im}$

are the specific comfort variables for the sub-categories

Cost

is a weighted sum, which takes in account direct cost, social costs and induced costs from serendipic actions

$$Cs = F_c (C, cs1, cs2, \dots, ci1, ci2, \dots)$$

Benefit

is defined by considering the primary Benefit and the added values of different (objective, subjective) quantifiable serendipic variables

$$Bs = F_b (B, bs1, bs2, bs3, \dots)$$

the Global Comfort Index GCI is then defined as:

$$GCI = F (S_1, S_2, \dots, Cs, Bs)$$

Holistic Design for Global Comfort – Urban Areas and Buildings



Project by Studio Boeri – Milan (2015)

Urban Holistic Design of Schools and playgrounds

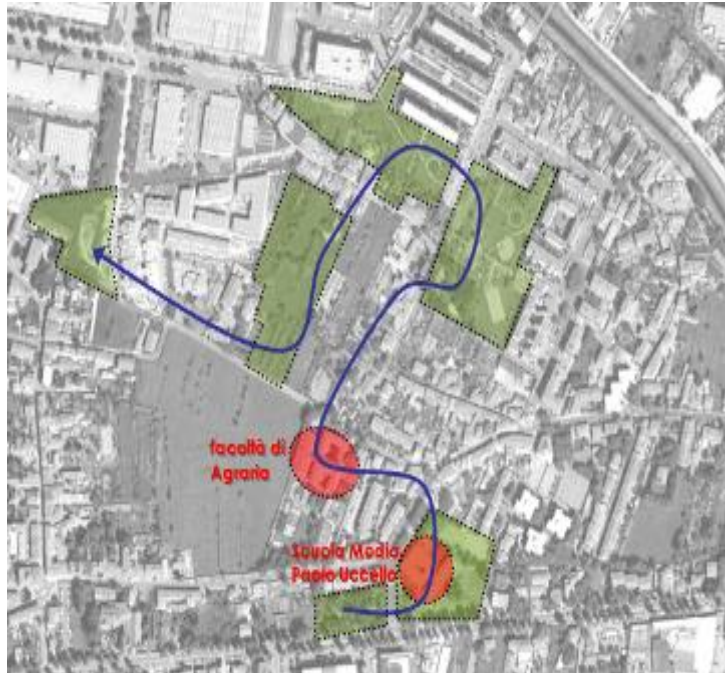


Project by
Vie en.ro.se. ingegneria
City of Florence (2011)

Barriers can be ...not just barriers. Noisy schoolyards can be converted ... from sensitive areas affected by noise to quiet areas open to pupils, relatives, dwellers, ...

Urban Holistic Planning and Design

Protected trails in noisy areas



Tranquillity Trails, Green zones

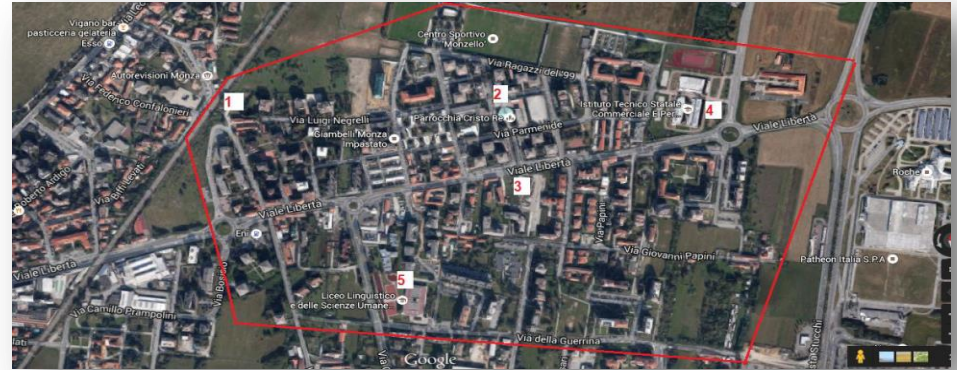
Project by Vie en.ro.se. ingegneria
City of Florence (2013)

Urban Planning and Design for Global Comfort

Noise Low Emission Zones



The Life Monza Project



B. Implementation actions

- ✓ **B1** TOP-DOWN actions planning in the pilot area
- ✓ **B2** BOTTOM-UP actions planning in the pilot area and public and stakeholders information and participation
- ✓ **B3** Prototype of monitoring system for Noise LEZ design - data analysis techniques definition
- ✓ **B4** Pilot area actions implementation
- ✓ **B5** Monitoring and data collection for impact assessment
- ✓ **B6** Noise LEZ Guidelines

C. Monitoring of the impact of the project actions

- ✓ **C1** Monitoring of the impact of the project actions. The monitoring activities in the pilot area will be carried out up to three years after the project end

D. Public awareness and dissemination of results

- ✓ **D1** Information and awareness raising activities regarding the project to the general public and stakeholders
- ✓ **D2** Technical dissemination activities to stakeholders could usefully benefit from project's experience

Project by Life Monza consortium:
ISPRA, University of Florence, Vie en.ro.se. ingegneria, City of Monza (2017)

Urban planning and Design for Global Comfort – Urban sonic gardens

Music can help...



MUSST Design, Berlin (2015)

A responsive and immersive integration of nature and technology for noise mitigation and wellbeing

Building Design for Global Comfort – Multisensory Restaurants



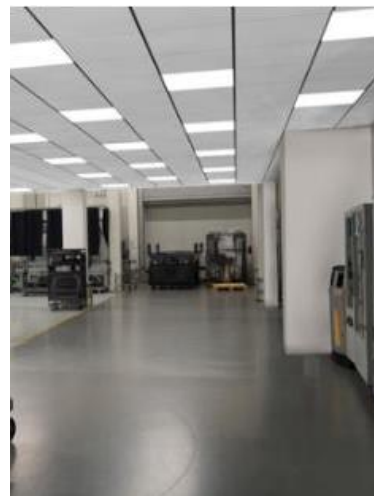
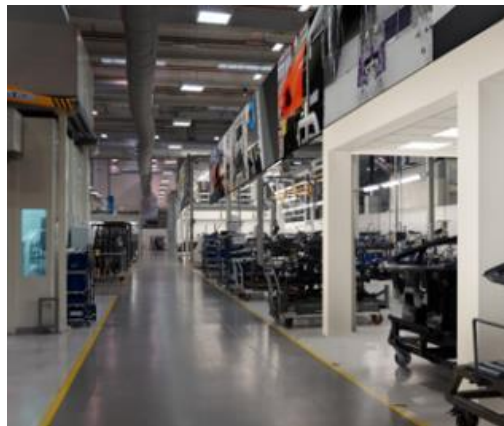
Project by Ab Rogers Design and Vie en.ro.se. ingegneria London (2013)

Building Design for Global Comfort – Multifunction Auditoria



Project by Vie en.ro.se. ingegneria
Legambiente, Rispescia (2015)

Building Design for Global Comfort – Workplaces



*Project by Vie en.ro.se. ingegneria
Lamborghini, CFK Center, Bologna (2016)*

Conclusions

The global comfort holistic approach is based on the idea of planning and designing urban areas and buildings safeguarding people's safety, health, and serenity, respecting the laws of nature and harmonious development.

In this integrated approach, acoustics plays an important role as one of the founding elements of the man-habitat-environment system.

The “holistic” planners and designers should always be integrated with the competences of experts in environmental, building and room acoustics, since urban landscapes (and soundscapes) are perceived as world around us and not in front of us.

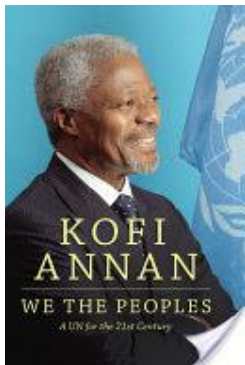
Smart and serendipic solutions should be considered as a part of the global comfort scheme: smart urban planning shows various connections with smart noise action plans. Serendipic attention can lead to added values in terms of acoustic benefits, not increasing costs, and vice versa. It allows to achieve the primary objective of the design with one or more free secondary pleasant added benefit

Participatory Design schemes should be implemented by Action Planners and Solutions Designers collecting Stakeholders and users opinions on strategic issues, useful for planning and designing phase.

“The future is not what it used to be”

“The future is always beginning now”

Mark Strand *“The way it is”* (1970)



“ Our biggest challenge in this new century is to adopt an idea that seems abstract: sustainable development.”

Kofi Annan, *“We, the peoples”*
Paradigm Publishers (2014)

Thank you for your attention

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