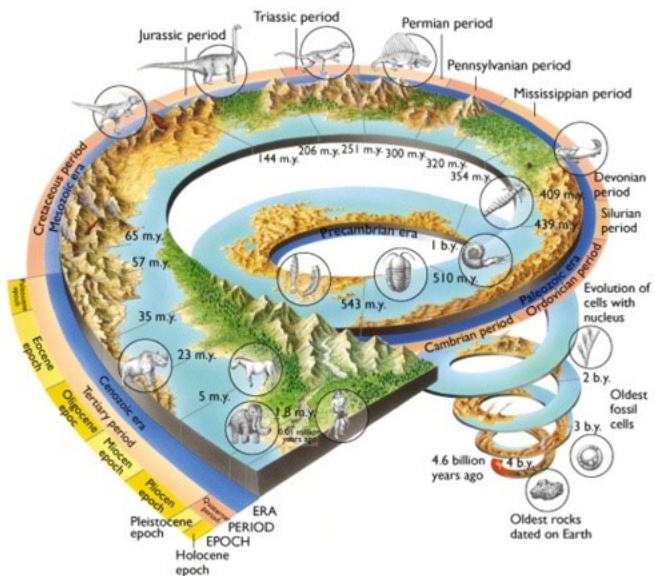




# ***Acoustics and global comfort in the habitat of Anthropocene***

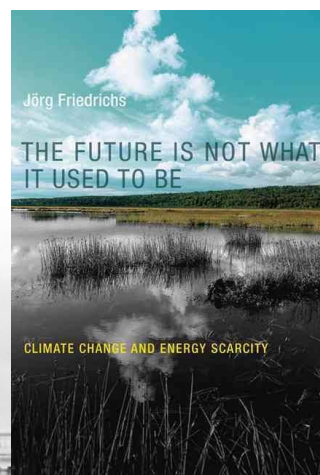


Sergio Luzzi

Vie en.ro.se. Ingegneria  
Florence Italy

Adjunct Professor  
University of Florence

# ***"The future is ... not what it used to be"***



*Paul Valery, 1937*

*Paul Strand, 1970*





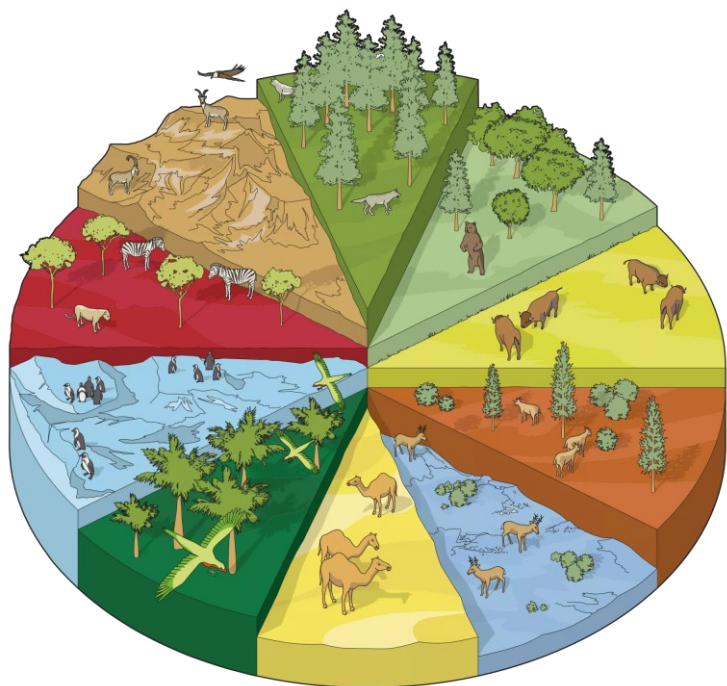
# Habitat

*The future is ... not what it used to be*

**Habitat** in Latin language means "he lives".

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

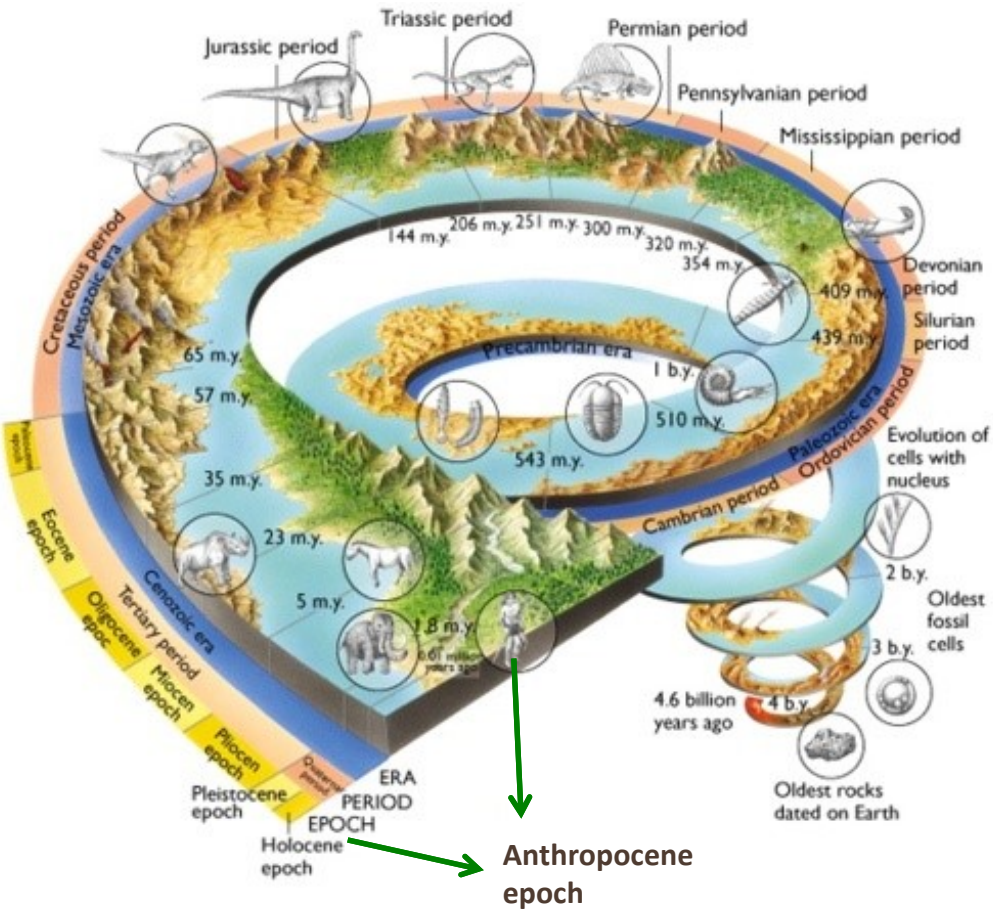
**Habitat** affects quality of life, which can increase or decrease, depending on climate and demographic changes.



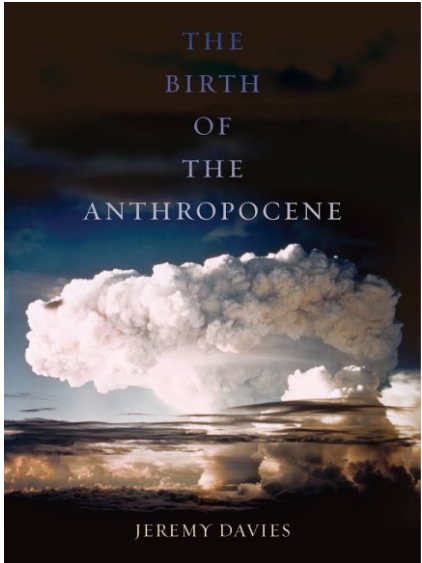
Anthropocene

The future is ... not what it used to be

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



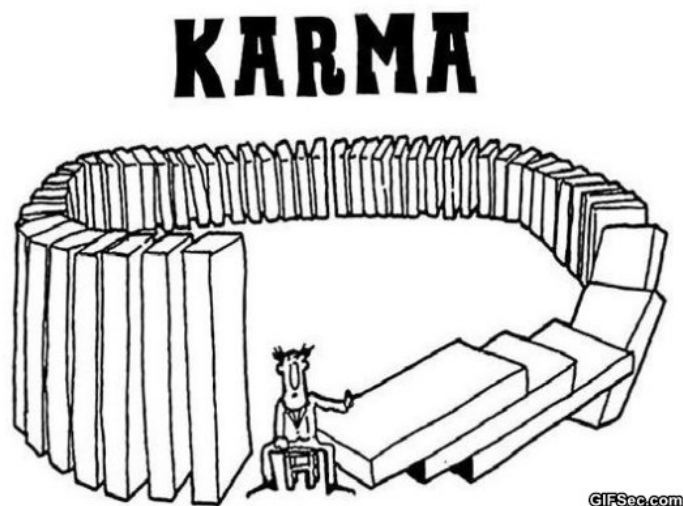


# The Karma of Anthropocene

Anthropocene is the geologic era (epoch) in which the main causes of territorial, structural and climatic changes are attributed to the human beings and to their activities.

Modern humans exist from two hundred thousand years ago, but it is only in 1950 that the number of human beings and the effects of science and industry have become the dominant factor in planetary evolution.

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



Francesco Gabbani "Occidentali's Karma", 2017

# The Karma of Anthropocene

## 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



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

# ***Keywords of URBANIZATION...***



Industrialization  
construction  
infrastructures  
transportation networks  
mobility  
energy

participation  
communication  
urban performance  
environment

dimension  
intensity  
density

quality of life  
smartness  
sustainability

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



# *New landscapes and soundscapes*

In landscapes and soundscapes of anthropocene man-made elements and their sounds play a decisive and discriminating role in the urban 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", living places changes from an object of contemplation, living places, inhabited by the observer

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



The human condition

René Magritte – Oil on canvas

Simon Spierer Collection, Geneva, Switzerland



# 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 buildings**, where the negative karma are evident in the perceived surroundings of the observer, noise control and soundscapes design are crucial, 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.

## Acousticians go holistic...

...taking in account



**LAYOUT E MATERIALS**

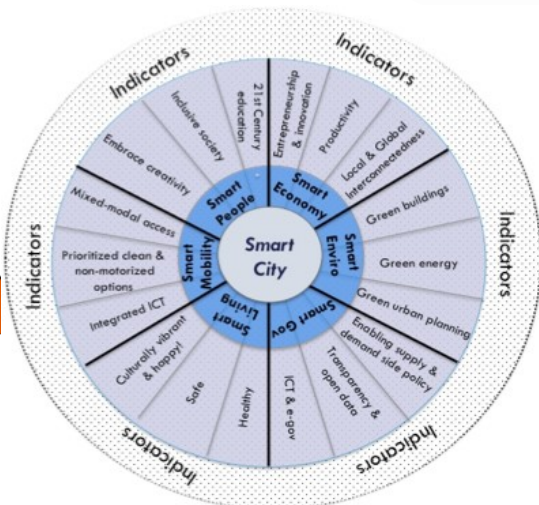
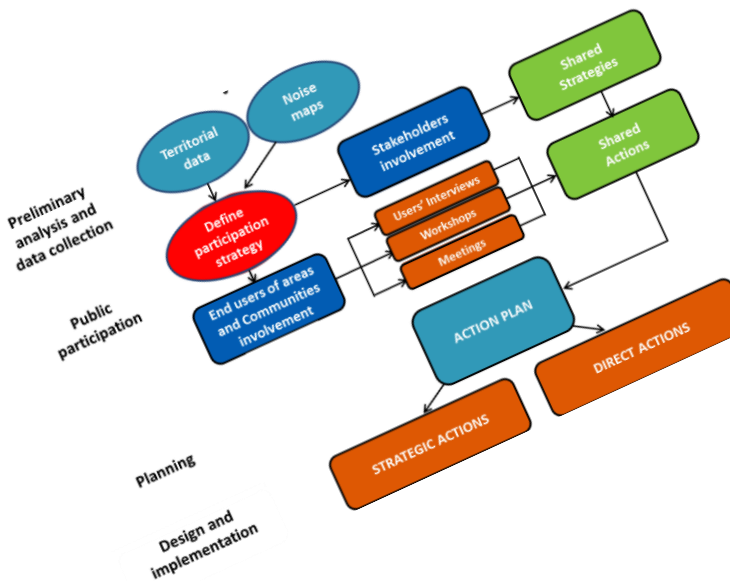
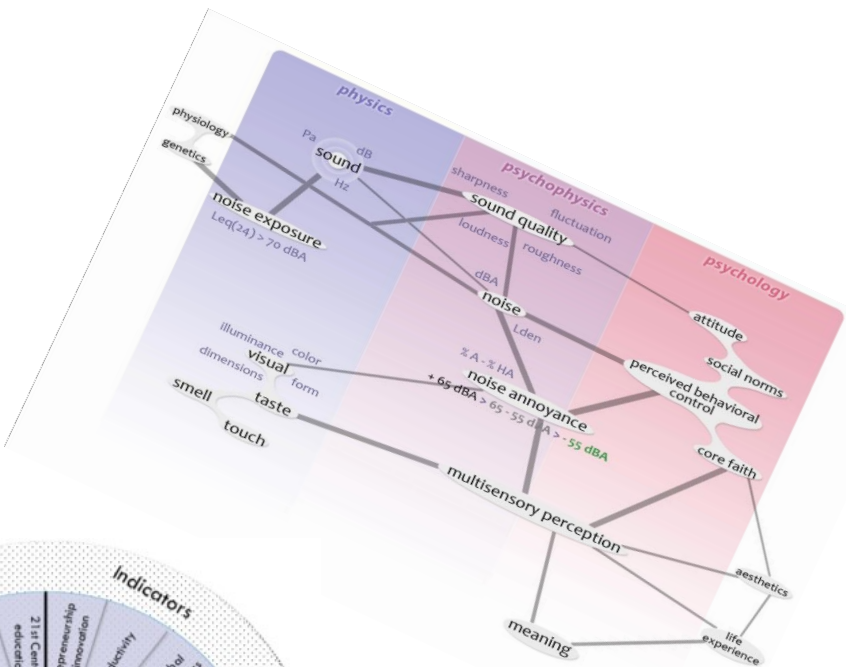
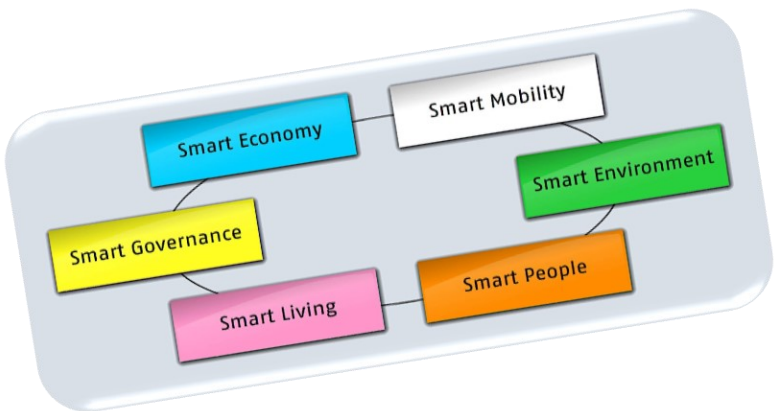


**MULTISENSORIAL APPROACH**



**PARTICIPATION**

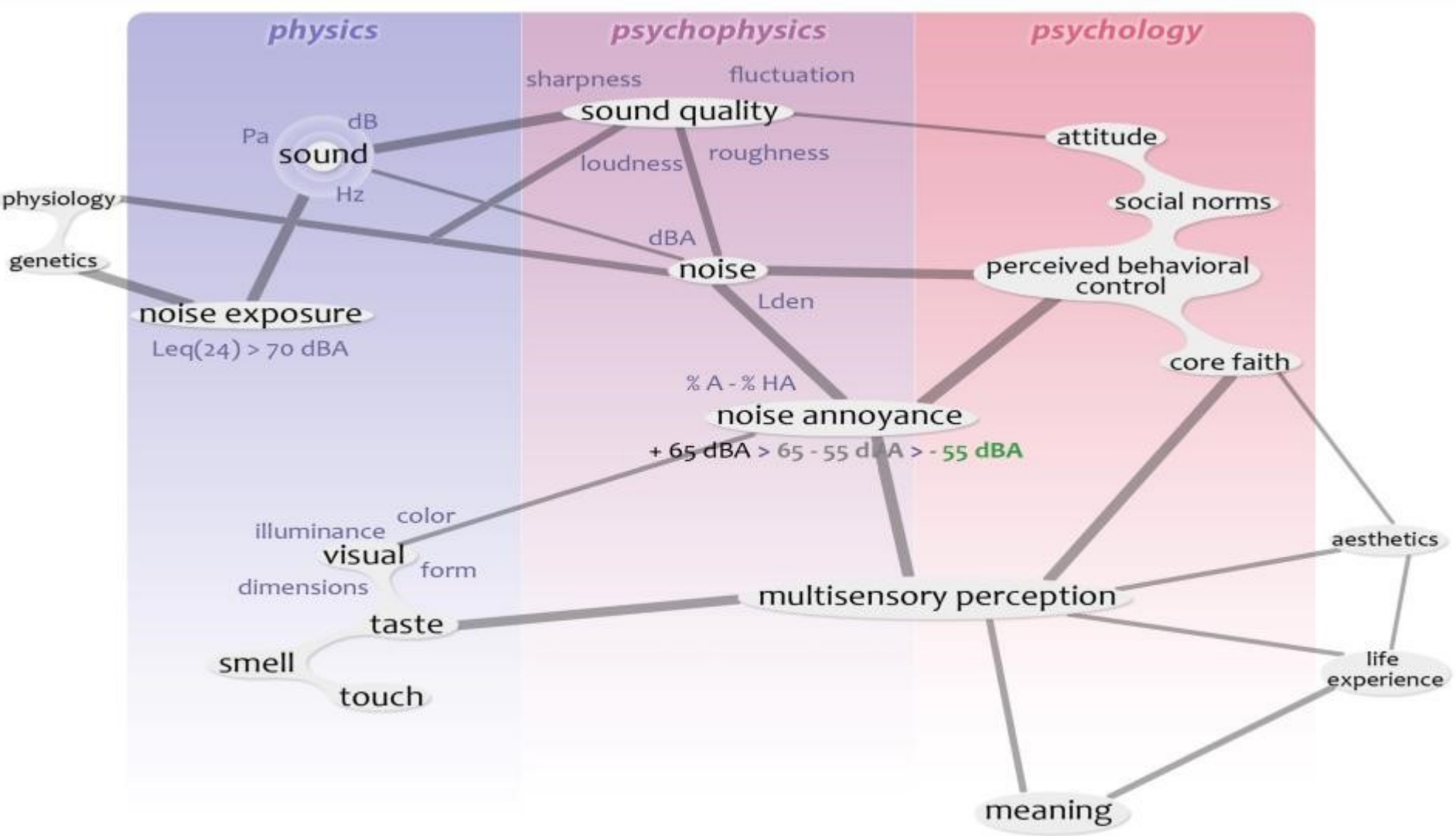
# Acoustics in the Global Comfort Holistic Chains and Wheels





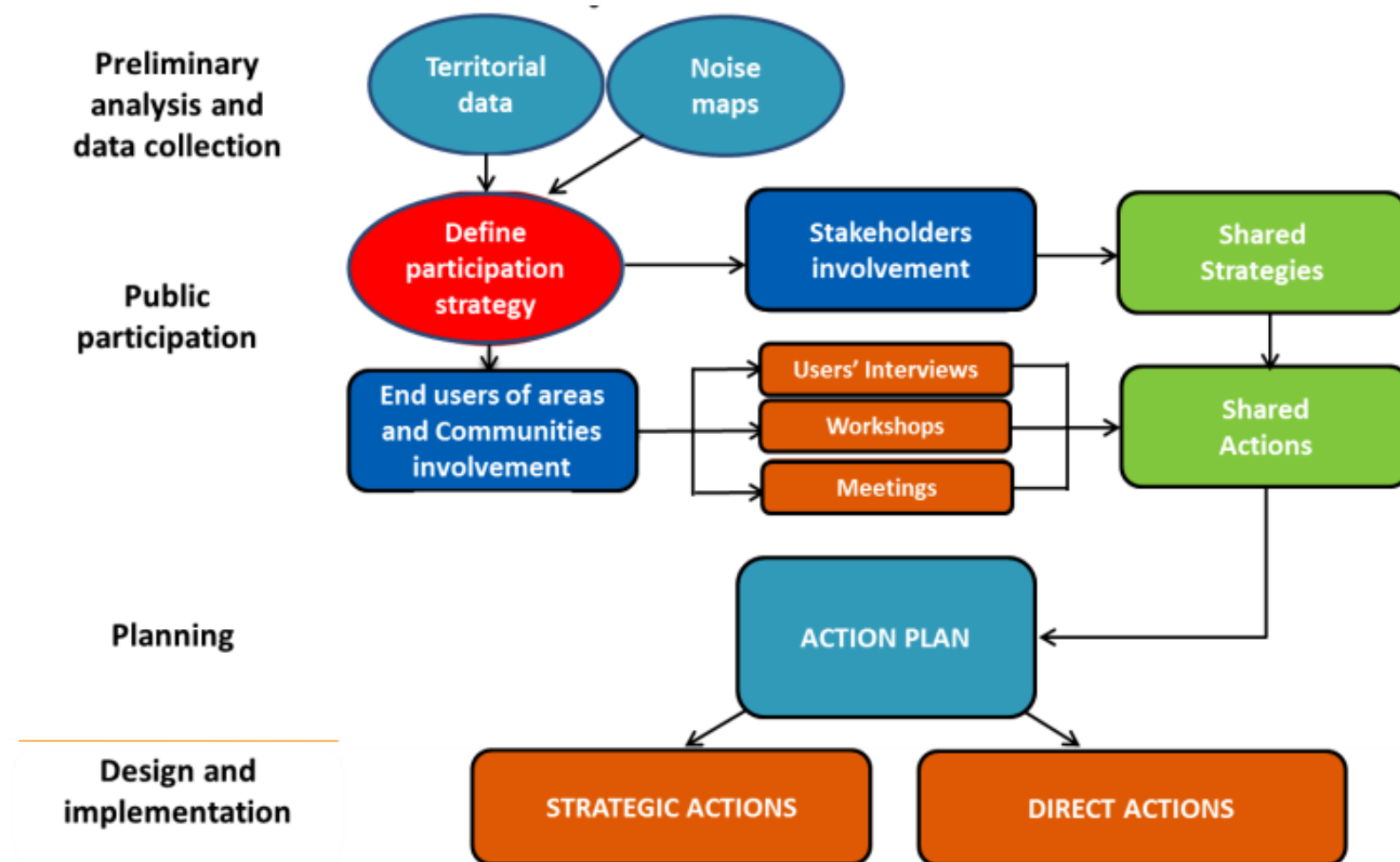
*Ellen Mac Arthur Foundation, 2016*

Multisensory approach



## Global Comfort Holistic Chains and Wheels

## Public Participation and participatory planning and design



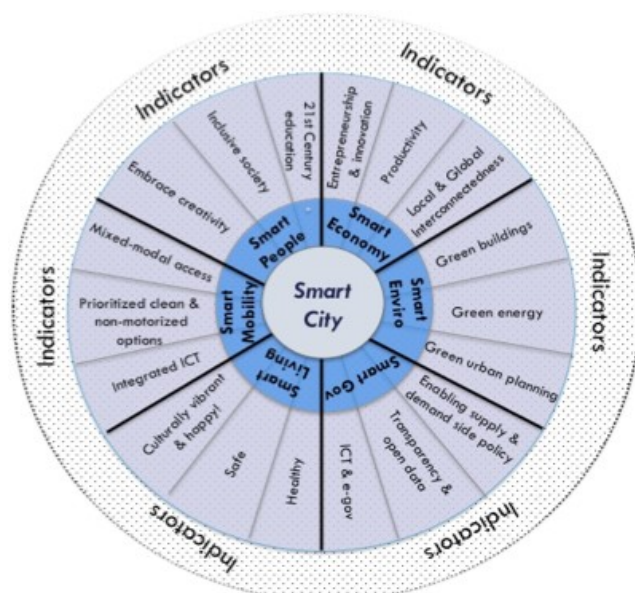
Exmple of Participatory Design Scheme for Noise Action Plans as required by EU END Directive



# Holistic approach to Global Comfort

## Smartness and Serendipity

A set of variables representing Smartness and Comfort are defined representing Comfort Level categories in terms of Visual, Thermal, Acoustic, Safety, Energetic, Cultural, Social, Welfare,... 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 social and induced costs to/from serendipic actions

$$Cs = F_s(C, cs1, cs2, cs3, \dots)$$

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

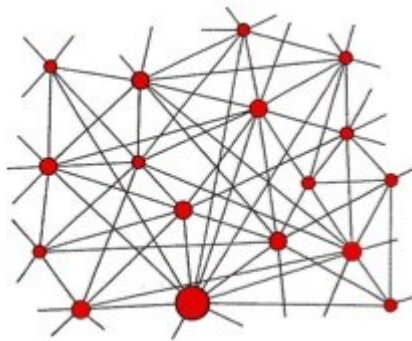
$$Bs = F_s(B, bs1, bs2, bs3, \dots)$$

the Global Comfort Index GCI is then defined as:

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

# Urban planning for Global Comfort

## Polycentrism



Urban polycentrism is based on material networks (infrastructures) and intangible links between different functional centers. The holistic goal concerns the rational design of diversity and diversity of functions, their distribution, and the consequent relationships of integration and interdependence between the centers.

# Urban Design for Global Comfort

## Schools and playgrounds

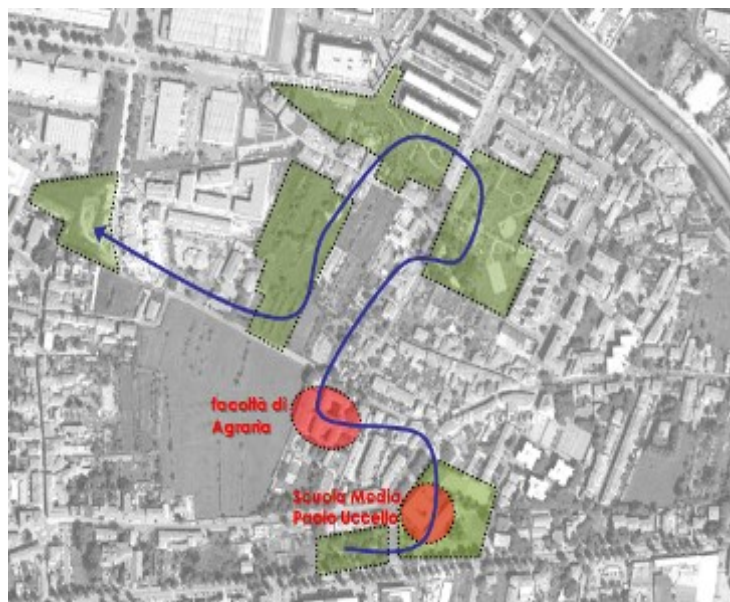


Barriers can be ...not just barriers. Noisy schoolyards can be converted ... from sensitive areas affected by noise to quiet areas open to pupils, relatives, dwellers, ...



# Urban Planning and Design for Global Comfort

## Protected trails in noisy areas

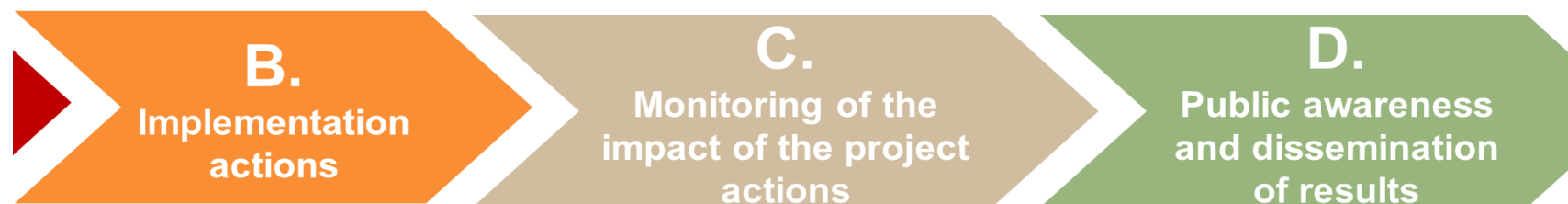
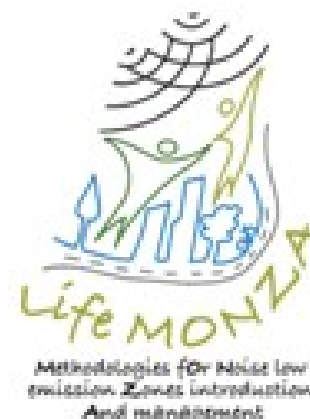


Tranquillity Trails, Green zones, Noise LEZ...

# Urban Planning and Design for Global Comfort

## Noise Low Emission Zones

### The Life Monza Project



- ✓ **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

- ✓ **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

- ✓ **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



# Urban planning and Design for Global Comfort – Urban sonic gardens

Music can help...



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



# Building Design for Global Comfort – Multisensory Restaurants



# Building Design for Global Comfort – Multifunction Auditoria





# 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.



# *Thank you for your attention*



*“The future is not what it used to be”  
“The future is always beginning now”*

Mark Strand  
from “The way it is” (1970)

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