Transparency in Supply Chains: Is Trust a Limiting Factor?

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Abstract

Transparency has gained much relevance in food chains. This paper summarizes the determinants of transparency and points out that transparency in the sense of effective information exchange needs trust as a mediator in order to become a powerful tool in supply chain management. In addition to that this paper analyses the characteristics of trust and highlights the reciprocal and dynamic mechanisms of trust on transparency and vice versa. It is argued that both constructs should be enhanced at the same time in order to realize the benefits of trust and transparency on supply chain management.

Keywords: *Transparency; trust; power; control; agribusiness*

1 Introduction

Enhanced by several crises the demand for transparency in supply chains as a matter of risk prevention and consumer protection has developed into a general demand for improved access to information in order to regain consumer trust in food products.

In order to understand the role of transparency in supply chains in general, it is necessary to analyze transparency in more detail. How can transparency be defined, and what are its main characteristics and determinants? Does trust limit transparency? Answers to these questions require a deeper analysis of trust: How does trust influence transparency, and how does transparency influence trust? Both constructs are analyzed separately in various research areas but there are only a few papers that consider the effects of trust on transparency and vice versa at the same time. This paper highlights the importance of a cross-disciplinary analysis of trust and transparency in order to understand their complex relationship.

2 Characteristics of Transparency

Transparency is a multifaceted phenomenon. In everyday understanding it means clearness and lucidity (Loddenkemper, 1998; Nitschke, 2002). In a physical sense transparency is the property of transmitting light through a substance so that objects lying beyond or behind it can be seen clearly. In a sociological or psychological context transparency implies honesty and openness (Jensen, 2001; Hofstede *et al*, 2004). Transparency enables one to understand the effects and consequences of a decision or a behavior and furthers understanding of environmental circumstances. That means transparency improves a global consciousness of cause-effect-connections which enables all human beings to orientate themselves in a complex environment, to reach their targets in an uncertain environment and to participate actively in all areas of human mankind. Therefore transparency in the sociological or psychological understanding of gaining information and knowledge about the environment in order to prepare certain actions or decisions can be identified as a general requirement for all human beings, as a main motivational factor of human behavior and as a central aspect of the existence and development of social systems (Karg, 1990; Winterstein, 1996; Meyerhuber, 2001).

Another strand in research on transparency concentrates on economic issues. From this perspective transparency means to supply a complete and detailed survey of all market conditions to make it available to all participants at the same time (Henrichsmeyer *et al*, 1993; Russo, 1996; Krone, 2003). Profit maximization is necessarily connected to the presence of knowledge about products and prices on the buyers' side and customer demands and competitor activities on the suppliers' side. Otherwise market participants will not be able to consider the opportunities and risks of a certain behavior and decisions will be taken by chance rather than in accordance with economic advantage and strategic choice (Brinkmann, 1963; Stöffler, 1982; Reisch, 2003).

Based on social and economic points of view, transparency has developed to a general claim with respect to social systems and democratic processes. The right to transparency is assured by various decrees, regulations and laws passed by the EU and national governments (Nitschke, 2002). Agribusiness in particular is a sector which is being confronted with new regulatory standards in order to make production processes more transparent. This is fuelled by targets like risk prevention, consumer protection and regaining trust in food products (Reisch, 2003). Against this background many people associate transparency with tracking and tracing systems that allow them to see what is produced and how it is produced (Hofstede, 2003a). Hofstede (2003b) calls this history transparency, which he characterizes as being primarily defensive, focusing on events in the past, enhancing rapid reaction in the case of accidents and often being imposed from outside the chain (for example, by government).

But cross-disciplinary review of the literature has shown that transparency is more than just tracking and tracing; it includes factors like orientation, participation and communication. Thus, transparency can be a powerful tool for supply chain management because it offers the potential for offensive and voluntary information transfer between business partners. Hofstede (2003b) differentiates two levels of voluntary information exchange beyond history transparency. The first level – operations transparency – leads to the coordination of business operations, like collaborative planning of daily activities (such as logistics), and focuses present challenges. The second level – strategy transparency – includes reciprocal information flows from a future-based and strategic perspective (such as product innovation). All in all, transparency "is 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, 2003a, p. 18).

Although general economic theory often promotes maximum transparency as a beneficial target, researchers agree that in reality complete or perfect transparency is not the goal to aim for. Competition needs the presence of some uncertainty about winners and losers in order to push all participants and to avoid illegal arrangements and imitative behavior that counteracts competition and market mechanisms (Brinkmann, 1963; Jensen, 2001). Furthermore, human information processing capacities are limited so that in real life many decisions have to be taken under conditions of uncertainty, that is, with limited transparency (Albrecht, 1968).

But what determines the degree of transparency in food supply chains? On the one hand, barriers to transparency arise due to organizational and structural factors (Figure 1). Theuvsen (2004, p. 128), for example, identifies the division of labor in supply chains as an important determinant: "The more intense the division of labor, the more process interdependencies result and […] the lower transparency is. The number of process interdependencies […] is mainly determined by the degree of specialization, the number of … transaction partners and the frequency of transactions." On the other hand, transparency is limited by social and relational factors that influence the quality of business relationships and information exchange behavior. Van Dijk *et al* (2003) and Theuvsen (2004) point out that cultural and physical as well as cognitive and emotional closeness affect transparency in a positive way, whereas power asymmetries and opportunistic behavior have negative effects on information transfers. Here trust as a determinant of information exchange behavior and a mediator for transparency comes into play and deserves a closer look (Meyerhuber, 2001).

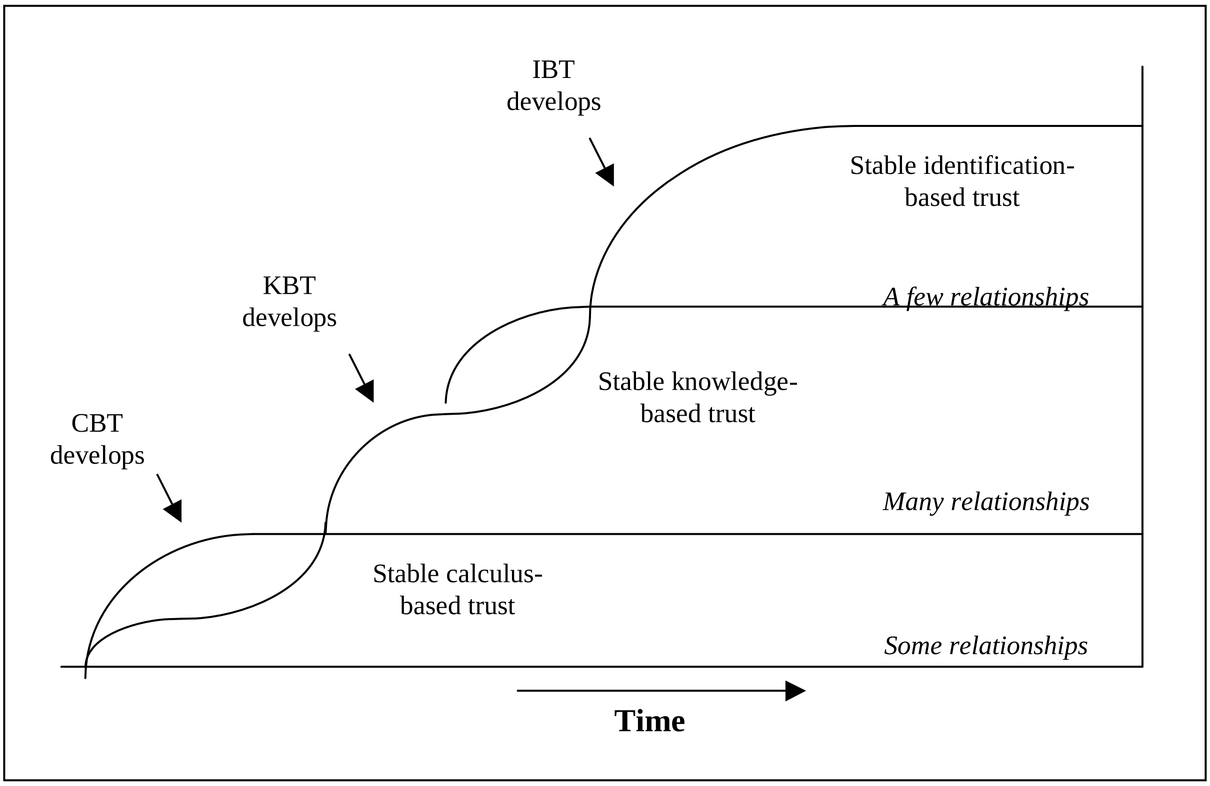

Figure 1. Determinants of transparency (adapted from Theuvsen, 2004)

3 Characteristics of Trust

Trust is also a multifaceted phenomenon: "From an economic perspective, […] trusting somebody is a way to save transaction costs. To a psychologist, […] trusting somebody makes one feel more secure, so one can give one's attention to other things. A sociologist might infer that the trusted person is a likely candidate for a network of friends or business relations" (Hofstede, 2003b, p. 4). Schweer and Thies (2003) give an interesting overview on different research streams. The first major definition of trust is its conceptualization as a personal variable in the development of human personality and individuality. This approach is represented by Erikson (1966) and his theory that each individual has to acquire a kind of general confidence towards the world and the environment in earliest childhood. Another representative of this research stream is Rotter (1981), who describes trust as something that constructs itself in a process of personal experience and leads to a general trustful or distrustful attitude towards others. The second major understanding of trust is reflected in the theory represented by Deutsch (1958) and others that trust is a situationally determined decision. The decision to trust includes uncertainty about the result of an action because this result is not dependant on the person's own activity alone but also on another's behavior. Coleman's (1990) rational choice theory is another example of the understanding of trust as a calculative weighing of perceived gains and losses in the form of a game or a bet. Schweer and Thies (2003) come to the conclusion that the components of trust in real life are at the same time cognitive, affective and behavioral; all of them are embedded in a network of relational, industrial and cultural elements (Köster, 2003), which means that trust is influenced by experiences in the past, impressions of the present and expectations of the future.

Based on recent research in economics, psychology and sociology, Rousseau *et al* (1998, p. 395) come to a multidisciplinary definition of trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another." The keyword *vulnerability* implies the risk of being disappointed or violated as a basic character of trust (Coleman, 1990; Bigley & Pearce, 1998; Dyer & Chu, 2000). The decision to trust is at the same time a decision against control (Plötner, 1995): "Trusting somebody means that you do not need to take the trouble of checking on them, accepting the chance that they might cheat on you" (Meijer & Hofstede, 2003). As a conclusion the main elements that engender trust are risk, knowledge, predictability and free will (Adams & Goldsmith, 1999). Given the bounded rationality of human beings, sociologists identify in trust a complexity- and risk-reducing function (Luhmann, 1989). Thus, trust is "vital for the maintenance of cooperation in society and necessary as grounds for even the most routine, everyday action" (Zucker, 1986, p. 56).

Trust is a dynamic construct that needs time and voluntary reciprocal interaction to be generated successfully (Schweer & Thies, 2003). Based on the first impression of another person or a business partner, trust is initially tested in less risky situations or on less important decisions. If the truster is not disappointed by the trusted, trust will be manifested on a more stable level; that is, the relationship becomes more trustful (Plötner, 1995; Meijer & Hofstede, 2003). Shapiro *et al* (1992) describe the development of trust in business relationships in three stages that can be achieved over time (Figure 2). In most cases the first level is calculus-(deterrence-) based, meaning that the decision to trust is determined primarily by a calculation of costs and benefits or the presence of penalties in the case of violated trust. What some scholars criticize here, however, is that the risk-reducing mechanism in this situation is control rather than trust, and, therefore, they do not accept deterrence-based trust as trust in the true sense of the word (Schweer & Thies, 2003; Das & Teng, 1998). The second level of trust building is gaining knowledge about and experience with the transaction partner in order to make the partner's behavior predictable (Shapiro *et al*, 1992). This level of trust – knowledge-based trust – is based on information instead of deterrence and control. The third level of trust is based on common intentions, values and norms. This level of trust – identification-based trust – requires reciprocal implementation of identical philosophies and convictions and trust as a general principle of organization (Schweer & Thies, 2003).

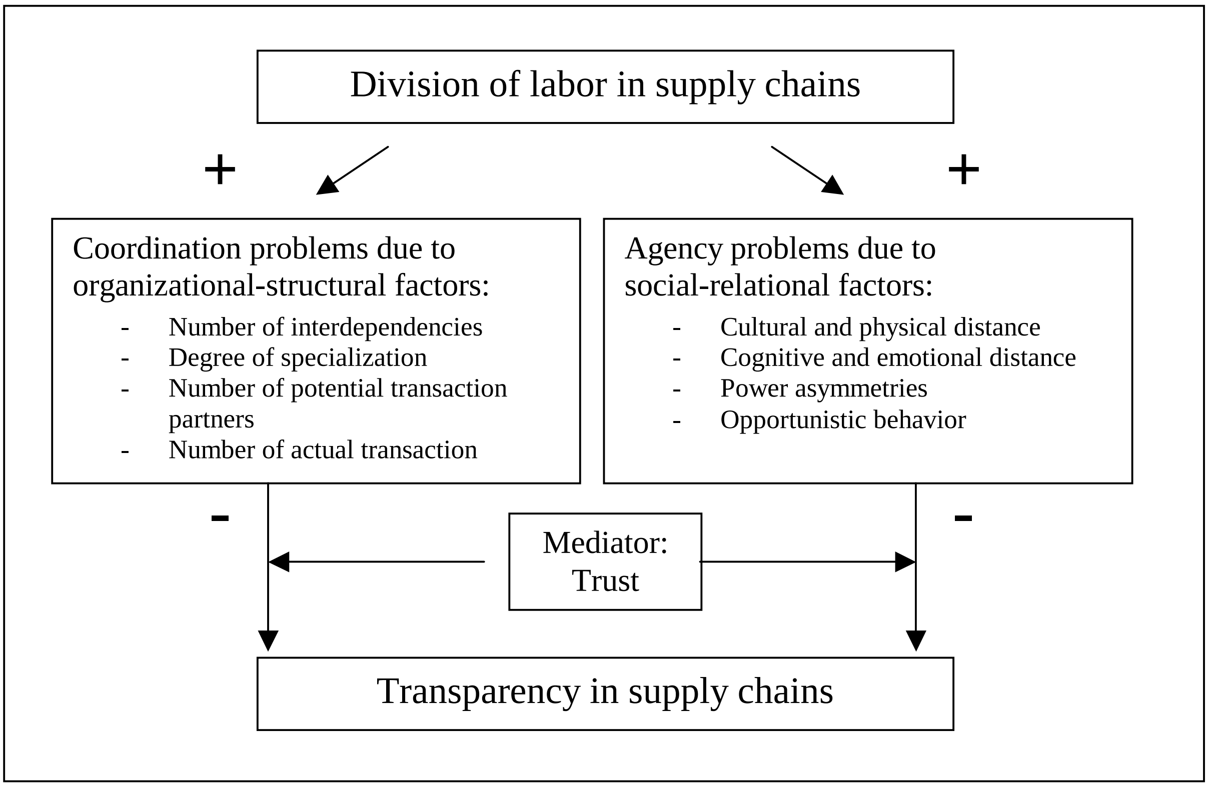

Figure 2. Development of trust in business relationships (Shapiro *et al*, 1992)

4 Transparency and Trust: A Tricky Relationship

Transparency and trust have been identified as increasingly important for the creation of business networks (Meyerhuber, 2001; Van Dijk *et al*, 2003; Hofstede *et al*, 2004). Due to the dynamic character of both constructs, the question arises whether there are reciprocal influences. Is transparency necessary to build a trustful relationship? Or is trust necessary to improve transparency? The general comprehension of transparency – easy and rapid information exchange – implies willingness to cooperate and to consider the supply chain as a team. Interpersonal cooperation and teamwork is free exchange of knowledge and information (Jones & George, 1998). This understanding of transparency implies at the same time the decision to share knowledge and to take the risk that the partner might exploit the information in an opportunistic manner and as a competitive advantage. These aspects are all well known as basic elements of trust. So the question remains: do the constructs *transparency* and *trust* describe the same phenomenon of collaboration and cooperation in business relationships? Hofstede (2003b, p. 4) points out that “people who trust one another do not need to tell each other anything just to show what they did. They only tell one another what they know the other needs to know.” Therefore “trust and transparency in netchains can be contradictory because in real life to trust means to accept an objectively incomplete status of information or knowledge as subjectively sufficient” (Apelt, 1999). The key point is that knowledge is a source of power (Jones & George, 1998), and information asymmetries are closely related to power asymmetries and opportunistic behavior. Moreover, power connotes control and counteracts the principles of teamwork and cooperation. The voluntariness and mutuality of an action or a communication process are identified as the dominant factors in trust building because to show the intention to share information or to provide confidential data means to trust the partner. But if “transparency is imposed from outside the netchain, or if the netchain is in fact institutionally a hierarchy and the leader imposes transparency”, transparency and trust contradict each other (Hofstede, 2003b, p. 8). As a consequence, history transparency, which is often imposed by the government, does not build trust because of its obligatory character. Thus, tracking and tracing systems might be interpreted as signals of distrust because trusting somebody means that there is no need to track or trace.

In contrast, the implementation of operations and strategy transparency is valuable for trust building because of their generally voluntary character. The obligation to track and trace should be taken as an opportunity to establish more profitable and long-term forms of transparency, that is, operations and strategy transparency (Meijer & Hofstede, 2003; Hofstede, 2003b). These forms of transparency are closely related to knowledge-based and identification-based forms of trust rather than to deterrence-based trust. Trust leads to cooperative behavior among individuals, groups and organizations; cooperation and teamwork are the framework for transparency in the understanding of an effective information exchange between business partners (Jones & George, 1998). The absence of trust limits the effectiveness of transparency on supply chain management (Hofstede *et al*, 2004) because information in general is not a guarantee of transparency; the precondition and the mediator for transparency in business relationships is trust (Meyerhuber, 2001).

But the paradox of trust is that only trust breeds trust. That means that to receive trust one has to assume trust. This leads to the question who does the first step in trust-building? In this respect, transparency becomes a precondition and a mediator for trust (DiPiazza & Eccles, 2002) and vice versa because information exchange in general – especially on a voluntary basis – includes a power-balancing and trust-building function. Due to the circular nature of the relation between trust and transparency, both constructs should be enhanced at the same time in order to support the accelerating effects and avoid the potential contradictions between trust and transparency. Figure 3 illustrates the framework for trust and transparency in supply chains.

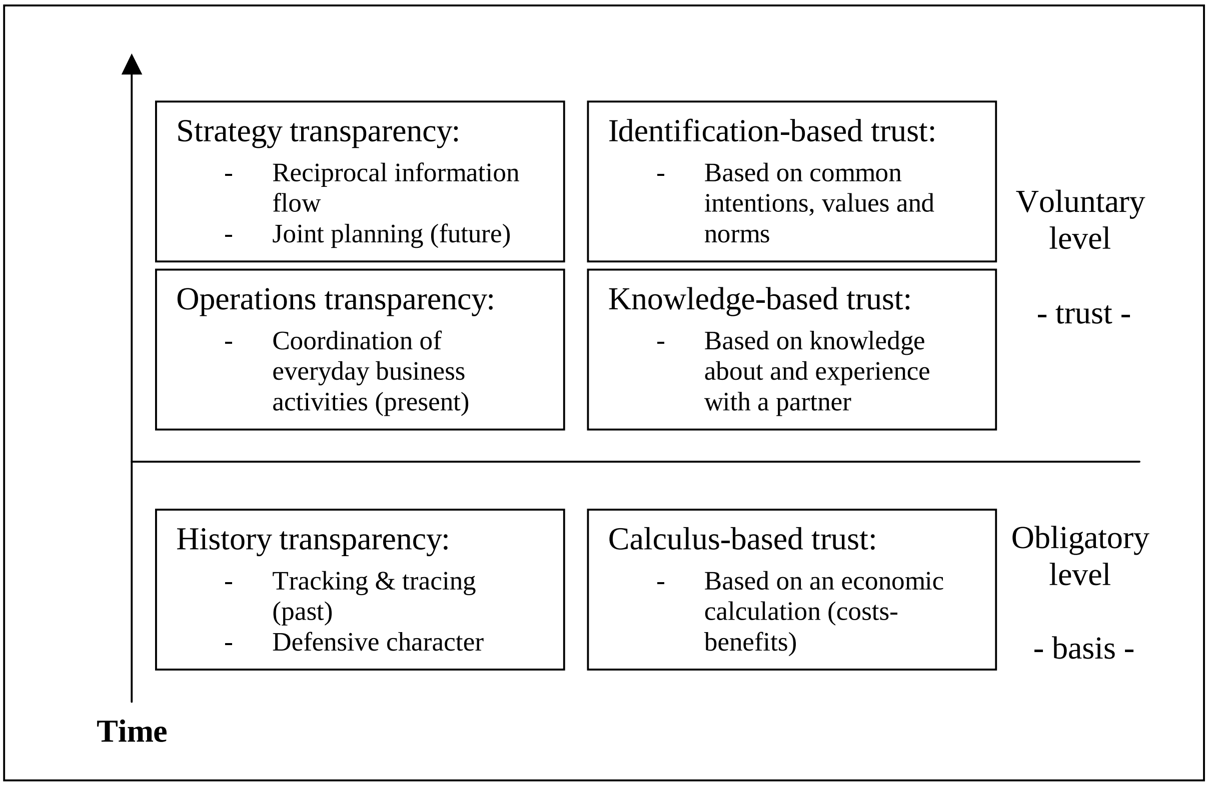

Figure 3. Trust and transparency in supply chains

5 Trust, Transparency and the Organization of Food Chains

The improvement of competitiveness in a complex and rapidly changing environment based on effective information exchange is the dominant reason for implementing trust and transparency in supply chains. Scholars agree that transparency and trust as sources of strategic advantage should receive more attention (Russo, 1996; Holst, 1998; Meyerhuber, 2001; Van Dijk *et al*, 2003). In food chains transparency has gained much relevance but is implemented mainly from outside the chain more as a matter of risk prevention and consumer protection than as a matter of improving the chain's effectiveness.

There are two main reasons why trust and transparency are limited to the obligatory levels of history transparency and calculus-based trust in today's supply chains in general and agrifood chains in particular. First, modern society has developed to a rapidly changing, technologically determined environment with a high information output to be processed by human beings with limited information-processing capacities. As a consequence, reality is characterized by confusion instead of orientation and increasing perception of but decreasing acceptance of risks – in other words a lack of transparency and trust (Reisch, 2003; Schweer & Thies, 2003). Second, business transactions are confronted with the challenges of increasing internationalization and globalization, which leads to a growing number of actual and potential transaction partners with different cultural backgrounds. Therefore, transparency is – from both the organizational and the social perspective – negatively influenced (Theuvsen, 2004).

Strategies like vertical cooperation and integration are identified as powerful tools for improving transparency in food chains and as solutions to the trust and transparency dilemma (Hofstede, 2003a; Theuvsen, 2004). First, food chain integration comes with formal or informal guidelines on procedures, thus standardizing the behavior of business partners and enforcing obligatory and voluntary communication. Food chain integration creates an environment of social embeddedness with respect to relational and cultural aspects, which influences transparency and trust in a positive way because mutuality and reciprocity – important preconditions to accepting vulnerability and risk and to trusting another person (Luhmann, 1989; Coleman, 1990) – come into play. Relational embeddedness leads to knowledge about business partners (whether gained by one's own experience or based on the partner's reputation) and supports trust on the knowledge-based level. Cultural embeddedness includes a collective program of the mind (Doney *et al*, 1998) and implements trust on the institution-based level. The social embeddedness approach can explain the prevalence of long-term orientation instead of short-term, profit-orientated behavior in business relationships and the existence of trust even in power-asymmetric relationships (Köster, 2003). Second, food chain integration offers positive effects on organizational barriers to transparency since it reduces the number and coordination requirements of process interdependencies in supply chains. This leads to an increase in cognitive and emotional closeness with benefits with respect to trust.

Thus, food chain integration may improve trust and transparency at the same time. But it should be kept in mind that neither construct is a guarantee of cooperation and the absence of risk. Trust and transparency are investments in business relationships (Adams & Goldsmith, 1999) with the focus on balancing costs and benefits. In this respect, an external impulse, such as the obligation to track and trace, often has to be imposed on all chain members in order to surmount social and organizational barriers and to implement trust and transparency as one major and powerful concept in supply chain management.

6 Conclusion and Future Research

The relationship between transparency and trust is reciprocal ,and, as a result, the two must be considered as tools in supply chain management at the same time. The implementation of both constructs in supply chains causes measurable costs, whereas the benefits are hard to calculate. The challenge is to find the balance between costs and benefits in order to determine the optimal degree of trust and transparency in food chains (Sporleder & Goldsmith, 2002; Van Dijk *et al*, 2003; Hofstede *et al*, 2004).

Further research should address the development of management concepts in order to enlarge the existing tracking and tracing strategies to more powerful and trust-building forms of transparency in supply chains.

7 References

Adams, C.-L., Goldsmith, P.D. (1999). Conditions for Successful Strategic Alliances in the Food Industry. International Food and Agribusiness Management Review, 2, pp. 221-248.

Albrecht, H.P. (1968). Konsument und Marketing. Zürich: Keller.

Apelt, M. (1999). Vertrauen in der zwischenbetrieblichen Kooperation. Wiesbaden: Deutscher Universitätsverlag.

Bigley, G.A., Pearce, J.L. (1998). Straining for Shared Meaning in Organization Science: Problems of Trust and Distrust. Academy of Management Review 23, pp. 405-421.

Brinkmann, H.-V. (1963). Markttransparenz und Wettbewerbsrecht. Dissertation, University of Göttingen.

Coleman, J.S. (1990). Foundations of Social Theory. Cambridge, MA: Belknap Press.

Das, T.K., Teng, B.-S. (1998). Between Trust and Control: Developing Confidence in Partner Cooperation Alliances. Academy of Management Review 23, pp. 491-512.

Deutsch, M. (1958). Trust and Suspicion. In: Journal of Conflict Resolution, 2, pp. 265-279.

DiPiazza, S.A., Eccles, R.G. (2002). Building Public Trust. New York: Wiley.

Doney, P.M., Cannon, J.P., Mullen, M.R. (1998). Understanding the Influence of National Culture on the Development of Trust. Academy of Management Review 23, pp. 601-620.

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

Erikson, E.H. (1966). Wachstum und Krisen der gesunden Persönlichkeit. Darmstadt: Wissenschaftliche Buchgesellschaft.

Henrichsmeyer, W., Gans, O., Evers, I. (1993). Einführung in die Volkswirtschaftslehre. Stuttgart: Ulmer.

Hofstede, G.J. (2003a). Transparency in Netchains. In Harnos, Z. *et al* (Eds.). Information Technology for a Better Agri-Food Sector, Environment and Rural Living. Debrecen, pp. 17-29.

Hofstede, G.J. (2003b). Trust and Transparency in Supply Netchains: A Contradiction? Paper presented at 8th AIM Conference, Grenoble, May 2003.

Hofstede, G.J. *et al* (Eds.) (2004). Hide or Confide? The Dilemma of Transparency. Reed.

Holst, J. (1998). Risikomanagement im Lichte des KonTraG. IFBG-Studies No. 9, University of Göttingen.

Jensen, H. (2001). Optimal Degrees of Transparency in Monetary Policymaking. Discussion Paper 04/01, Economic Research Centre of the Deutsche Bundesbank. Frankfurt/M.

Jones, G.R., George, J.M. (1998). The Experience and Evolution of Trust: Implications for Cooperation and Teamwork. Academy of Management Review 23, pp. 531-546.

Karg, K.R. (1990). Transparenz in Organisationen aus der Sicht ihrer Mitglieder. Dissertation University of Erlangen-Nuremberg.

Köster, O. (2003). Trust Development in Power-Asymmetric Relationships. St. Gallen: Verlag für Wissenschaft und Forschung.

Krone, P. (2003). Horizontale Markttransparenz im Zeitalter einer Informationsgesellschaft. Hamburg: Kovac.

Loddenkemper, H.-J. (1998). Transparenz im öffentlichen und privaten Wirtschaftsrecht. Baden-Baden: Nomos.

Luhmann, N. (1989). Vertrauen. Ein Mechanismus der Reduktion sozialer Komplexität. 3rd ed., Stuttgart: Enke.

Meijer, S., Hofstede, G.J. (2003). Trust and Tracing Game. Paper presented at International Workshop of the IFIP, Aalborg, Denmark, 22-24 May 2003.

Meyerhuber, S. (2001). Transparenz in Arbeitsorganisationen. Wiesbaden: Westdeutscher Verlag.

Nitschke, J. (2002). Maßstäbe für die Transparenz Allgemeiner Versicherungsbedingungen unter Berücksichtigung des englischen Rechts. Baden-Baden: Nomos.

Plötner, O. (1995). Das Vertrauen des Kunden. Wiesbaden: Gabler.

Reisch, L.A. (2003). Transparenz auf Lebensmittelmärkten: Theoretische Begründung und verbraucherpolitische Praxis. Hauswirtschaft und Wissenschaft 51(2), pp. 58-64.

Rotter, J.B. (1981). Vertrauen. In: Psychologie heute 8(3), pp 23-29.

Rousseau, D.M. *et al* (1998). Not so Different after All: A Cross-Discipline View of Trust. Academy of Management Review 23, pp. 393-404.

Russo, P. (1996). Die Problematik mangelnder Preistransparenz im bargeldlosen Zahlungsverkehr und Möglichkeiten der Problemlösung. Frankfurt/M.: Peter Lang.

Schweer, M., Thies, B. (2003). Vertrauen als Organisationsprinzip. Bern: Hans Huber.

Shapiro, D., Sheppard, B.H., Cheraskin, L. (1992). Business on a Handshake. Negotiation Journal 8, pp. 365-377.

Sporleder, T.L., Goldsmith, P.D. (2002). Network Embeddedness in the Food Supply Chain and Firm Strategy on Signaling Quality. In Trienekens, J.H., Omta, S.W.F. (Eds.). Paradoxes in Food Chains and Networks. Wageningen: Wageningen Academic Publishers, pp. 720-728.

Stöffler, M. (1982). Markttransparenz in der Lebensversicherung. Dissertation University of Mainz.

Theuvsen, L. (2004). Transparency in Netchains as an Organizational Phenomenon: Exploring the Role of Interdependencies. Journal on Chain and Network Science 4, pp. 125-138.

Van Dijk, S.J., Duysters, G.M., Beulens, A.J.M. (2003). Transparency Dilemmas in Strategic Alliances. Working Paper, s'Hertogenbosch: KLICT.

Winterstein, H. (1996). Mitarbeiterinformation. München/Mering: Hampp.

Zucker, L.G. (1986). Production of Trust: Institutional Sources of Economic Structure, 1840-1920. Research in Organizational Behavior 8, pp. 53-111.