Trust and control dynamics in agrifood supply networks: Communication strategies for electronic transaction environments

Melanie Fritz, Tobias Hausen

Department of Food and Resource Economics, University of Bonn, Germany m.fritz@uni-bonn.de

Poster paper prepared for presentation at the International Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006

Copyright 2006 by Melanie Fritz, Tobias Hausen. All rights reserved. Readers may make verbatim of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Trust and control dynamics in agrifood supply networks: Communication strategies for electronic transaction environments

Melanie Fritz, Tobias Hausen

Department of Food and Resource Economics, University of Bonn, Germany m.fritz@uni-bonn.de

Abstract

Agrifood supply networks are dynamic structures where firms regularly face the need to search for new market partners. A decision for a transaction with a new partner requires the existence of appropriate control and safeguard mechanisms as well as trust to overcome perceived risk and uncertainties. Electronic transaction environments offer new potentials for the identification of new transaction partners. However, trust and control need to be communicated appropriately in electronic transaction environments for agrifood supply network scenarios. Problems for appropriate communication are posed by the complex interrelation between trust and control in transaction relation. This paper contributes to the development of appropriate trust and control communication strategies in e-commerce as it analyzes the occurrence of trust and control elements in the phases of a transaction in the agrifood sector.

Keywords (JEL): Agricultural Markets and Marketing (Q13), Technological Change (O3), Social Norms and Social Capital (Z13), e-Commerce (L81)

1 Introduction

In the agrifood sector transactions between firms take place to exchange goods between the different levels of the value chain. Often, transactions occur within a network of companies with relatively stable relationships. The efficiency of the realization of transactions adds to the competitiveness of the firms. Varying supply and demand situations in the agrifood sector regularly create the need and urgency for companies to search for new buyers and for new suppliers outside an existing network. However, fragmented and therefore intransparent agrifood markets, the complexity of agrifood products and the related information asymmetry between sellers and buyers necessitate upfront investments to identify suitable new transaction partners. The complexity of food products and the related information asymmetry create uncertainty and induce buyers to perceive risks, in particular in a first transaction with a new and so far unknown transaction partner. This is particularly true when it comes to food products only to acquire on international markets. To overcome uncertainty and perceived risks, various control and safeguard mechanisms have emerged including quality signs, third party auditing, or guarantees. An important supplement and sometimes substitute for control and safeguards in transactions is trust between transaction partners. Trust and control in transactions are highly interlinked and complex mechanisms. Trust between transaction partners is of interest for transactions as it is less costly than control and safeguards (see DYER 1997, ZAK, KNACK 2001). Electronically supported transactions, also referred to as electronic commerce, offer support potentials for both the efficient organization and coordination of transactions within existing buyer-seller relationships as well as the identification of new transaction partners. Next to transaction process efficiency, e-commerce increases market transparency and market coverage and therefore opens market access for companies in remote and rural areas as well as international marketing opportunities. At present, potentials from electronic commerce for the efficient organization of transactions within networks of existing relationships in the agrifood sector are increasingly utilized (FRITZ et al. 2004). However, controversial to its potentials electronic commerce is less exploited for the setup of new relationships in the agrifood sector. Rea-

sons for this are that electronic commerce transaction environments are often perceived as anonymous as trustworthiness and control mechanisms are not appropriately and sufficiently communicated. A so far unsolved question concerns the appropriate selection and communication of trust and control elements in electronic transaction environments to support the set up of new buyer-supplier relationships in the agrifood sector.

It is the objective of this paper to discuss and analyze the occurrence of trust and control elements during transaction processes in the agrifood sector. This knowledge is essential for the purposeful communication of trust and control in electronic transaction environments. The paper first outlines theoretical concepts dealing with the role of trust in business relationships. The following section analyzes trust and control dynamics in agrifood transactions. The paper concludes with the discussion of first experimental results with electronic trust elements for an agrifood transaction scenario.

2 Theoretical background: Trust and control in transactions

The exchange of complex goods in market transaction is related to information asymmetries and uncertainties and builds on control mechanisms and a certain level of trust between the business partners (FYNES et al. 2001). Literature provides many definitions of trust in business relationships, but their essence is that trust is one party's belief that the other party will not exploit its vulnerabilities (see BARNEY, HAN-SEN 1995). In general, trust is an expectation into the future behavior of others and a mechanism to reduce complexity in a social decision situation (LUHMANN 2000).

Transactions between buyers and sellers are subject to a range of research areas including transaction cost economics, information economics or socio-economics (for an overview see HAUSEN 2005). Transaction cost economics claims that every transaction between buyers and sellers creates transaction costs due to costs for coordi-

nation, information search, monitoring, and controlling that the transaction goes on as predefined and that opportunistic behavior is controlled (WILLIAMSON 1985). Transaction costs not only include quantifiable costs, but also "costs as disadvantages". Trust in relationships between buyers and sellers lowers transaction costs by reducing the efforts for contracting and the costs for control and monitoring (DYER, CHU, 2000; WILSON, KENNEDY 1999). This is why trust in buyer-seller relationships is often considered as an economic asset creating value.

Information economics (NELSON 1970, AKERLOF 1970) analyses the impact of an asymmetric information level on buyers and sellers and on market performance. Information asymmetry is typical for goods where experience and credence characteristics are predominant such as in agrifood products and induces moral hazards. To overcome information asymmetry and moral hazards, control in form of information screening and signaling together with the creation of long-term business relationships is necessary. Long-term business relationships build on experience as alternative to information search (SELNES 1998). Past experiences and interaction create trust between business partners (ANDERSON, WEITZ 1989).

Socio-economics (GRANOVETTER 1985; ETZIONI 1988) analyzes the influence of social networks, the social environment and cultural rules on the behavior of market participants. Trust and social control from "social embeddedness" in a society's values and moral ideas are considered as determinants to business decisions. It is argued that direct personal experiences and social ties play a more important role than indirect reputation. Different cultural backgrounds and habits influence the interaction between businesses (see HOFSTEDE et al. 2002).

3 Trust and control dynamics in agrifood transactions

For the development of a communication strategy for trust and control in electronic commerce environments for the agrifood sector, the principles of transaction decisions and the dynamics of trust and control need to be understood.

3.1 Transaction decision making principles

Transaction decisions for the exchange of goods in the agrifood sector are embedded in and influenced by the transaction scenario (see **Figure 1**) determined by (see also TAN, THOEN 2001)

- the transaction environment with external influences, including safeguards and control mechanisms as well as hazards and risks,
- the concrete transaction situation with its potential gains, hazards from a. o. opportunistic behavior, trust and control elements interlinked with a company's strategy and objectives as well as the requirements coming from production processes, and
- the decision maker's individual perception of uncertainties, risks and hazards.
 Essential in business-to-business marketing and transactions is the perception of relative performance of the transaction partner (BACKHAUS 1990).



Figure 1: Principles of transaction decision making

An individual would only take a transaction decision if perceived hazards and risks from the transaction are compensated by either expected potential gains from the transaction along the company's strategy and objectives, an appropriate combination of trust and control mechanisms in the transaction, or a combination of both.

The relationship between risks, gain, trust and control in a transaction is highly complex (see LUHMANN 2000). Trust and control as determinants for transaction behavior have their origin in both the external transaction environment and the concrete transaction situation. Trust and control are inseparably linked, have a mutually reinforcing relation, are to a certain degree interchangeable (LINDGREEN 2003) and inversely proportional and contribute to the transaction decision by reducing the perceived uncertainty and risk (SELNES 1998, ZAK, KNACK 2001, DYER 1997). Examples are trust in the transaction partner, long term relationships, company networks, reputation, formal and informal control and security mechanisms such as quality signs, or production contracts (GULATI, NOHRIA, ZAHEER 2000, MÉNARD, KLEIN 2004, FEARNE et al. 2001).

In a given transaction situation, an individual perceives potential risks and hazards, gains as well as trust and control mechanisms. It is important to note that risk perception is socially constructed, that psychological elements guide responses to risks, and that available information influences an individual's risk perception (see LOBB 2005, VERBEKE 2005). As a consequence, the individual's perception of the trust and control complex is the key to the transaction decision. To influence the decisions and transaction behavior, the existence and communication of trust and control is necessary. In case perception and reasoning leads to confidence in the transaction, it is going to be realized and the transaction decision is taken (see also TAN, THOEN 2001). Results and experiences from the transaction influence the next decision by creating a generalized expectancy (SELNES 1998, LORENZ 1999).

Although it is difficult to identify clear principles of cause and effect in the emergence of trust (LOOSE, SYDOW 1994), it is known that positive personal experience is a strong determinant for the emergence and generation of trust. In addition, the identification of the impact of trust on a transaction decision is difficult as the individual receives rewards in form of a positive transaction experience only after the transaction has taken place. As a consequence, the relevance of trust or control shifts with the length of a transaction relationship provided that it is positive. The fact that gains are expected to be realized in the future and that they are uncertain at the time of the decision makes it unsuitable when it comes to the purposeful communication of appropriate information to *ex ante* compensate perceived hazards and risks.

3.2 Dynamics of trust and control in transactions

A transaction process is an interaction, communication and decision process between two parties, the seller and the buyer. On a more disaggregated level of examination, it consists of different transaction phases, the information phase, the negotiation phase, the settlement phase, and the after-sales phase taking place after the actual transaction (HAUSEN 2005). During these transaction phases, both seller and buyer perceive potential gains, hazards and uncertainties from the transaction and look for appropriate trust and control elements. For the active and purposeful influencing of the transaction decision in electronic transaction environments through appropriate communication strategies, awareness of the position of the trust and control elements in the process course as well as the origin of these elements is of paramount importance.

Figure **2** shows the four transaction phases embedded in the transaction environment and analyses the trust and control elements and their position in the transaction process course as determinants of the transaction decision. It includes trust and control elements from both the external transaction environment and the actual transaction process. The elements are based on literature as well as the results of a focus group discussion with experts in business-to-business transactions in the agrifood sector and ICT support potentials.

Influencing factors from the transaction environment are the structure of the industry sector and possible differences in market power, formal regulation, informal "rules of the game", norms specific to the sector, the product and its characteristics as well as the current market situation of supply and demand. Factors determining the buyer's and seller's perception and decision behavior in the transaction include the potential gain and risk for their companies, the companies' strategies, and cultures. The urgency of the buyer's supply needs or the seller's urgency of vending the product as well as their personal gains, risks, experiences and knowledge levels are additional influencing factors on the transaction situation. During the actual transaction and its phases, intense information exchange, communication and interaction takes place.

This is important as frequent communication is a determinant stimulating the generation of trust.



Figure 2: Trust and control elements in the transaction process phases

It is important to note that the information and negotiation phases take place before the actual transaction and the decision for the transaction, that the settlement phase is realized during the transaction, and that the after-sales phase occurs after the transaction has been carried out. The position of the trust and control elements in these transaction process phases is of fundamental importance for the development of an effective communication strategy for e-commerce environments as it determines their suitability for influencing of the transaction decision. The figure also shows that the buyer's experiences from the transaction only emerge ex post after the transaction has been carried out. As a consequence, this effective mechanism for the generation of transaction confidence is not suitable for the active ex ante influencing of a first time transaction decision. However, it is suitable for leading to repeated transactions between the transaction partners.



Figure 3: Shifting importance of trust and control in transaction relation

Figure 3 shows the dynamically changing relative importance and the inverse proportionality of trust and control elements in the course of a transaction relationship.

Figure 4 refers to the shifting importance of trust and control in a transaction relation n a first or one-shot transaction (transaction 1) and in repeated transactions (transactions 2 and 3) on the disaggregated level of transaction phases. It shows an example situation with three transactions with their transaction phases. The first buy of a complex product such as food from a new partner entails a high level of perceived risk, positive transaction experiences lower the perceived risk in future, repeated transactions (see Selnes 1998). In order to influence the transaction perception and decision of the first time transaction between new partners, a different combination of trust and control elements in the transaction phases I_{T_1} , N_{T_1} , S_{T_1} , and A_{T_1} is suitable and effective than in following, repeated transactions.

The dynamic change of trust and control effectiveness and suitability in repeated transactions is again interlinked with the dynamically changing situation of potential risks and gains. E.g., repeated transactions leading to cooperation and network build-

ing is a path dependent process (GULATI, NOHRIA, ZAHEER 2000) bringing along risks in the form of opportunity costs of potentially finding a superior business partner for transactions (see Selnes 1998).



Figure 4: Dynamically changing transaction phases in repeated transactions

4 Empirical results and future research

First empirical results were received in experiments analyzing the

- suitability of multimedia elements for generating transaction trust in electronic transaction environments as well as the
- effect from multimedia trust elements on transaction efficiency.

The suitability of multimedia transaction elements for trust generation was tested in an experimental long term study for an agrifood transaction scenario where experience from past transactions is important. Different degrees of relationships between participants were realized in the electronic transaction environment to test whether multimedia trust elements raised the transaction confidence level sufficiently to make individuals engage in electronically supported transactions: anonymous, reputation, videoconference and personally known. Results show the suitability of reputation and videoconference as trust generating elements. The experimental comparison between different levels of communication support (text, audio, multimedia) in an agrifood transaction scenario and therefore trust generation showed that transactions with multimedia support were most efficient.

Future research will regard the development of a procedure model for the analysis of trust and control elements in a given agrifood transaction scenario as well as the implementation of appropriate trust and control elements in an electronic transaction environment. It includes the analysis of the importance trust and control elements for different agrifood transaction scenarios. Rules need to be developed to find an appropriate combination of trust and control elements for agrifood transaction scenarios including multimedia trust and control as well as "real world" trust and control elements. This combination would lead to "blended commerce", transactions building on electronic and traditional elements. Challenges lie in the

- derivation of appropriate multimedia elements for trust and control in agrifood transactions, the
- exploitation of information and communication technology and multimedia potentials to offer innovative ways to communicate trust and control, and the
- assessment of the interchangeability potential of trust and control elements in agrifood transactions.

5 Conclusions

Agrifood supply networks are dynamic structures where firms regularly face the need to search for new market partners. A decision for a transaction with a new partner requires the existence of appropriate control and safeguard mechanisms as well as trust to overcome perceived risk and uncertainties. Electronic transaction environments offer new potentials for the identification of new transaction partners. However, the communication and implementation of appropriate trust and control elements in electronic transaction environments in agrifood supply network scenarios is difficult. The difficulty comes from the different position and effectiveness of trust and control elements throughout the transaction phases as well as the dynamically changing importance during a longer transaction relation.

This paper has analyzed trust and control elements in agrifood transactions and their prevalence and occurrence throughout the four phases of a transaction. This knowledge is of paramount importance for the purposeful influencing of transaction decisions and their transfer to and implementation in electronic transaction environments.

References

AKERLOF, G. (1970). The market for "lemons": Qualitative uncertainty and the market mechanism. Quarterly Journal of Economics 84: 488-500

ANDERSON, E. and WEITZ, B. (1989). Determinants of continuity in conventional industrial channel dyads. Marketing Science 8: 310-323

BACKHAUS, K. (1990). Investitionsgütermarketing. 2nd ed., Vahlen, München

BAKOS, Y. (1998). The emerging role of electronic marketplaces on the internet. Communications of the ACM 41 (8): 35-42

BARNEY, J.B. and HANSEN H. (1995). Trustworthiness as a source of competitive advantage. Strategic Management Journal 15: 175-190

DYER, J.H. (1997). Effective interfirm collaboration: How firms minimize transaction costs and maximize transaction value. Strategic Management Journal 18 (7): 535-556

DYER, J.H. and CHU, W. (2000). The Determinants of Trust in Supplier-Automaker Relationships in the U.S., Japan and Korea. Journal of International Business Studies 31 (2): 259-285

ETZIONI, A. (2003). Toward a new socio-economic paradigm. Socio-economic Review 1 (1): 105-118

FEARNE, A., ILNORNIBROOK, S. and DEDMAN, S. (2001). The management of the perceived risk in the food supply chain: A comparative study of retailer-led beef quality assurance schemes in Germany and Italy. International Food and Agribusiness Management Review 4 (1): 19-36

FRITZ, M., HAUSEN, T. and SCHIEFER, G. (2004). Developments and development directions of electronic trade platforms in US and European agri-food markets. International Food and Agribusiness Review 7 (1): 1-20

FYNES, B., de BÚRCA, S. and ENNIS, E. (2001). A Contingency model of quality management and business-to-business relationships. Journal on Chain and Network Science 1 (2): 111-122

GRANOVETTER, M. (1985). Economic action and social structure: The problem of embeddedness. American Journal of Sociology 91 (3): 481-510

GULATI, R, NOHRIA, N., ZAHEER, A. (2000). Strategic Networks. Strategic Management Journal 21: 203-215

HAUSEN, T. (2005). Elektronischer Handel. Einbettung in Geschäftsbeziehungen. Deutscher Universitätsverlag - Gabler, Wiesbaden

HOFSTEDE, G.J., PEDERSEN, P. and HOFSTEDE, G. (2002). Exploring culture: Exercises, stories and synthetic cultures. Intercultural Press, Yarmouth

LANCASTER, K. (1971). Consumer demand: A new approach. Columbia University Press, New York

LOOSE, A., SYDOW, J. (1994). Vertrauen und Ökonomie in Netzwerkbeziehungen – Strukturationstheoretische Betrachtungen. In: Sydow, J., Windeler, A. (Eds.). Management interorganisationaler Beziehungen. Vertrauen, Kontrolle und Informationstechnik. Westdeutscher Verlag, Opladen: 160-193

LINDGREEN, A. (2003). Trust as a valuable strategic variable in the food industry. Different types of trust and their implementation. British Food Journal 105 (6): 310-327

LOBB, A. (2005). Consumer trust, risk and food safety: A review. Food Economics 2 (1): 3-12

LORENZ, E. (1999). Trust, contract and economic cooperation. Cambridge Journal of Economics 23: 301-315

LUHMANN, N. (2000). Vertrauen. Ein Mechanismus der Reduktion sozialer Komplexität. 4th ed., Lucius & Lucius, Stuttgart

MALONE, T.W., YATES, J. and BENJAMIN, R.I. (1987). Electronic markets and electronic hierarchies. Communications of the ACM 30 (6): 484-497

MÉNARD, C., KLEIN, P.G. (2004). Organizational issues in the agrifood sector: Toward a comparative approach. American Journal of Agricultural Economics 83 (3): 750-755 NELSON, P. (1970). Information and Consumer Behavior. Journal of Political Economy 78 (2): 311-329

SELNES, F. (1998). Antecedents and consequences of trust and satisfaction in buyerseller relationships. European Journal of Marketing 32 (3/4): 305-322

TAN, Y.-H. and THOEN, W. (2001). Toward a Generic Model of Trust for Electronic Commerce. International Journal of Electronic Commerce 5 (2): 61-74

VERBEKE, W. (2005). Agriculture and the food industry in the information age. European Review of Agricultural Economics 32 (3): 347-368

WILLIAMSON, O.E. (1985). The economic institutions of capitalism. Firms, markets, relational contracting. The Free Press, New York

WILSON, P.N. and KENNEDY, A.M. (1999). Trustworthiness as an Economic Asset. International Food and Agribusiness Management Review 2 (2): 179-193

ZAK, P.J., KNACK, S. (2001). Trust and Growth. The Economic Journal 111 (April): 295-321