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Gottlieb, Stefan Christoffer; Frederiksen, Nicolaj; Sørensen, Lise Hvid Horup; Kjerulf, Lin Engholm; Secher, Andreas Qvist; de Gier, Andreas

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Quantifying or qualifying the circular economy?

AUTHORS

Stefan Christoffer Gottlieb [1]
Nicolaj Frederiksen [1]
Lise Hvid Horup Sørensen [2,3]
Lin Engholm Kjerulf [1,4]
Andreas Qvist Secher [3]
Andreas de Gier [1,4]

ORGANIZATIONS

(1) Department of the Built Environment, Aalborg University, Copenhagen, Denmark

(2) Technical University of Denmark (DTU)

(3) Rambøll Danmark A/S

(4) Enemærke & Petersen A/S

The transition to the circular economy (CE) in the built environment seems to rest on the development of professional expertise in quantifying the world. CO2 emissions, Life Cycle Costs, material flows, and the amount of waste recovered and fed back into the economy are all important indicators of the CE and metrics to which the industry is held accountable. These calculations have become a basis for decision-making, as well as a necessity for documenting compliance to legally binding commitments in transnational, national, and sectoral regulation, as well as being evaluated by stakeholders in the market and the wider society.

Calculations and quantifications are often favored by politicians and other decision-makers for their ability to provide a structured and systematic approach to decision-making, mainly due to their presumed objective nature reducing the potential for subjective biases or personal preferences to influence decisions. Moreover, quantifiable criteria and data are purported to increase transparency and enable comparative analyses of different options, leading to informed and logical decisions.

While this may be theoretically true, the use of deceptively precise numerical values as a basis for decision-making rests on assumptions that may be highly problematic if they are not acknowledged – or more so, are obscured by decision-makers promoting the objectivity of the inputs to those decisions. According to organizational theorist James G. March, any putatively rational decision is based on improbable assumptions about the nature and quality of the data that informs them. Rational decisions thus presume that we have complete information about (1) all alternative courses of action when we make the decision,

(2) future consequences of those alternatives, and (3) future preferences for the consequences of current actions.

The improbability of comprehensiveness arises from institutional, technical, and cognitive factors. At any time, there are limits to how much information can be processed and how many alternatives decision-makers can consider. Moreover, calculation tools are constrained by the availability and quality of data, modelling assumptions, and the methodologies employed, and different political objectives and industry standards influence the criteria that are included in the calculations. Uncertainty also impacts our ability to predict the future consequences of different alternatives. These predictions will, at best, reflect the inherent rationales and limitations of existing analytical tools and thus be bounded by current best practices and perceptions.

While calculations supporting decisions for the future are often based on status quo assumptions about society or predictions regarding technological developments, growth etc., the inherent uncertainty of the future should be included as a strong caveat. However, reporting often falls short of clearly stating these complexity-induced uncertainties, which introduces the risk of using the results inappropriately. This is probably the most dangerous feature of calculation tools. While the decision basis they offer is alluring and powerful due to their (necessary) simplifications of reality and the opportunities for comparisons they enable, the fact is that inconsistencies and uncertainties may be hidden under a veil of calculative rationality. Below, two illustrative examples of this issue are provided.

Construction tendering involves the selection of a contractor based on a quantitative assessment of the price and/or other qualitative requirements (e.g., sustainability services, process and organization and architectural quality), which are calculated as a weighted percentage to enable a comparative evaluation on a scale from 1-10. In the terms of French sociologist Michel Callon, this quantifiable valuation of a good or service is based on an 'objectification' of its properties and a 'singularization' that recontextualizes it into the buyers' world. In the case of tendering CE services, objectification takes place as bidders interpret the tender requirements in defining the good or service, for example the specific type of materials or products to be delivered;

and singularization involves highlighting a factor such as the potential CO2 savings for the client.

In tendering, and in the construction industry generally, CO2 savings are often calculated with life cycle assessments (LCA) following the EN15978 standard. The building regulations prescribe which phases of a building's life cycle should be accounted for and which building parts should be included. This enables comparability across buildings, but also results in the nullification of what is not included. One example is construction site energy consumption, which is not yet included in a standard LCA. At the same time, LCAs suffer from uncertainties regarding future emission such as those associated with energy supply, material replacements during the lifespan of the building, and waste handling. Another important point is that the industry regulates per square meter, which applies to both the energy frame calculations and the CO2 limits introduced in 2023. This does not incentivize building fewer and/or more efficient square meters but rather rewards large buildings with a higher CO2 budget. Instead, it could be argued that the CO2 budget should be based on the function the building serves to society, such as the provision of a number of residences, office spaces, hospital beds etc.

Thus, while quantitative assessments have several strengths, we emphasize the necessity of challenging quantitative methodologies and partnering them with qualitative. It is essential to recognize that a calculative rationality does not capture all relevant considerations in decision-making. It is, therefore, most effective when used in conjunction with other decision-making approaches that address a broader range of factors.