

NO MORE BLACK BOXES

Working with causal mechanisms in evaluations

Summary

Evaluations not only ask whether and to what extent impacts were obtained, but also how and why a programme had impact. Evaluations that aim at generating lessons learned need to unpack the causal black box and analyse the causal mechanisms between cause and effect.

However, it is frequently not known whether, when and how causal mechanism analysis in evaluations can be utilized. Several design options are suitable for analysing causal mechanisms. Besides frequently discussed realist evaluation and contribution analysis, statistical designs are also suitable for causal mechanism analysis. The benefits and costs of individual causal mechanism designs vary greatly, depending on the properties of the evaluand and data availability.

This policy brief is oriented towards evaluators and commissioners who work with causal mechanisms in evaluations, and enables their selection of suitable designs and methods for causal mechanism analysis. First, causal mechanisms are defined and their simplified typology presented. Subsequently, the policy brief facilitates the systematic selection of causal mechanism designs and methods along a decision tree.

This policy brief is part of DEval's own methods research programme on causal mechanisms in complex evaluations.

Why causal mechanisms?

For several years, there have been increasing methodological discussions within the evaluation community about the added value of causal mechanisms. This is because causal mechanisms

can expose the causal linkages between a cause (e.g. of the examined intervention) and its (anticipated and unanticipated) effects. Evaluations that focus on generating lessons learned ask not (only) whether or how much, but (also) the how and why of effects. Causal linkages between individual components of comprehensive programmes in complex evaluations can be captured and tested using causal mechanism analysis.

What are causal mechanisms?

The literature in the broader social sciences as well as on evaluation methodology controversially discusses and differentially defines causal mechanisms (Gerring, 2008; Hedström and Swedberg, 1998). Several similarities arise from these diverse discussions and definitions:

- Causal mechanisms generate the observed effects.
- Causal mechanisms describe what occurs between cause and effect; the causal black box can be unpacked through causal mechanism analysis.
- The analysis of causal mechanisms provides answers to how and why questions.

Two types of causal mechanisms can be distinguished, depending on the focus of the analysis (see Table 1). Social mechanisms refer to changes of awareness and attitude that result in behavioural changes of individuals. Social mechanisms can be triggered through an intervention. They are modelled as non-observable intervening variables that generate the observed effect. For example, introducing standards and certification programmes that support rural value chains can lead to better quality management due to a social mechanism (here: quality awareness of farmers). The analysis of social mechanisms requires a close-up view with a

Table 1: Types of causal mechanisms

	Causal mechanism type	Design / method	Analytical focus	
	Social mechanism	Realist evaluation, mediation analysis, experiments	Close-up view: small parts from the intervention logic	
	Process mechanism	Process tracing, contribution analysis	Wide-angle view: large parts of the intervention logic	

Source: own figure.

focus on relevant parts of the intervention logic. They can be captured and tested using realist evaluation, mediation analyses or experiments at the micro-level.

Contrarily, a process mechanism is not understood as an intervening variable, but instead as a system of interlocking parts which together generate the observed effect (Machamer et al., 2000). Process mechanisms describe a cause-effect relationship along large parts of the intervention logic. A process mechanism consists of a series of causally linked events through which an intervention has the desired effect. In this way, multi-level political reform processes, such as programmes of budget support, can be described and tested. A wide-angle view is necessary to capture the entire process. Process mechanisms are generally observable meso- or macro-phenomena and can be captured and tested using process tracing or contribution analysis.

Capturing and testing causal mechanisms

The design and method choice is crucial to maximize the potential of causal mechanism analysis. Whether causal mechanisms in evaluations are utilized, and with which methods they are captured and tested, depends mostly on the research interest, as well as considerations on efficiency and practicality.

Figure 1 shows the paths to select the suitable causal mechanism design for individual evaluation questions.

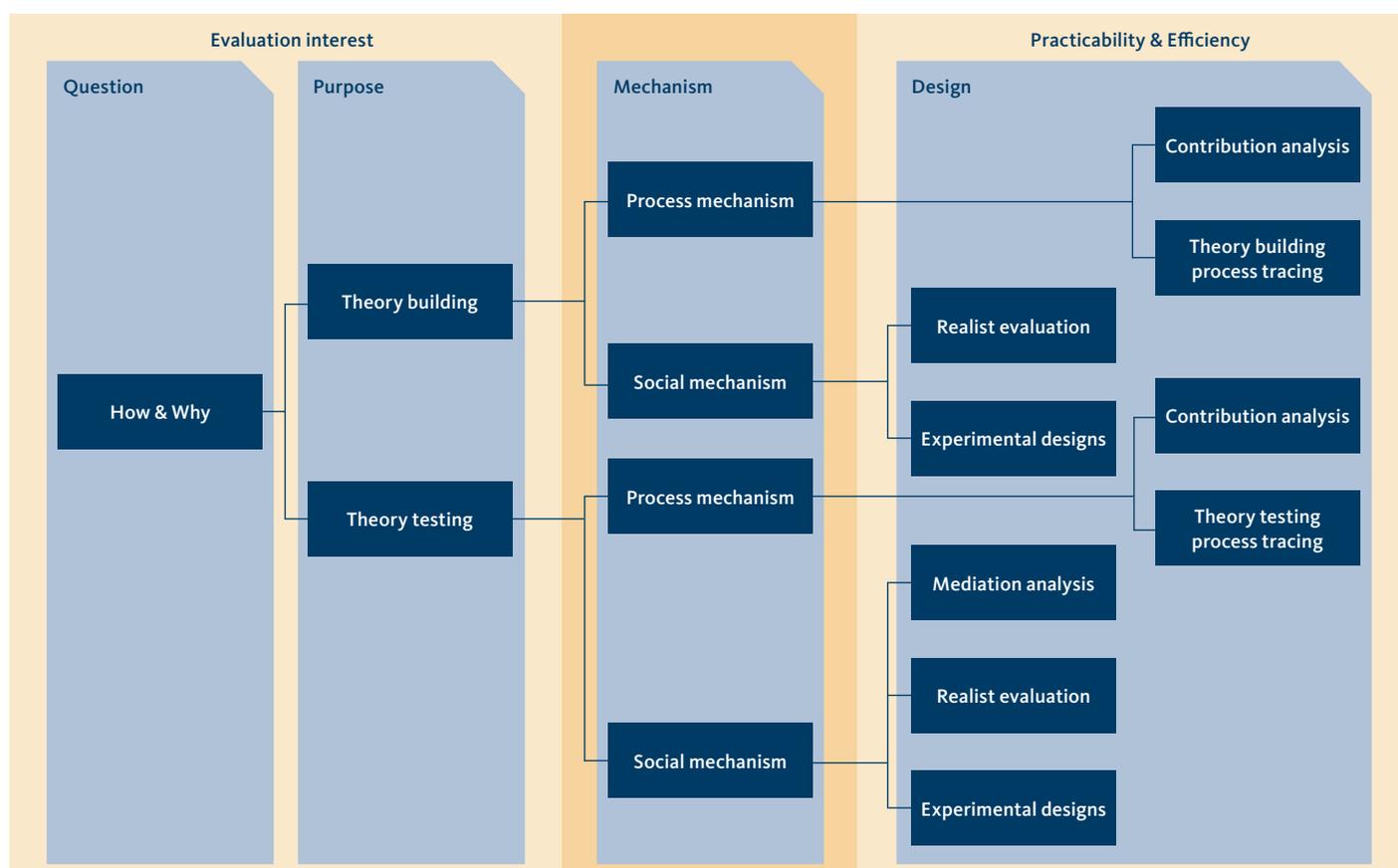
Research interest

The foremost question is whether causal mechanisms should even be considered in the evaluation. Evaluations that exclusively ask whether and to what extent an intervention had impact do not necessarily require a causal mechanism analysis. However, when evaluations (also) ask how and why questions, different types of causal mechanism analysis should be considered.

The second step is determining the primary purpose of the evaluation question. The theory-building path should be selected when we are still oblivious to the causal linkages of the evaluation target. In this case we are primarily interested in how an intervention did or didn't make an impact, and how it could have made one. Contrarily, we follow a theory-testing path when the focus is mainly on accountability. If we are already knowledgeable on the causal linkages of an intervention, we can test one or more of the theoretical causal mechanisms.

The causal mechanism can be designed either as a process or social mechanism, depending on the focus of analysis during the third decision point (see Table 1).

Figure 1: Decision tree



Source: own figure.

Practicality and efficiency

Practicality and efficiency are important considerations in the final selection of the suitable design and when choosing the mechanism type. Causal mechanism design choices are limited depending on the properties of the evaluand. Contribution analysis or process tracing are suitable if the evaluand can only be analysed in one or few cases, such as the support of national reform politics. Mediation analysis or experiments are more suitable where we can analyse causal mechanisms in a large number of cases. The data availability for the analysis of causal mechanisms must be clarified early on.

The benefits of different causal mechanism designs must be comparatively discussed, based on their efficient use of resources. A complex causal mechanism design (e.g. realist evaluation) is justifiable in evaluations that have a clear focus on

how and why questions. Questions on efficiency are intensified in evaluations that also answer whether and to what extent, in addition to how and why questions. In these cases, methodological synergies with other evaluation design components can be utilized.

Participatory tool

The decision tree can be used by various stakeholder groups of an evaluation. Evaluators can elaborate possible design options in the early phase of an evaluation using the decision tree and discuss these with the commissioner. Individual evaluation questions can have their own paths that lead to different causal mechanism designs. Combinations of options are also possible, especially in larger evaluations. Evaluations can be theory-building as well as theory-testing or target the analysis of both mechanism types.

Conclusion

Causal mechanisms are of crucial importance in many evaluations. This insight has penetrated both the methodological as well as the practical aspects of evaluation. However, the benefits of causal mechanisms in evaluations have so far been discussed mainly at the theoretical level. Practical applications of different causal mechanism designs are comparatively scarcer.

The decision tree presented in Figure 1 offers orientation and facilitates the selection of causal mechanism design. It is now important to utilize it and to learn from new applications of causal mechanism designs for evaluation practice. This policy brief is part of DEval's own methods research programme on causal mechanisms in complex evaluations. Do you have further application examples of causal mechanism designs? Questions or suggestions? We look forward to your email (Johannes.Schmitt@deval.org).

DEval application examples

Causal mechanisms play an important role in DEval's evaluation work. They have already been empirically analysed in several DEval evaluations. You can find information on the applied causal mechanism designs in the corresponding methodological chapters of the evaluation reports.

DEval evaluation	Causal mechanism design	Causal mechanism type
Schwedersky, T. et al. (2014), <i>Thirty Years of Rwandan-German Development Cooperation in the Health Sector</i> , DEval, Bonn.	Contribution analysis	Process mechanism
Kaplan, M. et al. (2016), <i>Agricultural value chains</i> , DEval, Bonn.	Realist evaluation	Social mechanism
Polak, J. T. et al. (2017), <i>weltwärts Volunteers and Their Civic Engagement in Germany</i> , DEval, Bonn.	Mediation analysis	Social mechanism
Orth, M. et al. (2018), <i>The future of integrated policy-based development cooperation</i> , DEval, Bonn.	Theory-testing process tracing	Process mechanism

References

- Astbury, B. and F. L. Leeuw (2010)**, "Unpacking black boxes: Mechanisms and theory building in evaluation", *American Journal of Evaluation*, 31(3), pp. 363–81.
- Gerring, J. (2008)**, "The mechanistic worldview: Thinking inside the box", *British Journal of Political Science*, 38(1), pp. 161–79.
- Hedström, P. and R. Swedberg (1998)**, *Social Mechanisms: An Analytical Approach to Social Theory*, Cambridge University Press.
- Machamer, P. et al. (2000)**, "Thinking about mechanisms", *Philosophy of Science*, 67(1), pp. 1–25.

Author



Dr Johannes Schmitt
Evaluator

The German Institute for Development Evaluation (DEval) is mandated by the German Federal Ministry for Economic Cooperation and Development (BMZ) to independently analyse and assess German development interventions. Evaluation reports contribute to the transparency of development results and provide policy-makers with evidence and lessons learned, based on which they can shape and improve their development policies.