Abstract

This paper examines the potential for improving transparency in the pork chain in the Netherlands. The paper perceives transparency as two separate sub-issues, one related to the ability to trace a product back to its place of origin and the other related to the type of product and process information that is created and distributed within the chain. More specifically, we examine the content of that information with regard to sustainability. By examining the policy network in which actors related to the pork chain are operating, this paper aims to contribute to an understanding of the opportunities and constraints for efforts to promote openness and sustainability in pork production and consumption processes.

1. Introduction

The role of sustainability related information in food products and processes has a great potential for fostering the greening of food production chains. Currently, the creation and distribution of such information is limited to production chains operating with environmentally friendly methods under strict regulations. The small market share of these products however, (only 2% of the total market share in the Netherlands) and the much higher price, places them in the category of luxury goods preventing an environmentally desirable behaviour on the side of the average consumer.

In the face of the various food crises, such as pig plague, salmonella and Bovine Spongiform Encephalopathy (BSE), public distrust in food handling and regulation grew substantially and a number of consumers refrained from buying conventionally produced meat products as long as the crises were in the headlines. As the publicity on the subject dropped, however, consumers gradually returned to their previously buying habits. Our argument is that the creation and distribution of sustainability related information in traceable conventional food chains could help to sustain environmentally desirable behaviour in the long-term.

The difficulty of this task, however, cannot be underestimated. The spatial and cultural distance existing between production and consumption decisions creates an informational distance that prevents actors at later stages of the supply chain from being able to use reliable sustainability criteria in their purchasing choices (Conca 2001, Princen 1997). Globalisation with the associated liberalisation of trade, and capital mobility and concentration, have led to the development of extremely complex product chains. The Uruguay round of the General Agreement on Tariffs and Trade (GATT), in particular, focused on a reduction of barriers to trade in agricultural commodities, a development which continues under the World Trade Organisation (WTO) today. Likewise, multinational corporations (MNCs) created global production, marketing, and distribution networks integrating the various stages of the product chain while spreading their activities across a multitude of geographic locations.
The perception, however, of a reduction in regulatory capacity of national governments has grown simultaneously. Practitioners and scholars argue that the transcending of territorial and jurisdictional boundaries by commodity chains and the imposition of constraints on domestic policy choices by supra-national actors reflect and foster a shift in political capacity from the state to non-state and supra-state actors. Hence, responsibility for improving transparency in the food chain and the pursuit of sustainability would have to lie with a whole range of actors besides government, including producers, retailers, and consumers (Fuchs and Lorek 2000).

The purpose of this paper is to explain the opportunities and constraints actors face in their efforts to improve transparency in the pork chain in the Netherlands. The paper pursues its aim using a policy network approach in which public and private actors based on their individual characteristics as well as the relationships developed in the network work together or against each other in order to promote or hinder transparency in the pork chain.

The paper proceeds as follows. Section 2 introduces our theoretical approach and expectations. Section 3 briefly presents the operationalization and measurement of the dependent and independent variables of our model. Finally, section 4 presents some results from our research in the pork chain in the Netherlands. Our results indicate that the pattern of communication among the network actors creates an unbalanced distribution of power in the network in favour of actors positioned towards relatively low scope of transparency. This fact together with the insufficient level of trust among actors who favour relatively high scope of transparency severely constrain efforts to promote openness and sustainability in the pork production chain in the Netherlands.

2. Approach

2.1 Rational choice versus Policy Networks

In political science we can distinguish two different perspectives that aim to explain the formation of policies; one has as a reference point the individual and her actions, while the other focuses on the context in which individuals operate on the basis of their relationships. The two different perspectives produce different kinds of explanations regarding how decisions in the form of policy outputs are reached. Models having as a focal point the individual provide explanations (and subsequently suggest interventions) on the basis of individual characteristics. On the other hand, models emphasizing the context in which individuals operate provide explanations based on the characteristics of the individuals’ relationships.

In my view, between the two, there is a fundamental difference that stems from a different understanding of the organization of the political and social life. On the one hand, the individualistic approaches view actors as units separated from the context in which they operate. Their motivation behind action is strictly their self-interest satisfaction irrespectively of whether this interest might damage their relationships with others and their environment. Sometimes the context is taken into account but only to
define further actors’ competencies. The policy output, in these types of approaches, is
determined by the strategy each actor follows in competition with all the other actors.

On the other hand, network approaches focus more on the context in which actors operate
and less on the actors themselves. Actors are described on the basis of their relationships
with other actors. Such relationships include communication and exchange of
information, power relationships, relationships of trust and confidentiality and so on. The
characteristics of actors’ relationships form the policy network, and it is the policy
network rather than the individual actors which determines the policy output (Bressers,
O’Toole and Richardson, 1995).

Both approaches have strengths and weaknesses, but it is not the aim of this paper to go
through them in detail. Rather, our aim is to emphasize the need to combine the two
approaches by allowing the micro-foundation of a rational-choice nature (Dowding,
1995) to be included in the policy network analysis. The reason for this is simple. At the
higher level of abstraction, individual behavior cannot be explained separately from the
society in which individuals are members. Moreover, the society, or the collective level,
is not simply an aggregation of myriad individual decisions, actions or transactions but
has a structure of its own, which affects behavior significantly, providing the context in
which individual decisions are made (Etzioni 1988). In the same respect, the policy
network can be viewed as the collective level of political activity. Individual actors
pursue their self-interest not blindly and not unrestrictedly from one another and their
context but in a form of interdependence, as expressed by specific kinds of relationships.

This is the core idea behind the model that we develop in the next section in order to
explain policy outputs. We include rational choice assumptions and arguments in the
policy network analysis and we argue that although actors are the foundation of the
policy process and their characteristics matter, their actions cannot be explained outside
the policy network in which they operate.

2.2 The Model

In this section we develop a model based on the literature of bounded rationality and
policy networks. The model is a special case of decision-making, where influence occurs
through communication and trust among the actors, rather than challenging or strictly
power oriented mechanisms. The dependent variable of the model is the scope of policy
outputs with respect to transparency in the protein food chain, while the independent
variables are the characteristics of the actors and the network in which they operate. I
begin with presenting the assumptions of the model; proceed with presenting the
dependent and independent variables; finally, I conclude this section with presenting a
model showing the interaction between the two.

2.2.1 Assumptions

The assumptions that guide our model of actor and network behavior and the
subsequent shaping of policy outputs are summarized as follows:
1. The policy output is determined by the interaction among actors who have an interest in influencing decisions on a particular policy issue.
2. Each actor has their own policy positions on the issue in question but the final outcome is reached by consensus among all actors.
3. All actors want an outcome to be reached and so all actors make compromises by moving more or less from their policy positions towards other actors’ policy positions.
4. Actors prefer to make the less possible compromises, hence they are less inclined to move towards actors whose positions are very distant from their own.
5. Actors’ compromises as expressed by movements (direction and length) towards other actors’ policy positions are determined by:
   a. the resources they hold and their willingness to mobilize those resources in order to resist or induce pressures.
   b. their position in the policy network (as determined by the relations of communication and trust they have with other actors).

2.2.2 Dependent Variables

The dependent variable of our model is the scope of the policy output. In other words, the range of subjects the policy covers out of all the possible subjects that could be covered by the particular policy. We regard the scope of transparency as an issue that can be separated in two sub-issues, each one of them representing distinct policy outputs.

Vertical Scope of Transparency

The first sub-issue relates to the ability to trace a product backwards and forwards through the whole production chain from harvest through transport, processing, distribution and sale. We call this sub-issue, the vertical scope of transparency. The vertical scope of transparency, or else traceability, is important in order to ensure the accurate and rapid identification of product and process information up and down the chain. Examples of traceability systems are registration and identification systems (I&R) and the more sophisticated information and communication technologies systems (ICT). The question regarding the vertical scope of transparency is how deep into the chain the policy will demand products to be traced. The highest vertical scope is achieved when all the protein food chain can be traced from the retail shelf to the production of feed ingredients. On the other hand, the lowest vertical scope is achieved when only the country of origin of the product is traced, while no vertical scope implies that the product cannot be traced back at all.

Horizontal Scope of Transparency

Systems of traceability, however, can be used for the distribution of a wide variety of product information within the chain. Our primary interest is in the inclusion of sustainability related information. We refer to the presence of sustainability related
information on products and processes in traceability systems as the horizontal scope of transparency. The sustainability related information covers the subjects of the impacts on human health and safety, animal health and safety, animal welfare and the environment caused by the various activities performed in each of the links that form the food chain. The question regarding the horizontal scope of transparency is how many subjects related to sustainability the policy will demand to be covered. These subjects are cumulative and so can treat the horizontal scope as a continuous issue. The highest horizontal scope is achieved when all the subjects (impacts on human health and safety, animal health and safety, animal welfare and the environment) are covered by the policy. On the other hand, the lowest horizontal scope is achieved when only the subject of human health and safety is covered by the policy, while no horizontal scope implies that none of the subjects are covered by the policy.

2.2.3 Independent Variables

We use two sets of independent variables, one that refers to actors’ individual characteristics and another that refers to the characteristics of the network in which actors operate.

I. Actor characteristics

We assume that the basic decision units for the formulation of policies are the individual actors. We define actors as “those acting units which are concerned with formulating, advocating and selecting courses of action that are intended to resolve the substantive problem in question”, (Kennis & Schneider, 1991; Laumann & Knoke, 1982). Political actors in our study include business actors, state actors and the civil society organizations that have a potential to influence decisions concerning transparency in the protein food chain.

We base our identification of actors’ individual characteristics on the bounded rationality model (Bueno de Mesquita et al. 1985; Bueno de Mesquita and Lalman, 1986; Bueno de Mesquita, 1994; Abdollahian and Kugler, 2003). This model assumes that three characteristics are significant for the determination of policy outputs: actors’ policy positions on an issue, their power resources and their salience on the issue in question. Below I go through each of those characteristics and describe them in more detail.

Policy Positions

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1 In this study actors are corporate actors, but we assume that the characteristics of individual actors, notably policy positions, salience and resources can be attributed to organizations through the persons who are responsible for the design of policy strategies and management of the organizations. For that reason, interviews for the identification of organizations’ positions, salience and resources were conducted with persons holding such critical positions within the organizations.
Actors have certain preferences regarding the output of the decisions on a particular policy issue. Their most preferred output is called their policy position. In our study actors’ policy positions concern the scopes of transparency in the protein food chain. If the policy positions can be represented in a straight line (Bueno de Mesquita, 1994; Abdollahian and Kugler, 2003), from the least extreme to the most extreme, then the final policy output will fall somewhere in between. Figure 1, shows such a line that represents the range of policy positions:

Figure 1. Range of policy positions

<table>
<thead>
<tr>
<th>Least extreme</th>
<th>Intermediate</th>
<th>Most extreme</th>
</tr>
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<tbody>
<tr>
<td>Policy position</td>
<td>Policy Position</td>
<td>Policy position</td>
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<td>range (h)</td>
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We assume that the final policy output is reached after various rounds of negotiations, called iterations (Bueno de Mesquita, 1994) among the actors. During those iterations actors influence one another, pressing for position changes and resulting in position shifts, until a common position, the policy output, is reached. We assume further, that actors want to shift as little as possible from their policy positions; to do otherwise would be irrational since their policy position is their most preferred policy output (Stokman and Zeggelink, 1996). Therefore, actors need a mechanism that would enable them to make the least possible compromises by shifting as little as possible from their policy positions. If we accept the proposition of the bounded rationality model (Bueno de Mesquita et al. 1985; Bueno de Mesquita and Lalman, 1986; Bueno de Mesquita, 1994; Abdollahian and Kugler, 2003) that actors are able to rank all policy positions expressed on an issue in an ordinal fashion, from their most preferred to their least preferred one, then the mechanism suggested above should reflect those preferences. The mechanism with which actors rank their preferences is otherwise called utility. We assume that actors assign greater utility to positions that are closer to their own and lower utility to positions that are further away than their own. Mathematically, this is expressed by equation (1):

\[
 u_i = h - |P_i - P_j| \quad (1)
\]

where, \(h\) is the range of policy positions, from the least extreme to the most extreme, as shown in figure 1. In the case where positions are normalised between 0 and 1, the value of \(h\) is equal to 1.

Equation (1) shows the utility of actor \(i\), for the policy position of actor \(j\). Specifically, if the policy position of actor \(i\) is represented by \(P_i\) and the policy position of actor \(j\) by \(P_j\), then \(i\)’s utility for \(P_j\) is a decreasing function of the distance between \(P_i\) and \(P_j\).
If $P_i$ and $P_j$ represent the two extremes in the policy position line, then the utility of $i$ for $j$’s position is zero, meaning that $i$ will not be influenced at all by $j$’s position because they are too far apart.

**Resources of Power and Influence**

If all actors’ policy positions converged and in the absence of fear for unilateral defection, the commonly advocated policy position would be translated into the output of the policy process. In most cases, however, actors’ positions over an issue diverge. Usually, different actors have different preferences concerning decisions over a particular issue or the means to enforce those decisions. In such situations, where an issue involves controversy, the policy output is determined by the *ability* of each actor to influence the output either directly or through attracting support from other actors by pushing for positional shifts or compromises. Actors’ ability to successfully promote their positions is determined by the power of resources they hold relative to the resources of other actors.

So, what constitutes actors’ resources of power? Usually, scholars base their categorization of resources according to the issue they study and the actors involved. For instance, Laumann and Knoke (1987) in their study of organizational influence on policy making, identify expertise, financial resources, staff or facilities, official decision-making authority, good connections to influential organizations, reputation, ability to mobilize members to support of proposal and ability to mobilize public opinion to support a proposal as important resources of power. Klok (1995) and Ligteringen (1999) who study policy for formulation and implementation processes involving the government and a target group list as influential resources physical goods and skilled people, information, time, money, legal rules and consensus, authority or trust. Stokman and Zeggelink (1996) who study influence relationships between government and private actors argue that in general important resources include exclusive information and financial resources, as well as official voting power. Although in the examples mentioned above, different resources are stressed as important there is consensus as to the importance of three of them. First of all, for the government or state actors the obvious resource is the official decision-making power or the power to legally bind decisions upon others. Then, for private/business actors, there is agreement as to the importance of financial resources and information. Financial resources can prove an important political resource because they enable actors to hold, for instance, offices in official centers of decision-making and therefore, closely monitor the political scene. In addition, financial resources are also important because actors can use them as a source of investment on research and as such create another resource, namely information or expertise. Both expertise and financial resources can be used, for instance, in the promotion of self-regulation activities. From the government’s point of view, private actors’ resources are particularly important. A thriving private sector does not impose financial burdens on the government, while in many cases the government relies on money provided by the private sector to launch, for instance, political campaigns. In addition the government increasingly relies on the expertise provided by the private sector for dealing with a number of issues; in our study, for example, it relies on the private sector for developing tools for transparency.
What is absent in the above mentioned inventory of resources is the resources held by civil society organizations (NGOs). However, NGOs play an important role in the promotion of certain policies and hence, they deserve our attention in this study. Surveys such as the Eurobarometer (2000) demonstrate that the NGOs enjoy the support from a large segment of the population. In addition, a number of NGOs activities (boycott, publication of black lists, etc.) illustrate that the NGOs have the ability to mobilize public opinion. The reason why NGOs have such appeal to the public is that they hold legitimacy in the sense of moral quality. The public perceives them as the defenders of consumer rights and the environment who have no individual financial profit in pursuing their activities and as such they have no incentives for deception. Both the state and business actors acknowledge this fact and therefore, they appreciate legitimacy as an important resource and NGOs as potentially important actors in the policy process.

Mathematically, the relative influence of actor $i$ on the basis of her resources is determined as follows. If the resources held by actor $i$ are denoted by $r_i$, then in a network of $n$ actors, the relative influence of actor $i$ ($I_i$) is the fraction of her own resources divided by the resources held by all the actors in the network. The relative influence of actor $i$ ($I_i$) is expressed mathematically in equation (2).

$$ I_i = \frac{r_i}{\sum_{k=1}^{n} r_k} \quad (2) $$

**Salience**

Stokman and Zeggelink (1996) are right when they call attention to the fact that the resources actors hold, represent only potential influence and not actual influence. Indeed, actors’ actual influence depends not only on the amount and quality of their resources but also on their willingness to invest their resources to influence a decision for a particular issue. As decisions over a particular issue are often parallel with decisions in many other issues, actors do not have the ability to participate in all the issues with the same level of influence, due to the scarcity of their resources. Rather, they put more effort to influence the issues that are of particular interest for them. The level of interest actors have on an issue in relation to all other issues is called salience. Salience, then, determines actors’ willingness to use their power resources to promote their positions and as such, it acts as a discount factor over actors’ power resources. Therefore, if we denote the salience of actor $i$ for a particular issues as $s_i$, then the actual influence of actor $i$ is given by the following equation:
II. Policy Network characteristics

Now, we go through the second set of independent variables, namely the characteristics of the network. Authors in the network literature stress different characteristics as important to characterise and differentiate networks. For example, Jordan and Schubert (1992) perceive the level of institutionalisation, scope of policy-making and number of participants to be important to characterise different types of policy networks. Van Waarden (1992) identifies seven characteristics to distinguish policy networks, which are the number and types of actors, function of networks, structure, institutionalisation, rules of contact, power relationships and actors strategies. Atkinson and Coleman (1989) use three characteristics, which are mobilisation of interests, autonomy and concentration of state.

However, these scholars perceive the network mainly as a metaphor and have been criticised for not assigning to it any explanatory value. We, on the other hand, perceive the network as a structure which plays a significant role in the explanation of policy outputs. Specifically, we argue that the network intervenes in actors’ actions by enabling or hindering their efforts to put pressures for position shifts or compromises and to build strong and stable coalitions. For that reason, we believe that two network characteristics deserve our attention: the patterns of communication among the network actors and the level of trust that exists among them. These characteristics are important for unanimity, which is the conditions under which our model works.

Below we present the network variables that are considered important in this study and explain in more detail how they influence the course of policy outputs.

\[
I_{ia} = \frac{r_i}{\sum_{k=1}^{n} r_k} S_{ia} \quad (3)
\]

Patterns of communication

Actors communicate with each other in order to exchange information but more importantly in order to express pressures to address a common problem or pressures to seek a common resolution to a problem (Warren, 1999). We argue that the position of
actors in the communication network significantly affects their ability to promote their positions through influencing their ability to effectively mobilize their resources.

A number of policy network studies use actors’ position in the communication network to explain actors’ ability to influence decisions. Specifically, Laumann and Knoke (1987) who study communication in terms of exchange of confidential information, argue that actors who occupy more central positions in the network, in the sense that they receive confidential information from many other actors in the network, are more influential than more peripheral actors. In the same respect, Stokman and Zeggelink (1996) who employ communication among the actors as a means to express pressures argue that the higher the number of incoming requests actors receive for position shifts, hence the more central positions they hold in the network, the more influential those actors are.

Stokman and Van den Bos (1992) provide the closer conceptualisation of the significance of actors’ position in the communication network to our own. Specifically, in their two-stage model of policy making, they argue that actors’ ability to influence other actors’ policy positions – and more importantly from their perspective, to influence actors with formal decision-making power- depends on their access to those actors in the stage prior to formal decision-making. Hence, their access to other actors permits actor’s power resources to be used effectively. In the same respect, in this study, communication among the actors is perceived as a channel through which actors express pressures. However, we argue that it is not only direct access that allows actors to express their influence but their overall embeddedness in the communication structure plays an important role in weakening or strengthening actors’ ability to effectively use their own resources of influence. Actors who are well-embedded are considered to have less difficulty in accessing other actors and hence, their position in the network facilitates the use of their own resources. On the other hand, actors that are situated on the margin of the network have more difficulty in accessing other actors and therefore, their position in the network constrains the use of their own resources. Hence, the pattern of communication in the network can be viewed as a catalyst that acts upon actors’ individual resources of influence. Nevertheless, actors with much power on their own are less affected by their position in the network but the results are much more apparent for less powerful actors.

The position of actors in the communication network is also important among actors who share the same policy position. It is often assumed that actors with the same policy position are implicitly on the same side and hence they can join forces when their position is threatened due to pressures from other actors. However, this is not always the case. In informal settings like the ones we are interested in it might often be the case that actors do not even know the position of other actors even if it is the same as their own. In addition, actors might share the same position with other actors but decide to drop that position in favour of a position held by actors with whom they communicate more easily. This is mostly evident when seemingly same positions are shared between business actors.

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2 The reason for this is that actors who receive a lot of requests can choose which ones to accept and which to reject, based on the assumption that actors can only accept a limited number of requests at a particular time.
and NGOs, who however rarely form a coalition in order to defend or promote their position (see Bressers and O’Toole, 1998).

**Patterns of trust relationships**

Trust relationships among the actors are often neglected in political studies mostly due to the assumptions of rationality. Since rationality assumes that actors will choose the courses of action that lead to higher net gains for themselves and their group, trust is overshadowed. In this study, however, we expect trust to constrain actors’ short-term rationality and to play a significant role especially in coalition formation and coalition split.

Actors develop trust relationships with each other during their past and present interactions inside and outside the policy process. Trust occupies an important role in the literature on management, where it is usually distinguished in two forms; one based on the other party’s intentions and the other based on the other party’s abilities (Dooley & Fryxell, 1999). Trust in someone’s abilities determines whether or not that person or organization will be assigned a certain task. From the perspective of influencing policy outcomes, trust in other actors’ abilities does not play an important role (perhaps only in the selection of instruments). A much more vital role plays trust in actors’ intentions. Scholars associate this kind of trust with the risk of facing opportunistic behavior (Coleman, 1990; Bradach & Eccles, 1989).

Trust plays an especially important role among actors who advocate the same policy position. If trust exists among two or more actors who advocate the same position, then the actors place low probability to the expectation that their partners might behave opportunistically. That way they increase the probability of successfully forming a coalition. On the other hand, the lack of trust indicates that actors’ fears of deception are at a high level and in that case they might decide not to form a coalition, even if they seemingly advocate the same policy position. Such behavior would lead to the fragmentation of support of specific policy positions and hence, larger probability of being taken over by other actors. The reader can consult figure 2, that depicts the network communication constraints among actors with the same policy positions to draw parallels with the effect of lack of trust among actors with the same policy position.

Trust also plays a significant role among actors with different policy positions who are trying to reach a compromise on a decision. Scharpf (1997) shows that when trust is unilaterally placed by one actor to the other, then the actor who is trusted (trustee) is better off than the actor who places the trust (trustor), because exploiting trust is proven more advantageous than honoring trust in that case. However, if trust is mutually present or absent, then the situation is advantageous for both actors. Nevertheless, the presence of mutual trust helps actors to reach compromise and seek consensus (Braithwaite and Levi, 1998), whereas the absence of trust induces actors to shy away from cooperation.
Therefore, trust plays a weakening role when it is unilateral or absent but a strengthening role when it is mutual.

**Combined Effect of Communication and Trust**

In the light of the discussion presented above for the effect of network characteristics, specifically communication and trust, on actors’ ability to pursue their policy positions we came to the conclusion, that the network plays a significant role in that respect. Specifically, both communication and trust affect the way in which actors’ influence (based on resources and salience) can be used to determine policy outputs. Specifically, the network acts as a facilitator or as a constraint in actors’ ability to form and maintain coalitions and their ability to effectively express pressures for position shifts and compromises.

Taking these facts into account, we are able to calculate actors’ influence in the following way.

Consider a network of \( n \) actors, where actor \( j \) tries to shift the position of actor \( i \). Then if we denote the resources and salience of actor \( j \) as \( r_j \) and \( s_j \), respectively, the communication of actor \( j \) with \( i \) as \( C_{ji} \) and the trust of \( i \) towards \( j \) as \( T_{ij} \), then the power of \( j \) to influence \( i \) by inducing a position shift is given by the following equation:

\[
I_j = \frac{r_j s_j (C_{ji} T_{ij})}{\sum_{k=1}^{n} r_k s_k (C_{ik} T_{ik})} \tag{4}
\]

Equation (4) shows that the relative influence of actor \( j \) in a network of \( n \) actors, when actor \( j \) tries to induce a position shift on actor \( i \), is equal to her resources discounted by her salience on the issue, discounted by her position in the network (network constraints or facilitators in communicating with the rival actor \( i \) plus trust constraints or facilitators in the relationship between \( i \) and \( j \)).

This equation can be compared to Stokman and Van den Bos (1992) control equation. Specifically, they refer to the influence (or in their terminology, power) of actor \( j \) as the amount of control on decisions taken by actor \( i \) which is equal to the power resources of actor \( j \) related to the power resources of actor \( i \) and those actors who have access to \( i \).

Then, if control of actor \( j \) over actor \( i \) is denoted as \( C_{ji} \), resources of \( j \) and \( i \), as \( r_j \) and \( r_i \), respectively, and access of actor \( j \) to actor \( i \) as \( a_{ji} \), then the control of \( j \) over \( i \) for a particular policy issue is given by the following equation:
\[ C_{ij} = S_i \frac{r_j a_{ij}}{r_j + \sum_{k=1}^{n} r_k a_{ki}} \]  

(5)

where, \( a_{ij} = 0 \), if actor \( j \) has no access to actor \( i \) and \( a_{ij} = 1 \), if actor \( j \) has access to actor \( i \).

**Calculation of Shifts in Policy Positions**

Based on the previous analysis, we are now able to provide our model for calculating actors’ position shifts and the estimation of the final policy output of the policy process. We proceed in four steps which we present below:

**Step 1.**

\[ P_i^{t+1} = \frac{\sum_{j=1}^{n} I_{ij} P_j^t a_j^t}{\sum_{j=1}^{n} I_{ij} a_j^t} \]  

(6)

where,

\[ a_j^t = |P_j^t - P_i^t| \]  

(7)

**Step 2.**

Each time actors shift their positions, the negotiation process enters a new phase (Bueno de Mesquita, 1994) and the steps 1 to 3, as described above are replicated. Each sequence of new policy positions on the issue in question is called “iteration” (Bueno de Mesquita, 1994). The policy process ends when actors do not move any more from their positions. In that case, the final policy position, the position of the network \( P_N \), is the weighted sum of the actors’ policy positions as they have been shaped during the negotiation process and the amount of influence that supports each position. If at time \( t+n \), actors have been gathered in two coalitions, supporting positions \( P_i^{++} \) and \( P_j^{++} \) with influence \( I_{ci} \) and \( I_{cj} \) respectively, then the network position is:

\[ P_N = \frac{I_{ci} P_i^{++} + I_{cj} P_j^{++}}{I_{ci} + I_{cj}} \]  

(8)
3. Measurement of Variables

Before I present the empirical application of the above mentioned analysis, I will briefly explain the operationalization and measurement of the variables.

Actors’ Positions

Positions are measured in an ordinal scale, ranging from 1 to 6 for traceability and from 1 to 5 for sustainability information. Positions indicate higher preferences towards transparency as we move from the left to the right. For instance, in terms of traceability position 6 means that actors want the whole chain to be traced, from production of feed ingredients through sale, while position 2 means that actors want traceability only up to the level of country origin of meat/fish and position 1 means no traceability. In terms of provision of sustainability related information, position 5 means that actors want information on human and animal health and safety, animal welfare and environmental consequences to be provided in the food chain, while position 2 means that actors want only information concerning human health and safety to be provided and position 1 means no horizontal scope.

Actors’ Resources/Influence

We evaluate actors’ influence according to the value actors participating in the policy process assign to them. This influence reputation mechanism is advocated by Laumann and Knoke (1987) who argue in favor of the subjective perception of influence. In order to find out how actors evaluate the influence of other actors we ask the following question:

Q. As we have indicated, all the organizations on the list are very important and influential actors. But we would like you to check those organizations, which you think, are especially influential.

Then, in order to associate influence with particular types of resources we ask the following question:

Q. Organizations may be regarded as influential participants in national and EU food policy because they possess certain resources. A list of such resources appears on the following card.

1. Political authority and legal rights
2. Financial resources
3. Legitimacy
4. Expertise

Would you please select 5 to 10 organizations that you know best and tell me for each of them all the characteristics or resources on which that organization’s influence is based? Are there resources not on this list that any of these organizations possesses?
The same types of questions are used in Laumann and Knoke (1987). Based on actors’ responses we are able to rank actors according to their importance and then assign values to actors based on that ranking. We assign the most influential actor a value of 100 and all the other actors are ranked in terms of their potential influence relative to that actor. It is possible that more than one actors are assigned a value of 100 or the same value. This value reflects the maximum influence an actor could exert on the issue if he/she fully mobilised his/her resources. This method of valuing actors’ ability to influence is used in the bounded rationality choice model (Abdollahian and Kugler, 2003), the only difference being that in that model the importance of resources held by actors are judged by experts whereas in our model the importance of resources is judged by the network actors.

**Actors’ Salience**

Salience measures the willingness of each actor to devote resources in influencing the issue in question. In order to measure salience we ask the following question:

Q. Please tell me, based on the following statements, which number represents better the level of interest your organisation has on the issue of transparency.

90-100: This issue is my number one priority when it comes up and I am absolutely committed.
70-80: This is my most important issue but I have other issues to address.
50-60: This is one of several important issues that I am committed to. I would drop this issue if another one of my important issues arose.
30-40: I care about this issue but it is not critical. There are many more important issues to deal with that I would commit to first. I generally focus on other issues.
10-20: This is a minor issue and I pay little attention or make extra effort.
Below 10: I am aware of this issue but do not care enough to get involved.

**Patterns of Communication**

In order to identify the pattern of communication among the actors, we provide actors with a list of organizations that we have identified as being important in influencing food policies in general and transparency in particular and we ask the following question:

Q. Here is a list of the most important organisations that operate at the national food chain and which we have compiled from various sources. Would you indicate the number of all organisations of this list with whom (ORG) regularly and routinely discusses matters of transparency?

Q. Are there any organisations not on this list with whom (ORG) regularly and routinely discusses the matter of transparency?

Then, using the network program UCINET we are able to map actors’ communication patterns. Using the same program we are able to derive the distances between the actors and use them as a measurement for the communication variable (C).
**Patterns of Trust Relationships**

We examine this type of relationship by asking actors to indicate which other actors in the network they trust. Specifically, we provide them with the same list as before (where they indicated with which other actors they communicated on a regular basis) and we ask the following question.

Q. Would you indicate which organisations of the list you trust and which organizations you do not trust?

Using the network program UCINET we are able to map actors’ trust patterns, however, what is more important in this case is simply the presence or absence of trust among the actors, and in the case where trust or absence of trust is not mutual, the direction of trust from alter to ego.

**4. Empirical Research**

In this section I present the results from the empirical analysis in the pork chain in the Netherlands. The data for the empirical part of the paper are derived from structured interviews made by the author in the period May-January 2003 in the Netherlands.

**4.1 Initiatives for Transparency**

The attention to transparency - or according to our distinction traceability - in the pig sector in the Netherlands started mainly with the BSE crisis in cattle. In 1992, the pig sector, through the Product Board for Livestock, Animal and Meat, set the foundation for an integrated chain control system (IKB) designed to control quality aspects in the production chain through a system of mutual agreements covering the chain from feed producers to slaughterhouses. More specifically, IKB farms may only use feed that comes from companies that are certified and operate in accordance with the Code of Good Manufacturing Practice (GMP) of the Product Board Animal Feed. Currently 80% of pig farms are IKB certified.\(^3\)

In 2002, a new regulation was adopted by the European Union (EU), the General Food Law. According to Article 18 of this regulation, food chain actors are responsible for developing systems for information exchange on products and processes backwards and forwards in the chain, from one link to another, by 2005. The regulation constitutes an important incentive for the improvement of the vertical scope of transparency; however, it is rather problematic in the sense that it leaves a lot of room for interpretation, since it does not set specific rules and targets. In addition to that, the regulation only mentions the

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\(^3\) The IKB and GMP standards are developed by the two Product Boards and certified by the SKV (Foundation of Quality Guarantee of the Veal Sector) and CBS (Central Bureau of Slaughter-Stock Services).
need to take into account environmental and animal welfare considerations, but does not specify how this is to be accomplished.

At the same time, a consumer organization in the Netherlands (Consumentenbond) made a proposal for a national regulation (Wok) to improve chain transparency. The proposal was stimulated by the Social and Economic Council’s (SER) advice on Sustainable Consumption to the government, part of which was to promote chain transparency and product information as a stimulus for sustainable consumption. Briefly, the basic idea of Wok was to upgrade the role of consumers to stakeholders, to facilitate the work of consumer and other societal organisations and to emphasize the need for government intervention. For this reason it was proposed that food chain actors should provide any kind of information on products and processes demanded by any other societal actor and in addition to that they should provide information actively by means of yearly reports or publishing information on their web-sites.

The main proponents of this proposal were the environmental and social organisations, a big retailer and the journalists’ organization. The Ministry of Agriculture, which according to its own statements aims to foster transparency in the food chain, chose to regard the proposal mainly as a “discussion paper”. The output of the first-round negotiations can be summarized as follows. The proposal was rejected as legislation, since both the government and the vast majority of chain actors did not want to adopt a regulation. It was decided that business should be more “transparent” through the publication of their website and telephone addresses for specific consumer questions. In addition, the permission was given to Consumentenbond and other societal organisations to conduct relevant research and publish the results. Finally, it was agreed that food companies should publish yearly reports.

The Consumentenbond proposal, then, is the farthest a transparency related policy proposal has come to date in the Netherlands. Accordingly, it provides a good opportunity to explore the impact of the structure and characteristics of the meat policy network on policy outcomes and draw insights for the future potential of such policies. From the presentation above, it should be evident that the outcome of that proposal was an almost complete undermining of its spirit. As the analysis below will show, this failure of the proposal can be explained on the basis of the pattern of interactions in the network as well as the lack of trust among relevant actors. Moreover, the analysis suggests that efforts to increase transparency in the Netherlands, at this point, do not have much chance of being adopted, at least, as long as it concerns the pork chain on which we concentrated our empirical study.

4.2 The network structure

The empirical research for this study, then, focuses on the pork policy network in the Netherlands. In total, we have identified 14 important actors who have an influence on national food policy making. In general, all the actors indicated in the interviews that they

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4 The Proposal is named “Weet wat je koopt (Wok)”, which in English means “Know what you are buying.”
are favorably positioned towards the vertical scope of transparency. Traceability is regarded as an instrument for food safety, which actors expect to enhance their “reliability” and competitive advantage in the market. The situation differs, however, with regard to the horizontal scope of transparency. More specifically, meat processors and their organisations (Nutreco, Dumeco, PVE and COV) have low preferences (position 2) regarding the inclusion of sustainability related information in the traceability systems. The feed organisations (PDV and Nevedi) have even lower preferences (position 1). On the other hand, consumer and environmental organisations as well as retailers and the Ministry of Agriculture have higher preferences regarding the inclusion of sustainability related information in the traceability systems. Specifically, the environmental organisation Stichting Natuur and Milieu and the organisation for animal welfare (Dierenbescherming) advocate position 4, while Consumentenbond, Platform Biologica, the Ministry of Agriculture (LNV) and the umbrella organisation for retailers (CBL) advocate position 5. Finally, the farmers’ organisations (NVV and LTO) are situated in the middle advocating position 3.

Graphically, actors’ positions are presented in the following figure:

Figure 1. Actors’ positions on horizontal scope of transparency in the pork network in the Netherlands

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<td>COV</td>
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</table>

The following figure shows the distribution of actors’ ability to support their positions on the horizontal scope of transparency based on their individual resources and salience on that issue.
Using a simple average weight calculation we find that the estimated policy position is 3.2. The question then is, why efforts to increase the horizontal scope of transparency fail, if the estimated policy position based on actors’ individual resources and salience is relatively high?

A first indication of a reason for this failure is provided by an analysis of the patterns of communication in the network. The following graph, produced by the network program UCINET, shows this pattern.

As the graph shows, all actors in the network communicate with each other. However, the interactions are more intense among some actors, while others play a more marginal role. Specifically, the NGOs are situated in the margin of the network, while the powerful processors and their product boards are in the centre of communication. This group is strong in terms of both their financial and political resources as well as on the basis of the
trust existing among them (see below). The Ministry is also part of this group, although its stated position coincides with that of the NGOs. The tightness of communication and “acceptance” of this coalition by the actors included is reflected, for instance, in the Ministry’s initiation of a Platform for Transparency. In this platform, the largest meat and fish companies in the Netherlands are to develop proposals for establishing transparency in the chain, while other groups including environmental and consumer organisations as well as retailers only receive a consultative status.

The patterns of communication among the actors are clearer in the following table which shows the geodesic distances between the actors and which is produced by the same network program.

Table 1. Communication Matrix (Geodesic Distances)

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<th></th>
<th>NVV</th>
<th>LTO</th>
<th>PIB</th>
<th>NEV</th>
<th>CBL</th>
<th>ConsB</th>
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The table shows the geodesic distance between the actors, that is the length of the shortest path between them. Values of one represent the shortest distance between the actors. As the numbers increase, so does the distance between them. Larger distances between the actors imply greater difficulty in expressing their pressures and therefore, a weakening effect in actors’ own resources. In our study the largest distance between the actors is three. A careful look at the table informs us that the closer relationships exist between actors that perform the same “social role”, specifically NGOs with NGOs, business with business, while the retailers’ organization CBL has equal distance with the NGOs and most of the business actors; the Ministry of Agriculture (LNV) is closer to business. The longest distance exists between the NGOs and the feed sector, represented by PDV and Nevedi. These actors also seem to have distant access to the rest of the business actors (but less than with the NGOs) although they have no difficulty in reaching the Ministry.

These observations suggest that the Ministry will probably be pulled towards the position of the business actors, since its relation with them is closer than its relation with the NGOs, and although they have the same position at the beginning of the process, in the course of communication this is bound to change. The same holds for the CBL, whose
close relationships with the business actors indicate that it will lower its position, however its position shifts will be less radical than the Ministry’s due to the close relationships with the NGOs. However, as we will see next, in the presentation of trust relationships, the absence of trust will induce sharper positional shifts than the ones predicted when trust is not taken into account. Finally, we also expect that the business actors will increase their position, especially due to pressures from the Ministry and the CBL, but also, as we will see later, due to the trust they place to the Ministry.

In order to derive the network communication variable (C), we have to normalize the values of table 1 between zero and one, and invert them so that lower values represent weaker communication between the actors and higher values stronger communication between the actors. After the relevant transformations we derive Table 2.

Table 2. Transformation of Communication Matrix

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</table>

The values from this table will later be used in equations (6) to (8) in order to compute actors’ positional shifts.

The patterns of trust relationships among the actors in the pork network in the Netherlands are illustrated in Figure 4.

23
Figure 4. Patterns of Trust relationships in the Pork Network in the Netherlands

Table 3 summarizes the patterns of trust relationships in the network by giving values to those relationships. Specifically, zero implies that trust is absent from one actor towards another actor, or else from ego to alter, while one implies that trust is present from ego to alter. If zero appears to both ego and alter, then there is mutual absence of trust between the two, while if one appears to both ego and alter, then there is mutual presence of trust between the two.

Table 3. Trust Matrix

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<th></th>
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Table 3 shows that a sufficient level of reciprocal trust exists only among the Ministry and the product boards (PVE and PDV), and among the product boards and the meat processors (Dumeco and Nutreco). Also, the Ministry enjoys the trust of the majority of
business actors while the NGOs trust only each other and are trusted only by themselves. Thus, the results indicate that the level of trust and closeness that exists among the actors favouring a high level of horizontal scope of transparency is insufficient in order for them to express a unified voice. Why is this the case? With respect to the Ministry, the cause for this lack of trust may be the result of the corporatist tradition, with retailers not being part of the traditional constituency of the Ministry. With respect to the retailers, the lack of a trusted relationship with environmental and consumer organisations may be the result of the existence of different fundamental organizational values. Retailers are business companies. On many political issues, their interests are likely to be closer to those of the meat producers than to environmental and consumer organisations. In this particular case, therefore, they may want to avoid an open conflict with the other business actors that could involve significant costs on future interaction. Without a sufficient level of trust among the relevant actors, however, a strong pro-transparency coalition cannot develop.

4.3 Calculation of Final Position

Based on responses regarding actors’ positions and salience, the calculation of their resources and the tables 2 and 3, we are able to use equations (6) to (10) in order to obtain actors’ positional shifts over time and eventually the final policy output. Table 4, summarizes these results. Each column represents a new round of negotiations called iteration and each round shows actors’ new positions. The process ends when actors do not move any more. In our study the process ends after eight rounds.

Table 4. Calculation of Actor’s Positions on the Horizontal Scope of Transparency in the Pork Network in the Netherlands

<table>
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<tr>
<th>Actors</th>
<th>Positions</th>
<th>Positions Iteration 1</th>
<th>Positions Iteration 2</th>
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<td>2.80</td>
<td>2.70</td>
<td>2.60</td>
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<td>Dumeco</td>
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We estimate that the final policy output will be the position 2.70, which can be interpreted as follows. Actors accept the importance of distribution of information concerning human health and safety in the chain and they make positive steps towards including information regarding animal health and safety. The results are in accordance with the expectations formulated in section 4.2. What is important to note from table 4 is actors’ shifts from their original policy positions at the beginning of the policy process, specifically with regard to LNV and CBL, relatively powerful actors who advocated the maximum horizontal scope of transparency. As we see the Ministry from position 5, quickly drops to position 4.60, then 4.15 and so on, until it reaches a compromise with the majority of business actors in position 2.60. This is due to the effect of communication and trust with those actors and at the same time barriers to communication and absence of trust with the NGOs. On the other hand, CBL which also follows a declining trend in its position, finally it reaches stability at position 3.03, a position also adopted by all the NGOs. This can be explained by the fact that CBL has close relations with business actors as well as NGOs and as such, it needs to satisfy both sides as well as itself. In addition, it is clear that the majority of business actors advocating position 2, have to make the less concessions in relation to all other actors. This is a result of their resources but also their ability to hold their resources together as a result of communication and trust. On the other hand, NGOs lack this ability, which is reinforced by the fact that they do not support the same position from the beginning. The reason for this is that some NGOs believe that complete transparency is unrealistic and therefore they have to lower their preferences in order to attract business actors.
5. Implications and Outlook

The above discussion presented some results regarding an explanation of the failure of transparency fostering regulation in the Netherlands and some indication of the future prospects of such regulation. The analysis suggested that efforts to promote sustainability related information in the Dutch pork chain have stumbled across a strong coalition of actors situated around the Ministry of Agriculture and are likely to continue to do so in the near and mid-term future. Change could only derive from a shift in patterns of communication and an increase in the level of trust among actors able to provide a counterbalance to interests opposing high levels of transparency. Such a shift could be initiated by government, which claims to be interested in fostering such transparency. At this point, however, the Ministry’s positioning of itself in the network and its patterns of communication with the other network actors force us to categorize such claims as political rhetoric. Furthermore, such a change could be initiated by retailers. To date, however, these appear to shy away from building a coalition with environmental and consumer organisations against producer interests and prefer to pursue a cooperative approach based on bilateral negotiations with producers. This preference could change at some point, if the retailers feel that they have no chance of success at that level. Moreover, retailers may also perceive the Ministry as unwilling to truly support a strong push for transparency at the current moment. Possibly, they would be willing to foster a pro-transparency coalition with environmental and consumer organisations if they saw more potential of government support for such an objective. An overriding question resulting from this research, then, is: “To what extent does the government really want transparency?” After all, the government benefits from the well-being of the meat industry in the Netherlands, especially due to the latter’s export-oriented nature. “Too much” information on meat production may help environmental and social sustainability, but may also reduce meat consumption and thereby hurt economic growth in the short-term.

Change clearly will eventually come from the EU. Due to diverging interests of other powerful actors there, a respective regulation has already been adopted and will have to be implemented by 2005, as pointed out above. However, the vagueness of the regulation and the strength of opposition to high levels of transparency in the Dutch pork policy network may prevent an implementation of the regulation that would allow it to be as effective as possible. At this point, one can only expect implementation provisions to be as vague and permissive as possible.
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