CONFERENCE PAPER

IMPORTANCE OF TRUST BUILDING ELEMENTS IN BUSINESS-TO-BUSINESS AGRI-FOOD CHAINS

Meixner, O., Ameseder, C. , Haas, R. , Canavari, M., Fritz, M., Hofstede, G.J.

In marketing literature, trust is perceived as a pivotal aspect of business transactions. However, trust is still a concept that needs to be clarified. Therefore, the purpose of this paper is to measure the importance of trust building elements in establishing a trustful relationship between trading partners in business transactions, and in the food and beverage sector. Required data was collected by 151 computer aided, qualitative expert interviews with SME business leaders in ten different countries. For the evaluation of the trust building elements, the analytic hierarchy process (AHP) was applied using a predefined, hierarchical structure. The analysis of the data demonstrates that the product related elements are the most important factors in explaining trust creation in business relationships, whereas relationship aspects and the market environment are of less importance. Results concerning trust creation in business relationships further indicate that there are some important differences between cultures and sectors. The estimation of the importance of trust elements in inter-organizational relationships will be useful for the implementation in b2b e-business applications simply because it will help to identify the trust building elements that should be the first considerations when integrating e-commerce applications into business procedures.

Keywords: Trust, analytic hierarchy process, b2b relationships, e-business, supply chain

1. Introduction

The European food and beverage (f&b) sector is characterized by a high percentage of small and medium sized enterprises (SME) which are organized within complex networks. More than 300,000 companies in Europe are involved in the production of food on different levels of the food chain, and more than 95% are micro or small sized enterprises (Eurostat, 2004). Despite this structure and high complexity of the f&b sector, the industry has reached a high level of internal process integration and supply chain-related activities (European Commission, 2007). In particular, the dominant supermarket chains are the main drivers for these supply chain management (SCM) activities (European Commission, 2007). The development of 'lean supply' enables companies to radically reduce costs (especially transaction costs) and inventory by optimizing inter-organizational flows or materials, information, and capital. Apart from cost reduction and logistical issues the focus moves more and more towards quality and security standards. Food supply security and traceability are important aspects in SCM and in the f&b industry. Aside from all these advantages of SCM activities, one negative consequence is the growing dependence of partners on each other. The more lean a supply chain is, the more likely it is that uncertainties, dynamics, and accidents in one link of the supply chain affect others (Berg *et al.*, 2008). The efforts to form lean supply chains therefore increase the risks for the companies as well as for the whole supply chain. Companies therefore should not only focus on their own business and its related risks, but also on risks in the other links of the supply chain (Souther, 2000).

Tight cooperation and mutual trust between the business partners is an important success factor to optimize complex value chains when facing these risks on a supply chain level. In particular, the f&b sector is characterized by a dynamic change in market conditions. Seasonal upward turns and downward turns in production and consumption, as well as annual variations of harvests and prices, create supply and demand dynamics in food supply chains. For instance, bottlenecks occurred for several products in the market of organic food in Austria and Germany, which forced companies to change suppliers (Ameseder *et al.*, 2008b). In general, the globalization in food supply, bottlenecks, and price pressure forces the companies to dynamically change their suppliers and set up new b2b (business-to-business) relationships. Trust is a crucial factor when considering transactions with new suppliers. As information asymmetry occurs (concerning e.g. food quality), delivery trustworthiness or monitoring activities exhibit much importance between buyers and sellers.

The trust challenges from market dynamics require improvements in food supply chains. E-business adoption provides huge potential especially when thinking about globalized supply chains and purchases in the international markets. Supply chain coordination in the f&b industry is heavily dependent on information and communication technologies (ICT), and e-business systems as information technology allows system integration (European Commission, 2007). Although the adoption and application of e-business offers great potential in terms of cost reduction, quality insurance, and safety insurance, the f&b industry is rather slow in the adoption process of e-business compared to other sectors (e.g. the ICT sector itself or the manufacturing industry like the automotive sector. European Commission, 2007).

Apart from other factors (like company size, technology costs or security concerns) one of the most critical barriers for e-business adoption and its implementation in b2b relationships is *trust*. Since trust in b2b relationships in the offline environment is essential for cooperation and coordination between companies, it is likely to be of the same importance in an online environment. It seems to be evident that an online transaction between companies without trust would not be possible, just as it would not be possible in 'traditional' offline transactions. Recent research on electronic commerce underlined the importance of trust as one of the key factors for successful electronic commerce adoption (Fritz and Canavari, 2008; see also Canavari *et al.*, 2008; Castelfranchi and Falcone, 1998).

While offline trust usually can easily be established between business partners during face-to-face communication, in an online environment, mutual trust is more difficult to establish (for a detailed discussion of the pitfalls of digital and personal communication see Haas, 2004).

Although the topic of trust is of increasing importance among academics, and even as recent developments in the financial sector highlighted the importance of *trust in b2b relationships*, the theory of trust is still inadequate. Seppänen *et al.* (2007) stressed the fact that the theoretical and empirical approaches to measure trust in an inter-organizational context differ a lot in terms of conceptualization and operationalization. When measuring trust, a

clear distinction is needed between trustworthiness and mutual trust, as these are continually viewed as being distinct concepts (e.g. Noteboom *et al.*, 2002). Within business transactions it is therefore crucial to distinguish between the trustor and the trustee. Furthermore, some evidence exists that the role and the nature of trust is affected by the national culture (Dyer and Chu, 2000).

2. Purpose and Method of the study

The study presented here focuses on trust in business transactions from a buyer's point of view (trustor) in European food chains. The purpose of this study is to estimate the importance of trust elements:

- in b2b transactions between companies
- in different countries (cultures).
- in different sectors (grain, meat, fruit and vegetables, olive oil)

Business transaction decisions are the result of an unstructured, fuzzy reasoning process (Turban, 1988). Influencing factors like risk, gain, trust, or control are rather complex (see Tan and Thoen, 2002). With regard to the f&b industry, food quality, food safety, and control opportunities are important factors that influence decision making in the transaction process with new suppliers. A typology of trust elements for the early stage of a b2b relationship was developed and tested for the purpose of this study (Canavari *et al.*, 2008; Hofstede *et al.*, 2008; Oosterkamp and Hofstede, 2007). The evaluation process conducted within this study is based on this typology. The first four levels of trust elements of the hierarchy are shown in table 1.

The typology used is organized hierarchically, with the main trust elements at the top and the specific trust-building elements at the bottom. These elements provide the link between the theoretical approach, the conceptualization, and the dimensions of trust. The typology contains five levels of trust elements. The first hierarchy level forms the *main goal* of the typology: trust from the perspective of a buyer who is in the early stage of initiating a new purchase relationship. The second level consists of the *objects of trust* (product, seller, market environment). The third and fourth levels contain the dimensions of trust (the fourth level was included for some dimensions of trust objects, if the number of items allowed clustering). At the fifth level (not included in the table), the *sources of trust* contain 63 elements. Cultural variety is particularly evident at this level (for detailed information concerning this hierarchy level please refer to Oosterkamp and Hofstede, 2007). The analytic hierarchy process (AHP) was applied methodically to estimate the importance of the trust elements in the typology (i.e. their ability to build trust).

3. The analytic hierarchy process (AHP)

The relative importance of the trust-building elements of the typology was assessed using a specific decision support system, the analytic hierarchy process (AHP). The AHP is a widely used method for structuring and solving complex decision problems for scientific and business applications (see

Ameseder *et al.*, 2008a; Haas and Meixner, 2005; Haas *et al.*, 2003; Meixner *et al.*, 2001; Meixner and Haas, 2002; Haas *et al.*, 1999). For the valuation of trust the application of the AHP seems to be promising, as trust is a context specific topic and it is difficult to be quantified (Seppänen *et al.*, 2007). As shown in table 1, a number of elements influence the perceived trust of the

Table 1. Typology of trust element s.

Objective	**Objects of trust**	**Dimensions of the objects of trust**	
Buyer's trust in transaction	1. Product	1.1 Reputation	
		1.2 Specification	
		1.3 Inspection	
		1.4 Certification	
		1.5 Price / per-formance ratio	
	2. Seller	2.1 Capability	
		2.2 Relationship	2.2.A Relationship between Individuals
			2.2.B Relationship between Companies
		2.3 Reliability	2.3.A Adequate communication
			2.3.B Deliveries
			2.3.C Financial situation
		2.4 Reputation	
	3.Market envi-ronment	3.1 Control institutions	
		3.2 Informal Institutions	
		3.3 Legal institutions	

Source: Oosterkamp and Hofstede (2007)

buyer in business transactions. By using the AHP, it is possible to capture such complex decision problems and to assess all inter-dependencies within the decision hierarchy (Meixner, 2003). To solve these complex decision problems, the problem is divided into smaller parts, which are incorporated in a predefined structure (i.e. the decision hierarchy, see table 1). One important advantage of the AHP for this study is that individual evaluations by the respondents can be aggregated easily group results for different sectors and different countries can be obtained by use of specific algorithms provided by the AHP theory (Meixner *et al.*, 2001).

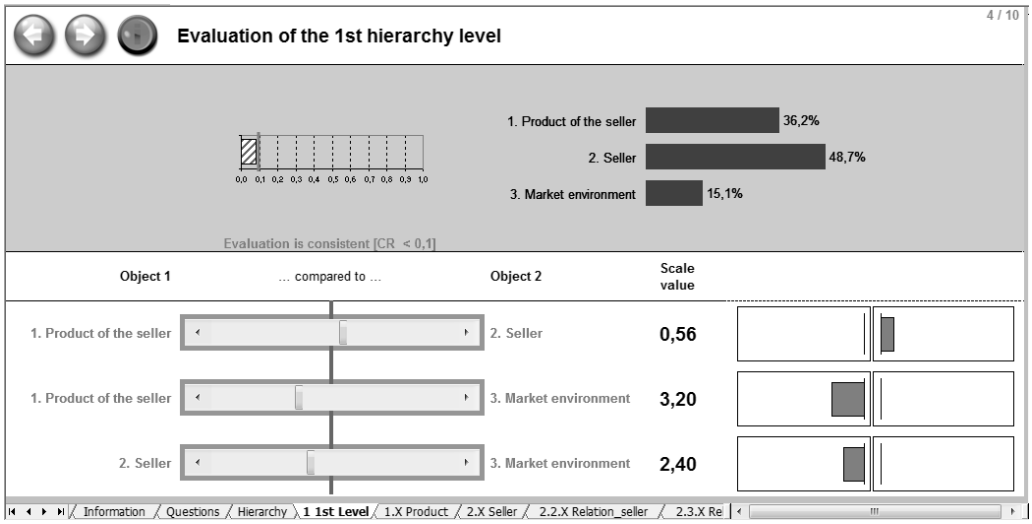
Because most of the criteria in the trust hierarchy have to be compared on a qualitative scale, the importance of trust elements was estimated using pair-wise comparisons (each element is compared with all the other elements of a specific hierarchy level; Saaty, 1995; Meixner and Haas, 2002). For the data collection Meixner *et al.* (2001) suggests to use special software for the pair wise comparison. Due to the fact that the assessment was conducted in ten countries (including countries with rather large distances), a standard spreadsheet software was adopted (figure 1). Files therefore could be sent by e -mail and the evaluation process itself did not require specific software. The questionnaire is self-explanatory and the respondents obtain the results of their evaluation immediately after finishing them. For validity reasons, two central figures were calculated interactively on each level of the evaluation (Saaty, 1995):

- Importance of the trust building elements, i.e. the estimation of the priorities confirming the eigenvector method suggested by Saaty (1995) (in order to give immediate feedback to the respondents)

- Consistency ratio (due to the fact that respondents tend to make inconsistent evaluations for larger hierarchies)

The interactive calculation of these figures is likely to have a positive effect on the validity of the results; respondents can adapt and modify their evaluations instantly if the results of the evaluation process do not meet expectations or the evaluation is inconsistent.

Figure 1. Assessment sheet with pairwise comparisons for the hierarchy level 'Objects of trust'– example evaluation



4. The assessment

Data was collected in seven European countries (Austria, Germany, Italy, Greece, Slovenia, Spain, The Netherlands), as well as in Brazil, Turkey, and the USA. The relative importance of the trust elements was assessed through expert interviews – most of them face to face and only several by e-mail and telephone; all of course with food chain business leaders and business associations. Between May 2008 and February 2009 the partners of the EU funded the project 'E-trust' and conducted 151 interviews. Respondents were mainly employees within the purchase department of the companies. In some cases respondents came from the quality management department, or just from general management divisions. The main focus of the assessment was the buying perspective from European SMEs in the f&b industry. However, for non-European countries, an additional selling perspective was included to keep the focus on European supply chains. For the selling perspective, the used typology was adapted, e.g. by replacing the term 'seller' through 'buyer' (see below). In an initial phase of the assessment the individuals who were interviewed could choose between the buying perspective and the selling perspective. The whole assessment sheet was then automatically adapted to the chosen perspective. The underlying questions for the two perspectives in the assessment are as follows:

- Buying perspective: "In an early stage of a b2b relationship with a possible supplier: Which factors *are* most important for you to develop trust in this relationship (using a pair wise comparison)."

- Selling perspective: "In an early stage of a b2b relationship with a possible client: Which factors *you think are* most important for your client to develop trust in this relationship (using a pair wise comparison)."

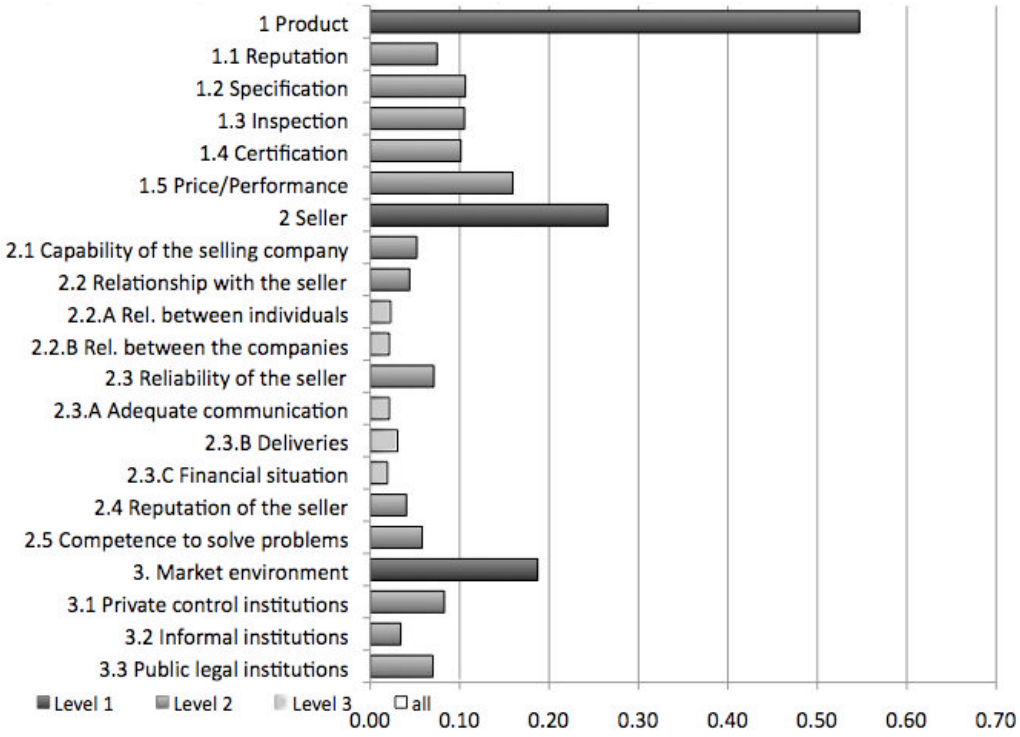
5. Results

5.1 General results

Figure 2 shows the importance of trust elements for all sectors and all countries. Within this Figure, the bars representing the first level of evaluation are illustrated in light grey. The second level and the third level of the evaluation are illustrated in dark grey. It is important to mention that the sample varies from 6-22 interviews for each country.

On the first level of evaluation, the 'product' is by far the most important trust element (0.547). The importance of the selling/buying company amounts to 0.266. The trust factor 'market environment' is of least importance at (0.187).Focusing on the product on the second level of the evaluation, the 'price/performance' ratio is the most important trust factor of all five factors (0.291 absolute and 0.159 relative weight, respectively; in the following only the relative importance of the trust elements will be stated; it is calculated by multiplying each hierarchy element with the importance of the relevant hierarchy element of the upper level). 'Product specification', 'product inspection' and 'product certification' are of almost the same importance

Figure 2. Importance of trust elements (n=151, the value of the subordinates of 1, 2, and 3 are global weights, i.e. relative importance of a hierarchy element with respect to the total hierarchy)



(about 0.1). The factor 'reputation' is of low importance (0.075). The 'reliability of the seller' (0.071) is the most important trust factor concerning the relational aspects in b2b. In particular, the trust factor 'deliveries' is of high importance (0.031 on the third level of the evaluation).

The second most important trust factor is the 'competence of a company to solve problems' (0.058) followed by the 'capability of the selling company' (0.052; if the interviewed company mainly acts as a seller, the wording 'selling company', 'reliability of the seller' etc. was replaced by 'buying company', 'reliability of the buyer' etc.). 'Private control institutions' are the most important trust factor on the market environment level (0.083), followed by 'Public legal institutions'.

5.2 Results concerning Cultural Differences

Some basic cultural differences can be described based on the analysis of the data for each country. As the analysis has indicated, Austrian and German business leaders are very product oriented, whereby the price/performance

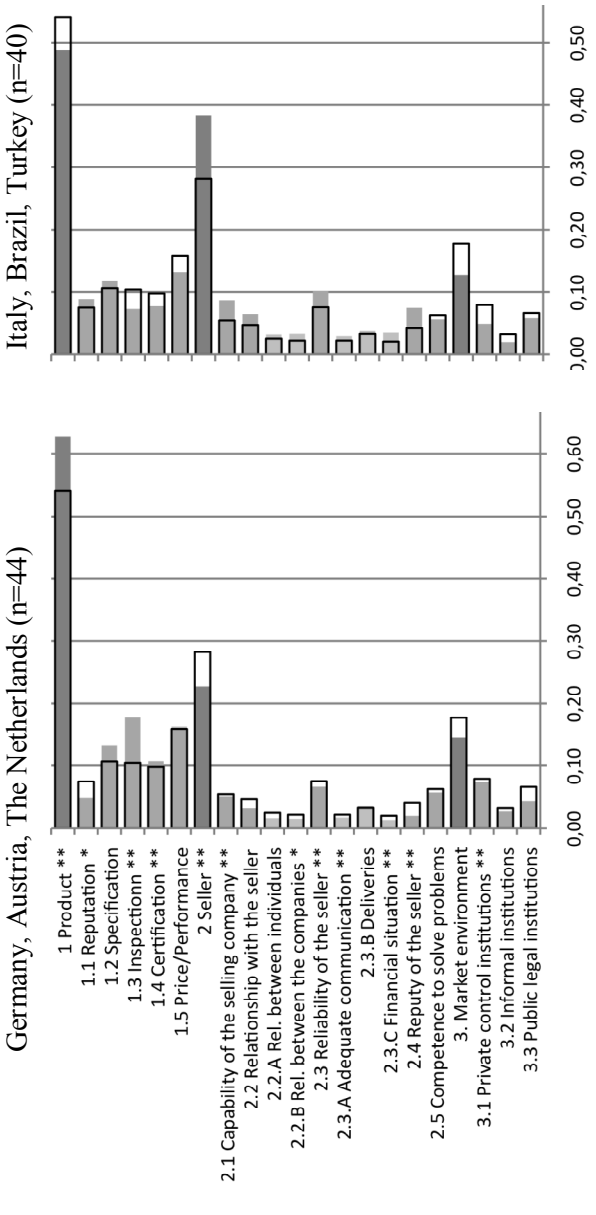


Figure 3. Comparison between product oriented northern European countries and relationship oriented southern European countries (n=84).

ratio for German business leaders is even more important than for Austrian companies. The Netherlands seems to be slightly more product oriented also, although the differences to the other countries are smaller compared to Germany and Austria. In total, this pattern may be typical for northern European countries.

In contradiction to these findings, Brazil, Italy, and Turkey seem to be much more relationship oriented. Priority emphasis for the hierarchy element 'seller' is higher compared to northern European countries. Reliability and reputation of the seller seem to be factors of high importance. This pattern cannot be viewed in all southern countries within this sample. The figure above shows a comparison between the Northern European countries Germany, Austria and The Netherlands (to the left), and the three mentioned southern European countries (to the right). These differences are significant for most of the criteria on a significance level of < 0,01 (** in Figure 3) or < 0,05 (* in Figure 3). This analysis was done by applying ANOVA analysis; as an example table 2 shows the results for the first level of the hierarchy.

Table 2. Variance analysis, hierarchy level 'Objects of trust' (n=84)

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Product	Between Groups	.347	1	.347	9.897	.002
	Within Groups	2.911	83	.035		
	Total	3.258	84			
Seller	Between Groups	.658	1	.658	24.022	.000
	Within Groups	2.272	83	.027		
	Total	2.930	84			
Market Env.	Between Groups	.049	1	.049	2.282	.135
	Within Groups	1.789	83	.022		
	Total	1.838	84			

Another interesting result refers to Slovenia. Slovenia is the only country where the market environment is of very high importance. Due to the new EU-membership, in recent years Slovenia had to bear many changes in the market environment, which could be a possible explanation of these Slovenian findings.

5.3 Results concerning Sector Differences

In total, some differences between the relevant sectors have must be taken into account. For the sectors grain (n=32) and meat (n=30), the factors related with 'product' are evaluated above average. In the grain sector especially, the 'price performance ratio' and the 'product specification' are more important than in other sectors. In the meat sector, 'product inspection' is important to

generate trust in business transactions.

The biggest share of the overall sample belongs to the sector 'Fruits and vegetables' (n=61). Within this group there is a slight shift away from factor 'Product' to factor 'Market environment'. In particular, the 2nd-level-factor 'Price/performance' seems to be of minor importance, compared to other sectors where the factor 'Private control institutions' is more important. This seems to be a specific characteristic of this sector. In contrast to that, the seller becomes more important in the supply chain olive oil (n=17). In comparison to all other sectors, the evaluation results of the interviewees of this supply chain exhibit the most difference. Here the factor 'Seller' is much more important compared to other supply chains (the priorities for factor 2.2 'Relationship with seller' is almost doubled!). In contrast to that, 'Inspection', 'Control institutions', and 'Certification' are much less important; and at this point, there seems to be a specific characteristic of this supply chain (but might also be connected to a more or less cultural approach, as within this study because the supply chain olive oil is mainly relevant in southern countries). However, the non-representativeness of the overall results generates sole hypotheses; therefore, these differences should not be over-interpreted; a further empiric proof of these results seems to be advisable.

6. Discussion and Limitations

By applying the AHP methodology from interviews to operators in the different sectors and countries, some interesting insights were gained. However, some important limitations of the general validity of the results have to be mentioned.

One of the main results is that the product dimension is the most important factor to explain trust creation in business transactions, followed by relationship issues with the partner. The market environment is generally of less importance. The 'product' dimension is more important than the 'seller' dimension. In any case, the predominance of the 'product' dimension on the 'seller' dimension does not allow us to claim that human relationships do not play an important role in business transactions. The relevant weight attached to the items 'Reputation' for the 'product' dimension and 'Reliability of the seller' for the 'Seller' dimension on the second level of the typology indicate the high importance of informal relationships, as well as institutional factors related to product costs and quality.

The culture related and sector related differences described in this paper are only of descriptive nature; further data analysis is required to prove if results between cultures and sectors differ significantly (test of hypothesis). However, the cultural differences come along with the theory. Respondents from northern countries (highly deal and data oriented such as Germany) are more concerned with the product, while most southern Europeans (more relationship and dialogue oriented; see Lewis, 2007 or Gesteland, 2005) are more concerned with the relationship to the transaction partner. Differences between the four sectors may be explained on the basis of the following assumptions: In the fruit and vegetable sector, f&b companies mainly purchase internationally, so the market environment might be of higher importance. Due

to the comparable small prices of grain (compared to other sectors), companies tend to buy in regional or national markets (transport costs are an important issue), because the price/performance ration seems to be one of the major issues. The fact that rather sensitive products are purchased and processed in the meat sector includes that product inspection is of high importance in this sector; here too food scandals seem to be of specific relevance (like BSE crisis etc.).

In general, it has to be considered that the sample of interviewed people and companies is a quite heterogeneous one. The selected companies are different in respect to position in the supply chain, territorial settlement (different regions), and size. In particular the most problematic component is the diversity of experiences and mentality of the individuals interviewed that can affect the result's reliability. These elements seem to play an important role especially when thinking about cultural and historical differences between countries. Moreover, the function of the individuals interviewed in the company could influence the results. It is more likely that respondents involved in job duties concerning products specifications (quality, safety) are more inclined to attach additional importance to products, rather than the seller/buyer elements. The influence of the individuals' personalities, their function's in the company, and their professional backgrounds might significantly influence the findings and should be an issue of future research.

However, even if we consider the restrictions of the findings presented herein, a general interpretation concerning trust building elements might be that product related factors seem to be of highest importance, followed by the seller/buyer characteristics. Therefore, E-business and implementation of ICT media in b2b relations have to take into account how product related features may be communicated effectively to potential buyers in order to gain trustworthiness on one side, and how trustworthiness of sellers, his/her reputation and reliability may be communicated on the other side. If the implementation of b2b-tools is to further increase within the f&b supply chain, in particular, these pre-conditions for trust have to be considered.

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Shorter abstract (cover)
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