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Abstract

We present a research plan to assess the value of transparency by comparing pork supply chains in

The Netherlands and China. We assume that chain performance depends on chain configuration, which depends on societal context and its associated quality control institutions. We define chain configuration in terms of structure and transparency. In order to be able to assess the influence of societal context and its quality control institutions on chain configuration and performance, we compare two countries that have very different societies. Ultimately, our goal is to be able to indicate whether a certain chain configuration suits all, or whether chain configuration should be tailored to societal context.

Keywords: *Pork supply chain, societal context, transparency, information exchange, chain configuration*

Introduction

Transparency has received a lot of attention in supply chain research in the past years. As a concept in supply chain management, transparency has a well defined meaning: the extent to which all the netchain's stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay and distortion (Hofstede et al., 2004). But transparency can also be associated with values like openness, honesty, decency, sincerity, morality and justice. It seems that transparency has become an implicit norm rather than a chain characteristic: a high level of transparency is considered good, something to be proud of, whereas a low level of transparency is considered bad, and preferably something to be concealed.

At least this is what could be concluded from a benchmark study on traceability covering seven countries, in which Jack van der Vorst (2004) concludes: "In order to make detailed comparisons between supply chains on the use of ICT for traceability for food safety one needs cooperation of multiple people (disciplines) from multiple organizations in each supply chain. Although the interest in the subject appeared to be significant, it was difficult to acquire this cooperation. The main reason was that food safety and traceability is seen as a political and strategically sensitive subject." Traceability is a form of transparency, 'history transparency', as opposed to 'operational transparency' and 'strategy transparency' (Hofstede, 2004). If

traceability already encounters political and strategical sensitivity problems, then the same can be expected for transparency as a whole.

In general, what we consider sound, fair, or important, is motivated by underlying values that root in our culture. The way in which we establish and maintain relationships and do business with our partners is subject to the same underlying value system. Whatever role in business we play, we are citizens from a society that shares political, social and economical structures that developed over many years. Our government issues laws and regulations and sets conditions that constitute the framework for our actions. We have to know how to deal with the institutions that control these governmental rules, for example rules concerning food quality and safety. We share a history of events, like certain food crises that came along our country. The way we respond to the outbreak of such a food crisis is a result of our perception and interpretation of events. Perception and interpretation are, again, subject to our underlying value system that differs across societies. Hirschauer & Muhoff (2004) illustrate this by their case study in Germany which shows that trying to control traceability appears to be dependent on the degrees of 'character trust' and 'situational trust' that prevail in a society.

As an example of how an institution can affect chain configuration: in 1992, the Dutch Board for Livestock, Meat and Eggs (PVE) in cooperation with the livestock and meat sector introduced a quality system ('integrated quality control', in Dutch: IKB). The purpose of IKB is to guarantee issues such as quality, animal origin and production, through the transfer of information along the chain (PVE, 2003). Following this system was voluntarily, but today it appears that 80% of all Dutch pigs are being raised according to the IKB quality system (Boston et al., 2004). Lindgreen, Palmer and Trienekens (2005) mention that the IKB system can be considered an instrument for providing the necessary vertical liaisons among the players in the chain. We could add that in this regard, IKB implicitly prescribes chain configuration in the sense that anyone who is willing to participate in the Dutch chain had better follow the conventions issued from the quality system.

In this paper, we propose a research plan to assess the value of transparency by observing it in different societal contexts. Figure 1 depicts a conceptual model of our research plan. This is a first publication, and all elements of the plan are still subject to improvement.

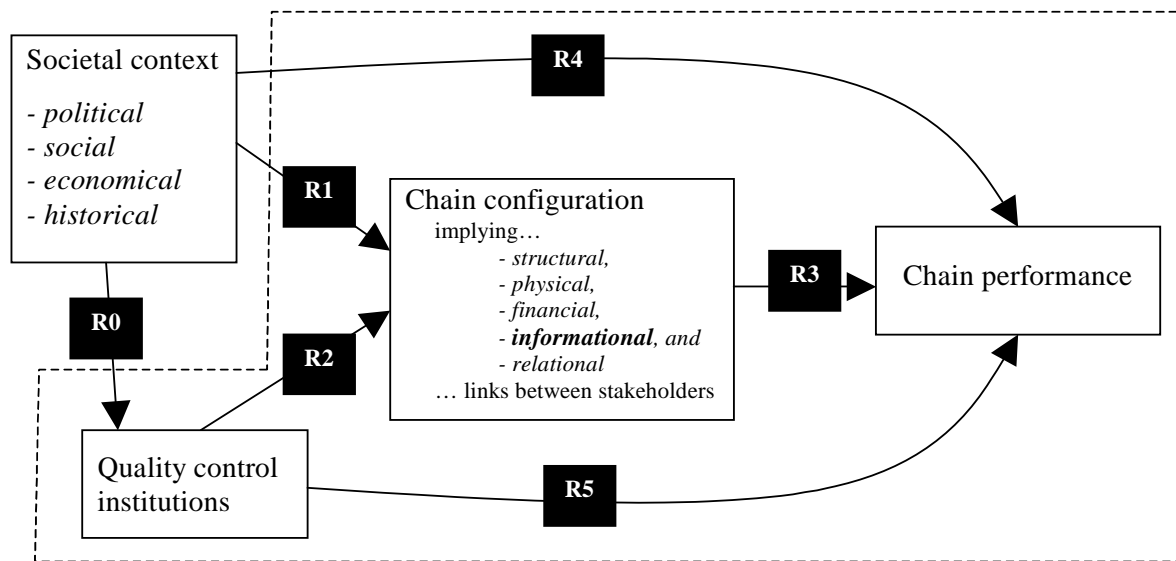


Figure 1. Conceptual model of our research. Boxes are variables. Arrows are relationships of type 'have effect on', and are labelled R0-R5. The dashed line indicates the scope of our data collection

Research framework

Following our line of reasoning from the introduction, chain configuration is dependent on societal context (relationship R1 in Figure 1). Chains were usually not formed overnight but developed subject to economical, social and cultural conditions, and they continue to change. Certain events on national, organizational or personal level may have speeded up or hindered this process.

The same holds for quality control institutions that affect the chain. These arise within a societal context to create and enforce governmental regulations (relationship R0 in Figure 1). An example of such an institution in the Netherlands is the Food and Consumer Product Safety Authority (in Dutch the VWA, Voedsel en Waren Autoriteit). The institutions interact with stakeholders from within the chain, and as such they have an influence on the chain configuration (relationship R2 in Figure 1).

Chain configuration can be analyzed by identifying chain actors (stakeholders) and links between them. Such links have a structural, physical, financial, informational or relational nature. Analyzing chain configuration results in rich aspect diagrams describing links between stakeholders not only concerning goods and money, but also information and relationships (Van Hal et al., 2004). It is hard to examine these aspects independently from each other. Amanor-Boadu and Starbird (2004) give an example of how the relationship between partners affects other aspects: beef producers in the US who felt disadvantaged by the structure and operation of the supply chain sometimes chose to hide behind anonymity and avoid efforts that could reduce contamination risk of their cattle, hence not providing the information they should have provided according to the arrangements.

We also assume a relationship between chain configuration and chain performance, as is illustrated on the right hand side of the model in Figure 1 (relationship R3). For our research, we will express chain performance as (a) percentage recall (which has to do with food safety considerations), (b) product quality characteristics, (c) certificates and standards, and (d) reputation among stakeholders. There may also be a direct relationship between societal context and chain performance (relationship R4) or between quality control institutes and chain performance (relationship R5).

As for analyzing these relationships, in our research we take on the perspective of information exchange: by analyzing information exchange between stakeholders of the chain, we seek to elucidate the relationships between societal context and quality control institutions, chain configuration and chain performance. As we pointed out above, we are conscious of the fact that information exchange as a separate entity is difficult to examine. Therefore, the other aspects of stakeholder links will implicitly be involved as well. This is why all other aspects are mentioned in the chain configuration box represented by Figure 1, but the informational aspect stands out.

Research objective

We allege in our research that societal context, chain configuration, quality control institutions and chain performance are variables that are dependent on each other: chain configurations develop under influence of societal context, resulting in the co-existence of different chain configurations in different societal contexts, and it also depends on societal context what type of institutions have what authority to influence chain configuration. In our research, we seek to clarify these relationships: can we distinguish an influence of one variable on another, and how significant is this influence? Does chain performance mainly depend on chain configuration, or directly on societal context, or maybe really on the institutions? After we have explored these relationships, we should be able to give an indication of how chain performance may be increased by changing other variables. For example, we should be able to suggest changes in chain configurations by means of changing control of institutions. Societal context is a variable that can not be changed, but it can be taken into account more effectively. Rising economies that are actively developing their chain configurations may benefit from our results: which chain configuration would work out best within which societal context? What would not work and why not?

Research issue

The main goal of our research is to find out what the interdependency is between relationships R1, R2, R3, R4 and R5 in our conceptual model of Figure 1. The dashed line in Figure 1 indicates the scope of our data collection. Relationship R0 from Figure 1 is not included: we assume that quality control institutions and chain configurations arise within a societal context, but we do not investigate how.

Main research questions

1. What relationships or chain configuration elements contribute most to chain performance, when analyzed in terms of information exchange and explained from societal context?
2. From the same perspective, what is the interdependence of relationships R1, R2, R3, R4 and R5?

Sub questions

- a. What are the differences in information exchange between stakeholders in different chain configurations?
- b. To what extent can these differences be explained from the societal context that led to this particular chain configuration (relationship R1)?
- c. To what extent do these differences account for differences in chain performance (relationship R3)?

Related questions:

1. Cross-national interchangeability, as a mind experiment: What would be the implications if the chain configuration and information exchange pattern of one country would be implemented in the other country and vice versa?
2. Once we have obtained and analysed our data, we may be able to answer questions from different perspectives, e.g.: What information is food safety related information, and to what extent is food safety a concept that is also dependent on societal context?

Research material and strategy*Research material*

For our research, we will take the pork supply chain as our chain of interest. The Dutch pork sector is the fourth biggest exporter of pork meat in the world (ABN Amro, 2002). The configuration of the pork supply chain in the Netherlands is reasonably uniform, with the slaughterhouses being identified as chain leaders. This is different from e.g. Denmark. The Dutch pig industry is characterized by corporate organizations at each stage of the supply chain (Boston et al., 2004), whilst the Danes have an umbrella organization, Danske Slagterier, which coordinates and encourages supply chain cooperation and undertakes activities such as training, market research and technology development on behalf of the supply chain (Lindgreen et al., 2005). The Netherlands and Denmark are neighbouring countries, but their different societal context already resulted in different chain organization. It is interesting to make a further comparison with China, because it has a societal context very different from the Dutch and the Danish, and is also the largest pig breeding, production and consumption country in the world.

We will use the results from past case studies available from literature, and do additional case studies in China and the Netherlands. We may extend our material with case studies in Denmark. Case studies will be designed after expert consultation and literature research.

With the stakeholders from our case studies, we will conduct interviews and make a chain analysis from the stakeholder's perspective in terms of information exchange. The chain analysis, which results in a rich diagram, will be created by means of a tool inspired on the chain analysis tool associated with the Klic-project, 'Nimpf' (van Hal et al., 2004). This tool may need some adaptations and / or extensions.

Resulting research material will be:

- a. chain analysis diagrams per stakeholder (from case studies);
- b. qualitative data (observations and interviews, from case studies and expert consultation);
- c. quantitative data from secondary data sources (figures on chain performance, statistics, etc).

Research strategy

Our intended research strategy is the following:

1. Conduct literature research and perform expert consultation in order
 - a. to make stipulative definitions of key concepts;
 - b. to make plausible choices with respect to chains and stakeholders;
 - c. to make design choices with respect to case study preparation and interview questions;
 - d. to collect additional secondary data sources, e.g. statistical information on pork supply chains.
2. Design the interview questions and prepare the contents of the case studies.
3. Select the 'middle of the road' pork supply chains that differ in societal context. These will have developed certain chain configurations, patterns of information exchange between stakeholders, and chain performances.
4. From these typical pork chains in each country, make a selection of stakeholders to be included in case study and interview sessions.
5. Conduct case study and interview sessions. These will result in chain analysis diagrams per stakeholder, created together with the stakeholder during interview sessions by means of a visualization tool. To support the analysis and interpretation of the diagrams, we have additional qualitative data from interview sessions and case studies, and secondary data from statistical sources.
6. Analyse the diagram data and construct a model that represents the information exchanged between stakeholders according to certain dimensions or categorizations. For example, 'degree of embeddedness' could be such a dimension (Uzzi, 1997).
7. Compare the diagram data and information model from both countries. The supportive data will help to recognize and interpret differences.
8. Draw conclusions in order to answer the research questions.

Key concepts to define in phase 1:

1. *Societal context*

We will define societal context in terms of historical, economical, social and cultural factors. We will use the theory from Hofstede and Hofstede (2005) combined with results from current research being done on the pork supply chain in China (Han, 2004), and do additional literature research.

2. *Stakeholders within pork supply chains*

We should clarify the concept of stakeholder (producer, processor) and differentiate between levels (company, branch, individual), and between internal and external stakeholders. This can be found in supply chain management literature.

3. *Define 'middle of the road' pork supply chains.*

order to compare chain configurations from different societal contexts, it is important that we are able to justify our choice of chain configuration. In the pork supply chain this means that we should focus on the volume-driven part of the supply system, omitting niche products like organic pork meats. We should consult experts to find useful criteria for our choice.

4. *Chain configuration*

Before we can carry out specific case studies, we should define our chosen pork supply chain configuration at a general level: which actors play a role, how are the ownership relationships mainly, what flows of goods, funds, information and relationship can be distinguished? We focus on informational links but take the other aspects into account as well. (Literature, expert consultation).

5. *Quality control institutions*

Quality control institutions play a special role as chain actors, as they represent the government and/or the citizens in a society. What institutions do we take into account, and why? (Expert consultation).

Information exchange between stakeholders

For our chain analyses, it is important that we focus on information exchange and the accessibility of this information, but the term information needs further clarification. We will use the typology of Hofstede (2004, page 228):

- Transaction data (e.g. for traceability purposes, as resulting from the General Food Law);
- Product-related data / measurements (new, recent, actual or contextual, for comparison);

- Perceptions/interpretations (compare new data to selected historical data and theoretical considerations, e.g. use point-of-sale data to predict trends);
- Expectations, plans, goals, strategies. (Are assumptions still valid?).
- Price data of transactions, to make markets transparent for others in a trading network.

7. *Dimensions of information*

After analyzing the information exchange between stakeholders, we construct a model that represents the information according to certain dimensions or categorizations. For example, ‘degree of embeddedness’ could be such a dimension (Uzzi, 1997). We need to find more such dimensions from expert consultation and literature research in order to construct a sensible model. Partly, these dimensions will emerge during and after the case studies.

8. *Chain performance*

If we want to assess pork supply chain performance, we should more adequately define how we can measure this, as there are:

- Percentage of recall
- Quality of meat (protein, fat, water)
- Certificates, norms (standards)
- Reputation among stakeholders.

Discussion

Sensitivity

As indicated in the introduction, transparency and information exchange appear to be sensitive subjects. How can we pay sufficient attention to this aspect when we carry out our case studies and interviews? Direct questions may be considered inappropriate, there is high chance of obtaining desirable answers, and these are only two expected difficulties that need to be taken into account when designing the interviews. A feasible approach may be to avoid too direct questions, but to interview in terms of marketing, expected to be less sensitive to discuss. “In what ways do you promote your company with your customers?” as a starting question may be much safer than: “What kind of information do you provide to your customers?”. Food safety related questions can be sensitive as well. Instead of asking: “What hygienic measures do you take?”, it may be better to start with: “Do you recall a situation where something went wrong and people fell ill?” – and explore from there.

Trust

Trust is something we cannot directly measure, but that plays an essential role in information exchange. The chain configuration implies a structure that requires stakeholders to maintain relationships with each other in which they exchange information. These relationships hold a

certain degree of trust (or distrust). The existing degree of trust or distrust between stakeholders will have an influence on the information that will be exchanged between them. On the other hand, new relationships that still have to be developed will be influenced by the frequency and type of information that is exchanged between them. In the latter case, information exchange can be considered a means to establish this degree of trust. In both cases, observing information exchange will not directly reveal the degree of trust or distrust between stakeholders. We will have to be very alert for signals indicating a significant degree of trust or distrust. This may help us interpret our information exchange analyses.

Pitfall

Our research is designed in such a way that the level of abstraction is high and that we have to make many choices in order to operationalize our concepts. A pitfall would be that we will make a wrong decision, or that we miss an important development. We depend on expert consultation and literature for this, and we should make sure that we do this carefully and constantly review and re-evaluate the validity of previously made choices.

Opportunities

The advantage of a high level of abstraction is that once we have carefully made our observations and analyses, the results will be applicable in a broad context. Globalization of the market, cross border governance, and the rise of developing economies are relevant issues in today's economy. Our research may contribute to the understanding of why relationships between buyers and suppliers are not independent from societal context, and whether certain chain configuration arrangements may work out better in one society than in another.

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