**Key Concepts in Processes of Sustainability Transformation**

# SCALING

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## DEFINITION

Within the context of transformation research, scaling processes increase the impact of small, individual initiatives to induce large systems change. With addressing both quantitative (in numbers) and qualitative (in the depth) increases, there is a notion of transformational potential of initiatives (Wiek 2015). A literature review by Lam et al. (2018, under review) identified different types of amplifying processes:

- Scaling within an initiative (stabilising or speeding up)
- Scaling out (repeat similar or same in different or same context)
- Scaling beyond an initiative (changing rules/institutional levels & values).

Sustainability scaling requires system, target and transformative knowledge (ProClim 1997), e.g., vertical or horizontal scaling (system), anticipatory and strategic thinking (transformative) and normative thinking (target).

## CONTEXT

The concept is widely used, especially in economics, development work and politics, and more recently in sustainability science. Depending on the discipline and discourse the word is used in, it can have a desirable (e.g., innovations) or critical (e.g., "colonial" knowledge transfer leading to cultural invasion) connotation.

In transition research, scaling means the transfer of sustainable innovations from the niche into the mainstream whereby the dominant unsustainable regime can be replaced (Schot, Geels 2008; Moore et al. 2015). These processes can also include scaling down an existing system. From a critical theory perspective, scaling can be considered unsuitable because power relations are often not addressed. Freire's semantic analysis on the term "extension" in relation to agrarian reform in Latin American countries during the '60s and '70s (1973) delved into the mechanics of how treating knowledge as "transferable"

can result in cultural invasion. For him, knowledge must be re-signified in each new cultural context through a dialectic process. Bhabha's work on cultural identity (2004) adds further insight to understanding power relations when translating knowledge. The post-growth debate brings further awareness to critical notions of (up)scaling (limits of growth, rebound effects and qualitative over quantitative needs).

## RELEVANCE

For processes of sustainability transformation *scaling* is relevant as several of us deal with niche innovations. There is interest on how actors can overcome barriers and lock-ins, and increase their impact in order to contribute to (an accelerated) sustainability transformation. This raises questions such as: Who? Where (to)? When? What (not)? To a (certain) limit?

As sustainability transformation is a global, collaborative endeavour, we see a need to co-create scaling processes in a way of two-directional learning by diverse actors that includes the co-definition of the final scalable product. Maybe alternative concepts such as "translation" are more appropriate to highlight the qualitative, context-dependent aspects of scaling.

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