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System design for sustainability for all: S.PSS design applied to distributed economies

Vezzoli, Carlo and Basbolat, Cenk

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System Design for Sustainability for All
Sustainable Product-Service System (S.PSS) Design applied to Distributed Economies (DE)

carlo vezzoli
politecnico di milano . DESIGN dept. . LeNSlab Polimi / DIS . School of Design . Italy
LeNS - Learning Network on Sustainability

coordinator LeNSin - international Learning Network of networks on Sustainability (EU erasmus+)
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1. The research context: LeNSin EU Erasmus+ project
2. Distributed Economies (DE)
3. S.PSS applied to DE: win-win sustainable opportunity for all
4. Design of S.PSS applied to DE: a new system design role
1. THE RESEARCH CONTEXT: LeNSin EU ERASMUS+ PROJECT
the international Learning Network of networks on Sustainability Multipolar and open network of network for curricula development on Design for Sustainability, focused on Sustainable Product-Service Systems (S.PSS) applied to Distributed Economies (DE).

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the largest and most multiregional ever EU funded project!

36 universities partners:

14 partners + 22 associates partners
2. DISTRIBUTED ECONOMIES (DE)

... since ~ 2005 have been studied as a promising model for locally-based sustainability
MANY PROCESSES OF CENTRALISATION RESULTED IN BEING ENVIRONMENTALLY, SOCIOETHICALLY (AND ECONOMICALLY) UNSUSTAINABLE
DISTRIBUTED ECONOMIES (DE): A CLASSIFICATION
(LeNSin Erasmus+ project consortium, 2018)

HARDWARE/RESOURCE-BASED DE
- Distributed energy Generation (DG)
  - home-based solar powered minigrid
- Distributed Water management (DW)
  - decentralized access to clean water from underground
- Distributed production of Food (DF)
  - urban gardening
- Distributed Manufacturing (DM)
  - 3D printed furniture production

KNOWLEDGE/INFORMATION-BASED DE
- Distributed Software development (DS)
  - open source software
- Distributed Information/knowledge generation (DI)
  - Wikipedia: The Free Encyclopedia
- Distributed Design (DD)
  - open source car design platform

DISTRIBUTED ECONOMIES (DE): A CLASSIFICATION (LeNSin Erasmus+ project consortium, 2018)
DISTRIBUTED ECONOMIES (DE):
a paradigm shift from centralized large production unit and distribution system to ...

**CENTRALISED**  TO  **DECENTRALISED**  TO  **DISTRIBUTED**

**STRUCTURE**
- hierarchical control  
- no intermediaries  
- distributed control

**SIZE/PROXIMITY**
- large/far form end-user  
- small/nearby end-user  
- small/by end-user

... small scale **locally-based** production units empowering end-user control on essential activities + (eventually) peer-to-peer **network-structured** to optimise production and consumption by sharing resources and/or goods and/or information/knowledge + to improve system resilience
DISTRIBUTED ECONOMIES: LOCALLY-BASED SUSTAINABILITY BENEFITS
(LeNSin Erasmus+ project consortium, 2018)

ENVIRONMENTAL POTENTIAL BENEFITS
- DE engage local users directly interested to safeguard the environment and the resources availability of the context in which they leave/work
- DE reduce overall goods distribution

SOCIOETHICAL POTENTIAL BENEFITS
- DE gives to local users direct access to resources + increasing their participation in the extraction, production, use and disposal
3. S.PSS APPLIED TO DE: SUSTAINABLE OPPORTUNITY FOR ALL
SUSTAINABLE PRODUCT-SERVICE SYSTEM (S.PSS)

A DEFINITION

“an offer model providing an integrated mix of products and services that are together able to fulfil a particular customer demand (to deliver a “unit of satisfaction”), based on innovative interactions between the stakeholders of the value production system, where the provider/s retain the ownership of the product/s and/or offer all inclusive life cycle services, so that the economic interest of the provider/s continuously seeks environmentally and/or socioethically beneficial new solutions”

[LeNSin, 2018]
The M-POWER company offers to Tanzania rural people a **Solar Home System** (SHS) which includes: the hardware to generate solar energy (**Solar panel + Storage + Wires**) + Energy Using Products (EUP) (**two lights + phone charger**). Customers pays as a **pay per period** (daily fees). **Off Grid Electric** retains **ownership** of SHS and EUPs.

**Cutting initial and life cycle costs** of DE hardware make it accessible and sustainable in time to low-income people (to all).

M-POWER is **economically interested** to offer **long lasting, efficient** and **easy recyclable** products.
S.PSS APPLIED TO DE: WIN-WIN OPPORTUNITY FOR ALL

SELLING PRODUCT TO “UNIT OF SATISFACTION”

INNOVATION
CUSTOM VALUE
STRUCTURE

IN LOW/MIDDLE-INCOME (ALL) CONTEXTS

Product-oriented
Result-oriented
Use-oriented

cut initial + life cycle costs of DE hardware >

downscaling DE access + sustainable use to low-income (all)
end-users and entrepreneurs

increase market opportunities (BoP) > increase local
entrepreneurship, hence employment and skills

ownerless DE and/or all-inclusive life cycle services > foster low
environmental impact DE design
4. DESIGN OF S.PSS APPLIED TO DE: A NEW SYSTEM DESIGN ROLE
**100K GARAGES**

. **“SATISFACTION-SYSTEM” APPROACH**
  design the satisfaction of a particular demand ("unit of satisfaction") and all its related (DE) products and services

. **“STAKEHOLDER CONFIGURATION” APPROACH**
  design the interactions of the stakeholder of a particular (DE) satisfaction-system

. **“SYSTEM SUSTAINABILITY” APPROACH**
  design such a stakeholder interactions (DE offer model) that for economic reasons continuously seek after both environmentally and socioethically beneficial new solutions
SYSTEM DESIGN FOR SUSTAINABILITY FOR ALL

ALL OF THE KNOWLEDGE-BASE and KNOW-HOW (method&tools) AVAILABLE FOR FREE IN OPEN ACCESS

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27 TOOLS

Carlo Vezzoli, Cenk Basbolat
Politecnico di Milano / DESIGN dept. / LeNSlab Polimi / DIS / School of Design / Italy
MORE THAN 150 CASES

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