

Impact assessment procedures for sustainable development: A complexity theory perspective

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Abstract

The author assumes that effective Impact Assessment procedures should somehow contribute to sustainable development. There is no widely agreed framework for evaluating such effectiveness. The author suggests that complexity theories may offer criteria. The relevant question is 'do Impact Assessment Procedures contribute to the "requisite variety" of a social system for it to deal with changing circumstances?' 'Requisite variety theoretically relates to the capability of a system to deal with changes in its environment. The author reconstructs how thinking about achieving sustainable development has developed in a sequence of discourses in The Netherlands since the 1970s. Each new discourse built on the previous ones, and is supposed to have added to 'requisite variety'. The author asserts that Impact Assessment procedures may be a necessary component in such sequences and derives possible criteria for effectiveness.

Keywords: Adaptive networks; Impact Assessment; Sustainable development; Transition management; Governance capacity; Complexity theories; Requisite variety

1. Introduction

The International Association for Impact Assessment (IAIA) indicates 'Impact assessment is about making the best possible decision using the best available information in a systematic and proper manner. (...) It is (also) an essential part of good governance and a key to sustainable development' (Au, 2002). IA may be defined as an activity, which can be applied without obligation, or as a procedure, that mandates such an activity. Different forms of IA procedures are applied all over the world (Wood, 2003). The activity of IA, without obligation, is probably applied much more widely than that. However, there are also doubts about IA procedures. Policymakers may see procedures for IA as bureaucracy, since they may think that they are perfectly capable themselves to decide when the activity of IA is required. This is certainly the case in a country like The Netherlands, where the discussion about adequate procedures is highly politicized. It would therefore be most useful to dispose of a framework for evaluating the effectiveness of IA procedures. Do they contribute to more effective application of the activity impact assessment than would have been the case without a mandatory procedure?

There is a rich literature about different forms of IA and their effectiveness, which can be assessed through Wood (2003) and the IAIA's website www.iaia.org. In this paper, I

develop an argument for a different theoretical basis for the evaluation of IA procedures. To that end, I define Impact Assessment procedures as processes that have the following characteristics (See also [Nooteboom and Teisman, 2003](#)): It is a standardized (formalized) process to provide information about the impacts of possible actions, with the aim of 'improving' decision-making about these actions. The process has built-in checks-and-balances to ensure sound information, so that one party that has an interest in certain outcomes does not control the information. The checks are mandatory, which makes the process a legal procedure.

Several efforts have been made to evaluate the effectiveness of Impact Assessment procedures, or to propose frameworks for evaluating Impact Assessment (e.g. [Sadler, 1998](#); [Bartlett and Kurian, 1999](#); [Innes and Booher, 1999](#); [Kørnøv and Thissen, 2000](#); [Thissen and Twaalfhoven, 2001](#)). The purpose of this paper is to suggest a new approach, based on the idea that effective IA procedures should contribute to a sustainable development. In that sense, the difference with prevailing definitions of Strategic Environmental Assessment (SEA) is limited—since also SEA is supposed to help develop strategic (sustainable) alternative courses of action ([IAIA, 2002](#); [Au, 2002](#)). The same obviously goes for proposed systems of Sustainability Impact Assessment (e.g. [Lee and Kirkpatrick, 2001](#)), which, if mandatory, fall under the definition of IA procedures. A key idea of complexity theories is that of systems. Like ecosystems and market systems, there are social systems (e.g. [Arthur, 1990](#); [Luhmann, 1995](#); [Byrne, 1998](#); [Stacey et al., 2000](#); [Holling, 1973](#)). Each system, to survive in a larger, ever changing environment, must keep its wholeness as well as its 'partness' of a larger system in which it is embedded and on which it depends for survival and to which it gives a contribution and in which it competes for resources (e.g. [Wilber, 2001](#); [Teisman, 2005](#)). If a system survives, it may be viewed as sustainable. A possible definition of sustainable development is therefore: 'a system has a sustainable development if that development enables it to maintain its wholeness as an integral system, whilst also maintaining its role as part of a larger system on which it depends'. A company that goes bankrupt because of mismanagement, or a society that falls apart because of religious conflict, has not been sustainable because it has not preserved its wholeness. A society that collapses after it has run out of resources, has not been sustainable because it has not preserved its 'partness'. In either case, the degree of order of the system is not maintained, and chaos has increased. It is not capable anymore to deal with dynamics in its environment, whether this is due to internal or external causes. Obviously, social systems like corporations depend on markets, and markets depend on a physical (eco)system; all therefore at the end of the day depend on a sustainable 'system earth'. A second key idea of complexity theories is that of requisite variety; in the case of social systems this may be defined as the capability of the system to envisage the future changes in its environment and have a range of adaptive or proactive responses at its disposition, limiting lock-in into a development that precludes future adaptations (loosely based on [Ashby, 1956](#); see also [Beer, 1989](#); [Rotmans et al., 2001](#); [Rotmans, 2003](#)). If it succeeds, it has sustained through adaptation. The problem of

sustainable development as it has been defined, for example, by [Brundlandt \(1987\)](#), is that the social system that has to adapt is much larger, and more complex, than individual organizations or even individual societies. For example, climate change is a problem of the whole world. Would Impact Assessment procedures help to make such a complex system, the whole world population, more adaptive?

This paper has the following sections. First, I present a short introduction to complexity theories, to give the reader a clearer theoretical understanding of the term 'requisite variety'. Then, I focus on a succession of policy discourses about sustainable development that has occurred in The Netherlands since the 1970s. The aim is to identify how in this western industrialized country, thinking about sustainable governance has developed, and how this was related to IA procedures. I observe a large scale and long-term learning process and I suggest how, implicitly, the Dutch society has been looking for 'requisite variety'. Whilst many discourses were attempts to achieve a more sustainable development, there is wide acknowledgement of the idea that our development is still by far not sustainable enough. For such judgments, I make use of the prevailing opinion of policy makers in The Netherlands ([Nooteboom, 2006](#)). If our development really is not sustainable, then it will lead to collapse at some point in the future. However, this is not knowable for an individual scientist and he must rely on the analyses made by experts and on the discourses that emerge. Fortunately, in view of the aim of this paper, the idea that our development likely is not sustainable unless we find sustainable innovations does not seem to be very controversial among professionals. The main differences are in the realm of solutions: will we be able to find solutions before it is too late, are currently proposed solutions feasible, are they enough? Taking The Netherlands as example was a pragmatic choice; a description of this part of its history was available. Finally, I draw conclusions about the possibility to derive criteria for evaluation of IA procedures from complexity theories.

2. Key ideas from complexity theory

Complexity theories are still young under that name: about fifteen years. They are a merger of several sciences that appeared to have abstract ideas, sometimes implicitly, in common: political sciences (e.g. [Kingdon, 1995](#)), management and organization sciences (e.g. [Beer, 1989](#); [Stacey et al., 2000](#); [McKelvey, 2001](#)), public administration sciences (e.g. [Byrne, 1998](#)), with the more 'hard' sciences like biology (e.g. [Maturana and Varela, 1992](#); [Kauffman, 1993](#)) and physics (e.g. [Prigogine and Stengers, 1984](#)). Underlying complexity theories is cybernetics, the (mathematical) study of communication and control (e.g. [Ashby, 1956](#)), applications of which also have been known as systems thinking (e.g. [Senge, 1990](#); [Luhmann, 1995](#)) Complexity theories also build on chaos theory (e.g. [Gleick, 1987](#)). There is no unified complexity theory, but a number of consistent publications. Recent introductions to (social) complexity theory include [Flood \(1999\)](#), [Mitleton-Kelly \(2003\)](#) and the Principia Cybernetica Web

(<http://pespmc1.vub.ac.be/>). I select the following ideas of complexity theory, which offer a flavor of it, and in my view are key to evaluating impact assessment.

2.1. Systems, networks and feedback

Every observable item in the universe has connections with other observable items, and groups of interconnected items are, as indicated above, called systems. Certain social systems, i.e. systems of humans producing policies, are often termed networks, or policy networks. Since everything is directly or indirectly related to everything else, we may speak of one huge system with a nested structure of subsystems (e.g. [Prigogine and Stengers, 1984](#)). All subsystems evolve (change) in communication with other subsystems, sometimes slowly and sometimes quickly (non-linear change); the change is determined by interplay between the characteristics of a subsystem and the changes of its environment. If different subsystems mutually influence one another's development, there is co-evolution ([Kauffman, 1993](#)). Causality is circular because members of governance networks influence each other without one being in control over the others; they all change together or there is no change at all. Hierarchical relations in human networks, suggesting a linear causality, are at best partial and temporary, as already noted in his own words by Machiavelli in 1513 ([Machiavelli, 1992](#)). The same is obviously true in ecosystems, where a predator's population size is as dependent on that of its prey as vice versa. Change in networks is caused by positive feedback, whereas negative feedback retains the status quo, which may be a constant direction of development (e.g. [Morgan, 1997](#)). Only under less complex conditions, which often are simplifications, uni-directional cause–effect analysis that is frequently used in IA, can give a meaningful explanation of change.

The terms positive and negative feedback are definitions and no value judgments. From the point of view 'never change a winning team', inertia can be beneficial. Inertia can also mean a steady development, where the future can be predicted through extrapolation. Further more, there are different nested system levels, and negative feedback on one system level may cause positive feedback on another level. This is key to understanding the possible benefit of IA. IA may create feedback between different planning sectors, like energy and environment, in the form of checks and-balances. A proposal is evaluated from other points of view than the ones that have produced it. The evaluation results in a 'yes' or 'no', but is not itself an appropriate platform to develop 'implementable' alternatives. There is at the formal stage hardly any possibility to propose major changes, other than mitigative measures. Major change would require positive feedback from the other side, since such a development process requires close cooperation and time. Therefore if IA creates any effect at its formal stage, it can at best create negative feedback. The 'yes' supports the status quo of development. If a proposal is formally rejected, an alternative proposal may be developed, and new ideas may receive positive feedback in that process, until support grows enough for these ideas to consolidate into a

new proposal, which is submitted to a second formal IA, where it may meet negative feedback again. Whether that is good or bad, obviously depends on one's point of view.

2.2. Coopetition to create positive feedback

Time and again, studies have shown that policy innovations meet negative feedback, either during their implementation (the famous study by [Pressman and Wildawsky \(1973\)](#) who concluded 'Great expectations in Washington are dashed in Auckland'), or, before implementation, in impact assessments. The reason could well be that those who propose anew policy are keen on creating voluntary alliances with all who will benefit from the proposal, whilst they tend to forget those who will be adversely affected. Mandatory checks-and-balances are then more likely to create negative feedback than positive feedback. On the other hand, such negative feedback crucially may result in positive feedback at another system level. It may serve as a driver for cooperation.

Many theories of policy networks have stated that cooperation to develop more widely acceptable policies, only can start after the participants have become aware of their interdependency (e.g. [Kickert et al., 1997](#)). Without such awareness, the benefits of cooperation are unclear. The key idea is that IA procedures force the actors to immediately face their longer-term interdependency. It brings interdependencies to the short term. Without a basic level of cooperation, and in a democratic system where a majority counts, IA procedures can be used to delay decision-making. IA procedures may give an early argument to opponents of a proposed policy. Under such conditions, proponents may decide to cooperate with opponents in a learning process to generate innovative ideas that are more acceptable in the first place. Clearly, such wonder-ideas may be difficult to find in the short term. Both parties therefore should accept that in the short term it might be inevitable to accept 'unsustainable' courses of action. Cooperation between opponents is termed 'coopetition' ([Branderburger and Nalebuff, 1997](#); [Hamel and Prahalad, 1994](#); [Von Krogh and Roos, 1998](#)), and it requires the ability to think at different social system levels in order to acquire the trust required to cooperate. Parties can be competitors or opponents in the primary short-term political arena, whilst they also cooperate on another, secondary, 'long-term' playing field. IA procedures may create negative feedback in the 'short-term game', e.g. the arena between planners and environmentalists, while it may induce these groups to also work together, generating positive feedback, about rules for future plan implementation or renewal. Put in yet other words, players may be competitors in a primary short-term game, whilst cooperating in a secondary long-term game, redefining the rules of the primary game. Reversely, ideas about interventions developed at the secondary level are aimed to be acceptable at the primary level, without distorting the competitive relationships. This is also a key idea in network organizations (e.g. [Mitleton-Kelly, 2003](#)).

Cooperation between competitors depends on the conduct of the individual policy maker—are they willing to invest where they could be opportunistic? Do they see the tensions created at primary system level, like the tension between planners and environmentalists

using IA, as risks or as opportunities? Answers have been given from several sides. [Fritz \(1989\)](#) has described creative use of social tensions. [Axelrod \(1997\)](#) has analyzed this from the point of view of the evolution of norms for cooperation in game theoretical settings. [Beck and Cowan \(1996\)](#) and [McLelland \(1987\)](#) provide a structure of human motivation, and [Heylighen \(1992\)](#) explains how such conduct could have evolved. Given the right conditions, behavior may evolve that uses the tension created by negative feedback, to develop innovative ideas that receive positive feedback at the secondary level. The problem is, these innovative ideas often meet barriers.

2.3. Barriers to proactive change

Social systems, or rather the people in them, may react to expectations of market developments or of exhaustion of non-renewable resources like biodiversity. These expectations can be influenced by the looming exhaustion of resources or social injustice that is seen as untenable on the long term. However, imperfections of the market and of the institutional system that produce the direction of our development (like possibly a high tax on labor, low on natural resources) are difficult to correct. They are intrinsically interwoven, creating an inert (reactive) web of interdependent actors (e.g. [Kickert et al., 1997](#)). I will term these webs power networks. Those who try to be proactive, run into the barriers of vested interests. Overcoming such barriers requires either catastrophic events that influence the public opinion ('emergency breaks law'), or a larger degree of cooperation throughout the whole web of actors.

It is useful to elaborate on barriers — they must be understood before they can be dealt with. Barriers are encountered in the form of political dispute, which is settled in power networks(arenas). There, knowledge is only used if it helps actors to support given interests. Since power battles between interdependent actors are costly, there is some bonus for looking for a joint perspective, which can lead to 'negotiated knowledge', or 'serviceable truth' ([Jasanoff, 1990](#)). Yet, urgent information that doesn't lead to imaginable realistic alternative courses of action is ignored. To become realistic, those implementing the alternative action should benefit immediately, either financially or politically. As long as such is not the case, complexity leads to a fragmented approach dominated by vested interests. These are the barriers, the negative feedback, proactive persons run into, even if they give each other positive feedback in alliances for change.

2.4. Management of tensions to create sustainable attractors

A system only changes if it is under tension, like the tension between a policy discourse aimed at economic growth and a policy discourse aimed at sustainable development. Such tension can, in some degree, be created by formal procedures, since these create interdependencies that place a bonus on some degree of cooperation. However, how the system reacts to such tensions depends on many factors, like the willingness to invest in proactive change, the available social capital(e.g. [Putnam, 2000](#); [Fukuyama, 1995](#)), the legal culture, the amount and direction of tensions, etc. Below a critical value level of

tension, a system remains inert, and above a higher critical value, the system breaks down into chaos. Only between the two critical values, the system can adapt to changing circumstances whilst retaining its internal complexity (McKelvey, 2001).

In which direction a system under tension develops, is determined by its so-called attractors (e.g. Gleick, 1987; Maturana and Varela, 1992; Morgan, 1997). These are created by the behavior of the units in the system. An important kind of attractor is the strange attractor, which is defined by the directions it does not follow, leaving many possible futures open (e.g. Morgan, 1997). On this path, development may be linear (or incremental) and at times non-linear. When the time is ripe for non-linear change, the butterfly-effect occurs: 'a butterfly in Rio causes a storm in Texas' (Gleick, 1987). It moves quickly to a new equilibrium of steady change until an unknown next transition. Sustainable development may also be seen as a strange attractor, driven by the desire of a system (or of its units that depend on it) to persist (Judge, 1994). This desire increases the reflexivity in the system, looking for ways to still influence a development that otherwise is not under control, with the aim to prevent an unsustainable lock-in. Its occurrence depends on the conduct of policy makers — are they motivated to put an effort in cooperation, looking for new directions? If policy makers understand the behavior of the social systems they are in, they can consciously try to develop interventions that are politically acceptable in the short term, whilst they contribute to tensions that create a strange attractor to long-term ends. This is called management of tensions (McKelvey, 2001). Management of tensions is applied in most organizations, creating incentives for employees or departments to perform. It may also be consciously applied at larger system levels. The very idea of separation of powers in a democracy, as proposed by Montesquieu in his *The Spirit of the Laws* from 1748, is an example. IA procedures also create tensions in the political arena, and these are therefore another example. IA, as will be elaborated later in this paper, can be used to consciously manage tension to create a strange attractor away from an undesirable development. Interestingly, the official rationale of IA procedures is not 'to create political tensions that contribute to a sustainable development'. It is normally something similar to 'to take environmental impacts into consideration', which also serves other needs than sustainable development. The effect of an IA procedure may well be that it will mainly benefit future decisions, while having a more limited impact on the decisions which the IA was meant to inform and influence.

The idea of sustainability as strange attractor may be difficult to comprehend for those who are not familiar with complexity theories. Sustainable development, like any other strange attractor, cannot be precisely defined. It has to be the outcome of a search process, but the search never ends. It is one of the possible outcomes of our development as the cumulative result of millions of small actions. As long as circumstances remain favorable, i.e. the tension on our system does not exceed the second critical value as indicated above, we may be able to achieve a development that, in hindsight, satisfies us. We may know what we don't want, but it is difficult to define a new course that is acceptable to all, and

that can be implemented as a business case (assuming the market has to produce our development within government-defined conditions). Such a business case for sustainable development can only slowly develop through a series of small interventions that add up to larger breakthroughs, which cannot be controlled by anyone. These interventions should be consciously created with that aim, based on our ideas of what is more sustainable and what is less. (Note, that 'quality' may be seen as another strange attractor, and in fact is in many ways similar to sustainable development; the latter puts specific focus on intergenerational equity. For this reason I have defined IA procedures above as contributing to 'improved' rather than 'more sustainable' decisions.)

2.5. Requisite variety

Tensions can only create strange attractors if their value is between both critical values, as indicated above. Too little tension creates inertia; too much tension causes chaos. These critical values are, theoretically, determined by the complex adaptive system itself; the conduct of its members (e.g. [Beck and Cowan, 1996](#); [McLelland, 1987](#)), their cognitive abilities (e.g. [Simon, 1957](#)), their interaction or social capital (e.g. [Putnam, 2000](#)). However the adaptive capacity (or learning ability) of social systems is an enigmatic phenomenon that is not well understood, despite the literature about social learning (e.g. [Brown and Duguid, 1991](#); [Flood, 1999](#); [Levitt and March, 1988](#); [Nonaka and Takeuchi, 1995](#); [Schön, 1973](#)). From the theoretical point of view of cybernetics, if we view the world as a nested system, these capacities should lead to 'requisite variety', an equally enigmatic term. The Law of Requisite Variety ([Ashby, 1956](#)) indicates that 'to ensure a given system has a specific value at a given time despite turbulence in its environment, a controller or regulator must be able to produce as many different counteractions as there are significant ways in which variations in the environment can impact on the system'. Translated to complex social systems, which have no external regulator, a subsystem can co-evolve with its environment, only if it can create complex (creative) behavior that matches the complexity of the changes in its environment. If it succeeds, it evolves without catastrophic collapse. The internal complexity remains, in an evolved form.

The operationalisation of Ashby's law for real life ecosystems and market systems, significantly influenced by man, is difficult. It depends considerably on the capacity of individuals to self-organize into groups that can lead a proactive change of power networks (as introduced in Section 2.3). These groups engage in cooptation without having a clear assignment from their superiors, and often without getting an immediate reward. Yet, they effectively develop ideas for interventions that are sustainable from multiple points of view. They act like a collective policy entrepreneur in terms of [Kingdon \(1995\)](#), which makes them convincing in the eyes of those in power. Such groups must be aware of the need of change for the joint benefit, as well as the inertia of their power contexts. In [Nooteboom \(2006\)](#) I term such networks adaptive networks to distinguish them from other learning networks. The impact of impact assessment procedures therefore

depends on whether they help the self-organization of such groups by putting in place a social tension that creates opportunities for adaptive behavior.

The independent regulator hypothesized by Ashby then becomes an emergent property of social networks, similar to the human consciousness and intelligence created by neural networks in the brain. Their wiring, the pattern they create, is an emergent property because it is constantly recreated by the individual neurons/policy makers through their collective behavior, and not observable for the individual. The brain/social system becomes capable of reflecting the complexity of its environment in its internal patterns. This creates a variety of options for conduct of the whole, resulting from individual behavior. The person/social system shows complex, proactive behavior. Self-organization leads to co-evolution of ideas between different components of the social system. This may include ideas about desirable development and action in economic sectors, the government, and the green movement. The organization as brainmetaphor has been vividly described by [Morgan \(1997\)](#). The adaptive management of social ecological relations has been described by [Holling \(1973, in: Walker et al., 2004\)](#). Attractive as these ideas may theoretically be (they may create attractors themselves), they have not been operationalized yet for social systems. 'Requisite variety' of social systems cannot be measured. There have been efforts to evaluate social capital and connectedness in networks (e.g. [Moody and White, 2003](#)), but there is no wide agreement about methods.

3. A history of sustainability policies

Above, IA procedures have been theorized as an instrument for the management of tensions, enabling a strange attractor for the development of social systems, making these more sustainable. In this section, I look for empirical proof of that. I reconstruct why IA has been introduced, and what its effects have been, in terms of 'discourse'. This leads to an interpretation of a large-scale social process, where a society has learned to better adapt to changing circumstances, thanks to, among others, IA procedures. [Hajer \(2003\)](#) defines a 'discourse' as an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices. Discourses are brought forward by policy networks that use a set of arguments that make them popular to some extent. From the point of view of complexity theories, discourses can be seen as 'virtual organisms', systems at a secondary level, uncontrolled by any person or organization, although each discourse needs its heroes. They expand or shrink as living organisms in an ecosystem where they have to compete with other discourses. The call for Impact Assessment is itself such a discourse, which was born in the 1970s, and it is still very much alive today.

Thinking about IA as an instrument for sustainable development is embedded in a wider discourse about sustainable development. A sequence of sustainability discourses has evolved since the 1970s. These discourses may show signs of thinking in terms of complexity theories, and in the following reconstruction I will look for such signs. An interpretation of the development of these discourses and the motives of those who have

supported these discourses may give indications about their implicit views about 'requisite variety'. I am going to make such an interpretation in the following paragraphs. I am aware that this is dangerous, for three reasons. First, complexity theory has to be accepted as theoretically valid before these interpretations become meaningful. Second, because complexity theories themselves are recent and not clear cut, and the involved policy makers must have operated quite implicitly, and third because empirically validating complexity theories purely on the perceptions of people may lead to circular reasoning. There is then no proof that it actually has contributed to a sustainable development. Despite these objections, the analysis hereafter may speak for itself. It is mainly based on a historical review I have done for The Netherlands ([Nooteboom,2006](#)). There can be, and probably are, similarities with many other countries.

3.1. The impact assessment discourse

The first discourse in the sequence is the impact assessment discourse. The adverse impacts of our development have fuelled upcoming discourses in the early 1970s. The club of Rome had influenced public opinions through its world model ([Meadows et al., 1972](#)). In the same period, citizens increasingly complained against developments in their direct environment. Knowledge was in both cases accepted as helpful to make policies and projects more acceptable. It helped to reduce the adverse impacts of development proposals by improving decision-making. However, it became clear that such knowledge was not applied sufficiently, since our environment still deteriorated. Available knowledge was, apparently, not sufficiently linked to decisions. Impact assessment procedures were thought to assist. These were hoped to make decision-makers more sensitive for the impacts of their decisions in an early phase, when they still were in charge, and not long after the next elections when many impacts become manifest. However, by 2006, evaluations of impact assessment never clearly showed an improvement of strategic decisionmaking in terms of becoming significantly more sustainable ([Wood, 2003](#)). [Wood \(2003, p 10\)](#), indicates 'there has been, as yet, no reliable quantification of the effectiveness of EIA. It may be that this is not possible'. On the other hand, involved policy makers often indicated they had learned valuable lessons (e.g. [Ten Heuvelhof and Nauta, 1997](#)). IA may raise some awareness, but rarely seems to directly lead to sustainable strategic alternatives.

In the 2000s, IA at different levels of decision-making about development projects is still widely accepted as necessary in The Netherlands, but most IA procedures seem to be more driven by European Union requirements than by wide support at home. For example, the European strategic environmental assessment Directive has been implemented at the minimal level, and a draft law has been published to reduce the EIA Decree to the basic requirements of the EU Directive on EIA (details on www.vrom.nl/). It is sometimes said that in the Dutch legal culture IA easily may create a spiral leading to a battle of reports, facilitated by the judges. The judges primarily look for a rationality of equality: each developer under the same conditions needs to undertake the same

assessment. Judges are said to have difficulty assessing the relevance of specific information in specific contexts of decision-making. If a road was designed on location X, the impact on species S has been predicted in detail, then this should also be done for a road on location Y, whether or not this is relevant in the specific decision-making context of X and Y. IA creates in the minds of planners a minefield, since you never know what a judge will do when it comes to appeals: conditions are not that easily comparable between decision contexts. Developers and competent authorities therefore often assess impacts in more detail than they actually think is relevant, with the sole aim to prevent a legal risk. By doing so, they are creating jurisprudence for the next developer, who is forced to follow their example and also gather more information than necessary. Under complex conditions, there are always opponents who will not cooperate, they ask for appeal, and thereby open the alleged downward spiral of trust.

In the Dutch domestic debates about IA, its beneficial effect on the support for policies is acknowledged; it has for example been the focus of a recent evaluation of strategic environmental assessment by the Ministry of Transport, Public Works and Water Management, where it was shown that the IA had created positive feedback on proposed assumed sustainable alternatives (Van Buuren and Nootboom, 2007). The question for many policy makers seems to be where to strike the right balance in the degree of mandatory procedures. To them the question is: under which conditions does the procedure help a learning process, and when does it overshoot this purpose? At the moment, the issue remains politicized.

3.2. The participative planning discourse

In the 1980s, many became aware that IA procedures are not enough. Society also needed to change the planning process itself, which is how the participative planning discourse emerged. Different affected groups and their counterparts in government should sit together and develop the plan. A lot was written about public participation and its different degrees, from only informing the public to allowing the public to participate in co-production (e.g. Arnstein, 1969; Healey, 1997; Edelenbos, 2000; Woltjer, 2000). Several experiments have been done, and new practices have evolved. Impact Assessment was often incorporated in the process without delaying it. In The Netherlands, this has culminated in the 1990s into the so-called Greenpolder Model: in this model, Cabinet asked the advice of societal platforms about spatial decisions. These platforms would include representatives from all stakeholder groups that were expected to have political influence, foremost the environmental NGOs. In certain cases this was successful like the extension of Rotterdam Port, where Cabinet and Parliament accepted the platform's advice (e.g. De Bruin et al., 1999; Deelstra et al., 2003; Weggeman, 2003). This is a successful case of coproduction. Evaluations indicated that the mandatory IA for this specific decision had not been of significant added value to this process (e.g. Weggeman, 2003). A possible interpretation is that previous IAs, for earlier decisions, had already done their job to create a sense of interdependency, trust and cooperation. Similar practices had

become normal practice in the planning of major infrastructures, and in urban and rural restructuring.

However, today, neither social scientists nor policy makers regard such processes of participative planning headed by the government to be successful in addressing more complex kind of problems — like sustainable development (e.g. [Rotmans et al., 2001](#); [Rotmans, 2003](#); [VROM, 2001](#)). Social tensions had not been removed, since development still clearly had an unsustainable direction: the tension between discourses for economic growth and discourses for sustainable development had not diminished. However, the involved policy makers often have developed compromises for the short term, under a mutual understanding that they would engage in a joint search for sustainable innovations. Hundreds, perhaps thousands of policy makers from all societal domains have worked together in such participatory processes, and they have learned that their opponents did have valid points, and that an alternative proposal, ready to be implemented as a business case, was not available. This was fertile soil for adaptive (learning) networks. The practice of participative planning is still continued without the hope that it will immediately generate solutions that are acceptable to all, or that are completely sustainable. The only mandatory procedure is still the basic transparent planning procedure, with IA attached to it.

3.3. The factor 20 discourse and the sustainable corporate governance discourse

In the mid-1990s, disappointment with IA and participative planning dominated in the Dutch environmental movement. Both had not made development significantly more sustainable compared with the size of the sustainability challenge. An influential national policy on sustainable development, the 4th National Environmental Policy ([VROM, 2001](#)), made no mention of impact assessment. A part of the movement started to work together with large and influential private companies in sustainability research programs to develop alternative development scenarios. A view of desirable futures was developed and ‘back casting’ was used to identify pathways from the present to the desirable future. It was clear that a much more sustainable development (‘a factor 20 more environmentally efficient’) was technically and economically possible. Well-known, government facilitated programs were DTO (Sustainable Technological Development; references to be found at <http://www.dto-kov.nl>) and NIDO (National Initiative Sustainable Development; references to be found at <http://www.nido.nu/home/english.php/>). Companies, the place where power ultimately had to change their attitude to allow sustainable transitions, participated at CEO level.

However, despite a huge load of convincing knowledge, corporate decision-makers still did not want to implement these alternative scenarios. Resistance continued to emerge from vested interests, or some legislation blocked implementation. A frequent complaint was about EU legislation: ‘the EU does not allow us to implement sustainable development’. A frequently used example was the limiting of national possibilities to raise taxes on fossil energy. This was done for good economic reasons, viz. to prevent

distortion of the European single market. The underlying problem was that Dutch policy networks could not reach agreement, in a sufficiently large social network, about a complex set of interventions by the public and private sectors. Again, there was no 'implementable' business case. Like in the case of participatory planning, here also networks of policy makers in different societal domains shared a frustrating experience. Both contributed to the next discourse, which may be termed 'systems thinking in governance'.

3.4. 'Systems thinking in governance' discourse

Both the participative planning and the factor 20 programs had created a widespread awareness of interdependency between the public, private and civil domains and frustration with the prevailing policy development practices. Many people from all domains knew that about each other, and had come to trust the intentions of the others. There were calls for 'strategic stakeholder dialogues'. Despite the fact that still many environmentalists did not trust CEOs in general, there was a will to cooperate among forerunners from all domains, but they did not know how. And these networks extended into Cabinet, Parliament and boardrooms. These groups became aware that to enable a successful discussion about the barriers to sustainable change they had encountered, a different process was needed. That process would have to be separate from the normal policy networks that discussed about concrete interventions and decisions to be made on the short term. Yet, it would have to be connected with short-term decision-making, because there it would need to have its effect. This was difficult: how could policy makers who are influential in short-term decisions spend part of their time with activities that are not oriented towards short-term decision-making? The private world did not believe the public world would be able to become detached from its rigid, fragmented programs. The public world did not trust that the private world would be interested in anything else than shareholder value. Both did not believe that the other would be capable of engaging in cooperation, as they were preoccupied with doing well in the short-term competition in the economic and electoral market respectively. The joint experiences, however, created an opportunity. When in 2001 the 4th National Environmental Policy NMP4 (VROM, 2001; an influential preparatory study was Rotmans et al., 2001) was developed. Members of the networks that had previously been engaged in DTO, NIDO and the green polder model influenced that process and used it to obtain political acknowledgement of the need to spend time in a social learning process. Systems thinking officially entered government policies, and it was debated in Parliament. NMP4's essential idea was that persistent environmental problems need complex interventions that cannot be developed by one organization, like the environment ministry. If one organization develops such interventions, the resulting propositions would run into barriers. Merely putting an intervention officially on the agenda is enough to start the power games. Forerunners from all domains should therefore develop joint perceptions of roads to sustainable development, which were termed 'transition paths'. They should do so outside the political limelight, but in close connection with the highest level to be ready for windows of

opportunity. These groups should help decision makers take first steps on these roads whilst keeping options open, aware that many other influential decisions are still part of routines or individual responses to changing circumstances, rather than part of policy discourses.

Five ministries (transport, energy, agriculture, international affairs and environment) started cooperating in this way as of 2001, and it was termed 'transition management'. In 2005, the finance minister joined and six ministers have signed an agreement to establish an Interministerial Program Directorate for energy transition management. This Program's task was to hire chairs to organize societal platforms, and to organize the dialogue between these platforms and the six ministries. It should try to ensure that these ministries speak with one voice to the platforms, so that the government could become a more reliable partner for corporations, and the gap between public and private could be bridged in some degree. The communications between public actors on the one hand, and private actors on the other, would include a wider range of options and through learning-by-doing in dynamic dialogue a more complex answer may emerge, supported by the organizations that were needed for implementation. By mobilizing a wide range of knowledge through this dialogue, impacts are constantly reassessed before a next step is made. For example, the involvement of the environmental movement was assumed to ensure that possible adverse impacts of biofuels on third world ecosystems became exposed from the start. However, to allow for flexibility, formal procedures would not be applicable until proposals were formally proposed for adoption and actually implemented.

The participants of this still ongoing process are mostly aware that their proposals have no legitimate status. Their process is only aimed at the identification of proposals that could be acceptable to power networks from different perspectives. In the case of major complexes of interventions, legitimacy will still have to be created in all involved domains. Each domain has its own discourse and rationality, created by elections, business cases, or supporters. The effectiveness of these processes in terms of sustainability can only be evaluated in the future looking back, but these processes have clearly had their impact on (support for) investments made, in particular in the energy system.

4. Toward an evaluation framework for impact assessment based on complexity

4.1. Have IA procedures contributed to requisite variety?

The succession of discourses as described above can be seen as a large-scale social learning process towards the acknowledgement of the importance of adaptive behavior: the awareness that cooperation at a secondary level is needed, even if actors are opponents at primary level. This includes the sense that systems thinking, used as a popular, intuitive name for thinking in terms of complex systems, helps to analyze the joint situation and to develop interventions that contribute to sustainable development whilst being acceptable on the short term. It is my personal impression that IA is also increasingly acknowledged

as an instrument for positive feedback at secondary level, contributing to a growth of cooperation for long-term joint interests—i.e. social capital, governance capacity, etc. Discourses about IA are normally less subtle because they form part of a political fight over procedures, but many individuals in my experience indicate that it is mostly a matter of balance. This position also transpires in a letter from the transport minister to Parliament, which had been based on the advice of the so-called Committee ‘Consultation new style’, chaired by professor Pieter Tops. This letter contains the following phrase: ‘the involvement of citizens in economic spatial development decisions can become more effective through adaptation of procedures, customized implementation and professionalizing. (...) During policy preparation, consultation occurs aimed at using the thinking power of society through creative and constructive forms of involvement. In the draft decision phase, a “final interests test” occurs according to the appropriate public procedure. This final test functions as a safety net for issues and interests that have been overlooked and for citizens who believe that their personal interest has been disproportionately adversely affected. The final test forms the coping-stone of the consultation and the hallway to a test by a judge’. (VenW, 2006). Here, the thought is clearly that the negative feedback in a relatively simple formal phase serves as an incentive for individuals to engage constructively (i.e. aiming at positive feedback) in an earlier informal consultation phase. The letter identifies ‘professionalizing’ as a need that will be fulfilled through this approach —suggesting that a mix of formal checks-and-balances (i.e. a form of Impact Assessment) and open implementation will be of assistance to a process of social learning which leads to a more professional behavior of policy makers.

Implicitly therefore, but at times also explicitly, several ‘fuzzy’ discourses emerge that all borrow ideas complexity theories. These may therefore be summarized as a ‘systems thinking for governance’ class of discourses; a notable one is ‘transition management’, another one may be termed ‘balance in IA procedures’. University professors are frequently asked to support these discourses, like Prof. Tops of the Committee ‘Consultation new style’, above, and Prof. Rotmans in transition management. Policy makers operating at the highest management level have even used terms like ‘requisite variety’ explicitly when they explained their conduct (Nootboom, 2006). The transition management discourse has survived at least five years since NMP4, with significant success in terms of the support it received at the highest level throughout this period. Parliament discussed annual progress reports. Academic research has been initiated in the area of sustainable governance, and interested policy makers have convened many times to discuss the principles of ‘transition management’. The dilemma they face is that this activity cannot be standardized or formalized, since it is difficult to allocate resources to ‘transition management’. The problem is that it does not cater to clear-cut results, and therefore it is not accountable, and vulnerable to skepticism and opportunism. As transition management is claimed to lead to more concrete results, the separation between the primary and the secondary level of interaction becomes blurred. Therefore, those

active only at the primary level (i.e. in power networks) without being conscious of a process at the secondary level (i.e. in adaptive networks), are unable to distinguish the different roles played by individuals acting at both levels. Several individuals of – in ‘primary level eyes’ suspect – corporations like Shell or ministries like the transport ministry, must act at both levels and are sometimes accused of acting in the self-interest of their organization. Reality is often that large organizations learn slowly, and insiders are needed to find interventions that can act as a lever for change in their organization—they can for example assess what the critical levels of tension are (see above), and which tension would have a creative effect. Individuals from these organizations acting at both levels must not only take political risks, but they also must be insensitive for the constant accusations of good willing, but impatient by standers. In hindsight therefore, the sustainability policy networks have learned the following lessons. In the 1970s they understood that knowledge about long-term impacts is relevant for decision making, but that it will not be applied in investment decisions unless there is some kind of mandate or obligation to at least provide information about impacts. Then, they learned that mandatory IA procedures do not directly create the cooperation needed to find sustainable alternatives in the specific decision for which an IA was undertaken. Next, they learned that organizing participatory processes does not lead to sustainable business cases because their outcome must be directly ‘implementable’. Finally, they learned that cooperating at a secondary system level, detached from short-term power processes but connected with power processes in the longer term, has a risk of never leading to proposals that can legitimize real market interventions. Adaptive (learning) networks have no legitimacy and must convince power networks through their arguments. They must find the openings in power networks to create ‘levers’ for change, politically acceptable at the short term, whilst indirectly leading to a wider change process, making use of positive feedback in the societal system. Yet, this has led to a process where six ministries cooperate at the highest level, and insiders indicate that for the first time the policy fragmentation that always has created barriers, may have been overcome. It seems that IA has been a necessary step in this 30-year learning process. Partly through IA, trust has emerged between policy domains, as a series of interviews with those involved with the green polder model and transition management has revealed (Nootboom, 2006). IA procedures had provided a platform for opponents to meet in consecutive procedures, develop trust and develop better cooperation in the context of procedures. That trust has therefore led to the relative successes that followed. Two uncertainties remain before we can know if IA contributes to requisite variety: has the overall learning process increased requisite variety? And what were to happen if IA were abandoned at the end of this succession?

4.2. Has the overall learning process increased requisite variety?

The effectiveness of the combination impact assessment, participative planning like in the green polder model, sustainability research programs like DTO and NIDO and transition management will remain difficult to evaluate. Policy networks operating at another system level, detached from power, are not legitimized to make formal decisions. Therefore the

impact of their efforts is always uncertain. A sustainable development still has not been achieved. This uncertainty is feeding skepticism, and the whole process depends on individual willingness and ability to operate at secondary level, which seems to be a weak basis. Breakthroughs that do occur are difficult to recognize as steps toward sustainable development — they may either be merely made to prevent lock-in into the wrong development, or they may be a step toward a larger, but still unforeseeable breakthrough.

Still, complexity theories suggest that this learning process is a step in the direction of requisite variety. The barrier between the public and private world, and between government and citizen, which has always led to a fragmented approach, is in some degree diminished. NGOs participate to ensure their points of view are considered. CEOs of forerunning companies from relevant sectors are now attracted to this interconnecting process, and they start to cooperate and make real deals about joint sustainable investments (Pers. Comm. Chair Platform Sustainable Mobility). Platform chairs explicitly manage the trust required for the necessary cooperation between competitors that represent the incompatible rationalities of shareholders and different kinds of voters and supporters. They also manage trust that the government will put the required conditions in place, without unnecessarily favoring certain solutions, giving all sustainable options an equal chance. Finally, therefore, knowledge may be linked to implementation power, through adaptive networks that not only learn, but also do: a secondary level emerges that actually influences power. (A frequent complaint against learning networks is that they might learn conceptually, but that they are incapable of implementing their ideas, i.e. to do something that is visible for the wider public). These networks therefore may be supposed to become increasingly capable of not only linking knowledge from all domains on a basis of trust, but also making proposals for change accepted and implemented. The patterns of knowledge and change they create are complex and dynamic. No individual policy maker oversees the whole pattern as it responds to changes in the economy and politics—which is why trust is so important. The proactive capabilities of society are likely to have grown. On the other hand, an equal amount of skepticism is also possible. There are still outsiders to this process who do not feel represented. Groupthink, collective misjudgment, is still a possibility. Vested interests have a sense of loosing if they do not anticipate changes in time. In Western policy processes, the interests of developing countries and future generations are only represented indirectly by NGOs (cf [Dryzek, 1990](#); [Latour, 2005](#)). Politicians do not dare to choose options that go against the immediate economic interests of their electorate. Sustainable development depends on incremental steps that act as levers for breakthroughs to a next level of change. Yet, these steps now may be assumed to be based on more collective thinking, where more minds and hands can be quickly mobilized as opportunities for sustainable interventions emerge. This is why I think requisite variety probably has increased.

4.3. What were to happen if we were to abandon IA procedures?

What were to happen if IA were abandoned at the end of this succession of learning processes? Would 'requisite variety' be lost again? Which kinds of IA remain constructive, and which have mainly become bureaucracy? Those who advocate abandoning, indicate that we have now changed our conduct and the activity of IA is applied wherever useful, without obligation. There is no need for procedures, which are indiscriminately applicable to all cases, even if impact assessment is not necessary. In terms of complexity theories, these advocates of abandonment implicitly indicate a 'strange attractor' has emerged, which attracts sustainable conduct and thereby increases requisite variety, our collective capacity to survive. The attractor is caused by a changed conduct of individuals in all societal domains—and this change has been the result of a learning process where IA has been a major factor. On the other hand, the attractor depends on trust between policy makers that have met one another during their involvement in decision making under IA procedures, and subsequent participatory processes. Newcomers to these processes would not have that chance if IA were abandoned. Also, the process may fall back to primary level if times get temporarily worse, e.g. if a new government were elected that has no interest in sustainable development. If that were to happen, the learning process would benefit from experiencing the interdependencies again, which IA procedures create. Therefore, there is considerable risk that the achieved complexity of our policy processes, needed to cope with the complexity of our problems, would collapse after a while if we were to abandon IA altogether. The question remains where do we draw the line? Which decisions require an IA, and which checks-and-balances should be created? As indicated above, the Committee 'Consultation new style' has already given one possible answer for the Dutch situation.

4.4. Criteria for effective IA procedures

At the start of this paper, I wrote that my intention was to explore the usefulness of complexity theories to serve as theoretical basis for an evaluation framework for IA procedures. I have provided a rough outline of the idea of IA procedures as incentives, the 'levers' proposed by [Senge \(1990\)](#), for the emergence of larger scale social processes at different, connected, system levels. Theoretically, there are several other ways of looking at it, like theories on impact assessment itself in its different forms, social learning, social networks theories, game theoretic theories, etc. It would be interesting to compare different frameworks, and identify similarities. Complexity theories, with the idea of 'requisite variety', potentially offer a relatively deep understanding of social processes. This includes the way knowledge is generated and used, and what procedures may 'do' to a society. Based on this general theory, theories for specific situations may be derived which may be easier to operationalize. These more specific theories may well resemble other existing, more pragmatic theories, which have already been operationalized for IA procedures.

On the other hand, [Wood \(2003\)](#) suggestion that evaluation of the effects of Environmental Impact Assessment on our development may not be possible is supported by complexity theory. IA produces its effects on our development in a very indirect way. Change of social connectedness and dialogue between the domains of wide ranging societal systems, what I have termed the secondary process level, is difficult to measure in the first place. The contribution of specific factors like IA procedures to such change is even more difficult. Procedures for IA, creating mandatory checks-and-balances in formal planning and decision-making processes, should create just enough interdependency at the primary level — so that the social tension reaches an appropriate level that leads to trust and complex, adaptive behavior at secondary level. The question becomes, where is such tension most constructive? Where does it lead to a social learning process and more trust? And where does it lead to stagnation, distrust, and unnecessary costs of decision-making? If procedures create too little transparency and hardly any negative feedback, they create no interdependency, and there exists no bonus for cooperation. Procedures must ‘irritate’ those who are subject to IA procedures a little. They need to be obliged to learn, and afterwards they may even be grateful (this was exactly what [Ten Heuvelhof and Nauta \(1997\)](#) have observed in a significant proportion of cases). However, as the administrative burden increases, the added value of more procedures diminishes. At a certain point the bureaucracy and negative feedback associated with IA procedures may become a barrier to effective behavior. An overdose of negative feedback, especially where action is considered urgent, creates stagnation, and the advocates of IA procedures risk losing their support completely. Where no procedures at all may lead to the ‘boiled frog syndrome’ (the frog doesn’t jump out of the water pan as it is slowly boiled—it has no procedures that give warning signals), an overdose of procedures leads to the ‘frozen deer syndrome’ (the deer stays in the car’s headlights — all options for action are rejected by an overdose of checks). Both animals are not sustainable.

Perhaps these issues are so context-dependent, as indicated in Section 2.4, that only insiders from the social system under tension can design the most effective IA system. At primary level, however, they have a strategic interest to plea for either abandonment or implementation of procedures, depending on their position. A fair evaluation may therefore only be possible in adaptive networks at secondary level; in fact adaptive networks probably have been responsible for the emergence of IA procedures in the 1970s. So here we may have witnessed a process of coevolution between adaptive behavior and the discourses creating more adaptive behavior, in a process of positive feedback. This process has met its limits and now we are looking for balance. Social scientists may provide theoretical criteria for such balance, but the insiders themselves must identify and assess the observable parameters. An independent evaluation based on facts is not possible, and it must rely on opinions from the inside.

5. Further considerations

Thus far, complexity theories only give a direction of thought about an evaluation framework for IA procedures. For those willing to engage further on this road, the following thoughts may be of interest.

5.1. IA procedures primarily for development consent decisions

At the level of strategic policies, which structure our development, IA procedures should be applied prudently. Strategies only have indirect impact on our development, because they first must be implemented through market interventions like development projects and legislation. They dynamically follow thinking in governance systems, reflecting prevailing discourses. Elections can easily turn around political discourse, which illustrates their dynamics.

IA procedures somehow should influence these discourses in order to have an effect on strategic policies. In theory it could do that, because interdependence between discourses affects the development of discourses. However, the dynamics of prevailing discourses about adequate government policies are difficult to follow for formal procedures. Alternatively, interdependency between discourses may be created at the less dynamic level of concrete development decisions, where more stakeholders groups are actively involved and where they may develop a sense of interdependency that feeds a more balanced development of the future discourses. The basic generative mechanism for discourses, as [Hajer \(2003\)](#) suggests, are the difficulties practitioners experience in their daily practice, be it in the economic market, in the electoral market, in bureaucratic struggle, or elsewhere. These practices are affected by concrete development decisions, and therefore also the discourses will be affected indirectly by these decisions, and practitioners become more aware of interdependency and more open for cooperation. The benefit of such IA for development decisions may only emerge in the farther future, when new development decisions must be made.

On the other hand, IA procedures may still be helpful at strategic level if government departments have a practice of preparing their strategies without considering and involving certain weaker interests. This probably has to follow a process at the political level, not to be in vain. The attention for weaker interests in strategic policy processes has to be driven by the political process itself, or politicians may simply not be interested in the assessments. Impact Assessment procedures may help to make strategic planners catch up with a political reality. The reverse, publishing impact reports about proposed strategies if politics has no interest in these impacts, seems less likely to become a lever for a co-evolution between the political process and the administrative process, unless first the political process has been 'sensitized' for these impacts. Such sensitizing may occur through IA at a level of decision-making where interests are more directly affected.

5.2. Transparency and closedness need to go together

Transparency is a paradoxical concept. If transparency increases, more policy makers from the private, public and civil domain and more citizens can be involved. The complexity of the transparent interactions grows, a complex structure emerges, composed of organizations, working groups, platforms, etc, which are all transparent, certainly for those with a keen interest in these processes. At the same time the amount of closed interactions also grows, behind the scenes of the transparent interactions. In fact, to reach an active society, as [Etzioni\(1968\)](#) has termed it, the adaptive (learning) interactions at large have to be differentiated to create requisite variety. An active civil society has to develop and become influential, in adaptive networks at secondary level of interaction, without taking over the constitutional powers. Closed interactions behind the transparent ones remain necessary to reach higher levels of trust before new ideas can be made transparent. These ideas will have to be acceptable for larger groups, which likely makes them more sustainable. If a closed stage were not allowed and everything should be exposed, like working in a glass house, vested interests would 'kill' every initiative, whilst when the time has become ripe for change, transparent procedures can still follow to create legitimacy. Sustainable development cannot be rushed only by creating transparency, but transparency reduces the likelihood that decisions are based on wrong, unbalanced or unfair ideas, and it increases the number of innovative ideas that can be taken into consideration.

5.3. IA also serves other needs

There are, of course, other reasons why we need IA procedures. They increase accountability of decision-makers, which may not only be useful to create constructive interdependencies, but also as a democratic principle. This may be especially true in countries with a less transparent planning system; IA may be the main instrument to create early transparency and, with that, accountability. Where adaptive networks may create strategic alternatives with long-term benefits, they do not address the impacts of developments that are already envisaged on the short term. As such developments directly affect citizens, citizens should still be involved in decision-making, if only to make them accept the situation and ensure they are properly compensated. An evaluation framework for IA procedures would not be complete without such criteria. At the same time, as difficult decisions remain unavoidable at the short term, the adaptive networks may search for interventions that reduce the need of such decisions at the longer term. Here, again, the case of the extension of Rotterdam port is illustrative (see Section 3.2). The environment movement agreed with this short-term decision about the extension, despite its belief that the Dutch economy should not remain dependent on international transport so much. They had made the step to engage in a strategic dialogue with representatives from the transport world, together making steps toward sustainable mobility on the longer term. What also made it easier was the environmental compensation that was included in the negotiation package — short-term gain. Yet, the key idea is that adaptive governance only indirectly leads to a visible change of our development. This is perhaps similar to what [Nilsson \(2005\)](#) asserts for Sweden.

5.4. Need for international research

This paper describes the learning process since the 1970s in The Netherlands. The idea that societal transitions are required, away from unsustainable development, is by no means unique for The Netherlands. It has also been proposed at least in the US ([National Research Council, 1999](#)) and Canada ([Standing Senate Committee on Energy, the Environment and Natural Resources of Canada, 2005](#)), but also for the world ([World Business Council on Sustainable Development, 2002](#)). A learning networks approach to sustainable development has been proposed, e.g., by UN Secretary General Kofi Anan, under the name Global Compact ([Ruggie, 2002](#)). The idea that social connectedness is important for well being, stability and economy has been proposed by several actors under the name social capital (e.g. [Putnam, 2000](#)). It has also been recognized in the international society of impact assessment (e.g. [Morrison-Saunders and Therivel, 2005](#)). The idea that IA procedures should not become too bureaucratic is also heard in other countries. It may be the case that there is a natural cycle that is followed by many countries, perhaps in a similar way as the discourses in The Netherlands. This would be an interesting field of research.

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