

Recently Introduced Policy Instruments and Intervention Theories¹

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Evaluation of recently introduced policy instruments (RIPs) is especially problematic, because only some effects have occurred, and information on them is imperfect. Policy makers and the public at large are, however, particularly interested in early evaluations. This article examines problems with the retrospective evaluation of RIPs, and explores the advantages of using intervention theories in these evaluations. Two case studies from the field of environmental policy instruments are used as examples. It is argued that when evidence on final outcomes is largely unavailable, an intervention theory is a useful tool to overcome information problems. By using intervention theories, it is possible to identify observable prerequisites that precede intended, but not yet occurred, outcomes.

KEYWORDS: policy instrument; program theory; 'recently introduced policy instruments' evaluation; regulation

The Importance of Early Evaluations

All retrospective evaluations of policy instruments face data problems. However, it can be argued with good reason that the nature and severity of the problems depend partly on the timing of the evaluation: the length of the time span between the introduction of a policy instrument and its evaluation. The amount of information available on the outcomes of a policy instrument introduced decades ago is inevitably much larger than that available on a policy instrument introduced, for example, a year ago. In this journal, Sidsel Sverdrup (2003) highlighted problems encountered when the long-term effects of laws and regulations are studied. If the problem of the evaluation of long-term effects is that observed outcomes may be caused by simultaneous events other than the policy instrument (Sverdrup, 2003: 333–8) then the problem of the early evaluations is that the outcomes have taken place only to a limited extent or not at all. Thus, an evaluation of recently introduced policy instruments (RIPs) is especially problematic in terms of information availability.

However, policy makers, managers and the public at large are especially interested in having evaluations of these new policy instruments carried out. Besides

the particular charm of novelty, RPIs are also interesting for many other reasons. First, it is not necessarily wise to wait for years or even decades before launching an evaluation of a policy instrument. This is especially the case with preventive action, i.e. policy instruments adopted to prevent a problem from occurring. In addition, experience has shown that the designers of a policy instrument are rarely able to take into account all factors relevant to the effects of that instrument (e.g. Braybrooke and Lindblom, 1963: 83–104; Rose and Karran, 1987: 101). The assumptions used in the design process may soon turn out to be defective. For example, the resource requirements may be underestimated or the economic development of different sectors affected by the policy instrument may not be considered. Besides, economic problems and other detrimental side-effects often accumulate as time goes by. Furthermore, as a policy instrument becomes more institutionalized, it is more difficult to change due to political inertia (Rose and Karran, 1987). It might therefore be easier to improve an intervening policy instrument at an earlier stage of implementation. In all, if evaluations are ‘intended to play a role in future, practical action situations’ (Vedung, 1997: 3; see also Pawson, 2002: 158), their timing is extremely important. Thus, there is a clear case for RPIs evaluation.

Aims of this Article

The aim of this article is to show that a retrospective RPIs evaluation is possible and that it is fruitful to use intervention theories as tools in early evaluations. From this position, many views appearing in the evaluation literature and policy papers are contradicted. For example Patton (1997: 218) claims that ‘a program must have achieved a certain level of maturity to make added effort involved in theory-driven evaluation fruitful’. Furthermore, the European Commission (2003: 7) has been suspicious of RPIs evaluation.

The article begins with a presentation of an input–output model of public policy. The model is used as a heuristic tool to identify the problems related to RPIs. Following this, the time sensitivity of evaluation criteria is discussed. Then, we examine how intervention theory can help to overcome the problems of RPIs evaluation. This is illustrated by two examples of the possibilities of using intervention theories in the evaluation of policy instruments that have produced some outputs, but only few, if any, outcomes. Finally, the advantages, inconveniences and limitations of using intervention theories for RPIs evaluations are discussed more generally.

The Input–Output Model and Time Sensitivity of Evaluation Criteria

An input–output model of public policy is often utilized in evaluations. It is a heuristic tool, ‘an instrument to support thinking’ (Vedung and Román, 2002: 10). This simplified model captures the essential elements of public policy: inputs, administration, outputs and outcomes of these outputs. By outputs we mean items (e.g. permits, taxes) that are issued by government bodies and interface

with the target group (e.g. permit holders). Outcomes are the actions taken by the target group when they encounter the outputs, but also what occurs after that in the chain of influence. Outcomes can be immediate (e.g. measures taken by a holder of a permit due to permit conditions), intermediate (e.g. reduction of emissions, demand for environmental technology) and ultimate (e.g. improved quality of the environment, impact on employment) (e.g. Vedung, 1997: 4–5; Suchman, 1967).

There are several criteria available for evaluations (Hildén et al., 2002: 17–18; Mickwitz, 2003). Perhaps the most used criteria are *effectiveness* and *efficiency*. *Effectiveness* has many definitions, but here it refers to the degree of correspondence between achieved outcomes and intended policy goals. *Efficiency* can be defined, for example, as a cost–result criterion (do the results justify the resources used?) or as a cost–effectiveness criterion (could the results have been achieved with fewer resources?). As for the other criteria, one can mention *relevance* (do the goals of the policy instrument cover the key problems of environmental policy?) and *impact* (have the impacts occurred due to the policy instruments?). Different evaluation criteria link different stages of the input–output model. *Relevance* links the perception of environmental problems and the objectives, *effectiveness* the objectives and the outcomes, *efficiency* the inputs and outputs and/or outcomes, and *impact*, the outputs and outcomes (see Figure 1).

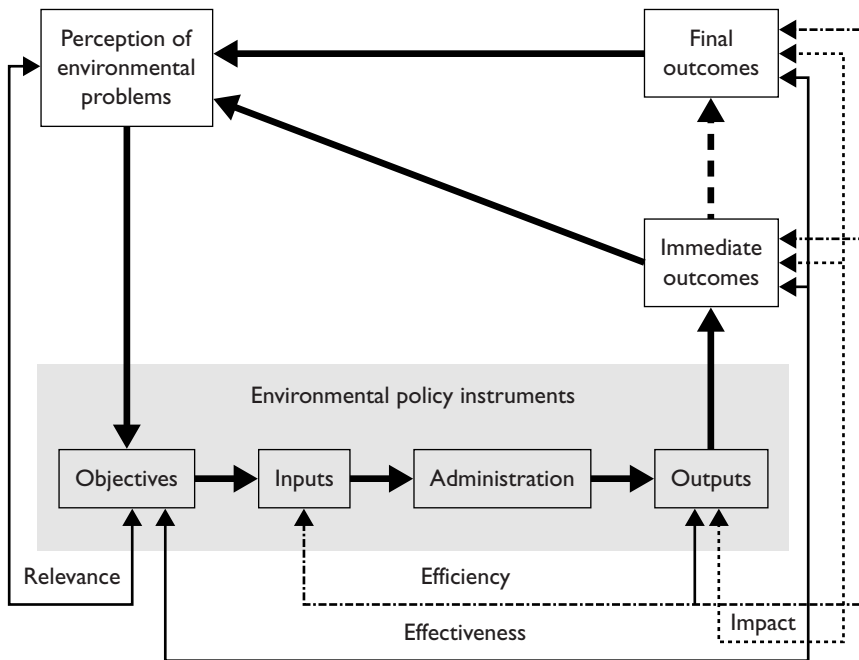


Figure 1. The Evaluation Criteria and Their Links to the Stages of the Input–Output Model (based on Hildén et al., 2002: 19; further inspired by Mickwitz, 2002)

In RPIs evaluations, due to the short time span between the introduction of a policy instrument and the evaluation, either outcomes may not have occurred, or where they have, information about the outcomes is difficult to obtain. Depending on the time span and the nature of the policy instrument, it may be the case that the administration has only produced a small number of outputs. Thus, although the question of ‘recency’ varies from case to case, generally a policy instrument can be defined as being ‘recent’ in so far as it has, due to the short implementation period, produced only some of its outputs and generated a small proportion of its outcomes.

The implication of the lack of outcomes or incomplete information on them depends on the criteria used. The use of a criterion that links final outcomes to earlier stages of the input–output model is particularly problematic. However, the use of a criterion that connects, for example, the perception of environmental problems and the objectives (i.e. a relevance criterion) is not necessarily more difficult in the case of RPIs than in the case of other instruments. There is no general reason to assume that there is not enough information available on these matters with respect to RPIs. However, this does not mean that a relevance analysis is an identical endeavour in these two cases.

Although the usability of evaluation criteria for a retrospective evaluation always depends on contextual matters, the input–output model helps an evaluator to ask more precise questions while choosing the criteria for use in the evaluation.

The Use of Intervention Theory in Overcoming the Problems of RPIs Evaluation

Even though a criterion may appear difficult to use in a retrospective evaluation due to the inherent information problems when evaluating RPIs, this does not mean that the criterion should be rejected categorically. In this article, it is argued that intervention theory can aid the use of different criteria in a meaningful way, for example, in the case of RPIs evaluation. The idea underlying the concept of intervention theory has become popular in recent years among evaluators and political scientists, although different authors use differing terms; for example, policy theory (Hoogerwerf, 1990), program theory (e.g. Chen, 1990; Weiss, 1997; Rossi et al., 1999; Rogers et al., 2000), program logic (Lenne and Cleland, 1987), the program’s theory of action (Patton, 1997) and theory of change (Connell et al., 1995; Pawson, 2003: 473). The aim of an intervention theory is to describe how the policy is intended to be implemented and function (Hildén et al., 2002: 16). It shows what measures are assumed to be taken, in what order, and what is assumed to follow from these measures. An intervention theory includes different kinds of assumptions: assumptions about the impacts at different stages of the causal chain and their causal relationships, as well as assumptions about the relationship between impacts, goals, various actors and moderators, i.e. contextual factors (Vedung, 1997; Chen, 1990; Dahler-Larsen, 2001: 336–40).

Assumptions may change over time and this change may be of great significance for later retrospective evaluations. However from the perspective of RPIs

evaluation, it is crucial to note that assumptions are formulated for the first time before the policy intervention. Thus, they are in existence – although not necessarily well articulated – when the implementation of a new policy instrument begins. Different actors (e.g. politicians, ministries, implementing agencies, various interest and target groups) may hold different assumptions about the causal chains that lead from means (policy instruments) to the goals and other anticipated impacts, or even different assumptions about goals and other impacts. Therefore, it may be possible to construct several intervention theories in each case (Vedung, 1997: 139). In addition, different approaches and methods can be used to reconstruct an intervention theory. Patton (1997: 219–24) has distinguished three major approaches to theory construction: deductive, inductive and user-focused. The deductive approach utilizes scholarly social science theories and is often closer to research than evaluation. The inductive approach is based on the fieldwork of the evaluator and resembles the grounded theory approach introduced by Glaser and Strauss (1967). This means that the (intervention) theory and the data are generated at the same time. In the user-focused approach, the evaluator helps the intended users to articulate their intervention theories (or theories of action) (Patton, 1997: 219–22). For RIIIs evaluation each of the three different approaches identified by Patton may be useful. The deductive approach has the advantage that theoretical assumptions about causal relationships may – if the evidence for them arising from other studies is convincing enough – help to overcome problems related to lack of information. The inductive approach connects the intervention theory to the practice of the case studies so that empirical evaluation questions can easily be formulated. The user-focused approach helps people to understand their own assumptions. This might be useful even in cases in which the validity of these assumptions cannot be fully evaluated. Thus, the choice of an approach is to a large extent a matter of the general purpose of the evaluation.

A review of approaches to theory reconstruction has been presented by Leeuw (2003). He specifies three approaches: a policy-scientific approach, a strategic assessment approach and an elicitation methodology. Of these, the two latter are approaches for ex ante evaluations and therefore, the policy-scientific approach is the most useful for RIIIs evaluations. Briefly, the policy-scientific approach includes the following six steps (Leeuw, 2003: 7–8).

- Identify behavioural mechanisms expected to solve the problem.
- Link the mechanisms with the goals of the policy instrument under review.
- Reformulate the statements on the policy instrument in conditional ‘if–then’ propositions.
- Search for warrants, to identify missing links in or between different propositions through analysis of argumentation.
- Reformulate these warrants in terms of conditional ‘if–then’ propositions and draw a chart of the links.
- Evaluate the validity of the propositions.

Reconstructing an intervention theory according to the policy-scientific approach is often a good option for RIIIs evaluation. The speciality of RIIIs

evaluation becomes clear at the final step: it is one thing to evaluate the validity of assumptions about the basis of abundant information on outcomes, but quite another to evaluate their validity when only some outcomes have occurred. This issue will be discussed further in the last section.

However, whichever approach is selected, it is useful to remember ‘that someone has done it before’ (Pawson, 2003: 487): comparisons with earlier research and lessons learned in other evaluations are especially helpful in early retrospective evaluations as the information is particularly limited. Therefore, it might be worthwhile to apply features of the strategic assessment approach and the elicitation methodology (e.g. how they make use of existing research and approaches developed in other fields of social science) to RIPIs evaluations. Nevertheless, this is a task for future elaborations of RIPIs evaluation.

Two Examples of the Use of Intervention Theories in RIPIs Evaluation

In this section, we illustrate how intervention theories can be utilized as an analytical tool to cope with problems inherently related to a retrospective evaluation of RIPIs. Although the examples come from the field of environmental policy, these experiences can be applied in other fields of public policy and program evaluation. The value criterion used in both examples is the same, i.e. effectiveness. In the examples an approach has been utilized that is close to an inductive one. The intervention theories were constructed using legislative documents as the source of information.

Environmental Protection Act, 1999

In Finland, a major reform of environmental regulation was undertaken in the late 1990s. The main result of this was the Environmental Protection Act, as well as related laws and regulations, which came into force on 1 March 2000. Through the reform, the European Union’s Directive 96/61 on Integrated Pollution Prevention and Control (IPPC) was transposed into the Finnish legal system. At the core of the reform was the integration of five different permits (air pollution, water pollution, waste management, protection of health and neighbourhood relations) into one environmental permit. In 2001, the Finnish Ministry of the Environment commissioned an evaluation of this Act from the Finnish Environment Institute and its collaborators. The evaluation covered the first two years of the implementation of the Act. The main results of the evaluation were published (e.g. Similä and Hildén, 2003; Hildén et al., 2003) just before the European Commission stated that it is still too early to evaluate the outcomes of the IPPC Directive (European Commission, 2003: 7).

The intervention theory of integrated permits was constructed using both European and national legislative documents. In these documents the benefits of integrated permits were defined in relative terms: integrated permits were assumed to be superior in comparison with a system of several sectoral permits. On the basis of the documents it was possible to identify assumed chains of

influence (i.e. assumptions) on which the superiority was based. The assumptions were the following.

1. Integration of permits will abolish the gaps between different permits.
2. Detrimental side-effects of environmental measures will be reduced, because pollution will no longer be transferred from one environmental medium (water, air, soil) to another.
3. Integration will enable a new kind of prioritization.
4. Integration of permits will result in technological change, from 'end-of-pipe' technologies to process technologies.²

After the formulation of the intervention theory of IPPC permits as part of the new regulations, it became possible to ask what kind of information was available to scrutinize whether theory-based assumptions hold true.

With regard to the first assumption, the outputs of administration, i.e. permits, provided a good basis to make observations. In fact, the essence of this assumption was that the IPPC permits would differ from the old permits (the gaps would be filled because the competencies of public authorities were extended). Thus, we could formulate a more precise question: do permits contain new kinds of provisions that regulate such environmental problems that were not regulated before? On the basis of interviews (27 representatives of environmental administration, companies and non-governmental organizations interviewed) and analysis of permit decisions (total: 611), we were able to conclude that the conditions set had changed very little. However, there were some exceptions (e.g. the biological waste originating from fish farming had been regulated by permits after the reform, but not before it). In sum, there was only weak evidence that this assumption held.

With respect to the second assumption, we were able to formulate a measurable question as follows: have the authorities taken account of side-effects like transferring emissions from one environmental medium to another as an argument when designing the content of the permits? On the basis of permit analysis as well as interviews, the answer was negative, i.e. the second assumption did not hold. In addition, it was possible to approach the issue of setting priorities on the basis of the decisions, because permit authorities are obliged to justify their decisions and this aspect certainly was one that needed to be justified. The permit documents confirmed that the argument had not been used. Additionally, the issue was cross-checked in the interviews, and this confirmed the result, with a modification: most of the interviewees were of the opinion that priority setting had not affected the design of permits. However, some interviewees pointed out that in individual cases a coherent timetable for different environmental measures relevant to different environmental media had been set up in order to direct the resources to the most urgent purposes. However, only very few examples were given. In addition, promoting integration by keeping different classes of investment separate only goes some of the way. Thus, priority setting with respect to the timetable was used, though to a minor extent. However, this was not meant to affect environmental outcome in the long term.

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The fourth assumption concerned technological change. It was assumed that the IPPC permits will lead to a shift from 'end-of-pipe' technology to process technology.³ However, the causal chain on how this impact will take place is not fully explained in the legislative documents. The regulatory authorities do not prescribe the technology that should be used. Instead, environmental requirements are set up in the form of emission limit values, based on the principle of best available technology (BAT). The use of emission limit values or the BAT principle is not a new approach, although the combination of them was assumed to have different results to those achieved before. This did not yet provide a sound basis for evaluation and it was necessary to continue the reconstruction of a more precise intervention theory, in order to explore whether there was anything in the causal chain of influence that could be monitored. To make the intervention theory more complete, two additional assumptions – or reformulated warrants, using Leeuw's terms – had to be formulated on the basis of an analytical reconstruction of the intervention theory:

- 4a. technological change will occur only if the activities concerned have impacts on more than one environmental media (air, water, land); and
- 4b. technological change is linked to the investment cycles of the plant concerned and regulatory authorities have only minor possibilities to affect these cycles. If the plant is not at the right stage of the investment cycle when applying for an environmental permit, it is unlikely that it will adopt new environmental technology to a significant extent.

These complements to the original assumption indicated what kinds of plants were potentially interesting. Very few plants, among the 611 permits studied, did have multiform emissions and were at the right stage of the investment cycle. No cases were found in which technological change could have taken place as assumed in the intervention theory. This does not prove that the assumed technological change could not occur in the future. However, the (reconstructed) intervention theory showed the relevance of the information available at the moment of evaluation.

Waste Tax Act, 1996

Our second example concerns the waste tax evaluation completed in 1998–9 (e.g. Melanen et al., 2002; Kautto and Melanen, 2004). According to the Finnish Waste Tax Act, a tax of €15 is levied per tonne of waste on all waste transported to public landfills, with the exception of, for example, de-inking waste, fly ash from power plants and waste that can be utilized in landfill structures. The waste tax is not levied on waste disposed of in private (industry-owned) landfills. Also, some large companies transport their waste to public (municipal) landfills and are thus obliged to pay the tax.

The intervention theory of the waste tax was reconstructed by the evaluators on the basis of official documents, particularly the Government Bill for the Waste Tax Act. According to the Bill, the Act has two types of objectives: fiscal and environmental. The evaluation was limited to the environmental objectives. According to the Bill, the environmental objective of the Act is to promote waste

prevention and waste recovery (with priority being given to material recovery, i.e. recycling) instead of landfilling and incineration without energy recovery. Here only the effectiveness of the Waste Tax Act in waste prevention is discussed.

Based on the above-mentioned documents, it was possible to reconstruct the main assumptions of waste prevention and the most important elements of the intervention theory. Compared with the case of the Environmental Protection Act, in this case the output (the incorporation of waste tax in municipal waste charges) occurred more immediately because the intervention was not modified case by case by administrative decisions.

The Government Bill states that the target groups avoid the rising costs most easily by reducing the amount of waste they produce. It is even emphasized in the document that this outcome is likely to occur soon. However, the top executives and environmental managers of the companies interviewed said that improvements in waste prevention occur primarily through the adoption of cleaner production technologies. On this basis, the intervention theory was once again reformulated into the form shown in Figure 2.

The material information available (statistics, interviews of 32 company representatives) indicated that the total amount of waste had not decreased either at

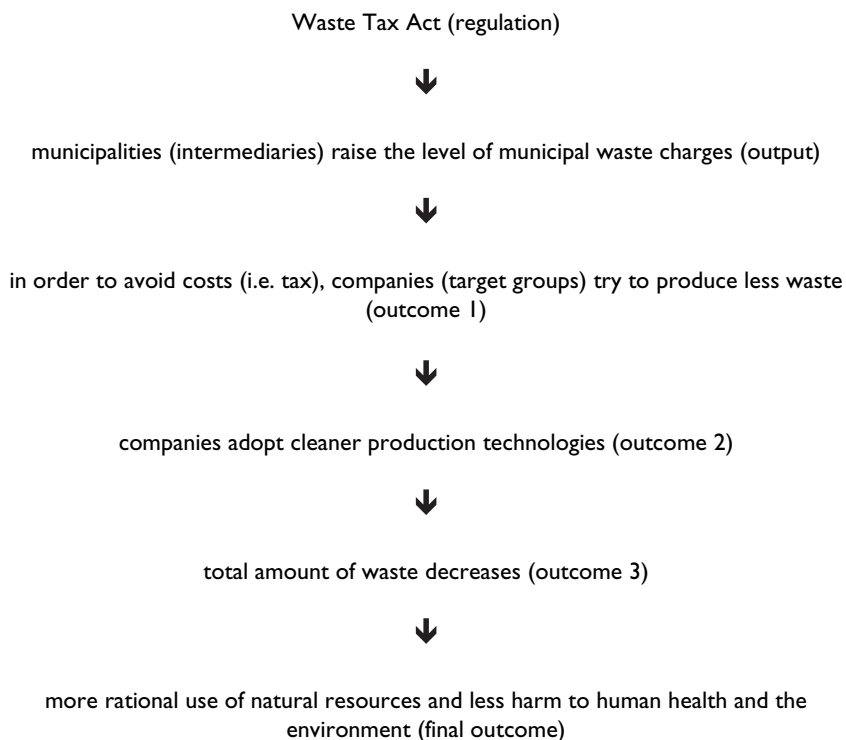


Figure 2. Reformulated Intervention Theory of the Waste Tax Act

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the company or regional level. However, this new intervention theory led us to examine the evidence available two years after the adoption of the waste tax from a new perspective: the adoption of cleaner production technologies would probably take years. Alternatively, through studying the cost of waste management at the company level, the cost was found to be relatively low and the reduction of waste was driven more by the cost of raw materials. As the cost of waste management was low in relation to investment in cleaner technology, we concluded that the waste tax is not effectively promoting waste reduction at source.

Furthermore, based on statistics and the interviews, it was possible to conclude that the waste tax has been effective as a policy instrument promoting recycling and recovery. Thus, the increased recycling and recovery has probably been one reason for the ineffectiveness of the waste tax in waste prevention, as recycling and recovery were more cost-effective ways of avoiding the costs of raised municipal waste charges for most of the companies. This mutual interdependence of the decisions on waste prevention and/or recycling and recovery was also a part of the intervention theory that was not explicated in the Government Bill for the Waste Tax Act.

Implications for RIPs Evaluations

The examples show some advantages of the use of intervention theories when evaluating RIPs retrospectively. Intervention theories have been used to formulate the right questions, i.e. questions that can be empirically assessed. In the example concerning the Environmental Protection Act, the first three assumptions of the intervention theory can be connected to certain characteristics of the administration and outputs. Because more than 600 permits (i.e. outputs) had been granted during the first two years of the implementation of the Act, it was possible to assess whether the assumptions about the characteristics of the outputs held. This enabled us to say something important about the effectiveness despite the fact that the (final) outcomes had not yet occurred. Concurrently, it must be noted that while the permits have not been changed as assumed at the beginning of the implementation process, this does not mean that they will never be changed. The evaluation itself may have an impact on the implementation and as a result, or for other reasons, the authorities may place greater emphasis on gaps and priorities in the future. In this context, the intervention theory was not used to predict the future, but to guide the evaluation.

One interesting conclusion is that although an impact analysis (use of the *impact* criterion) is impossible because outcomes have not occurred, this does not necessarily mean that the use of *effectiveness* as a criterion is also impossible – thanks to the concept of an intervention theory. However, the exact content of the effectiveness criterion must be reformulated in order to do this. In the section on evaluation criteria, it was noted that effectiveness refers to the degree of correspondence between intended policy goals and achieved outcomes. If outcomes have not yet occurred, a comparison of the objectives and achieved outcomes is impossible. Instead, it is possible to ask whether the outputs (or

immediate outcomes) include features that are preconditions to the achievement of the goals according to the intervention theory. Any answer regarding effectiveness given on this basis is only indicative. However, it may be interesting and useful, e.g. for the administrators of the policy instrument.

A reconstruction of an intervention theory may be useful even when it does not lead to measurable questions. It was not possible to design a measurable question concerning technological change on the basis of the intervention theory used for the evaluation of the Environmental Protection Act. However, the reconstruction of the intervention theory supported the conclusion that the data available were insufficient. The intervention theory indicated certain characteristics of the plants that were most likely to adopt new kinds of technology. This made it possible to understand the results, although not to confirm the validity of the assumption. In addition, the intervention theory explicated links between outcomes and factors other than the policy instrument itself. Furthermore, an explicit intervention theory can help the authorities to guide information gathering in order to carry out another evaluation later (by themselves or by outsiders), when it is reasonable to assume that the relevant information is available.

As the waste tax example illustrated, only the search for warrants, identifying missing links in or between different propositions, can significantly add to our understanding of the effectiveness of policy instruments. Precisely because the designers of the policy instrument did not explicate the whole intervention theory, they had unrealistic expectations of the time frame within which the outcomes would occur and of the cost of waste prevention for the target groups of the policy instrument. These imperfections might be a consequence of political expediencies, or of the culture of law drafting. However, if the theory is incomplete or false, it is not surprising that the expected and publicly expressed outcomes do not occur.

Furthermore, it should be noted that RIPIs evaluation can shed light on the role of moderators (i.e. on contextual factors) that have not been taken into consideration when the intervention theory was originally constructed. Considering that these moderators (e.g. the implications of the effects of organizational cultures when integrating the different regulatory authorities that issue IPPC permits) can negate an otherwise sound intervention theory under a given set of circumstances (Dahler-Larsen, 2001: 337), this is an important additional argument for RIPIs evaluation.

Nevertheless, intervention theory is not a magic wand that produces information on something that has not yet occurred. A retrospective evaluation concerning RIPIs has its limitations, and proper use of intervention theory is not a solution to all those problems. If the outputs have not been produced or outcomes have not occurred, there is no information on them. In addition, it is possible that problems are due to the slow rate of data compilation and production by other parties, e.g. statistical authorities. Furthermore, if all the observations made confirm that everything takes place as is assumed in the intervention theory, this does not necessarily validate the whole intervention theory. Thus, the possibility of theory failure (i.e. the wrong idea underlying the intervention) should also be taken into account (Rossi et al., 1999). Further limitations on the

logic of RIPIs evaluation may be found in the theories of autogenesis or self-organizing systems (e.g. King, 2000; Hoffman, 2001). According to these theories, organizations may seem to continue to be the same but actually incrementally develop fundamentally new mindsets and strategies.

To conclude, there is extensive demand for early evaluations of policy instruments. Although the information on outcomes is often imperfect at this stage, the use of intervention theories facilitates an evaluation in these cases. This article concludes with five recommendations for those conducting ex-post evaluation of RIPIs. First, reconstruct the intervention theory utilizing a theory-based approach suitable for the evaluation (e.g. deductive, inductive, user-focused and/or policy-scientific). Second, select the criteria to be evaluated and define the links in the causal chain between the different criteria (see Figure 1). Third, identify those stages of the causal chains on which it is possible to obtain empirical findings and/or to make observations. Distinguish the evaluation criteria that can be fully used in the evaluation on the basis of the empirical material available. Fourth, regarding the rest of the criteria, consider whether it is possible to reformulate them so they can be linked to stages of the causal chain on which it is possible to make observations. If this is not possible, leave them out of the scope of the empirical evaluation. If these steps can be completed, you can carry out an evaluation, although the reformulation of the evaluation criteria may make it possible to construct only indicative results. This means that the conclusions based on the indicative results must be drawn with caution. Fifth, on the basis of social science theory, the likelihood of theory failure should be considered. The observations at the beginning of a causal chain do not necessarily reveal the existence of theory failure.

Notes

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2. End-of-pipe technologies are technologies that reduce emissions of pollutants after they have been formed.
3. Integrated pollution prevention and control, by bringing environmental considerations together, therefore lead away from an approach based on ‘end-of-pipe’ technology (i.e. reacting to pollution once it occurs) to one in which environmental considerations are given greater priority at the design stage of an installation (European Commission, 1992).

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