

## **Implementation as communicative action**

### *An interpretive understanding of interactions between policy actors and target groups*

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**Abstract.** Many social problems can only be solved through some form of governmental involvement. In this article, a model is formulated for policy implementation. The various criticisms against a top-down model of implementation can be taken into account by conceptualizing implementation as communicative interaction between policy actors and their target groups, each characterized by distinct rationalities (section 4) with important consequences for the likelihood of learning and behavioral change (section 5). As explained in section 3, 'communicative action' is being used to underline that we go beyond the top-down vs. bottom-up distinction, thus doing justice to empirical findings and adopting a post-positivist epistemology. Normatively, this expresses a critical approach to 'implementation as the continuation of politics with different means.'

The need for such an approach is illustrated by two case stories (section 2), one about fresh dairy packing in the Low Countries, the other one about nuclear missiles in the United States. Examples from these stories are used in sections 4 and 5 to clarify our model.

## **1. Introduction**

There is ample reason to maintain that many social problems can only be solved through some form of governmental involvement. The challenge is to formulate a model for policy implementation that is both helpful in meeting this need, *and* not vulnerable to the range of criticisms against the top-down approach to governmental regulation.

The earliest attacks rose from detailed empirical analyses of policy implementation processes (Murphy, 1971; Derthick, 1972; Pressman and Wildavsky, 1973; Mazmanian and Sabatier, 1983; Hofferbert, 1986). The findings of these studies have been provocatively summarized by Majone and Wildavsky (1978): 'Implementation is the continuation of politics with other means.'

Parallel to these analytical objections, political objections were brought by various authors, ranging from those suspicious of governmental intervention and societal planning, to proponents of more participatory views of democracy (Dobuzinskis, 1992: pp. 360-361). Finally, there was criticism from those who reject the underlying neopositivist view of goal-seeking human rationality. They hold that problem setting as the motor of the policy process is a matter of 'forward and backward mapping' (Elmore, 1985; see also Hoppe et al., 1987) between problem definitions and assessments of policy solutions. In this view, the distinction between policy formulation and implementation/evaluation gets blurred.

We suggest that these various criticisms can be taken into account by conceptualizing implementation as communicative interaction between policy actors and their target groups. We use 'communicative action' to underline that we go beyond the top-down vs. bottom-up distinction, thus doing justice to empirical findings and adopting a post-positivist epistemology. The use of the adjective 'communicative' can best be explained after two stories have been told (section 2). Once we have reflected on these stories in section 3, we unfold a model of implementation as communicative action, and use the two case stories to clarify it. Thus we contribute to a more praxeological interpretive perspective on the policy process, in the tradition of authors as Beiner (1983) and Sederberg (1984).<sup>1</sup>

## **2. Fresh dairy packing in the low countries and nuclear missiles in the United States**

Both case stories can be understood from the perspective of implementation as communicative action, although the policy issues they relate to could hardly be more different: one concerns packing fresh dairy products in the Netherlands, the other is about the development of three generations of submarine-launched ballistic missiles in the United States. The two stories clarify our framework and help us to explore the meanings of the adjective 'communicative.'<sup>2</sup>

### *Story 1: Towards a more sustainable packing of fresh dairy foods<sup>3</sup>*

This story starts around 1988, when the Dutch government published a Policy Plan on Waste Prevention and Recycling. As an elaboration of the document, a voluntary agreement ('covenant') on packing wastes was signed in June 1991 between the Ministry of Environmental Management (MoEM) and an association of enterprises who provide or use packing, the Foundation for Packing and Environment (FPE). The covenant included quantitative targets in all areas except for product recycling. In the latter area, severe disagreement between the government and FPE persisted as to whether or not multiple use packing systems were environmentally better than single use systems. As a way out of the dispute, a procedure for case-by-case decisions was agreed upon. Life cycle analyses (LCA's) were to be performed for specific product-packing combinations. If these analyses of a particular product indicated that multiple-use systems were significantly better for the environment, then industry would switch to multiple use for that particular product, unless there were major market objections against doing so.

After the covenant had been signed, FPE charged a group of specialists in public administration and environmental studies with designing a so-called '*proces standaard*' (guidelines for a good process). These guidelines had to ensure that the LCA's are performed in such a way that not only interested

market parties, but also representatives from environmental and consumer organizations would participate in the analytic process. This '*proces standaard*' was followed during the analyses of product-packing combinations in nine different product fields. The main deviation was that the environmental and the consumer organizations were represented by experts who more or less shared their perspectives, because they did not want to commit themselves too tightly through direct participation.

Fresh dairy products were also analyzed. In the Netherlands, social organizations had been campaigning for years in favor of replacing the milk carton (actually a laminate of carton and poly-ethylene, PE) by the glass bottle. After tough pressure by the social organizations, and although this was not prescribed in the covenant, industry eventually admitted to include, in addition to the carton and the glass bottle, also the poly-carbonate (PC) bottle, as an alternative multiple use system. The organizations were convinced that the PC bottle would stand the comparison with the milk carton much better than the glass bottle. They won their pledge, at the price of including the poly-ethylene (PE) bag as an optimized single use system.

The comparison of these four alternative packing systems led to surprising conclusions. The LCA showed that the PE-bag was clearly the most environmentally sound option. The PC bottle appeared better than the carton in most respects (including waste production and energy), but somewhat worse in the area of human- and aquatotoxicity. And, a conclusion that the FPE printed with bold letters, after all the years of campaigns: the environmental burdens of the glass bottle and the carton turned out to be comparable.

Nevertheless, although market parties could have scored tremendously by switching to the PE-bag, they did not. So, they missed the final victory in a long battle of prestige, a boost of their environmental image, and a cheaper dairy product in a time in which a vehement price war characterized supermarkets competition. One might be tempted to explain this with the significant drawbacks of packing milk in a plastic bag from the viewpoint of consumer convenience. These drawbacks were serious enough for the MoEM to refrain from pushing for the PE-bag. Yet, this fails to explain why one supermarket chain, Dirk van den Broek, together with one dairy firm, Menken van Grieken, brought the PE-bag into the stores. This is the riddle we focus on in this article.

### *Story 2: The development of fleet ballistic missiles in the United States*

The second story is about three generations of sea-launched ballistic missiles, which were developed to add a naval component to the air force operated missiles.<sup>4</sup> A new organization, the Special Projects Office (SPO), was charged in 1955 with establishing a working fleet ballistic missile (FBM) as soon as possible. Because it had to provide a 'proof of existence' of FBMs, SPO developed an attitude of technological prudence: do not promise more than you will surely be able to fulfill. As early as in July 1960, the first version (A1) of the so-

called Polaris missile was successfully tested. Later, a version with improved range and accuracy was developed. Yet, this Polaris A3 version also missed the combination of accuracy and warhead yield needed for a capability to kill hard targets. It was completely in line with the Navy's preference for a countercity strategy, which – contrary to a counterforce strategy – does not require a hard target kill capability. It took until 1963 before the Navy started – initially reluctantly – to give FBMs features that departed from strict countercity requirements.

In November 1963, Pentagon superiors ordered the SPO to develop a new generation FBMs, with enhanced penetration capabilities to attack defended industrial-urban targets and with a new warhead that was to be developed in cooperation with the Air Force (or better, with Lockheed). Reluctantly, SPO and Lockheed cooperated for some time on the development of the Mk12 warhead. SPO, however, both wanting to differentiate from the Air Force and to focus on a countercity capability, was not really interested in this 150 kiloton warhead. In spite of Pentagon pressure, and in spite of the growing support within the Navy for a hard target kill capability and a confrontational approach towards the Air Force, the SPO finally managed to get rid of the Mk12. The key was the possibility to choose a delivery system that could carry also other warheads than the Mk12. SPO's desire to be independent from the Air Force and to ensure that technology was optimized for Navy use was very strong. This is why the Office embraced the new type of delivery system, even though its guidance experts did not like the implication that a new type of gravitational (gyroscope) guidance system, including on-board electronics, would be needed. The Office eventually convinced Pentagon leaders that the Mk3, developed for but not adopted by the Air Force, would be an interesting alternative. Yet, the Pentagon, pressing for a hard-target kill capability, insisted that along with the Mk3 the larger yield Mk17 should be further considered and that accuracy should be significantly improved.

Yet, SPO did not want to go for the best possible accuracy: on the one hand, accepting an accuracy requirement would introduce an unacceptably high chance that the Office would not be able to live up to its expectations; on the other hand, SPO wished to stick to the differentiation approach towards the Air Force. Moreover, by then many within SPO were deeply committed to the finite deterrence strategy *per se*, even though it had been initially conceived to strengthen SPO's position. Yet, after some initial reluctance, SPO accepted the proposal of General Precision Corporation's Kearfott Division to consider a much more accurate guidance system. It oriented itself on the stars rather than on the terrestrial gravitational field. MIT, strongly resisting the 'too complicated' and 'vulnerable' stellar guidance system, and preferring to refine their gravitational system, finally felt compelled to follow the strong wish of their client. SPO highlighted the advantages of the system and won the battle over the warhead through arguing that it would make the heavy Mk17 warhead superfluous. Once it had helped to eliminate the Mk17 option, however, SPO made little effort to save the stellar guidance from slack (as a result of disagree-

ments between Kearfott and the MIT laboratory). The final blow came when, in the early 1969, the new Secretary of Defense Laird so strongly supported stellar inertial guidance that the issue attracted the attention of Congress members who opposed the hard target kill capability. SPO hardly resisted the consequent Pentagon action to terminate the program. So, SPO got a missile with the Mk3 rather than the Mk12 warhead, and with an improved gravitational guidance system. The missile was not optimized for engaging hard targets, but fitted well SPO's approach towards the Air Force and towards technology development.

The Department of Defense, however, did not give up. It got its next chance when a new FBM generation was being conceived, the Trident missiles. Initially, SPO managed to stick to the finite deterrence approach. The Secretary of Defense was handicapped by the still strong resistance in Congress, which made it impossible to impose outright counterforce requirements. John Brett, at that time Undersecretary, a Kearfott engineer well acquainted with stellar inertial guidance technology, managed to formulate seemingly countercity requirements which still would lead straightaway to a stellar inertial guidance system. At the time, there was great concern about Soviet anti-submarine warfare advancements. Missile range and submarine underwater capability thus had become more important.

Brett demanded that the new missile would have the same accuracy at 4000 nm (nautical miles) range as its Poseidon predecessor had at 2000 nm; and that the submarine navigation system should be able to operate for periods of thirty days without external reset. These two requirements could only be fulfilled by switching to the stellar inertial guidance. Yet, as it had happened with earlier generations of missiles, SPO's (by then renamed SSPO) technological prudence brought it to merely accept Brett's demands as a goal and not to commit itself to accuracy requirements. Nevertheless, The Trident I got a stellar inertial system and with this an even better accuracy than the Poseidon.

More importantly, from the point of view of the Pentagon, Brett had made SSPO 'an offer they could not refuse': a hundreds-of-millions-dollar Improved Accuracy Program that lasted from 1974 until 1982. SSPO, always keen to work with technologies and organizations it trusted, became acquainted with new technology and new technological institutes through this program. The program's success, the already made switch toward a stellar inertial guidance system, and some changes in the SSPO staff – these were major factors which contributed to ultimately getting a hard target kill capability for the next FBM, Trident II. The shift was further facilitated by the growing acceptance of the counterforce concept in Congress, and by the argument that Trident II provided the Navy with an opportunity to beat the Air Force. The latter was attempting to develop a new missile system that would be based in a rather invulnerable way and would have a hard target capability. But the first requirement appeared hard to meet, and it was increasingly felt that submarine based missiles *with* a hard target kill capability would be a much better alternative.

### 3. What we can learn from the stories: the need to understand implementation as communicative action

What do these two stories teach us? The dairy packing story is an apparent puzzle. Why did most supermarket chains not adopt the PE-bag, in spite of its economic advantages and the opportunity to 'score' environmentally? What were the reasons for this one single chain to adopt the PE-bag? It is too simplistic to assume that only this chain noticed the economic advantages. Nor was Dirk van den Broek a firm known for its consistent environmentally friendly behavior. What sort of rationality is guiding the choices of these firms if it is neither that of rational 'economic' actors nor that of environmentally oriented actors?

The second story also raises intriguing questions. Why did it take so long before SPO started implementing Department of Defense's orders? One simple answer is that SPO firmly stuck to its choice for a countercity strategy. However, this cannot explain why SPO eventually adopted a hard target kill capability, or why a technology development program could help to persuade SPO staff. The same objection can be made against another simple explanation: SPO's reluctance to adopt a hard target kill capability was informed by organizational interests.

An interpretive approach can help to understand such implementation puzzles. As Dvora Yanow has pointed out, such an approach reveals at least two features of implementation processes that cannot be understood by more neopositivist approaches (Yanow, 1993: p. 42). First, it draws our attention to the fact that policymakers, implementers and target groups will form interpretations of 'policy language, legislative intent, and implementing actions', and that these interpretations may differ from each other. Such differences may either facilitate or impede policy implementation. Second, an interpretive approach brings to the surface the importance of what Polanyi (1966) has called 'tacit knowledge': the background theories from which actors interpret policy objectives, ends and means. In the following pages we present the nature of the frames from which various types of actors interpret the world. We argue that this can explain the puzzles above.

The two stories raise pertinent normative matters. The dairy packing story shows that during implementation, choices are made of an essentially normative nature. The PE-bag was rejected in spite of its great environmental advantages, and in spite of the absence of major market-economical disadvantages. To be sure, the fact that it was a single-use packing system implied that this rejection was not a violation of the letter of the covenant. But it certainly was against its spirit. In other words, the choice not to adopt the PE-bag was essentially political in nature. Yet, it was not discussed in these terms (i.e. the Minister rejected it on basis of rather different considerations: user convenience), at least not fundamentally (i.e. these considerations were not explicitly weighed against the policy problem and objectives), and certainly not in Parliament.

Similarly, many of the discussions between DoD, SPO and others were carried on in rather technical terms. Yet, both their object and their outcome were directly related to one of the most fundamental debates in American security policy since 1945: countercity *versus* counterforce strategy. Although Congress frequently has hearings about these technical choices, the discourse about these implementation choices is rarely seriously related to the discourse about nuclear strategy. More than that, it was relatively simple for Laird to mislead Congress on the hard target kill specifications for Trident I by relating them to politico-strategic considerations such as the vulnerability of the US nuclear force. Congress simply appeared unable and unwilling to critically assess the technological choices implied by these specifications and their relation to the ongoing debate concerning soft vs. hard target kill capability.

In other words, both stories illustrate the phrase quoted in the introduction of this article: 'implementation is the continuation of politics with different means.' The stories also illustrate the need for *learning*<sup>5</sup> between policymakers and those involved in implementation (see e.g. Majone and Wildavsky, 1978; Sabatier, 1986). Only through such learning can the choices made during policy implementation remain in line with democratically legitimized policy decisions. Creating loci for such learning may help make implementation a form of *communicative action*. We deliberately use the latter term rather than e.g. Schön and Rein's (1994: 84) 'intentional action and communicative interaction'. Our term implies a critical connotation in the trail of Habermas. The stories serve to support this choice of terminology.

Unfortunately, the stories also illustrate that such learning may be impeded by the circumstance that implementation choices and political choices may be made in rather different discourses: our institutions are hardly used and tailored to accommodate both in a sensible dialectic (Majone, 1989: ch. 1). We argue that these different discourses are rooted in the different types of frames of actors involved in policy making on the one hand, and those involved in policy implementation, on the other. Further in this article, we develop a conceptual framework for understanding the conditions under which learning between various types of actors can still occur.

In the following pages, the frames are depicted from which various actors interpret the objects of their behavior; subsequently, the conditions are outlined under which learning between actors with different types of frames is more or less likely to occur. The focus is on one particular type of object, a technological artifact, such as a particular kind of dairy packing or a fleet ballistic missile. A technological artifact is defined here as an item (hardware or software) that results from the application of scientific and technological knowledge and which can be instrumentally used by social actors to solve social problems. Technological artifacts are just one species of what Yanow (1993: 47) calls 'organizational artifacts', and what Schön and Rein (1994) designate 'policy objects'. Both references yield a deeper understanding of the relevance of such objects or artifacts.

Yanow asks the intriguing question: *How does a policy mean?* Her answer is: through the creation and communication of *context-specific* organizational artifacts, which are vested with *meaning* (emphases added-JG/HvdG). Such organizational artifacts are meaningful for members of the organization from the perspective of their underlying beliefs and values and in a specific context. Exactly because of this, however, different actors and different contexts may yield different meanings. It may well happen that such differences become clear only after some time (Yanow, 1993: 47).

Schön and Rein (1994: 84) point to the fact that the policy dialectic centers on a relatively constant policy object, shaped over time in a process of 'intentional actions and communicative interactions' and often serving as 'an "external memory" of the actors' cumulative moves. Moreover, a policy object 'anchors the sometimes divergent cycles of policy making activity, being one of the more or less constant elements of a policy arena which ensure that we can speak of one process rather than of many disconnected processes (p. 64). These anchoring and integrative roles notwithstanding, Schön and Rein – like Yanow – recognize that objects carry multiple meanings, and that differences in meaning may lead to divergent actions at some time. Schön and Rein (1994: 185-187) point to an important practical corollary of these insights: policymakers must understand the patterns of behavior of implementers and their target groups and how these can be influenced; that is, they stress the importance of implementation as learning.

It is important to stress here that we elaborate on those forms of learning on technological artifacts and their meanings which also include learning about the underlying beliefs and values, as well as about the artifact's context. This idea of 'spill-over learning' – as Bernstein, (1988) has convincingly argued – is an essential feature of the hermeneutic tradition in epistemology. It is precisely this feature which makes possible a link with the critical theory in the tradition of Habermas. (Torgerson, 1994).

#### **4. The frames of meaning of various types of actors and the conditions for joint action**

How can the frames of meaning of various actors be depicted, and what is the locus of technological artifacts in these frames? This section poses these questions for three types of actors who generally are involved in processes of technology development: policymakers and implementers, treated here as policy actors, and corporate managers and technologists as two examples of target groups.

In previous work (Grin and Van de Graaf, 1996) these frames of meaning have been depicted for these three types of actors, inspired by earlier work of Donald Schön (1983). In his enlightening book *The reflective practitioner*, he discusses actual observations of professional activity when the professional deliberately considers a case to be unique and when the situation is character-



ized by complexity and uncertainty. When dealing with a unique case under complex and dynamic conditions, the professional will use earlier experiences and theories from her area of expertise to initially and intuitively frame the problematic situation. She then engages in an iterative reflective process of inquiry in which she suggests a line of solution, experimentally finds out what consequences are implied by that particular problem definition and the implied solution, evaluates these consequences in terms of her appreciative theories and then, if necessary, revises her initial problem definition. Schön emphasizes that it is important that the practitioner i) 'listens to the situation' which 'talks back' and ii) defines the problem in such a way that the inquiry keeps going. These features make the process iterative. Normally, professional inquiry is limited to so-called first order reflection, i.e. consideration of problem definitions and evaluation of solutions. Only under peculiar circumstances, a professional may reflect upon the background theories and appreciative systems that she brings to bear upon the situation ('second order reflection').

### *Policy actors*

Fischer (1980; 1995) has proposed a series of levels of argumentation for policy actors which are closely related to Schön's framework. Policy belief systems can be conceptualized as a whole of normative and empirical beliefs that play a role in argumentative discourse (reflection; debate; personal and mutual evaluation). This has been schematically represented in the first two columns of Table 1. Basically, Fischer distinguishes two orders of discourse. On the first order level, major objectives are set for a specific situation and then translated into causal means-end chains. Traditionally, neopostivist approaches limit their scope of analysis to this type of discourse. Objectives are taken for granted or, at best, related to presumed interests that are not subject to further debate. However, Fischer draws the attention to the possibility of second order discourse which bears upon the more general perceptions and values generating these objectives as well as the means-ends chains to attain them. The object of Fischer's first order discourse is analogous to the object of Schön's first order reflection-in-action. What he calls second order discourse corresponds to Schön's second order reflection.

Within both orders, Fischer distinguishes two levels of argument. For first order discourse, the lowest level concerns an evaluation of the effectiveness, including unintended side-effects, and costs of alternative solution strategies for the achievement of the objectives set ('technical verification'). The choice of specific policy measures is at stake at this level; argumentation (reflection and debate) is of a causal nature: means-ends reasoning is involved. The other layer of first order discourse is that of 'situational validation'. It involves, first, defining the problem in the case at hand. Second, policy objectives and the consequent causal chains of means and ends chosen to implement them, are validated as contributions to solving that problem. Since these forms of argumen-

Table 1. Structure of the frames of meaning of policymakers, technologists and corporate managers.

	Policy making	Technology development	Management
evaluation of solutions	causal evaluations of the effectiveness of policies consisting of causal chains of objectives, ends and means	causal evaluations of the effectiveness of technological development paths	causal evaluations of the effectiveness of management measures, i.e. tasks and relations of functional departments
problem definitions and the meaning of solutions	the policy problem as defined by the actor, and the meaning attributed to policy objectives, means and ends in the light of the policy problem; this includes attributing a meaning to technological artifacts	the technological problem is defined and a meaning attributed to technological development paths	defining the corporate problem and attributing a meaning to management measures (including developing, marketing an artifact with a particular preferred meaning) in the light of that problem
empirical and normative background theories	world views and value systems	scientific and technological theories and appreciative systems	appreciative systems and theories concerning markets, organizations, micro-economics etc.
normative-ontological preferences	preferences about the social order	preferred meaning of the artifact	firm's preferred competitive position

Source: Grin and Van de Graaf (1996).

tation amount to the attribution of a *meaning* to the situation as well as to policy objectives, ends and means, this layer of discourse can be named 'phenomenological'. Argumentation at this level takes place from the perspective of given second order beliefs.

For second order discourse, the highest level contains fundamental preferences about the social order.<sup>6</sup> Arguments on this 'rational social choice' level are normative and philosophical in nature. They concern the ultimate level of political accountability. On the other level, systems of values and perceptions (what Schön calls, respectively, appreciative systems and overarching theories; and what elsewhere may be referred to by such terms as 'world views' and 'background theories') related to a specific policy area are evaluated. Arguments on this level ('system vindication') are of a hermeneutic-interpretive nature: world views and associated value systems are investigated in terms of their contribution to the preferred social order. Reasoning at this level involves investigation of the question whether values and beliefs generate objectives and associated strategies that strengthen the preferred social order.

### *Example*

Let us illustrate this structure of policy belief systems by depicting the belief system of the Dutch government with regards to environmental policy in general (cf. Weale, 1993: ch. 5 for an excellent review in English), and the Packing Covenant in particular. The preferred social order was one in which government, industry, social organizations and citizens share the responsibility to shape a 'sustainable society.' World views and value systems included two assumptions: first, for the realization a sustainable society, material and energy cycles need to be closed, at least within a feedback time of twenty-five years (one generation); second, the latter requires that environmental policy target groups adapt their behavior accordingly. It is interesting to note that, as Fischer and other authors in the hermeneutic tradition presume, these background views and the preferred social order reinforce each other.

In line with these views, in the case of the packing covenant, the government defined the problem as follows: how to reduce domestic waste resulting from packing (partly for its effects *per se*, and partly because packing is a strong symbol of the 'waste society') by making the branches that produce and use waste move into the direction of material and product recycling? Also in line with these views, a voluntary agreement ('covenant') was chosen. When it appeared impossible to reach consensus about the need for product recycling, a procedural solution was chosen that would generate detailed information about material and energy cycles both for the industry and the government. By including the proviso that severe market economical objections would veto new packing systems, the government further expressed its cooperative attitude. Thus, in the eyes of the Environmental Department, the PE-bag as a single use package system had no relevant meaning in the symbolic policy on 'waste society'. It also did not fit in a cooperative approach, because of the strong feelings of all parties involved. Not surprisingly, the department did not press for adoption of the PE-bag.

Similar to policy processes, technology development and corporate management can be seen as heuristic search processes. Thus, the frames of meaning of technologists ('technological paradigm') and of corporate managers ('management paradigm') can be depicted in a similar way.

### *Technological paradigms*

Technology development can also be conceptualized as a heuristic search process guided by shared frames of meaning. The object of a *technology development process* is the evaluation of the impact of technological development paths on the preferred meaning of the artifact in which they are to be applied.<sup>7</sup> Technological development paths can be evaluated against the background of scientific and technological theories and bodies of practical knowledge as well as appreciative systems (containing, e.g., standards of reliability or ideas about aes-

tethics), shared by the community of technologists involved. Using this analogy with the policy process, we can now present a technological paradigm analogous to policy belief systems (see the third column of Table 1).

First order reflection deals with technological development paths that are considered necessary to attain an artifact with the desired meaning. Second order convictions include overarching theories in the form of scientific and technological theories and bodies of practical knowledge (the analogue of the world views or perception systems in policy formation processes) Together with appreciative systems in the form of associate broad guidelines for sensible technology development they form the lowest second order level of argument. They also provide the language and repertoires for reasoning and communication about technology development. The highest (normative-ontological) second order level is formed by the meaning attributed to a certain artifact by the community involved. This may, for instance, be required by the technologists' firm's management, or it may be their own estimate of the envisaged user's preferences.

### *Example*

A good illustration is the structure of technological paradigms of the technologists working within and for SPO during the Polaris and Poseidon development. The meaning of the artifact they were working at was a missile that would be an effective and reliable means of realizing the Navy's countercity strategy under operational circumstances; a missile that would, under the threat of Soviet countermeasures, be able to hit its relatively soft targets. Technological background theories included knowledge on gravitational gyroscopic guidance, Q-computation and ballistic trajectory theory. A major element of the appreciative system was the preference for proven technology and robust solutions. Again, normative ontological preferences and empirical and normative background theories reinforce each other.

Depending on the specific context, technologists translated these second order beliefs into particular problem definitions and preferences about technological development paths. During the early years of the Polaris development, the challenge was just to *get*, as soon as possible, a proof of existence of a fleet ballistic missile. Technological development paths included tailoring state-of-the-art gyroscopes to the use in fleet ballistic missiles. Later, during the development of the A3 version of the Polaris, the context had changed in two major respects: the Navy had established itself as a nuclear service, and a nuclear test moratorium impeded testing the reliability of new warheads. By then, the problem was defined as developing a missile with similar accuracy at a more useful range, as well as increasing effective yield while avoiding both the use of an Air Force warhead and an untested warhead. Technological development paths chosen included improved gyroscopic guidance and a new delivery system that enabled the use of several existing 'Navy' warheads adding up to the desired yield.

### *Management paradigms*

Corporate managers are the third type of actors with a role in the generation of new technologies. The object of general management is to formulate and pursue a management strategy (comprising objectives, ends and means). When formulating management strategy, general managers evaluate the strategy's impact on their firm's preferred competitive position, or in other words, its preferred identity within the market.

On the first order level, the problem is defined by interpreting the circumstances internal and external to the firm as a challenge (a risk, an opportunity or whatever) to the firm. Problem definition is a matter of forward and backward mapping between this challenge and the evaluation of alternative management measures which constitute management strategy and form the final element of the management paradigm.

On the second order level, in addition to normative-ontological preferences such as the firm's identity, there are appreciative systems and overarching theories concerning the operation of the market, marketing approaches, macro-economic phenomena and so on, as well as organizational theory, management methods, micro-economy.

### *Examples*

In the dairy packaging example, it became clear from documents and interviews that supermarkets do define their preferred competitive positions differently, although they all operate on the same market and are involved in the same price battle. Contrary to what neoclassical economic theory would claim, there is nothing 'objective' about this. For instance, one Dutch supermarket chain, Albert Heijn which adopted the PC-bottle but not the PE-bag, is known to have as its preferred identity being 'the best supermarket', offering good quality and a stable assortment for reasonable prices to a very broad range of consumers. Its overarching theories and appreciative systems include reliable quality monitoring and valuing structural, sound approaches to e.g. internalizing environmental considerations in the firm's operations. Dirk van den Broek's preferred identity, on the other hand, is to be 'the cheapest' and known for 'striking activities'. Its overarching theories and appreciative systems include knowledge about niches in suppliers' market where reasonable quality products can be obtained in a certain period at a low price.

SPO, which can also be characterized by a management paradigm, and the Office of the Chief of Naval Operations offer other examples of our claim. There is nothing 'objective' about the preferred identity of organizations, contrary to what some organization theorists would claim by using the concept of *the* organizational interest. At the time when most officers in these offices preferred an identity as a nuclear service different from the Air Force, there were others who preferred the identity of the Air Force. The overarching theories and appreciative systems of the two factions were in line with these preferences: a military strategy of countercity and an organizational strategy of avoidance of both

confrontation and cooperation with the Air Force on the one hand, and a counterforces strategy and an approach of direct competition (including opportunistic cooperation) with the Air Force, on the other.

### *Congruent meanings*

We have seen the place which the meaning of technological artifacts occupy in the various frames of meaning. The position of this meaning in management paradigms is similar to its place in policy belief systems. Both for corporate managers and for policy actors, a technological artifact is an instrumental object. For policymakers, an artifact may be an end or a means in dealing with a particular policy problem as perceived from the perspective of the policy-maker's value system and worldviews. For managers, it may be an end or a means in a corporate strategy to deal with challenges that face the firm (from the perspective of the manager's micro-economic, macro-economic, and organizational background theories). On the other hand, the meaning of an artifact takes a normative, guiding role for those who are actually developing the technology. In evaluating alternative technological development paths, technologists are ultimately guided by the contribution of these paths to their preferred meaning of the artifact.

This is how, during the implementation game, actors 'construct' the features of an artifact, through a process of communicative action. For joint action, a joint construction is needed in which the artifact has a sensible meaning in the eyes of those willing to use it to solve their problems (such as policy actors and corporate managers). But these 'properties' should also make sense in the eyes of the technologists who are to generate it. In other words, they should be in accordance with the feasibility criteria derived from their background theories. Actors attribute congruent meanings to an artifact if they perceive the artifact's properties in such a way that the artifact has a sensible meaning to all of them. Congruency or incongruency of meaning is what determines the degree to which artifacts, 'vested with different meanings' (Yanow), impede or facilitate joint action.

## **5. Implementation as communicative action: a conceptual framework**

We now turn to formulating a model of implementation as communicative action. The model focuses on the conditions under which congruency of meaning and thus joint action can be expected. Our choice for hypotheses reflects the current state of literature: empirical testing and further development are still insufficient. Nevertheless, the very possibility to formulate hypotheses with some plausibility means that literature *does* offer some important clues.<sup>8</sup>

### 5.1. General features and premises of the framework

Our framework for implementation as communicative action is formulated in analogy to the framework designed by Paul Sabatier (1986; 1987; 1993) which describes policy change as the product of learning between policy coalitions and external changes, the latter influencing the constraints and resources of the various coalitions.<sup>9</sup>

This 'advocacy coalition framework' (ACF) focuses on a policy subsystem made up by the set of all politically relevant actors involved with a particular policy issue. The units of analysis are advocacy coalitions which include a wide variety of policy actors (a subset of all the actors in the policy subsystem), sharing a set of normative and causal beliefs. This set of shared beliefs, the coalition's policy belief system, is what actually constitutes the coalition. Coalitions will attempt to turn their belief systems into actual policy programs. To survive, however, they face the need to change their beliefs from time to time. The process of changing belief systems is called policy-oriented learning.

We actually add other professional communities characterized by a shared professional frame, such as a management paradigm or a technological paradigm, to the policy coalitions. The resulting framework is schematically represented in Figure 1. In its further elaboration, a number of limitations and simplifying assumptions are being adopted. First, we believe it is justified to mainly draw upon the work of Chris Argyris and Donald Schön, since it is rather generic in nature. Moreover, much of the other more specific literature on learning (cf. the review by Bennet and Howlett, 1992) is based upon them.

Second, following Sabatier, we take together policymakers and policy implementers under the common heading 'policy actors', and assume that they together belong to coalitions (cp. Sabatier, 1987, ACF). We thereby do *not* assume it self-evident that, in a particular case, policymakers and implementers do share a policy belief system. Policy-oriented learning between policymakers and implementers may be necessary to achieve this. Such learning is, however, not the subject of this article:<sup>10</sup> the focus is on learning between policy actors and target groups.

Third, we assume that professional communities are homogeneous, that is each can be represented by one (*anyone*) of its members. Thus, when 'learning by a community' is defined as the adaptation of the frame of meaning shared by the members of this community (cp. the definition we gave in section 4), we mean that all members adapt their frames in such a way that they eventually share a frame of meaning again.

Fourth, we define learning between (actors from) two different types of communities as learning by a particular community, induced by interaction (debate, challenging, negotiation, shared experience) with the other community (and *vice versa*).

Fifth, we assume that, as a first approximation, learning between a multitude of communities amounts to the sum of various learning processes between

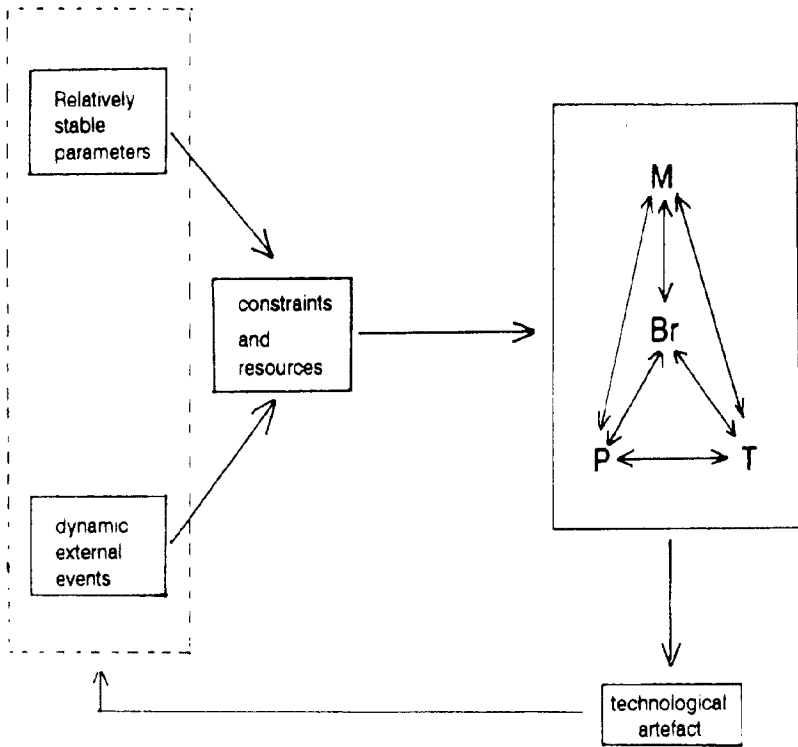


Fig. 1. General outlook of a framework for learning between policy actors (P), managers (M) and technologists (T), may be mediated by brokers (Br). External factors both of a structural and of a dynamic nature, affect the process. The model can be seen as an extension of Sabatier's.

two actors. This enables us to focus in the discussion below on such 1-1 interactions.

5.2. Behavior of target groups; role of learning

The first two questions to be dealt with are: under which conditions is it likely that the behavior of target groups is congruent with a particular policy coalition's intentions? What learning can contribute to improving these conditions? We formulate three hypotheses and then illustrate them with examples from our case stories.

*Hypothesis 1:* If a technologist is to develop (invent, adapt, elaborate) an artifact with a meaning desired by a policy actor, it is necessary that the technologist attributes a meaning to the artifact that is congruent with the meaning attributed to it by the policy actor. This will only occur if the



technologist identifies an artifact with the required properties which he is able to develop within the scope of his scientific and technological background theories.

*Hypothesis 2:* For a corporate manager to produce or use a technological artifact with a meaning preferred by a policy actor, it is necessary that manager and policy actor attribute congruent meanings to the artifact. The manager will only produce this artifact if he judges that producing the artifact contributes to the preferred competitive position of the firm.

These two hypotheses are obviously in line with the discussion in section 4. They can be seen as specific elaboration of Argyris and Schön's (1974; cited in Argyris, 1976) hypothesis that 'human behavior, in any situation, represents the most satisfactory solution people can find consistent with their governing values or variables.'

The reader may note that contrary to hypothesis 1, overarching theories and appreciative systems are not explicitly mentioned in the second hypothesis. This reflects our assumption that corporate managers will pragmatically achieve new background theories within their firms when they need them. Technologists, on the other hand, are assumed to be 'service agents' developing artifacts with a meaning desired by others, as long as they see possibilities to do so within their own background theories.

Let us now illustrate both hypotheses with our case stories. Hypothesis 1 sheds some light on the reluctance of the SPO guidance engineers to change toward systems using on-board electronics during the development of the Poseidon FBM, thus departing from one of the overarching theories hitherto applied, Q-computation. Later in the process, when the idea of stellar inertial guidance was temporarily and opportunistically embraced by SPO, this radical departure from the earlier approach met with outright resistance of MIT engineers, who The technological community they were part of shared a paradigm centering around gravitational guidance methods and techniques.

Hypothesis 2 helps to understand why only Dirk van den Broek and Menken van Grieken brought the PE-bag on the market. The adoption of the PE-bag contributed to the two major elements of Dirk van den Broek's preferred identity: being 'the cheapest supermarket' and being noticeable through striking activities. Menken van Grieken, a relatively small family firm, wishes to be known for its close cooperation with its client firms and for its openness to innovative approaches. Since Dirk van den Broek was keen to have milk in the PE-bag in its supermarkets, Menken van Grieken agreed to package milk in the PE-bag, although very much aware of the option's disadvantages.

The preferred identity of other firms inhibited the adoption of the PE-bag. For instance, Albert Heijn, 'the best supermarket,' not merely rejected the PE-bag because of its disadvantages in terms of user convenience. The firm also found that the bag would not be 'representative' in the eyes of the clients.

These examples show how our claim that actors seek to realize their normative-ontological preferences essentially differs from the view that such actors are characterized by goal-seeking behavior with the preferred competitive position as a sort of super-goal. Rather, it is a way of self-expression: through their actions, firms seek to show their true identity, and they strongly refrain from actions that appear to violate this identity.

In both hypotheses, a major condition is that technologists and managers, on the one hand, and policy actors on the other, attribute congruent meanings to an artifact. It cannot be excluded that target groups incidentally generate an artifact that suits the meaning policymakers wish to attribute to it, even when this condition is *not* satisfied. But this is not likely to happen, and the congruency in meaning will seldom be perfect. More importantly, such an incidental congruency will hardly be lasting: when new circumstances arise, each of the actors will tend to shape the object in a way compatible with their own frame of meaning (see the discussion in section 3 based on Yanow, 1993 and Schön and Rein, 1994). In general, congruency in meaning will only arise and last when some form of learning occurs between policy actors and target groups. There is only one exception: when these target groups themselves happen to share the policy actor's policy belief system. Technologists or managers, respectively, may have a well-developed policy belief system if they are professionally intensively involved in the relevant policy debate. To a significant extent, this was how the leading SPO staff developed a finite deterrence stance during the early years of the office's existence.

When target groups do have a well-developed policy belief system, we assume:

*Hypothesis 3:*

- a) Without some form of learning between policy actors and target groups (be they technologists or managers) a congruent meaning attributed to a particular artifact will not occur and last *except* when the target groups have, in addition to their professional paradigm: i) a well-developed policy belief system related to the artifact and its use, which ii) matches that of the policy actor at the second order level *and* translates into a meaning congruent with that inherent to their professional paradigm.
- b) Conversely, even in the case of a significant learning effort, a shared meaning is *not* likely to emerge if target groups have a well-developed policy belief system which in its second order aspects does not match that of the policy coalition.

Yet, as we already noted, such cases are exceptions. The rule is that some form of learning between policy actors and their target groups is required to achieve congruent meanings. We now turn to the different types of learning, and the conditions under which they are likely to occur.

### 5.3. *Conditions for learning*

The brief discussion in section 4 of Schön's (1983) findings indicates that the conditions for learning differ for first and second order reflection. According to Schön, a significant degree of consistency of a professional's overarching theories, appreciative systems and preferences is needed to be able to adequately perform her daily job. These theories and preferences help the professional to set the problem and to identify and evaluate solutions. Reflection upon these more generic elements of professional frames of meaning occurs much less often than reflection on problem definitions and evaluations of solutions in a specific context.

Argyris et al. (1985: pp. 76-78) argue that human beings as agents display as a basic activity designing and taking actions in order to achieve intended consequences (in our terms, their normative-ontological preferences – JG/HvdG) as basic life activities. The authors summarize this by saying that human agents 'seek to be competent.' In most cases, people who interact with other people seek to be competent through what Argyris and Schön (1978) call Model I behavior. The variables governing such behavior are: an individual defines goals and then seeks to achieve them; he maximizes gain and minimizes loss; he minimizes the generation or expression of negative feelings; and he is 'rational.' These variables lead to defensive action strategies ('design and manage the environment unilaterally;' 'own and control the task;' 'unilaterally protect yourself;' and 'unilaterally protect others from being hurt') which inhibit second order reflection. Thus, a self-sealing environment is created in which second order reflection is unlikely to occur (though not absolutely impossible; see below). Building upon the work of various other researchers, Argyris et al. (1985: pp. 61-62) remark that people will follow Model I especially when they are facing threatening issues. Therefore, it should not come as a surprise that most people do have difficulties in really pursuing second order reflection, although they claim to be open to it (Argyris 1982, referred to in Argyris et al., 1985: pp. 89-92).

Second order reflection is more likely to occur when people display what Argyris and Schön call Model II behavior. The variables governing such behavior are *not* the opposites of those governing Model I behavior. Rather, they are: valid information; free and informed choice; and internal commitment. This can be an alternative way to 'seek competence.' As Argyris et al. (1985: pp. 76-77) put it, "competence obviously requires that action be informed by valid information; creating and maintaining behavioral worlds that are conducive to generating valid information requires conditions in which agents can make free and informed choices (cp. Habermas' ideal speech situation) and feel internally committed to their choices." Unfortunately, it would be extremely difficult to produce such a behavioral environment, given the prevalence and nature of Model I behavior (Argyris et al., 1985: p. 102).

The preceding discussion suggests that it makes sense to distinguish between three different scenarios:

- I) congruent meanings may arise as a consequence of first order reflection only;
- II) congruent meanings require second order reflection, which is to take place in a Model I world;
- III) congruent meanings require second order reflection which can be realized in an 'artificial' Model II world, locally created in such a way that it has a global impact.

### *I. Congruent meanings through first order reflection*

In the first scenario, an actor finds out that it is possible to conceive an artifact which makes sense both to him and to the other actors involved. An opportunity for achieving congruent meanings is 'discovered' for which no second order learning is needed. Put differently, this implies that the actor 'broadens' the meaning he attributes to the artifact in such a way that it is congruent with the meaning attributed to it by others and still makes positive sense to him. It is not very likely that such a broadened meaning develops just from the actor's own reflection.

*Hypothesis 4:* A target group will not attribute a broader meaning to a technological artifact in such a way that the broadened meaning is congruent with the meaning attributed by a policy actor, unless it is brought to participate in a 'forum' for learning between the target group and the policy actor. A broader meaning is to say that an additional aspects is taken into account, within the boundaries of the target group's second order convictions.

Our two case stories provide straightforward examples of what these fora can be, and how they may work. In the dairy packing case, learning by the industry had been induced long before the covenant was signed, by claims of environmental organizations (supported by public actions) that existing packing systems had a negative environmental impact. Tetrapak, a leading firm in laminate packing systems, made an LCA as early as 1981. As a result, in further developing the laminate packing, the industry took environmental aspects into account. The LCA provided a 'forum' since it offered a systematic way to bring together environmental aspects and design options. The resulting new developments included the replacement of the existing type of ink by a water based one, as well as weight reductions (which also led to cost savings).

In the missile case, SPO initially did not accept any hard target kill requirement, but it still adopted the goal of improving this capability. That was a result of continuous attempts by the government to push the office in this direction by using regular intra-organizational procedures and channels as the 'forum.' However, the goal acquired a meaning within the framework of SPO's strategic background theories: for instance, the increased accuracy of the Poseidon guidance system was justified as a measure to ensure the same overall accuracy at

the longer range that was necessary to maintain a countercity deterrence in the face of Soviet anti-submarine measures.

## *II. Real world conditions for second order reflection*

In the second scenario, second order learning is required but Model I conditions prevail. Second order learning is unlikely under Model I circumstances. Yet, it is not impossible. Literature provides a number of clues. Argyris et al. (1985) emphasize that Model I prevails especially in threatening situations. This suggests that second order reflection becomes more likely either when threat perceptions decrease, or when not-learning implies even greater threats.

Schön (1983: pp. 275-283) has discussed at some length the conditions under which a professional may engage in second order reflection. Put briefly, these are: unanticipated effects ('surprises'); external events; and mutual learning between the professional and others. The idea of 'surprises' stems from the assumption that the main interest of the professional is to transform the situation; improved understanding of the situation is primarily instrumental to this aim.<sup>11</sup> The situation may not be transformed as expected; this is what Schön calls 'surprises.' Second order reflection is most likely to take place if the professional is faced with a surprise and assesses it negatively. In that case, reflection can help the professional to adapt her overarching theories or appreciative systems in order to ensure a more desirable outcome next time. Thompson et al. (1990: pp. 69-75) use a similar concept of 'surprises,' but add an important qualification. In general, it is not one particular surprise which triggers second order reflection, but rather the cumulative impact of several surprises. This is probably what Argyris (1976) means when he writes that even under Model I conditions, second order reflection might occur under conditions of severe crisis or revolution. He does not define these terms, but especially their combination has a strong Kuhnian connotation.

Regarding external events as triggers for second order reflection, Thompson et al. (1990) add that an event is only a surprise if it is recognized as such. Unless 'others help him to see what he has avoided seeing' (Schön, 1983: p. 283), a professional simply may not register the event because his overarching theories or appreciative systems do not direct his attention towards it. Thus, mutual learning may significantly contribute to the effect of such events. Sabatier's work offers some insight in how such events may lead to learning. Close analysis of his examples (Sabatier 1987: pp. 655-658) reveals various mechanisms for the case of policy-oriented learning between or within policy coalitions: such events amount to introducing new objects or causal relations in the policy area; they influence the resources needed for a particular policy; such events present challenges to the coalition much like the 'surprises' discussed above.

*Hypotheses.* According to hypothesis 2, a firm will only produce an artifact with a meaning preferred by a policy coalition when its general management judges that doing so contributes to the preferred competitive position of that firm. There is, therefore, some plausibility to the following

*Hypothesis 5:*

- a) The general management of a firm will not adapt its preferences about the firm's competitive position in the absence of *either* serious external events that urge a revision *or* repeated serious failures over a prolonged period of time to achieve the competitive position hitherto preferred. Even under such circumstances, a firm will first attempt to improve its success in achieving the originally preferred competitive position through extending or deepening its overarching theories and appreciative systems.
- b) Adaptation of a general management's preference about its firm's competitive position, or adoption of radically different overarching theories and appreciative systems will only result from learning processes internal to the firm.

Part b) of this hypothesis is a corollary of the research finding that second order reflection is not likely to occur within a Model I world, in threatening situations. Given the generally 'threatening' nature of the market environment, we suggest that even under circumstances of crisis, second order reflection will only occur in a relatively 'safe' internal environment (which may include hiring independent external advisers).

A good example of the hypothesis is the learning that took place within SPO while Trident I and II missiles were being developed. During this period, SPO's military strategic background views gradually shifted towards counterforce, and its organizational strategy towards competing with the Air Force. This learning was induced by external events in the form of increased pressure by deputy Secretary Laird, with a strong impact on SPO's resources. It was stimulated by the growing number of counterforce/competitive approach proponents who caused an intense internal debate. Learning was also facilitated by the relatively safe circumstances, given the misery surrounding the Air Force's MX program.

In hypothesis 1, we have proposed that a technological community will not develop an artifact congruent with policymakers' intentions unless the required overarching theories and appreciative systems are available to it. Now we formulate

*Hypothesis 6:*

- a) A technological community will not seek overarching theories and appreciative systems from other technological paradigms unless the community is strongly stimulated to look for such concepts through an articulated order to develop an artifact with a meaning beyond the scope of its own paradigm.
- b) The community will only achieve such overarching theories and appreciative system if it gets the opportunity for continuous, open exchange with communities with a different paradigm.

Because the Improved Accuracy Program fulfilled both conditions, it succeeded in making the engineers of SPO and their agents switch from gravitational guidance to other forms (especially stellar inertial guidance).

### *III. An Artificial Model II world with repercussions for the real world*

The third scenario develops in a situation in which neither first order reflection (hypothesis 4) nor second order reflection under normal conditions (hypotheses 5 and 6) can lead to the development of an artifact with a meaning desired by a particular policy actor. Guba and Lincoln (1989) and Argyris et al. (1985), among others, have argued at length that learning about meanings requires a constructivist methodology when actors with different frames of meaning are involved (see also Durning 1993: pp. 317-318). These authors have also given operational prescriptions for such a methodology: the object of analysis should be approached from the perspectives of all participants; not only first order convictions of the various actors should be iteratively discussed, but also the underlying, often initially tacit, second order notions; and this should be done in such a way that the process leads to a 'joint construction' by the participants, as Guba and Lincoln call it. In our terms, a joint construction might be a technological artifact that has a sensible meaning for all actors involved. Argyris et al. (1985) and Guba and Lincoln have argued that their modes of constructivist inquiry require Model II behavior of the participants in the process. Also, to optimize the chances for the required learning to occur, a rather broad set of actors is essential. We thus formulate

*Hypothesis 7:* In cases in which the conditions specified in hypotheses 4, 5 and 6 are absent, a policy actor will only succeed in making target groups define an artifact with a meaning congruent to his own, when a learning process is undertaken in which:

- i) next to the policy coalition(s) involved, a plurality of target groups is engaged;
- ii) all participants seek to obtain valid information to guide their actions; they are willing to and have the resources to make free and informed choices and to enable others to do so; and they seek to make choices to which they can sincerely commit themselves;
- iii) a constructivist methodology is followed.

Our case story on dairy packing offers a negative example of the importance of these conditions. Although a plurality of actors was involved in the LCA process undertaken after the covenant was signed (condition i), it seems that participants were not free of strategic behavior (condition ii) was thus not really fulfilled). Nor was a constructivist methodology (condition iii) followed: underlying assumptions and background theories were not systematically discussed, and the problem definition was much narrower (it only covered environmental aspects). Indeed, the responses to the LCA outcome show that congruency had not resulted.

Interesting positive examples of such 'artificial Model II' environments are now emerging. In technology assessment, the field focusing upon politically assessing technological artifacts, some promising attempts have been made to elaborate the constructivist methodology into forms of interactive technology assessment (ITA). In ITA, an artifact is assessed through a process of evaluation by and debate between a variety of actors involved in its generation and use (Grin and Hoppe, 1995). Examples of ITA are the interactive bottom-up approach designed by Bunders (1990; 1994), the idea of 'proactive technology assessment' developed by Danish researchers (Jørgensen, 1992), as well as 'consensus conferences,' frequently organized in Denmark and the Netherlands (Joss and Durant, 1995).

Under the conditions specified in hypothesis 7, an artifact may be defined which embodies congruent meanings. Yet, this does not necessarily imply that the artifact will be actually generated. For this to occur, it is necessary that, first, appropriate conditions are created in the real, Model I world, and second, also actors who have not participated, adopt the idea, and then pursue it. A necessary condition for the latter is that the idea is compatible with major actors' second order convictions (see hypotheses 1 and 2). The adoption of the joint construction by others can be greatly facilitated if the learning process leads to what Guba and Lincoln call 'vicarious experience.' In their words (1989: p. 181), a joint construction, if suitably formed, can help others who have not participated in the exercise, to 'come to a realization (in the sense of making real) not only of the state of affairs that are believed by the participants to exist but also of the underlying motives, feelings and rationales leading to those beliefs. The [joint construction] is characterized by a thick description that not only clarifies the all-important context but that makes it possible for the reader<sup>12</sup> vicariously to experience it.' To be sure, Guba and Lincoln mean these sentences to be prescriptive: they indicate how the joint construction should be shaped.

We argue that joint constructions should fulfill at least two requirements in order to enable vicarious experience: first, they should be accompanied by or include an account of the process that led to these constructions and the considerations that emerged in the process; and second, they should take a shape in which the meanings of the artifact are as 'visible' as possible. Finally, it is important to note that even in case of a joint construction which significantly facilitates vicarious experience, a learning process will be needed between, for instance, actors that participated in the Model II process, and outsiders involved in its Model I follow-up.

Summing up, we arrive at the following

*Hypothesis 8:* The likelihood that the type of learning process specified in hypothesis 7 leads to a situation in which an artifact is generated with a meaning congruent with policymakers' intentions increases with the degree to which the following conditions hold:



- i) the process leads to a joint construction which makes the meaning of the artifact as visible as possible;
- ii) the course of the process is reconstructed in such a way that non-participants can understand the underlying process of communicative action;
- iii) the process is followed by further learning.

Once again, our cases do not offer a positive example of this hypothesis. In another policy area, there is an interesting positive case in which these conditions were realized to a rather significant extent. Lippincott and Stoker (1992)<sup>13</sup> discuss committees that analyze ways to reduce delays in treating criminal cases before court. Another interesting case is that of a constructivist policy analysis undertaken to guide a revision of the selection policy of a rehabilitation service agency, reported by Durning (1993).

## 6. Conclusions

This article has discussed implementation as communicative action between policy actors and their target groups. It has identified the objects for such learning and presented a depiction of policymakers, implementers and target groups as actors whose behavior is guided by professional frames of meaning. Finally, it attempted to shed some light on how these frames of meaning guide actors' behavior, how that behavior can be influenced through learning, and on the various conditions under which types of learning are more or less likely to occur. This understanding has been shaped as a framework for analysis, important elements of which have the form of hypotheses to be tested in further research.

A lot of work remains to be done. The hypotheses proposed should be tested.<sup>14</sup> Also, a number of simplifying assumptions should be subject of further scrutiny. Moreover, the discussion of learning was limited to individual actors. Recent insights on organizational learning yield a similar (more specifically: hermeneutic) perspective on organizational learning as adopted in this discussion, and confirm that this point demands further scrutiny. Furthermore, an interesting elaboration is suggested by a wide range of literature (e.g. Simon, 1976; Browne and Wildavsky 1984; Thompson et al. 1990; Echeverri-Gent, 1992; Hoppe and Peterse, 1993) claiming that the nature of organizations and institutional settings makes a difference for the likelihood of learning. Also, the distinction between feasibility testing-as-learning and implementation-as-learning should be considered more carefully, leading to more specific operational recommendations of the set-up of both types. Also, except for engaging into learning processes, policymakers have other means of influencing policy area processes. These means, as well as their relation to learning processes, should be investigated more carefully (see also e.g. Hoppe et al. 1987: p. 590).

Studying these matters is crucial for the further elaboration of a more interpretive perspective on the policy process. Such a perspective is of interest not only for a more adequate understanding of policy processes in post-industrial societies, but also as a sound basis for prescriptions on how to deal with wicked issues in the actual policy practice.

## Notes

1. Some other elaborations are treated in Hoppe (1993) and Breiner (1994).
2. Moreover, the two stories complement each other with regards to the nature of the target groups involved. In the missile story, a major role is played by technologists, engaged in developing SLBMs. In the dairy story, corporations are the main actors. As will become clear in section 3, technologists and corporate managers represent the two types of target groups that can be theoretically distinguished: those, like managers, to whom the policy object is instrumental; and those, who, like technologists, are actually generating it.
3. The following is based on a case study that was part of a research project (February 1995 – April 1996) on environmental policy instruments, sponsored by the Dutch Ministry of Environmental Management.
4. This story has been based on the thorough analyses by Donald MacKenzie and Graham Spinardi, especially Spinardi (1990); Mackenzie and Spinardi (1988a,b); and Mackenzie (1990).
5. Following Sabatier's (1987) adaptation of a definition by Hecló (1974), we define learning here as a 'relatively enduring alteration of behavioral intentions, which result from experience and which are concerned with the attainment or revision of policy objectives.'
6. These preferences are the only object of argumentation distinguished by Fischer which are not dealt with explicitly by Schön. Background theories may be evaluated (at the system vindication level) in terms of their expected contribution to promoting the preferred social order.
7. In many cases, there may be several artifacts relevant for each development path. This complicates the description, especially since it may mean that several policy areas are involved in influencing a particular technological development path. Yet, it does not fundamentally alter the description of technology generation as a heuristic search process.
8. In other words, by formulating some of the main elements of our model in the form of hypotheses, we do not imply that we expect them to be way off the mark. Rather than such a Popperian approach to hypotheses, we use them in a Lakatolian sense. That is, we think that our basic claims – there are various types of frames, these are similarly structured, they guide the responses of actors to their contexts, and joint action requires congruency of meaning – are correct; they form, as Lakatos would call it, our 'research program'. To be of use, however, we need to push things one step further, trying to understand how exactly frames pose boundary conditions to behavior, and what the conditions are under which congruency can result from learning. On these issues, literature offers less certain clues, and therefore we formulate the corresponding elements of our model as hypotheses belonging to the protective belt surrounding our basic claims.
9. It is of interest to note that Majone (1989: 145-166) has expressed a similar view on the policy process. We use Sabatier's version since he has formulated it more as an analytical framework.
10. It is the subject of Sabatier (1986, 1987)'s ACF; especially, it corresponds primarily to learning within advocacy coalitions.
11. More accurately, Schön argues that in reflection-in-action cannot one cannot isolate understanding from transforming: "The unique and uncertain situation comes to be understood through the attempt to change it; and changed through the attempt to understand it." (1983: 132).
12. In fact, the authors write about the case report which is the type of joint construction resulting

form the type of constructivist analysis they are studying. In our case, also other types of constructions can be envisaged.

13. Interestingly enough, the general approach these authors take seems to resemble closely the perspective we have taken. See especially pp. 377-378; 380-381; and 384-385.
14. Some initial tests have been performed by graduate students in our group and confirmed our main lines of argument, while adding useful corrections and additional insights. We intend to publish these cases later.

## References

- Argyris, C. (1976). 'Single loop and double loop models in research on decisionmaking,' *Administrative Science Quarterly* 21: 363-375.
- Argyris, C. (1982). *Reasoning, Learning and Action: Individual and Organizational*. San Francisco: Jossey Bass Publishers.
- Argyris, C. and D. A. Schön (1974). *Theory in Practice: Increasing Professional Effectiveness*. San Francisco: Jossey Bass Publishers.
- Argyris, C. and D. A. Schön (1978). *Organizational Learning*. Reading, Massachusetts: Addison-Wesley Publishers.
- Argyris, C., R. Putnam, D. McLain Smith (1985). *Action Science*. San Francisco & London: Jossey Bass Publishers.
- Beiner, R. (1993). *Political Judgment*. London: Methuen.
- Bennet, C. J. and Michael Howlett (1992) 'The lessons of learning: Reconciling theories of policy learning and change,' *Policy Sciences* 25: 274-294
- Bernstein, R. J. (1988). *Beyond Objectivism and Relativism: Science, Hermeneutics and Practice*. Philadelphia: University of Pennsylvania Press.
- Breiner, P. (1994). 'Paradigmatic examples and political judgment,' paper presented at the 1994 Annual Meeting of the American Political Science Association, New York, September 1-4.
- Browne, A. and A. Wildavsky (1984). 'Implementation as Adaptation,' chapter 10 in Pressman and Wildavsky, 3rd edition (1984).
- Bunders, J., ed. (1990). *Biotechnology and Small-scale Farmers in Developing Countries*. Amsterdam: VU University Press.
- Bunders, J. F. G. (1994). *Participative Strategies for Science-Based Innovations. The Case of Biotechnology for Small-Scale Farmers in Developing Countries*. Amsterdam: VU University Press.
- Derthick, M. (1972). *New Towns In-Town*. Washington D.C.: The Urban Institute.
- Dobuzinkis, L. (1992). 'Modernist and postmodernist metaphors of the policy process: Control and stability vs. chaos and understanding,' *Policy Sciences* 25: 355-380.
- Durning, D. (1993). 'Participatory policy analysis in a social service agency: A case study,' *Journal of Policy Analysis and Management* 12: 297-322.
- Echeverri-Gent, J. (1992). 'Between autonomy and capture: Embedding government agencies in their societal environment,' *Policy Studies Journal* 20: 342-364.
- Elmore, R. F. (1985). 'Forward and backward mapping,' in: K. Hanf and D. Toonen, eds., *Policy Implementation in Federal and Unitary Systems*. Dordrecht: Martinus Nijhoff, pp. 33-70.
- Fischer, F. (1980). *Politics, Values and Public Policy. The Problem of Methodology*. Boulder, Col.: Westview Press.
- Fischer, F. (1995). *Evaluating Public Policy*. Chicago: Nelson-Hall.
- Grin, J. and H. van de Graaf (1996). 'Technology assessment as learning,' *Science, Technology and Human Values* 21 (1): 72-99.
- Grin, J. and R. Hoppe (1995). 'Toward a comparative framework for learning from experiences with interactive technology assessment,' *Industrial & Environmental Crisis Quarterly* 9 (1): 99-120.
- Guba, E. G. and Y. S. Lincoln (1989). *Fourth Generation Evaluation*. Newbury Park: SAGE Publications.

- Hecló, H. (1974). *Modern Social Politics in Britain and Sweden: From Relief to Income Maintenance*. New Haven: Yale University Press.
- Hofferbert, R. I. (1986). 'The rise and decline of the U.S. policy evaluation industry: Lessons for export?' paper presented at the ECPR Joint Sessions of Workshops, Gothenburg.
- Hoppe, R., H. van de Graaf and A. van Dijk (1987). 'Implementation research and policy design: Problem tractability, policy theory, and feasibility testing,' *International Review of Administrative Sciences* 53: 581–604.
- Hoppe, R. (1993). 'Political judgment and the policy cycle: The case of ethnicity policy arguments in the Netherlands', in F. Fischer and J. Forester, eds., *The Argumentative Turn in Policy Analysis and Planning*. Durham & London: Duke University Press.
- Hoppe, R. and A. Peterse (1993). *Handling Frozen Fire. Political Culture and Risk Management*. Boulder, Col. etc.: Westview Press.
- Jørgensen, M. S. (1992). 'Some experiences with proactive technology assessment in the Danish food sector,' in *Proceedings of Technology and Democracy. The use and impact of technology assessment in Europe*. Copenhagen, 1992 (4–7 November), 487–506.
- Joss, S. and J. Durant, eds. (1995). *Public Participation in Science*. London: The Science Museum.
- Lippincott, R. C. and R. P. Stoker (1992). 'Policy design and implementation effectiveness: Structural change in a county court system,' *Policy Studies Journal* 20: 376–387.
- MacKenzie, D. and G. Spinardi (1988a). 'The shaping of nuclear weapon system technology: US fleet ballistic missile guidance and navigation: I: From Polaris to Poseidon,' *Social Studies of Science* 18: 419–463.
- MacKenzie, D. and G. Spinardi (1988b). 'The shaping of nuclear weapon system technology: US fleet ballistic missile guidance and navigation: II: Going for broke: The path to Trident II,' *Social Studies of Science* 18: 581–624.
- MacKenzie, D. (1990). *Inventing Accuracy. A Historical Sociology of Nuclear Missile Guidance*. Cambridge, MA/London: The MIT Press.
- Majone, G. and A. Wildavsky (1978). 'Implementation as evolution,' *Policy Studies Review Annual* 2 (also reprinted in the third edition (1984) of Pressman and Wildavsky).
- Majone, G. (1989). *Evidence, Argument and Persuasion in the Policymaking Process*. New Haven & London: Yale University Press.
- Mazmanian, D. A. and P. A. Sabatier (1989). *Implementation and Public Policy*. Boston & London: University Press of America (new edition of the original 1983 book).
- Murphy, J. (1971). 'Title I of ESEA,' *Harvard Educational Review* 41: 35–63.
- Polanyi, M. (1966). *The Tacit Dimension*. New York: Anchor Books.
- Pressman and Wildavsky (1973; 3rd ed.: 1984). *Implementation*. Berkeley etc.: The University of California Press.
- Sabatier, P. A. (1986). 'Top-down and bottom-up approaches to implementation research: a critical analysis and suggested synthesis,' *Journal of Public Policy* 6: 21–48.
- Sabatier, P. A. (1987). 'Knowledge, policy-oriented learning, and policy change. An advocacy coalition framework,' *Knowledge* 8: 649–692.
- Sabatier, P. A. and H. C. Jenkins-Smith (1993). *Policy Change and Learning. An Advocacy Coalition Approach*. Boulder, Col. etc.: Westview Press.
- Schön, D. A. (1983). *The reflective practitioner. How professionals think in action*. New York: Basic Books Inc.
- Schön, D. A. and M. Rein (1994). *Frame Reflection. Toward the Resolution of Intractable Policy Controversies*. New York: Basic Books.
- Sederberg, P. C. (1984). *The Politics of Meaning. Power and Explanation in the Construction of Social Reality*. Tucson: University of Arizona Press.
- Simon, H. A. (1976). *Administrative Behavior. A Study of Decisionmaking in Administrative Organization*. New York: The Free University Press.
- Spinardi, G. (1990). 'Why the US navy went for hard-target counterforce in Trident II (and why it didn't get there sooner),' *International Security* 15 (2): 147–190.
- Thompson, M., R. Ellis and A. Wildavsky (1990). *Cultural Theory*. Boulder, Col: Westview Press.

- Torgerson, D. (1994). *Power and Insight in Policy Discourse: Postpositivism and Problem Definition*, a paper prepared for the Annual Meetings of the American Political Science Association, New York, September 1–4.
- Weale, A. (1992). *The New Politics of Pollution*. Manchester & New York: The Manchester University Press.
- Yanow, Dvora. (1993). 'The communication of policy meanings: Implementation as interpretation and text,' *Policy Sciences* 26: 41–61.