

**ADDRESSING COMPLEXITY WITH FOOTPRINT ACCOUNTING AND NETWORK  
VISUALIZATION WHILE INTEGRATING OPEN INNOVATION IN  
SUSTAINABILITY ASSESSMENT OF URBAN AREAS – ADCONET**

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Sustainability assessment (SA) in urban areas requires the quantitative measurement of economic, ecological and social parameters. A number of multiple indicator approaches have been developed and implemented that are applying a larger number of single indicators, attempting to assess a wide range of detailed data in order to assess the bigger picture of sustainability. Such single indicator approaches have been most commonly applied in assessing sustainability in urban areas, and a major lack of such tools is that the resulting list of rather independent parameters cannot reflect their interaction in a systems understanding. A joint ‘currency’ is missing that is capable of reducing the complexity of SA and that allows for better stakeholder communication.

Another quantitative approach is to measure a composite indicator such as the ecological footprint, resulting in one single parameter of global hectares (Gha). Gha have meanwhile become an internationally used and thus comparable single unit in sustainability assessment, measuring the bigger picture of ecological sustainability in a more interrelated and more coarse way. The footprint may have advantages in accessibility and applicability, as well as in reducing complexity of SA, but may lose on accuracy because of many implied simplifications.

However, both types of quantitative approaches do not integrate the individual and collective ‘understandings’ of urban sustainability – which needs to be seen as mandatory in an integrative assessment tool, because the population of a town is most affected for example by externalities, and needs to participate and to support policy changes for more sustainable development – behavioral changes being part of it. The combination of a quantitative with a qualitative participatory feedback loop is needed in order to enable integrative SA.

In this research both quantitative approaches are applied in the same urban area as a pilot town, in a status quo and a development scenario that demands considerable stakeholder engagement. Both approaches are compared given their technical applicability and feasibility, their accuracy and their capability to translate results into policy strategies in an underlying reflexive process. As part of this comparison both quantitative results are discussed in stakeholder workshops in the pilot town, and merged with the individual and collective ‘mental models’ or ‘understandings’ of what sustainability means to people and how they believe it can be achieved. The quantitative results are visualized in a network model in order to reduce complexity and demonstrate feedbacks and side effects of any kind of ‘adjustment’ of the system for the discussion processes.

From this qualitative feedback process it is intended to derive policy recommendations for the pilot town on the basis of the initially measured quantitative data. Furthermore, the reflective comparison of both quantitative models with the participatory qualitative models is analyzed in a metamodeling process in order to develop a ‘common sustainability currency’ and general recommendations for the integrative assessment of sustainability in other, larger and even more complex urban areas.

