design for environment

OPORTUNIDADES E DESAFIOS PARA A INDÚSTRIA BRASILEIRA
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APPROACHES TO SUSTAINABILITY

- intervening after processes’ damages
- intervening on processes
- intervening on products and services
- intervening consumption patterns (SCP)

INCREASING (POTENTIAL) ROLE FOR DESIGN
INCREASING (POTENTIAL) ROLE OF DESIGN

emphasis on prevention
emphasis on socio-cultural dimension

> responsibility for:
the “technical” definition of the solutions
the “attractiveness” of solutions
WHAT DO PEOPLE (IN GENERAL) KNOWS OF DESIGN AND SUSTAINABILITY?
CARDBOARD SEAT

HOW MANY OF YOU WOULD THINK IT IS WITH A LOW ENVIRONMENTAL IMPACT?
SAVONAROLA SEAT

walnut-wood, so far 500 years life span

MADE WITHOUT ANY CONCERN FOR THE ENVIRONMENT, BUT ...
time/function
Chadwick, Stumpf
Aeron, Herman Miller

seat steel and plastics,
12 years warranty
Even in use commodatum

DESIGNED TODAY WITH A
RIGHT CONCERN FOR THE
ENVIRONMENT
PEN
biodegradable material
(from corn starch)

HOW MANY OF YOU WOULD
THINK IT IS WITH A LOW
ENVIRONMENTAL IMPACT?
Pen, MONTBLANC

DESIGNED WITHOUT ANY CONCERN FOR THE ENVIRONMENT, BUT ...
“Natural” materials

HOW MANY OF YOU WOULD THINK THEY ARE ALWAYS WITH A LOW ENVIRONMENTAL IMPACT?

Asbestos (amianto) is a natural material! (and one of the most cancerogenic!)
how many of you would evaluate correctly the environmental sustainability?

HOW MANY COMPANIES COULD CORRECTLY DESIGN FOR SUSTAINABILITY?
THE TRUTH IS ...

... TODAY FEW COMPANIES AND DESIGNERS ARE “EQUIPPED” WITH A SOLID KNOWLEDGE-BASE AND KNOW-HOW (METHODS AND TOOLS) ON DESIGN FOR SUSTAINABILITY
EVOLUTION OF THE (POTENTIAL) ROLE OF DESIGN FOR SUSTAINABILITY (in industrially mature contexts)

- ~1970-... low impact mat./energies
- ~1990-... Product Life Cycle Design Ecodesign
- ~2000-... system design for eco-efficiency
- ~2005-... design for social equity and cohesion

widening the “artefact” to be designed
1. LOW ENVIRONMENTAL IMPACT MATERIALS/ENERGIES

... since the ’70 research has started to "produce knowledges" for the selection of low impact materials/energies:

- NON-TOXIC
- "NATURAL"
- RECYCLABLE
- RENEWABLE
- BIO-DEGRADABLE
2. PRODUCT LIFE CYCLE DESIGN (ECODESIGN)

... since the beginning of the ’90 design research has started to redefine the approach to product design:

an extended design horizon
from product design
to the design of the product LIFE CYCLE stages

the design “reference”
from product design
to product’s “FUNCTION” design
PRODUCT LIFE CYCLE DESIGN: (ECODESIGN) DEFINITION

“the design of the product life cycle stages that, while considering all requirements, aims at minimising the environmental impact of the whole of the life cycle phases in relation to the functional unit”

... in the ’90 research has developed a fundamental method for the product environmental impact assessment:

LCA: LIFE CYCLE ASSESSMENT

a quantitative method to assess the environmental effects of the life cycle of a given product/service in relation to its functional unit

ISO 14040
... since the '90 some methods and tools have been developed to support product life cycle design

METHODS/TOOLS

UNEP-TUD (PROMISE, 1997)  POLIMI-DIS (MPDS, 2009)

in 2002 has been issued the ISO/TR 14062:2002 Environmental management - Integrating environmental aspects into product design and development
3. (PRODUCT-SERVICE) SYSTEM DESIGN FOR ECO-EFFICIENCY

... since the end of the ‘90 some business cases offering as a full package a mix of **product** (not owned by the customer) and **services** shows to be capable of creating **(new) value** decoupling it from the materials and energy consumption has been studied.
XEROX

Xerox offers a package deal and installs and maintain photocopiers (not owned by the customer) and may even makes and delivers copies. The customer pays for the package.

The innovative interaction between the company and the client, make the companies’ economic interest to provide (and design) long lasting, reusable and recyclable photocopiers.
NEW METHODS/TOOLS

... since ~2005 methods/tools have been developed (EU and UNEP researches) to support the development of eco-efficient PSS

HiCS, Highly Customised Solutions [see Manzini et al., 2004]

MEPSS, MEthodology for Product Service System development [see van Halen et al., 2005]

SusProNet, Network on sustainable PSS development [see Tukker & Tischner, 2006]

Design4Sustainability, Step by step approach [see Tischner & Vezzoli, 2009]

Product-Service System Design for Sustainability [see Vezzoli et al., 2014]
SYSTEM DESIGN FOR ECO-EFFICIENCY: A DEFINITION

“the design of the system of products and services that are together able to fulfil a particular customer demand (deliver a “unit of satisfaction”) based on the design of innovative interactions of the stakeholders (directly and indirectly linked to that “satisfaction” system) where the economic and competitive interest of the providers continuously seeks environmentally beneficial new solutions

[Vezzoli, Maggioli, Milan, 2007]
... since ~2005 methods/tools have been developed (EU and UNEP researches) to support the development of eco-efficient PSS

A. “SATISFACTION-SYSTEM” APPROACH
   design the satisfaction of a particular demand (satisfaction unit) and the mix of product and services

B. “STAKEHOLDER CONFIGURATION” APPROACH
   design the interactions of the stakeholder of a particular satisfaction-system

C. “SYSTEM ECO-EFFICIENCY” APPROACH
   design the interactions of the stakeholder (offer model) leading them for economic-competitive reasons towards the innovation reducing the environmental impact
where various forms of social inequality are directly addressed in the design process.
... today’s main approaches to design for social equity and cohesion

- product design for low-income contexts and basics needs (design for the BOP, etc.)

- PSS (stakeholder interaction) design joining eco-efficiency with social equity and cohesion
TSSFA company offers to Brasilian rural people a solar home kits that include the hardware to generate solar energy, the installation service and products that use the electricity, e.g. lighting and electrical outlets. Customers sign a three-year service contract (all of the tangible inputs are owned by the provider).

Environmentally sustainable because it uses the solar energy + socioethically sustainable because it give to poor people access to useful services + it is economically sustainable because in a business for TSSFA company.
SUSTAINABILITY IN DESIGN ROLE
STATE OF THE ART
(in industrially mature contexts)

- low impact mat./energies ~1970-
- Product Life Cycle Design Ecodesign ~1990-
- system design for eco-efficiency ~2000-
- design for social equity and cohesion ~2005-

CONSOLIDATION ~1970-
DISSEMINATION ~1990-
(education and practice)
new research frontier ...

( research achievements on knowledge-base and know-how)
DESIGN A NEW “AESTHETICS” FOR SUSTAINABILITY?
SUSTAINABILITY REQUIRE **RADICAL CHANGE**, I.E. SYSTEM INNOVATION TO BE **DIFFUSED**

**PROMOTE SUSTAINABLE (SYSTEM) INNOVATION FEASABLE AND “ATTRACTIVE”**
SUSTAINABLE PRODUCTS FOR MOBILITY
NEW PRODUCTS
SUSTAINABLE SYSTEMS FOR MOBILITY
CAR-SHARING SYSTEM
AN AESTHETIC FOR SUSTAINABILITY?
the aesthetic has a fundamental role!

A “ICONIC-ENVIRONMENTALIST AESTHETIC”? 
a mass of “green-recycled-panda” products?

A “PLURALISM OF AESTHETICS FOR SUSTAINABILITY”

arise from the sustainability’s (new) values that take the expressions in a multiplicity of forms
PEDAL ASSISTED BIKE

WHICH AESTHETICS FOR SUSTAINABILITY?
DESIGNER:

A SOCIO-CULTURAL “INNOVATOR”? 

A DESIGNER MAY ...

... observe emerging/new types of demands (coherent with sustainability) and transforming them into products, services and systems

... A DESIGNER MAY ...

... induce new quality criteria (coherent with sustainability) throughout the offer of (more) attractive products, services and systems
E-WHEEL
DUCATI ENERGIA
SENSEable City Lab MIT

NOT ONLY AESTHETICS FOR SUSTAINABILITY!
THANKS!

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Learning Network on Sustainability (EU asia-link)
Learning Network on Sustainabile energy systems (EU edulink)

STRETTAMENTE CONFIDENZIALE