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## Local value creation and eco-design: A new paradigm

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### Abstract

Design has a great role to play in sustainability. Interesting progresses has been performed within the last decades. Nevertheless, some issues of sustainability, and their impact on design, remains poorly studied. Specifically, when it comes to the field of local value creation, the literature in design is still limited. However, the Local Value Creation (LVC) thinking can be a great insight for designers to develop more eco-innovative concepts, through new product design, new services and new business models. In order to go towards this direction, it is necessary to include new variables that are rarely considered in design processes such as the local workforce, sustainable local resources or the customization of the new product or service for local customers.

This paper proposes a better understanding of the relation between eco-design approaches and LVC, and more precisely how current eco-design approaches consider this issue. To do so, a first part introduces the Local Value Creation concept and its challenges for sustainability. Then, a second part focuses on a literature review to understand how the LVC dimension is studied in the eco-design process. This will lead in a third section to concretely characterize how eco-design approaches and tools consider LCV issue. A last section proposes to identify potential contradiction between the LVC and the eco-design concept, in order to draw first outlines of a new eco-design paradigm with a Local Value Creation dimension.

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### 1. Local thinking and sustainable issue

Since the early industrial revolution, the business value creation factors slightly evolved from an industrial economy, through the optimization of production systems, to a market economy, through the minimization of production costs and marketing, and finally to a service economy, through a combination of high value services with low-cost goods [1]. Beside all the benefits it brought, the globalized economy, the mass consumption and the economic growth paradigms are major contributors to the current system crisis: environmental, social, economic or financial [2].

Environmental issues of globalized economy are mainly due to resource overconsumption and, to a lesser extent, to the

relocation of production to low wage countries with lower environmental and social standards (e.g. textile industry in Bangladesh). As a consequence, supply chains tend to grow longer and the international freight tends to intensify [3], [4] (see the well-known example of the 6000km traveled for a yoghurt pot [5]).

The constant extension of the supply chain leads to a dilution of the responsibility, even though more and more confidence is expected from users. Consequently, nowadays, working with suppliers and supply chain issues is an important strategic consideration [6]. In early industrialized countries, there is also a growing demand from consumers for the geographical origin of products and its traceability. The location of production has become one of the main criteria for

sustainable consumption. Moreover, local production often incorporates additional values in goods (e.g. environmental protection, fair trade, local sourcing).

From a strategically perspective and to meet its needs, territories must deal with the scarcity of primary material (such as iron or copper) and the availability of natural resources [7].

From a socio-economical perspective, localization of the production in low cost countries means, in a short term, losses of local employment in developed countries, a drop of product export and, in a medium term, the loss of mastery on production's techniques and a decrease the capacity to design or innovate [3]. These capability losses increase the vulnerability of territories in industrialized countries [4]. Moreover, emerging countries or regions of natural catastrophes may not have sufficient infrastructures (e.g. roads, water and energy supply) to start production activities that would ensure economic autonomy to go beyond daily struggle for survival. Thus, the challenge is to improve people's ability to meet their primary needs (i.e. food, clothes, health, and mobility) [8]. As one half of the world population lives without telephone and electricity, there is a legitimate claim for fair distribution of resources and access to wealth. In these cases, the objective is to provide local actors with easily and economically equipment, so "inexpensive, modular, easy to use and easy to maintain" [7]. Practical models of local manufacturing with limited resources (e.g. skills, tools, materials) could help building this local capability.

Thus, local approach has the potential to address sustainability challenges (i.e. increasing individual or community capability, efficient use of scarce resources etc.) in design through innovation.

### 1.1. The concept of "local" in literature

As a result of globalization crisis, new way of production and consumption, more focused on a local approach, have been studied and developed. Local is often associated to an emergent citizen's movement, the "localism movement" [9], which is looking for buying locally, independently from major companies.

But there is various research works and the mainly come from the economical sciences, with no clear definition. Johansson et al. [4] propose the concept of distributed economies (DE), as a way to develop regionally economy, with small-scale and flexible production units, in opposition to a more centralized economy with large scale production units. Frankova and Johannisova [10] worked on the concept of "economic localization". Through the analysis of several authors, they define it as "a support of as many localized aspects of production and consumption as possible". They also underline the need to develop local communities and democratic decision-making and they also integrate the economic localization within a moral and political thinking. In a same approach, Xue [11] consider that local economy includes "economic decisions at the local level". He underlines that the localization is not only for the production and consumption of goods, but also the relocalization of politics and decision making.

In a more design perspective, Manzini [12] introduce the "multi-local society" concept, as a network of "local systems". In other word, the local concept is embedded in a physical place, but connected other territories. A multi local society produce and consumes locally, "using to best advantage whatever is locally available", but in parallel exchanges with other territories "whatever cannot be locally produced".

Emerging from these propositions, we adopt in our research the concept of local value creation (LVC) which can be defined as "economic activities using locally available input flows and generating output flows for the local community". As a result, the definition of LVC shall include both the territorial and lifecycle perspectives. Designing a local product therefore consists in setting constraints (raw materials, needs, economics, human skills, etc.) in each physical area all along the lifecycle, from raw material extraction to end of life.

### 1.2. Main perspectives of Local Value Creation

A first essential dimension of the LVC is the definition of a geographic/physical scale. The reflection perimeter may be defined by two complementary approaches [1]. The first one 'administrative' consider business as an entity of a larger system. Existing administrative boundaries (i.e. region, country) may be considered for reflection. The second approach is centered on the business and considers its value creation system (i.e. stakeholders). In a CSR perspective, through the ISO 26000 norm, the value creation system encompasses both the creation and the destruction of value in the sphere of influence of the organization. This approach implies that the company's territory evolve with new partnerships. A first aim of the LVC is to minimize distances between value creation nodes.

A second essential perspective of LVC is to enable local value creation all along the life cycle of the product, with low environmental impacts, in line with an eco-design approach. As an illustration, the "made in France" label considers that a product is made in France as long as "the place where the product acquired its principal characteristics is located in France" and "more than 50% of the product costs are acquired in France". This definition therefore does not require that all the activities of the supply chain are located in France. One can ask the legitimacy of this label depending on what part of the value chain is considered.

From an environmental point of view, considering durability in local production further consists in setting constraints to the input and output materials (i.e. input material shall be locally available and renewable; output material shall be locally valorized until the end of life). Therefore, creating local value in this sense means creating value with short loops of materials. From a socio-economic point of view, local value creation requires use of local workforce and generation of valuable output for the community and therefore favors local employment, local ownership and local dynamism.

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