

Local value creation and eco-design: a new paradigm

by

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Local product & services?



Agricol sector



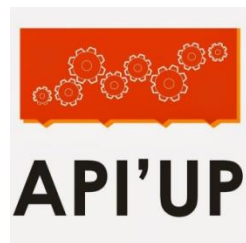
Energy sector



Automotive industry



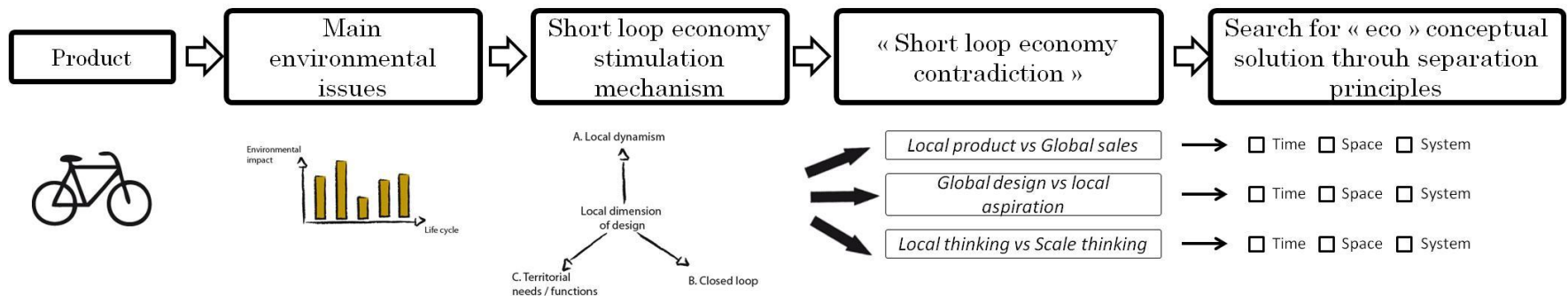
IT sector



Furniture sector

Let's start with conclusion

- The Local Value Creation approach is introduced as a **new way to design sustainable systems** and to **revisit current system** of production and consumption
 - Gives the possibility to a territory to fulfill its own need, to create sustainable added value for local stakeholders
- First outlines of **a new eco-design paradigm** with a Local Value Creation dimension. This new paradigm may also reinforce the current PSS design strategies



1. Local thinking and sustainable issue
2. Local thinking and (eco) design
3. Local Value Creation:
A new paradigm
4. Perspectives



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Local issues

- Effect of globalization:
 - **Environmental issues** as the intensification of international freight [Johansson 2005; Brissaud 2013]
 - **loss of industrial knowledge/know-how** and **autonomy** in developed countries (e.g. textile industry in France)
 - **a dilution of the corporate responsibility.**
- Geographical origin of products is becoming a major preoccupation for consumers

Perspectives of local issues

Strategically perspective

Territories must deal with the scarcity of primary material and the availability of natural resources to meet its needs [Heyer 2012].

In early developed countries

Provide local actors with easily and economically equipment: “inexpensive, modular, easy to use and easy to maintain” [Heyer 2012].

Practical models of local manufacturing with limited resources (e.g. skills, tools, materials)

Socio-economical perspective

Loss of local employment in developed countries

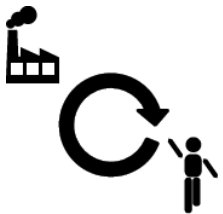
Loss of mastery on production’s techniques and a decrease in the capacity to design or innovate [Brissaud 2013].

In industrialized countries

Vulnerability of territories [Johansson 2005].

“Local” thinking in literature

Various research works, mainly from the **economical sciences**, with **no clear definition**.



Economic localization [Frankova 2012]

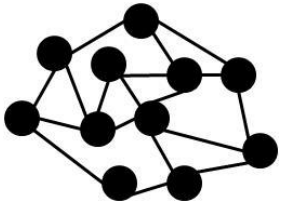
- a support of as many localized aspects of **production and consumption** as possible”.

Relocalization of politics and decision making [Xue 2014]

- Localization is not only for the production and consumption of goods, local economy includes “economic decisions at the local level”



“Local” thinking in literature



Distributed economies [Johansson 2005]

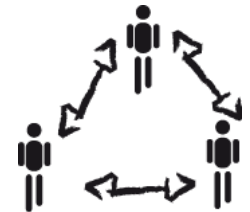
- Development of a regional economy, with **small-scale and flexible production units**, in opposition to a more *centralized economy* with large scale production units.

Multi-local society [Manzini 2007]

- Network of “local systems”
- A multi local society produces and consumes locally, “using to best advantage whatever is locally available”, but in parallel exchanges with other territories “whatever cannot be locally produced”.

Proximity [Boschma 2003, Buclet 2011]

- aims to bring together decision-making level and the level impacted by the decision.
 - physical proximity, customer’s proximity (customization, fair trade), cultural proximity (e.g. tradition, ties to the territory)



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Challenges of local in eco-design

- Local issues can offers great potential to eco-innovate.
- Design team and companies are inviting to reconsider the territorial and local dimension of the products and services.
- Two main challenges

Physical challenges

- applying local sourcing and production paradigms, SMEs may radically remodel their supply chain.
- an efficient supply chain (less steps, less warehousing, less transportation, packaging) [Klewitz 2014]

Organisational challenges

- the integration of territorial resources into product development process requires a deep evolution in strategic processes
- the use of both tangible and intangible territorial resources has the potential to improve the overall performance of a company and its territory [Allais 2015].

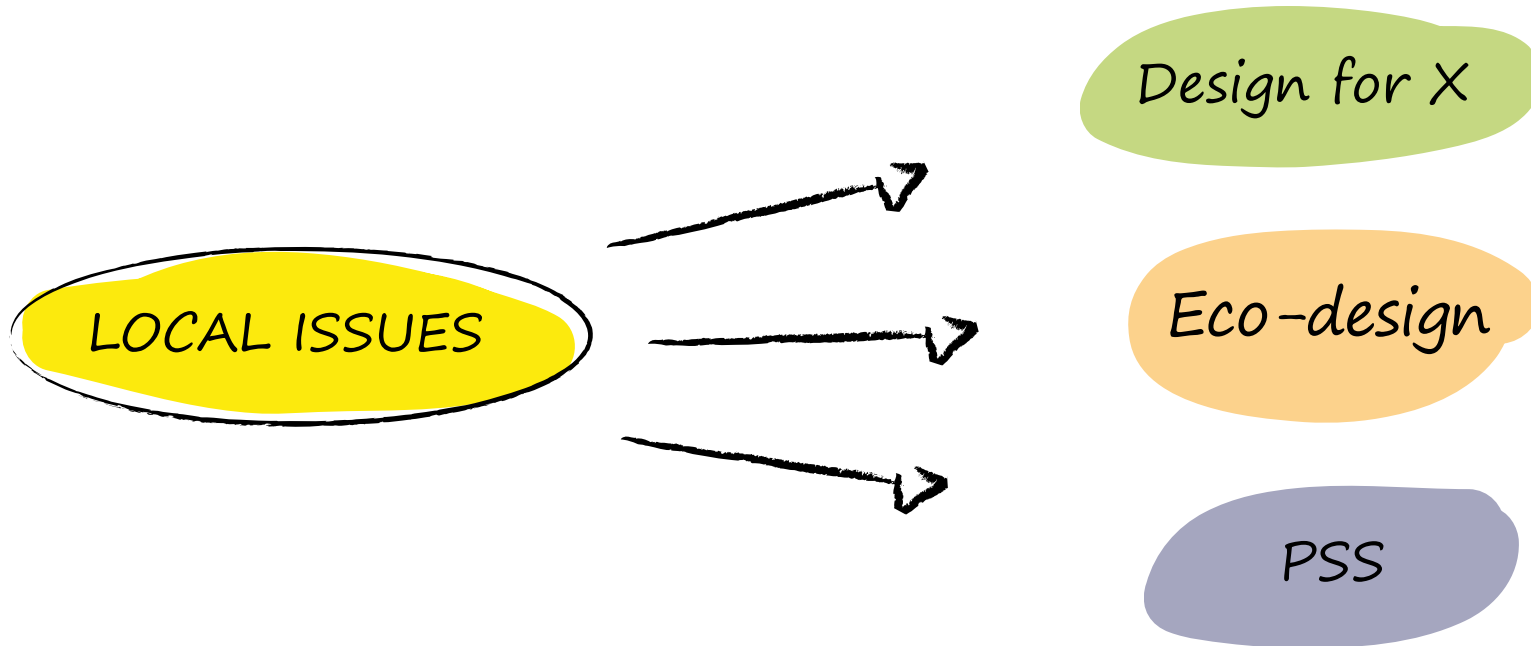
Challenges of local for PSS

- **Specific knowledge** for generating local solutions [Ceschin 2013].
 - Specifying the context of use, and need
 - develop local services to have knowledge on local customers and to be flexible with customized solutions. [Tan 2012]
- Crucial roles of **local**, rather than global, **stakeholders**, such as governmental agencies, local administrations, providers, customers
- Foster the reinforcement and **prosperity of the local economy.**” [Vezzoli 2015]
 - PSS can also lead to an **increase in local employment** and a consequent **dissemination of skills**” [Vezzoli 2015]

The local thinking in (eco) design

- Local issues and its impact on eco-design remains poorly studied.
- **Sustainable system** [Manzini 2007]
 - low material-energy intensity
 - a high degree of context quality, i.e. “it has to be tailored to fit the specific characteristics of the local context”.
- **Socially responsible design** [Melles 2011]
 - the advancement (does it create local jobs and develop new skills?),
 - the local control (can the solution be understood, controlled and maintained locally?)
 - the empowerment (does it empower the community to own the solution?)
- **Distributed production** [Kohtala 2014]
 - how distributed production can promote product longevity and closed material loops, as well as localizing production?

How does design integrate local issues?



Design for X approaches (DfX)

- Additive manufacturing (AM)
 - The **decentralization of little production units** = high local value manufacturing services
 - **Personalization and mass customization** = integration of the customer deeper in the decision processes and increases the proximity between customer and “his/her” product.
 - **Neo-craftsmanship concept** [Steffen 2003]
 - **Personalized production** [Hu 2013]: on-demand production of goods tailored to the customer’s needs through a co-creation process.

Eco-design and eco-innovation approaches

- Few of them shares direct advice to integrate LVC in the product design.

Tools	Local issues	Local value creation issue
LiDS Wheel [Brezet 1997]	“Energy efficient logistic”	/
Eco design Pilot [Wimmer 2003]	Minimize transportation, use regionally available energy resources, Minimize transportation for distribution of product	Minimize requirement for transportation of materials and component, “realizing regional value added”
sLCA [UNEP 2009]	Integration of the logistic stage	Local communities Socio-economic repercussion
EcoASIT [Ty1 2013]	Resource consumption in logistic stages	1. “The system does not participate in local dynamism”, such as “local employment, work condition, employment of ethnic minorities, new partnership, new activities creations and social cohesion.
D4S [UNEP TU 2009]	Energy efficient logistics	Selection of low-impact materials that generate local added value, Optimization of distribution system that involve local supplier, Involve local maintenance and service systems, Taking into consideration local (informal) collection / recycling systems. Some strategies linked to Distributed economies (Increasing the sustainable use of local resources in economic activities, the share of added value benefits retained in the regions, ...)
Material, energy and toxicity (‘MET’) matrix	Logistic stage	/

Product Service System approaches

- Buclet [2014] proposes a 6-level typology for PSS
 - considers the **territorial issues and the capability of individuals**.
 - the fifth level considers issues at the **territorial scale**, i.e. “offer a function to meet requirements at a territorial scale (e.g. mobility)”.
 - The higher level: **empowerment of final user**: “co-design of a function (as well as the required physical media) by promoting local production of physical media”. He illustrates this level by the emergent trend of fab labs, living labs, etc.

- Tools:
 - MEPSS tool , a specific local-oriented guideline: “Empower/valorize local resource”.
 - PSS Urban toolkit [Jégou 2014]: focused on a territorial approach to innovate on local solutions that meet local stakeholder’s needs.

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Local Value Creation perspectives

Local value creation (LVC): *“economic activities using locally available input flows and generating output flows for the local community”*

- **Environmental point of view**

Setting constraints to the input and output materials (input material shall be locally available and renewable; output material shall be locally valorized until the end of life).

- **Socio-economic point of view**

Use of local workforce and generation of valuable output for the community (favors local employment, local ownership and local dynamism.)

From LVC to eco-design strategies

- Inclusion of **new variables rarely considered in design** processes:
 - local workforce, sustainable local resources, customization for local customers, etc.

➔ **Objective:** identify new dimensions to guide the eco-design process toward local value creation.

➔ **PSS:** Designing a PSS includes also new variables:

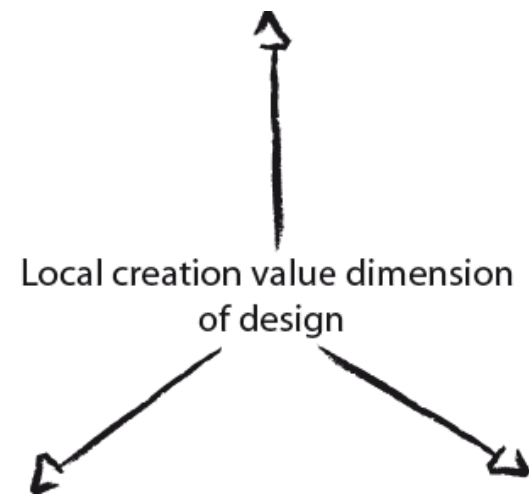
local workforce and skills, specific functions for local context, customization for local customers, etc.

LVC Contradiction

Local Value Creation /
Product eco-design
contradiction



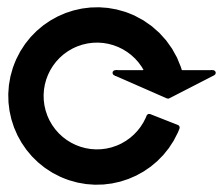
Local Value Creation
versus life cycle thinking



Local Value Creation versus
economies of scale

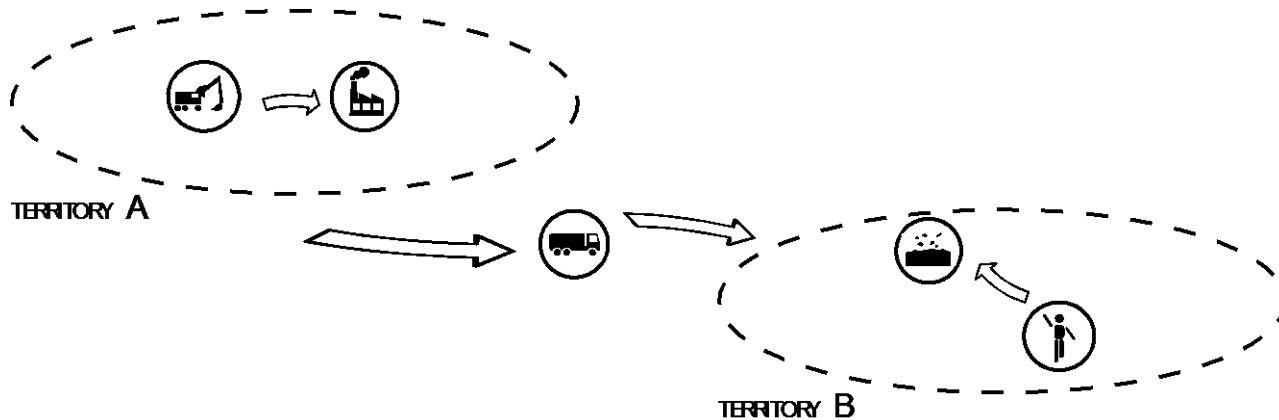
Local Value Creation versus
Global design

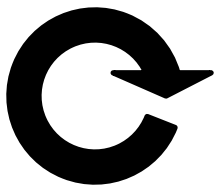




Local Value Creation versus life cycle thinking

- Short loops are developed in industrial sectors that **are not mobile** (ex: agricol sector)
- In the manufactured product scope: increasing **nomadism** of companies
 - If the manufacturing of a product can be guaranteed in a specific territory (in terms of origin of raw materials, assembly), **the consumption of this product generally differs from the place of production.**

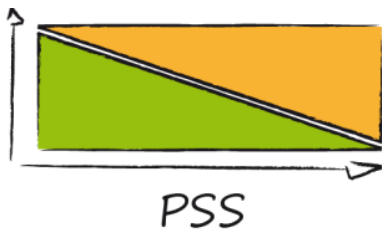
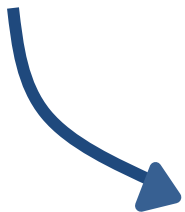




Local Value Creation versus life cycle thinking



Notion of “multi-local system” [Buclet 2010], a system involved in various territories, which has to participate to the local dynamism of these territories.



- Development of a “*multi-local system*” based on the development of activities into different regions with local partner to provide new services
- Tactics: Contract, Marketing, Network, Product/service design, sustainability [Reim 2015]
 - ✓ Network: Dealers and service partners
 - ✓ Design: Functionality and customization



Local Value Creation versus economies of scale

Economy of scale: reduction of production cost by increasing the number of produced items and consequently the size of production units

- Make also sense from an environmental point of view [Schlich 2005]
- « ecology of scale » leads to a minimum business size to reduce the environmental impact [Edwards-Jones 2008]
- This means that the development of smaller and local production units may increase in some cases the environmental impacts

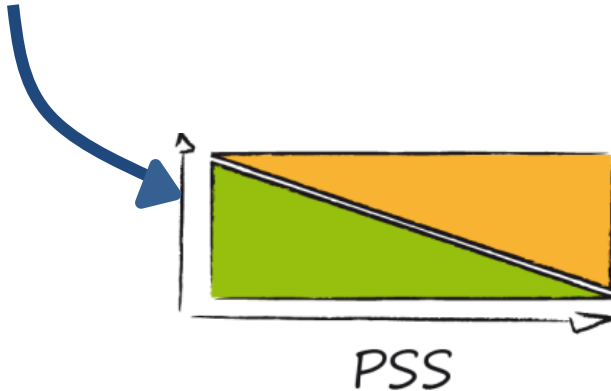
Various work: Scale and counterproductivity (Illich), diseconomies of scale (Korh), Scale and customization aspects



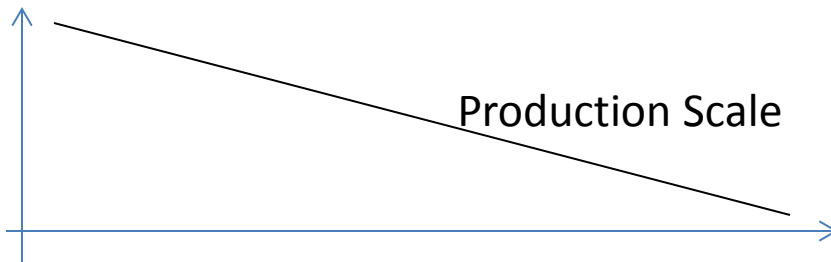
Local Value Creation versus economies of scale



Need to define the right scale of production



- The “**right scale**” can involve a modular product, to have the possibility to determine the size of each manufacturing unit differently.
- **strategy**= Captured value on services to enable small production unit





Local Value Creation versus global design

Eco-design considers whole life cycle of a product using multi-criteria approach.

- Each stage can be very different depending on the region.
- Instead of developing one global design solution for a global uniform market, designers have to understand and integrate into their design activities a very **large range of different constraints and local characteristics**.
- the cost structure of a real customized design (i.e. demand-driven design versus option-driven) will explode



Local Value Creation versus global design



Notion of “**empowerment**”, of local stakeholders that would become the designers of their own solution with their infrastructures

- Strategy of the company is to manufacture product modules in order to be adapted to local stakeholder skills and answer to the different functions of the PSS.
 - Makers, Fab labs

Illustrations

- EVOLO is a company that develops an electric assisted trike.
- Local value creation approach:
 - Development of a “*pluri-local system*” based on the development of activities into different regions with local partner to provide new services: the **current region**: design of the core vehicle and the **“customer” region**: design of the rear modules.
 - The “right scale” involves a modular product, to have the possibility to determine the size of each manufacturing unit differently: **High scale** for the chassis and **Small series** of rear module (big volume / significant to transfer the production unit to America.)
 - The strategy of the company is to manufacture the rear modules in order to be adapted to local stakeholder skills and answer to the different functions of the trike (goods transportation, people transportation, waste collect, advertising, food or beverage sales, etc.).



Perspectives

- Work on a **dynamic system definition** with various proximity level [Allais, under submission]:
 - Administrative-oriented: business as an entity of a larger system. Existing administrative boundaries (i.e. region, country) may be considered for reflection.
 - Business-oriented / CSR-oriented / value creation system. This approach implies that the company's territory evolve with new partnerships.
 - Organizational proximity (functional economy)
- Development of a **set of indicator to evaluate the “LVC”** of a product [Sirina, 2014]
 - Forest management

Perspectives

- Research on the potential benefits of the **inclusion of local intangible resources** [Allais 2015]
- Development of **eco-ideation stimulation mechanism** to generate LVC-oriented ideas [Tyl 2014]
- Practical approach: **Local Value creation and repair workshop**
 - Submission of an H2020 project [APESA, CNRS (UTT & UTC), TU Delft, TU Hamburg, ZeroWaste EU, RREUSE, API'UP, Maibine]
- Local **business model**
 - Research on **citizen founding for local business model** in the energy sector [Partnership APESA & GDF Suez]
 - PhD position (2015) [ESTIA] [Lizarralde 2014]

Perspectives

- Local **business model**
 - Research on **citizen founding for local business model** in the energy sector [Partnership APESA & GDF Suez]
 - Eco-innovation: Significant change towards sustainability
 - PSS BM shall be combined to other SBM archetypes [Bocken 2014]
 - While developing PSS:
 - Creating value from waste (if producer owner of the product gets more value for)
 - Substitution to renewable and natural processes (local resources)
 - Encourage sufficiency (earth limits and regional limits)
 - Promoting equity (local ownership, solidarity)

Thank you – Milesker anitz

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Local Value Creation versus economies of scale

➔ The “right scale” involves a modular product, to have the possibility to determine the size of each manufacturing unit differently.

- **High scale** for the chassis
- **Small series** of rear module (big volume / significant to transfer the production unit to America.)



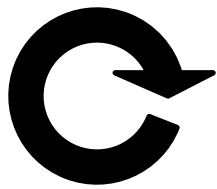


Local Value Creation versus global design



- The strategy of the company is to manufacture the rear modules in order to be adapted to local stakeholder skills and answer to the different functions of the trike (goods transportation, people transportation, waste collect, advertising, food or beverage sales, etc.).
- Independently of the usage, all the chassis are equal and only the colour can be customized.





Local Value Creation versus life cycle thinking

➔ Development of a “*pluri-local system*” based on the development of activities into two regions:

- the **current region**: design of the core vehicle
- the regions in **America**: design of the rear modules.



- Offers the possibility to each local industry to **use other materials for the rear modules manufacturing** (e.g. local vegetal fibres composite panels).