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Prepared by: UGENT, CCH, PEG

BELGIUM

1. Introduction

Organizations no longer compete as independent entities, but as chains (Christopher, 1998, Cox, 1999, Lambert and Cooper, 2000), therefore these organizations more and more realize the performance potential of chains (Pearson and Samali, 2005, Gellynck et al., 2006). Being part of a well-performing chain generates important performance benefits for the individual organization. As a result, there is increasing interest in the performance of chains as a research subject (Beamon, 1998a).

Adequate chain performance measurement identifies how well the chain is performing, draws attention to where improvements are possible, facilitates detecting problems and helps identifying where to focus on (Cohen and Roussel, 2005). Consequently, it affects decision making through the assessment of past actions and through benchmarking (Aramyan, 2007). Further, it can assist the distribution of resources, measure and communicate improvement towards strategic goals and assess managerial practices (Ittner and Larcker, 2003). In addition, it helps managers to recognize good performance, to make tradeoffs between profit and investments, it provides ways to set strategic targets and enables managers to get involved if performance is distracting (Neely et al., 1995).

Contrary to the raising awareness of the performance potential of chains, a vast group of authors (Neely et al., 1994, Neely et al., 1995, Beamon, 1998b, Christopher, 1998, Beamon, 1999, Li and O'Brien, 1999, Van der Vorst, 2000, Gunasekaran et al., 2001, Lambert and Pohlen, 2001, Gunasekaran et al., 2004, Van Der Vorst, 2006) endorse to the need of key issues to be addressed related to chain performance measurement.

First, the quality of chain relationships, should be one of the central questions in chain performance measurement (Cousins and Hampson, 2000, Molnár et al., 2007, Molnár et al., 2007) because of several reasons. Managers as well as practitioners believe in the importance of enhancing chain relationships and getting close to chain partners (Spekman et al., 1998, Lambert and Cooper, 2000, Benton and Maloni, 2005), since flexible and successful chain relationships are the key success drivers in today’s word of globalization (Mentzer et al., 2001). Successful and unique chain relationships hold the potential of being a source of competitive advantage (Barney, 1991, Lamming et al., 1996, Russo and Fouts, 1997, Coff, 1999, Alvarez and Busenitz, 2001, Barney, 2002, Gellynck, 2006) and the ability to form valuable, compatible and complementary relationships is necessary to reach chain success (O'Keeffe, 1998, Quinn, 2004). This suggests that relationship measures should be included in chain performance measurement instrument as possible performance determinants. Still, relationship measures are not extensively included into chain performance measurement (Molnár et al., 2007).

Second, with regard to measuring performance of chains active in the agri-business sector in general and in the traditional foodsector in particular, literature points a number of additional problems over the already mentioned ones (Aramyan, 2007). Many agri-food firms, including traditional food firms do not screen their performance in a regular way (Collins et al., 2001). Besides, chains belonging to different sectors may have different characteristics (e.g. chain length, the closeness of chain relationships, types of process links) (Lambert and Cooper, 2000), which may influence their performance. Consequently chain performance measurement being carried out in other sectors might reveal differences as compared to performance measurement of traditional food chains.

Concluding, research on measuring performance of traditional food[1] chains[2] integrating relationship measures in the analysis deserves more attention. This is the rationale of our research being designed to fill these gaps 1) by measuring traditional food chain performance, 2) by assessing the quality of chain relationships and 3) by identifying the main relationship measures discriminating between low, medium and high performing chains. The results are interpreted and presented focusing on the differences between the three participating countries, from a viewpoint of Belgium.

As a result, the following research questions are formulated:

1. What is the relationship between cultural backgrounds/political systems and chain performance?
2. What is the relationship between cultural backgrounds/political systems and the quality of chain relationships?
3. What is the relationship between the quality of chain relationships and chain performance?
4. Is the relationship between the quality of chain relationships and chain performance is influenced by cultural backgrounds/political systems?

This report is structured as follows: In the following part the methodology of the report is presented together with the formulated research hypotheses. Next, the research results are discussed and finally conclusions are drawn as well as further research topics formulated.

2. Methodology

2.1. Research method and research sample

Quantitative data were collected via individual interviews with 271 companies belonging to traditional food chains across three European countries (Belgium, Italy and Hungary). In these countries traditional food subsectors were selected based on their socio-economic importance (Belgium: cheese and beer, Italy: cheese and ham, Hungary: white pepper, sausage and bakery). Next, traditional food producers were identified in each subsector and selected for interviews (details about the composition of the sample are provided in Table 1). During the interviews, each of the focal company was asked to identify suppliers and customers. In the next phase, one supplier and one customer were selected and interviewed. In this way, a total of 91 traditional food chains (including 91 suppliers, 91 focal companies and 89 customers) were contacted. The interviews have been carried out between December 13, 2007 and June 20, 2008. In Belgium, quantitative data were collected via individual interviews with 91 suppliers, 91 focal companies and 89 customers. Further, cheese and beer products are selected for analysis, based on their socio-economic importance.

Table 1: Sample description

[1] The definition of traditional food products involves four dimensions: (1) local production; (2) authenticity of the product; (3) 50 years commercial availability; (4) association with gastronomic heritage (Truefood, 2006).

[2] Within the context of the current report the chain definition developed by Mentzer et al. (2001) is followed, namely a chain consists of a focal company, a supplier, and a customer involved in the upstream and/or downstream flows of products, services, finances, and/or information;

Country/product/chain/respondents	Chain member	Size
ITALY: HAM	15 S	Micro: 3, Small: 5, Medium: 16, Large: 1
15 CHAINS	15 FC	Micro: 6, Small: 7, Medium: 1, Large: 1
43 RESPONDENTS	13 C	Micro: 2, Small: 6, Medium: 5, Large: 0
ITALY: CHEESE	16 S	Micro: 10, Small: 6, Medium: 0, Large: 0
16 CHAINS	16 FC	Micro: 13, Small: 2, Medium: 1, Large: 0
48 RESPONDENTS	16 C	Micro: 11, Small: 5, Medium: 5, Large: 0
HUNGARY: DRY SAUSAGE	11 S	Micro: 2, Small: 2, Medium: 7, Large: 0
11 CHAINS	11 FC	Micro: 2, Small: 3, Medium: 16, Large: 0
33 RESPONDENTS	11 C	Micro: 1, Small: 3, Medium: 7, Large: 0
HUNGARY: WHITE PEPPER	5 S	Micro: 3, Small: 1, Medium: 1, Large: 0
5 CHAINS	5 FC	Micro: 1, Small: 2, Medium: 2, Large: 0
15 RESPONDENTS	5 C	Micro: 4, Small: 1, Medium: 0, Large: 0
HUNGARY: BAKERY	14 S	Micro: 2, Small: 7, Medium: 5, Large: 0
14 CHAINS	14 FC	Micro: 0, Small: 7, Medium: 7, Large: 0
42 RESPONDENTS	14 C	Micro: 8, Small: 3, Medium: 3, Large: 0
BELGIUM: BEER	**15 S**	**Micro: 4, Small: 7, Medium: 1, Large: 3**
15 CHAINS	**15 FC**	**Micro: 8, Small: 5, Medium: 2, Large: 0**
45 RESPONDENTS	**15 C**	**Micro: 9, Small: 5, Medium: 0, Large: 1**
BELGIUM: CHEESE	**15 S**	**Micro: 7, Small: 4, Medium: 2, Large: 2**
15 CHAINS	**15 FC**	**Micro: 11, Small: 2, Medium: 2, Large: 2**
45 RESPONDENTS	**15 C**	**Micro: 4, Small: 5, Medium: 2, Large: 0**
TOTAL	**91 S**	**Micro: 31, Small: 32, Medium: 22, Large: 6**
	91 FC	**Micro: 41, Small: 28, Medium: 21, Large: 1**
	89 C	**Micro: 39, Small: 28, Medium: 17, Large: 5**

Micro: Micro sized enterprise: < 10 empl, Small: Small sized enterprise: < 50 empl, Medium: Medium sized enterprise: < 250 empl, Large: Large sized enterprise: > 250 employees; S=Supplier, FC=Focal company, C=Customer

2.2. Measurement and scaling

To measure **traditional food chain performance**, respondents (suppliers, focal companies, customers) are asked the extent to which they agree or disagree with 11 statements about five main areas of chain performance using a seven-point response scale ranging from completely disagree (1) to completely agree (7). The 11 statements and the five main areas of traditional food chain performance have been selected at the previous stage of the research and summarized by Gellynck et al. (2008). The five main areas of traditional food chain performance are: 1) Traditionalism, 2) Efficiency, 3) Responsiveness, 4) Quality and 5) Chain balance. Given the multi-dimensional character of the five main areas, all include several performance indicators (several statements) (Gellynck et al., 2008). Each focal company answered the statements related to their individual suppliers and customers. The same statements are used in the questionnaire of the suppliers and the customers but in relation to the focal companies. Details about the statements measuring chain performance are provided in Table 2. A higher agreement of the focal company on the statements related to the individual suppliers/customers corresponds with a higher performance and vice versa. The total chain performance includes four dimensions and is computed as the mean of all scores (Table 3).

Table 2: Traditional food chain performance

Traditionalism

Authenticity: Doing business with our supplier/customer is crucial in maintaining the authenticity of our products

Gastronomic heritage: Doing business with our supplier/ customer helps my company to be part of the gastronomic heritage

Efficiency

Logistic cost: Doing business with our supplier/ customer helps my company to lower logistic costs significantly

Profit: Doing business with our supplier/ customer helps my company to maintain acceptable profitability

Responsiveness

Lead time: Doing business with our supplier/ customer helps my company to reduce lead time (time from sending/getting the request till reply)

Customer complaints: Doing business with our supplier/ customer contributes to avoid (customer/consumer) complaints

Quality

Safety: Doing business with our supplier/ customer helps my company to manage product safety

Attractiveness: Doing business with our supplier/ customer helps my company to produce more attractive products

Environmental friendliness: Doing business with our supplier/ customer helps my company to manage environmental friendliness

Chain balance

Distribution of risks and benefits: Doing business with our supplier/ customer contributes to a more balanced distribution of risks and benefits along the chain

Chain understanding: Doing business with our supplier/ customer helps my company to better understand other chain members' interests.

Table 3: Dimensions of total chain performance score

Total chain performance
DIMENSIONS:
1) Perceived supplier's contribution to focal company's per-
2) Perceived customer's contribution to focal company's per-
3) Perceived focal company's contribution to supplier's per-
4) Perceived focal company's contribution to customer's per-

In order to assess the **quality of chain relationships**, suppliers, focal companies, customers are asked the extent to which they agree or disagree with 20 statements about eight relationship measures using a seven-point response scale ranging from completely disagree (1) to completely agree (7). 1) Trust, 2) economic satisfaction, 3) social satisfaction, 4) dependency, 5) non-coercive power, 6) coercive power, 7) reputation, 8) conflict are the integrated relationship measures. Again, these statements were presented to the focal companies and their individual suppliers and customers. The focal companies answered the statements related to their suppliers and customers. The same statements are used in the questionnaire of the suppliers and the customers but in relation to the focal companies. Details about the statements measuring chain relationships are provided in Table 4.

Table 4: Relationship measures

Trust
Our supplier/ customer keeps promises
Our company has high confidence in our supplier/ customer
We believe that the information our supplier/ customer provides us is correct
Our supplier/ customer considers how its decisions/ actions may affect us
Economic satisfaction
Our business relationship with our supplier/ customer significantly contributes to our profitability
Our business relationship with our supplier/ customer is very attractive because of getting fair prices
Social satisfaction
Our supplier/ customer hardly considers our arguments when changing prices
Our supplier/ customer leaves our company in the dark about what we ought to know
Dependency
Our company is not significantly dependent on our supplier's/ customer's resources (e.g. raw materials, packaging machines, transport facilities)
Our company is significantly dependent on our supplier's/ customer's capabilities (soft skills, such as expertise)
Our company can easily replace our supplier/ customer
Non-coercive power
Our company receives benefits from our supplier/ customer when we regularly meet their needs /requirements (technical support/ free advice/ financial support/ market information etc.)
Our supplier/customer rewards our company without requiring specific behaviour in return (technical support/ free advice/ financial support/ market information etc.)
Coercive power
We can be sure that our supplier/customer will not retaliate our company when we do not accept our suppliers' / customers' business proposal (keep back important information / terminates contract, press down price, etc)
We can be sure that our supplier / customer will not neglect our interests even if we fully meet the conditions detailed in the contract with our supplier / customer (keep back important information / terminates contract, press down price, etc)
Reputation
Our supplier/ customer is well-known for caring about its business partners
Our supplier/ customer is well-known for its expertise
Our supplier/ customer is well-known for its accuracy
Conflict
We disagree with our supplier/ customer on critical issues
Our business interest doesn't match with that of our supplier/ customer

A higher agreement of the focal company on the statements related to the individual suppliers/customers corresponds with a higher quality relationship between the focal company and the individual suppliers/customers and vice versa. The total chain trust, total chain economic satisfaction, total chain social satisfaction, total chain dependency, total chain non-coercive power, total chain coercive power, total chain reputation, total chain conflict is computed as the mean of all scores similarly to total chain performance (Table 3).

Besides the above relationship measures, the **choice of governance structures** is also assessed, as a measure of the quality of chain relationships. In the previous stage of the research, a theoretically-grounded and empirically-tested taxonomy of governance structures have been developed, summarizing by Gellynck and Molnár (2008). This taxonomy serves as a base for our analysis. This taxonomy relates, identifies and understands seven governance structures and creates a straightforward continuum of integration. The seven governance structures are the following: spot market, non-contractual relationship with non-qualified partner, non-contractual relationship with qualified partner, contractual relationship, relation-based alliance and equity-based alliance and vertical integration (Webster, 1992, Gardner et al., 1994, Van der Vorst et al., 1998, Steele and Beasor, 1999, Davies, 2000, Mair, , Jagdev and Thoben, 2001, Peterson et al., 2001, Raynaud et al., 2002, Claro et al., 2003, Humphreys et al., 2003, Trent, 2005, Lu et al., 2006, Szabó and Bárdos, 2006, Gellynck and Molnár, 2008). In this report, the seven governance structures are given a rising number from 1 to 7, where 1 represents sport markets and 7 represents vertical integration. The statements (key determining variables) of the seven governance structures are presented in Table 5. Focal companies are asked to choose one of the seven statements characterizing the best their relationship with their individual suppliers and customers and vice versa. In case of mismatch between the choices of governance structure of the focal company towards the individual suppliers/customers and vice versa, answers representing the higher levels of integration are taken into account.

Table 5: Governance structures

Integration
When our company does business with our supplier/ customer each transaction (price, quantity, quality etc) is negotiated individually
Doing business with our supplier/ customer is based on trust and it is not a prerequisite that we know in advance whether our supplier has a qualification/third party certification
Doing business with our supplier/ customer is based on trust but it is a prerequisite that we know in advance whether our supplier has a qualification/third party certification
Our relationship with our supplier/ customer is based on a written contract (price, quality, delivery time, etc)
Our company and our supplier/ customer develop common business ideas
Our company and our supplier/ customer combine resources (human, financial etc) in joint projects
Our company and our supplier/ customer are fully integrated (financial, organisational)

2.3. Analysis

First, significant differences between the different countries for chain performance and for the quality of chain relationships have been investigated. Comparisons of the different countries with respect to performance and relationships are obtained through Kruskal-Wallis test followed by post-hoc Mann-Whitney U tests whenever the Kruskal-Wallis test yields a statistically significant result. Second, the investigated chains (representing answers from one focal company and its individual suppliers and customers) are classified as high, medium or low performing chains by a tertile split of the total chain performance score. Significant differences between the high, medium and low performing chains are analyzed for the quality of chain relationships by using Kruskal-Wallis test followed by post-hoc Mann-Whitney U tests whenever the Kruskal-Wallis test yields a statistically significant result. Further significant differences are analyzed for sample characteristics by conducting Crosstabs in order to find out whether or not the relationship between the quality of chain relationships and chain performance is influenced by cultural backgrounds/political systems?

As a result, the following research hypotheses are formulated:

1. Different cultural backgrounds and political systems lead to different levels of chain performance
2. Different cultural backgrounds and political systems lead to different quality of chain relationships
3. Chains characterized by better quality of chain relationships realize higher performance
4. Different cultural backgrounds and political systems lead to different relationship between the quality of chain relationships and chain performance

3. Results

3.1. Performance of traditional food chains

First, we investigate, how Belgians chains are performing on the five different areas of traditional food chain performance (1) Traditionalism, 2) Efficiency, 3) Responsiveness, 4) Quality and 5) Chain balance) and on the 11 performance indicators (1) Authenticity, 2) Chain understanding, 3) Logistic cost, 4) Profit, 5) Lead time, 6) Customer complaints, 7) Safety, 8) Attractiveness, 9) Environmental friendliness, 10) Distribution of risks and benefits, 11) Gastronomic heritage). Second, significant differences between the different countries for chain performance are investigated in order to see how close Belgium is performing to the reference countries (Hungary, Italy). These two questions can be answered by computing the mean scores for the traditional food chains in the different countries.

Table 6: Chain performance scores for the different countries, mean scores and standard deviations (SD)

Seven-point Likert scale: 1 = completely disagree; 2 = moderately disagree; 3 = slightly unimportant; 4 = neither agree nor disagree; 5 = slightly agree; 6 = moderately agree; 7= completely agree; different letters (a-b-c) indicate significantly different average scores using Mann-Whitney U test, FC_S = Focal companies' perception about their suppliers, FC_C = Focal companies' perception about their customers, S= Suppliers' perception about their focal companies, C=Customers' perception about their focal companies

Performance	**Italian chains n=31 Mean (SD)**	**Hungarian chains n=30 Mean (SD)**	**Belgian chains n=30 Mean (SD)**	**Sample Mean (SD)**
Traditionalism				
Authenticity	5,53 (0,87)	5,27 (1,38)	**5,72 (1,02)**	**5,51 (1,11)**
Gastronomic heritage	5,66 (0,97)b	4,94 (1,16)a	**5,52 (0,95)b**	**5,38 (1,06)**
Efficiency				
Logistic cost	4,79 (0,73)	4,68 (1,32)	**4,53 (0,96)**	**4,67 (1,03)**
Profit	4,86 (0,51)a	5,41 (0,90)b	**5,04 (1,00)a,b**	**5,10 (0,85)**
Responsiveness				
Lead time	5,45 (0,60)b	5,78 (1,03)c	**4,81 (1,23)a**	**5,35 (1,05)**
Customer complaints	5,45 (0,69)a	5,92 (0,82)b	**5,11 (1,12)a**	**5,49 (0,94)**
Quality				
Safety	5,43 (0,96)a	5,96 (0,71)b	**4,98 (0,98)a**	**5,45 (0,97)**
Attractiveness	4,71 (0,82)a	5,51 (1,01)b	**4,98 (0,95)a**	**5,06 (0,98)**
Environmental friendliness	5,26 (1,15)b	4,65 (0,99)a	**4,48 (1,01)a**	**4,80 (1,10)**
Chain balance				
Distribution of risks and benefits	5,20 (0,67)	5,40 (1,07)	**4,66 (1,06)**	**5,09 (0,99)**
Chain understanding	5,22 (0,69)	5,34 (0,95)	**5,10 (0,93)**	**5,22 (0,86)**
Total Supply Chain Performance	5,23 (0,60)	5,36 (0,63)	**5,00 (0,64)**	**5,20 (0,63)**

Investigating the different areas of performance in the Belgian traditional food chains, Belgium is the best performing in authenticity (nr. 1), gastronomic heritage (nr. 2) and customer complains (nr. 3). Chain understanding is on the fourth place, while profit is on the fifth. Safety and attractiveness, the two quality measures score the same, and therefore are on the sixth place of performance. Belgium performs the lowest on lead time (nr. 7), distribution of risks and benefits (nr. 8), logistic cost (nr. 9) and environmental friendliness (nr. 10) (Table 6 and Graph 1).

Further, Belgium is performing better than the average (sample) on authenticity, gastronomic heritage and attractiveness which might be the most important attributes of traditional food products as well (Table 6).

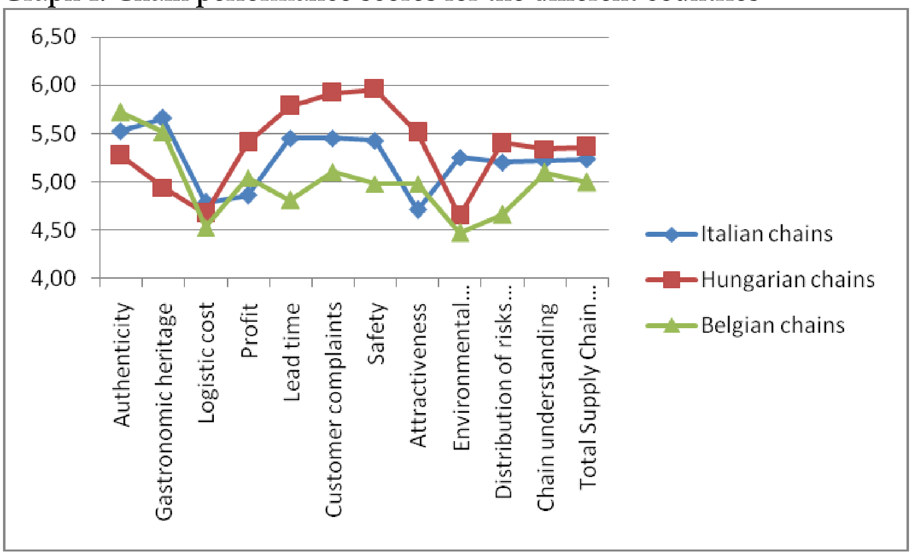
Considering the total performance of the traditional food chains from the different countries, Belgium is performing the lowest (mean=5,00) (Table 6 and Graph 1). Although, considering that Belgium score 5,00 on a seven-point scale, generally speaking the performance of the traditional food chains in Belgium is satisfying. Further, this difference is not significant.

Significant differences are found on the following performance indicators between Belgium compared to one or both of the other countries: gastronomic heritage, lead time, customer complaints, safety, attractiveness, environmental friendliness (Table 6 and Graph 1).

Belgium is the highest performing compared to the reference countries in authenticity. Belgium is middle performing compared to Hungary and Italy in gastronomic heritage and attractiveness. Last, Belgium is the lowest performing in logistic cost, lead time, customer complaints, safety, environmental friendliness, distribution of risks and benefits and chain understanding (Table 6 and Graph 1).

As a result, Hypothesis 1 is rejected, since the different cultural backgrounds and political systems (measured by the country of origin) don't lead to different levels of chain performance. Nevertheless, the country of origin is a differentiating variable between some areas of performance (gastronomic heritage, profit, lead time, customer complaints, safety, attractiveness, environmental friendliness).

Graph 1: Chain performance scores for the different countries



3.2. Quality of traditional food chain relationships

First, we investigate what is the quality of the relationships in the Belgians chains on the five different areas (1) Traditionalism, 2) Efficiency, 3) Responsiveness, 4) Quality and 5) Chain balance). Second, significant differences between the different countries for the quality of the chain relationships are investigated in order to see how close Belgium is performing to the reference countries (Hungary, Italy). These two questions can be answered by computing the mean scores for the traditional food chains in the different countries for the different relationship measures (Table 7).

Investigating the quality of the relationships in the Belgian traditional food chains, global results indicate that Belgian traditional food chains are characterised by high levels of trust (nr 1), reputation (nr 2) and economic satisfaction (nr 3) and low level of conflict (nr 8). It might be linked to the fact that relationships in traditional food chains already exist for a long period and to the fact that in many chains personnel contact between focal companies on the one hand and suppliers and customers on the other are the dominant business relationship (Table 7).

Further, Belgian chain relationships are characterized by lower level of conflict compared to the average (sample). Nevertheless, on the rest of the relationship measures, Belgian chain relationships are weaker than the average (sample) (Table 7).

Significant differences are found on the following relationship measures between Belgium compared to one or both of the other countries: trust, reputation, dependency, non-coercive power and economic satisfaction (Table 7).

Stakeholders in Belgian chains have the lowest level of conflict in their relationships. Belgium is middle performing compared to Hungary and Italy in economic satisfaction and dependency. Last, Belgian chain relationships are characterized by the lowest trust, non-coercive power and reputation compared to the reference countries (Table 7).

As a result, Hypothesis 2 is accepted, since the different cultural backgrounds and political systems (measured by the country of origin) don't lead to different quality of chain relationships (trust, economic satisfaction, dependency, reputation, coercive power, non-coercive power). In the same time, Hypothesis 2 is rejected related to social satisfaction and conflict.

Table 7: Scores for the quality of chain relationships for the different countries, mean scores and standard deviations (SD)

Relational variables	**Italian chains n=31 Mean (SD)**	**Hungarian chains n=30 Mean (SD)**	**Belgian chains n=30 Mean (SD)**	**Sample Mean (SD)**
Trust[1]	5.8 (0.75) b	6.1 (0.86) a	**5.8 (1.12) b**	**5.9 (0.93)**
Conflict[1]	5.0 (0.92) b	5.6 (1.13) a	**5.2 (1.40) b**	**5.2 (1.19)**
Social satisfaction[1]	5.2 (1.31)	4.9 (1.48)	**4.7 (1.62)**	**5.0 (1.48)**
Dependency[1]	3.3 (0.99) c	4.3 (1.38) a	**3.7 (1.70) b**	**3.8 (1.44)**
Non-coercive power[1]	3.9 (1.30) a	3.4 (1.78) b	**3.1 (1.79) b**	**3.5 (1.67)**
Coercive power[1]	2.1 (1.34) b	2.5 (1.50) b	**4.5 (1.40) b**	**3.0 (1.76)**
Reputation[1]	6.1 (0.90) a	5.8 (1.03) b	**5.4 (1.05) b**	**5.8 (1.03)**
Economic satisfaction[1]	2.9 (1.57)	2.5 (1.51)	**2.5 (1.44)**	**2.7 (1.51)**

Seven-point Likert scale: 1 = completely disagree; 2 = moderately disagree; 3 = slightly unimportant; 4 = neither agree nor disagree; 5 = slightly agree; 6 = moderately agree; 7= completely agree; different letters (a-b-c) indicate significantly different average scores using Mann-Whitney U test

3.3. Determinants of high, medium and low performing chains

Table 8: Relationship measures scores for low, medium and high performing chains, mean scores and standard deviations (SD)

Performance	Low n=31	Medium n=30	High n=30	Sample n=91
Relationship measures on chain level	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Trust[1]	5,55 (0,55)a	5,74 (0,64)a	6,33 (0,34)b	5,87 (0,62)
Economic satisfaction[1]	4,85 (0,68)a	5,28 (0,66)b	5,57 (0,67)b	5,23 (0,73)
Social satisfaction[1]	4,48 (0,86)a	5,05 (1,07)b	5,28 (1,05)b	4,94 (1,04)
Dependency[1]	3,40 (0,82)a	3,86 (0,82)b	3,98 (0,82)b	3,75 (0,85)
Non-coercive power[1]	3,00 (0,85)a	3,61 (0,83)b	3,88 (1,17)b	3,50 (1,02)
Coercive power[1]	3,55 (1,50)b	2,85 (1,27)a,b	2,60 (1,30)a	3,00 (1,40)
Reputation[1]	5,31 (0,63)a	5,74 (0,72)b	6,29 (0,55)c	5,78 (0,75)
Conflict[1]	3,13 (1,03)b	2,70 (1,28)a,b	2,15 (1,00)a	2,66 (1,17)
Integration[2]	2,83 (0,73)	3,01 (0,58)	3,03 (0,62)	2,95 (0,65)

[1]Seven-point Likert scale: 1 = completely disagree; 2 = moderately disagree; 3 = slightly unimportant; 4 = neither agree nor disagree; 5 = slightly agree; 6 = moderately agree; 7= completely agree; [2]Seven-point scale representing the degree of integration 1= not at all integrated, 7= fully integrated; different letters (a-b-c) indicate significantly different average scores using Mann-Whitney U test, Low=low performing chains, Medium=medium performing chains, High=high performing chains.

The individual performance scores are aggregated into chain performance scores. It results in 91 cases or chains. A tertial split (comparing top third, middle third and bottom third of sample) is used to split the data to ensure discrimination between the groups.

To identify the variables being linked to total chain performance, Kruskal-Wallis test is conducted followed by Mann Whitney U test. Low, medium and high performing chains show significant differences regarding all the relational measures (trust, economic satisfaction, social satisfaction, dependency, non-coercive power, coercive power, reputation, and conflict) except for integration (Table 8).

Global results indicate that traditional food chains are characterised by high levels of trust and reputation. It might be linked to the fact that relationships in traditional food chains already exist for a long period and to the fact that in many chains personnel contact between focal companies on the one hand and suppliers and customers on the other are the dominant business relationship. In addition, a fairly high score is obtained for economic satisfaction.

In line with the expectations low and medium performing chains score significant lower than high performing ones on trust (p=0,00, p=0,00). Further, economic satisfaction (p=0,02, p=0,00), social satisfaction (p=0,02, p=0,00), dependency (p=0,02, p=0,01), non-coercive power (p=0,01, p=0,01) delineate differences between low and medium performing chains. In the same time, the results uncovered significant negative relationship between performance and coercive power as well as between performance and conflict. This significant negative relationship results in difference between low (p=0,01) and high (p=0,01) performing chains. Last, the study determine a link between reputation and performance, resulting in a significant difference between low versus medium (p=0,010), between low versus high (0,000) and as well as between medium versus high performing chains (0,003). As a result, the relationship measure showing the largest discriminating power between the three performance groups is reputation. It means that traditional food chains composed of chain members having a highly appreciated business reputation score the best. A striking finding relates to the fact that within the context of our sample, no relationship can be identified between the level of chain integration and performance. It means that fully vertical and financial integration as the one extreme do not necessarily generate better results and vice versa. All types of relationships, structured both in a formal and informal way, might generate success or failure. This finding is contrary to the assumptions of Gellynck and Molnár (2008), expecting that chains realize enhanced performance by being integrated.

As a result, Hypothesis 3 is accepted, since chains characterized by better quality of chain relationships realize higher performance.

Table 9 examines possible links between some sample characteristics and performance. The figures reveal no significant differences related to origin. It means that these characteristics or variables do not help explaining performance differences in the traditional food sector and Belgian chains are cannot be found significantly more in the group of low performing chains.

Table 9: Socio-demographic differences between low, medium and high performing chains; percentages

	Low	Medium	High	Sample	
	Percent-	Percent-	Percent-	Percent-	Statis-
Country					
Italy	30,0	32,2	40,0	34,0	P=0,14
Hungary	20,0	41,9	36,6	32,9	Cramer'
Belgium	50,0	25,8	23,3	32,9	s

Significant difference calculated using Crosstabs

Therefore, Hypothesis 4 is rejected, since different cultural backgrounds and political systems (measured by country of origin) do not lead to different relationship between the quality of chain relationships and chain performance.

4. Conclusion

In the frame of this report, we measured traditional food chain performance; we assessed the quality of chain relationships and identified the main relationship measures discriminating between low, medium and high performing chains. It is realized with the help of quantitative data collected via individual interviews with chain members from 30 traditional food chains from Belgium. The Belgian results are compared to the results of the other two reference countries (Hungary, Italy).

Belgian traditional food chains are the best performing in authenticity (nr. 1), gastronomic heritage (nr. 2) and customer complains (nr. 3) and they are the weakest in environmental friendliness (nr. 10). Further, significant differences are found on the following performance indicators between Belgium compared to one or both of the other countries: gastronomic heritage, lead time, customer complaints, safety, attractiveness, environmental friendliness.

Belgian traditional food chains are characterized by high levels of trust (nr 1), reputation (nr 2) and economic satisfaction (nr 3) and low level of conflict (nr 8). Further, significant differences are found on the following relationship measures between Belgium compared to one or both of the other countries: trust, reputation, dependency, non-coercive power and economic satisfaction.

The comparison of low, medium and high performing chains identifies that the most discriminating determinant of performance is chain reputation. Further, governance structures (chain integration) do not reveal any significant difference. These results are valid across member states, therefore Belgium didn’t show significant differences compared to the other countries.

Future tasks will develop innovative chain strategies based on the findings. Changes in the supply chain structure (length, composition, kind of interrelationships, channels of distribution, etc.) will be proposed in a “Chain guideline concept paper” which focuses on potential triggering factors and comprehensive change-inducing strategies.

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HUNGARY

1. Introduction

The main purposes of the research were to understand and measure the determinants of high and weak performance of the supply chain of traditional food products and to develop a method, which suitable for determination of supply chain performance.

To achieve the main goal high and weak performance is measured through measuring cost reduction, revenue increase, market orientation, profitability increase, value added, time to market, quality, reliability, flexibility, etc. Further, determinants of high and weak performance are measured too, such as geographic location, type of product, structure of supply chains, type of relationships (governance structures; tool developed at the earlier phases of the research), characteristics or relationships (satisfaction, risk, trust, power, dependence, relationship bonds etc.).
The applied method was questionnaire survey, which was conducted in Italy, Belgium and Hungary. In this cross-cultural survey the same research method, questionnaire, recruitment criteria and data collection, analysis method were used.
In each country 15 chains were selected for both selected products that are 15 focal companies and one of their suppliers and customers. This means that 30 supplier-focal company-customer triplets were interviewed.
In Hungary traditional fermented sausage, processed white paprika and typical, traditional bakery products (scones, Danish pastry curls with cocoa) were targeted supply chains.

2. Research hypothesis

With the agreement of the research partners the main research hypothesis was to focus on the key factors that might influence the supply chain performance, such as trust, supply chain satisfaction balance, power, dependency, reputation, conflict, and governance structure.

3. Methodology

3.1. Data collection method

The applied method was questionnaire survey through face-to face, self registered and phone interviews. The combination of the different techniques was necessary to reach the target group and increase the respondent rate. In all cases the respondents have opportunity to clarify the misunderstandings related one or two questions.
In order to avoid any data collection biases and missing data interviewers were checked by field supervisors, especially the completed questionnaires by logical aspect.

By asking the respondents which way they prefer to take part in the interview the majority of them (cca75%) have chosen phone interview.
In the case of less available respondents we applied the self-registered questionnaire so the questionnaires were filled in by the respondents and the answers not clear were discussed with them by phone. The application rate of this method was 20%.

The third method the face-to face interview was applied in a very small rate (5%) because the travel time and costs are higher than that of the phone interview and the respondents were not motivated to organise meeting for the interview. By using of face-to-face interview the communication with the respondents was better, than by phone, because there was opportunity for clarification of misunderstandings.

3.2. Description of sample

The three selected supply chains in Hungary were:

- **dried fermented sausage** supply chain

Campden and Chorleywood Kht. recruited companies according to the recruitment criteria from a database of Hungarian fermented sausage manufacturers, who were asked to select one of their suppliers and customers. From dried fermented sausage supply chains 11 forming triplets were ready to answer to the questionnaire.

- processed **white paprika products** supply chain

Campden and Chorleywood Kht. recruited companies according to the recruitment criteria from a database of Hungarian white processed paprika products manufacturers, who were also asked to select one of their suppliers and customers. As a result of it 5 complete white paprika supply chains were ready to answer to the questionnaire.

- **traditional bakery product** supply chain (scones, Danish pastry curls with cocoa)

The willingness taking part in this survey was significantly lower in the case of processed white paprika than in dried fermented sausage, therefore traditional bakery product supply chain was also involved in this survey.
Focal companies were recruited from a database of traditional bakery product manufacturers, who selected one of their suppliers and customers. As a result of it members of 14 complete were ready to answer to the questionnaire.

It is important to mention that sometimes the same supplier or the same customer was identified in different supply chains (same additive supplier of the dried fermented sausage or same large retailer as customers). In order to avoid biases the contribution of one chain member/respondents was limited to maximum 3 in the different chains.

The classification of the sample, divided in the 3 selected traditional food chains in Hungary, is shown in Table 1.

Table 1: Composition of sample of the interviewed supply chains

Type of company	Number of companies in the sample Dried fermented sausage	White paprika	Traditional bakery products
Focal company	11	5	14
Supplier	11	5	14
Customer	11	5	14

Table 2: Classification of sample by size of the company

Enterprise category	Number of employees	Number of companies in the sample		
		Focal companies	Suppliers	Customers
Medium	< 250	15	13	13
Small	< 50	12	10	10
Micro	< 10	3	7	7

3.3. Data analysis

7-point likert scales were used for data capture. Respondents used the following agreement / disagreement scales to express their opinion about the statements in the questionnaire.

7 Strongly agree
6 Moderately agree
5 Slightly agree
4 Neither agree, nor disagree
3 Slightly disagree
2 Moderately disagree
1 Strongly disagree

The data were analysed by a number of methods described below. Summary statistics were applied to determine the potential directions and methods for final analysis. As the data did not show normal distribution we used non-parametric tests for analysis. We used Kruskal-Wallis test (α=5%) to establish if the are significant differences between more than 2 variables. Mann-Whitney test (α=5%) was used to explore differences between 2 independent variables (eg. between focal companies and suppliers, or between focal company and customers). Wilxocon sign rank test (α=5%) was used to investigate if there is a significant difference in the level of agreement of the focal company compared to their supplier and customer. The relationships between supply chain performance and relational variables was analysed with correlation.
The SPSS® 16.0 for Windows statistical software was used for the evaluation of the data.

4. Results

The Part 4.1 shows the results of summary statistics of supply chain performance and relational variables and summarizes the comparison of the answers of the different stakeholders. The discussion of results follows the main topics of the questionnaire. The relationships between supply chain performance and relational variables are discussed in Part 4.2.

4.1. Summary statistic of supply chain performance and relational variables, comparison of the opinions of different stakeholders

Business reference information

Differences were observed in profitability and business growth among stakeholders.

Profitability: Only 50% of the focal companies agreed at some level that they were profitable in the last 3 years, while this rate were higher in case of the suppliers (70%) and the customers

(73,3%). More than 30% of the focal companies stated that they were not profitable, while this percentage is lower for the suppliers (16,7%) and the customers (13,3%).
Cross-tabulations between profitability and company size let us to conclude that in case of focal companies and suppliers mostly the micro enterprises tend to disagree that they were profitable in the last 3 years, while most of the customers stated they were profitable at some level. Small and medium suppliers and customers tend to be more profitable than the small and medium focal companies.

Business growth: Business growth shows a slightly different pattern. Approximately 60% of the focal companies and customers indicated that they had reached business growth in last 3 years. This rate was higher in case of the suppliers, as 80% of them agreed that to some extent they achieved business growth in the last 3 years.
Cross-tabulation between business growth and company size shows that in the case of micro enterprises the focal companies have not reported business growth. Most of the micro-size suppliers have achieved business growth, while in case of customers the answers distributed evenly between the positive, neutral and negative answers. The small and medium enterprises reported business growth in the last 3 years.

Business performance

Business performance was characterized by 11 statements, which related to traditionalism, efficiency, responsiveness, quality and chain balance. The chain members - suppliers, manufacturers, and customers - expressed their opinion on their relation.

Authenticity

The scores given to authenticity suggest that the participants slightly agreed that doing business with their partner helps to maintaining authenticity, although some differences could be detected between the stakeholders.

- Suppliers gave significantly lower scores for this question than the focal companies, which suggests that the focal companies evaluate their relationship about the authenticity more important than the suppliers themselves. It shows also that while the authenticity of the raw material may have a major impact on the authenticity of the processed product, some of raw materials can be sold as authentic ones without further processing.
- There were not significant differences between focal companies' and customers' opinion about authenticity.

Being part of the gastronomy heritage

Stakeholders slightly agreed that doing business with their partner helps them to be part of the gastronomy heritage. There were not significant differences between the supply chain members.

Logistic costs

Participants less strongly agreed that the business relationship with their partner helps to achieve lower logistic costs. Differences could not be observed between different stakeholders regarding to this question.

Maintaining to profitability

Supply chain members slightly agreed that their business relationship with their partners contributes to the profitability. Significant differences in the opinion of stakeholders could not be observed.

Reducing lead time
Scores related to the reduction of the lead-time were slightly higher that suggests that the participants moderately agree that the business relationship with their partners helps to reduce lead-time. There were not significant differences between the answers of stakeholders.

Avoiding complaints
Supply chain members moderately agreed that their business relationship with their partner enables them to avoid complaints. The opinion of the different stakeholders about this statement did not differ significantly.

Product safety
Statements related to product safety showed stronger agreement than other issues, but significant differences could be observed between the different stakeholders.

- Focal companies show significantly stronger agreement than their suppliers about product safety. Focal companies highly agree that the relationship with their suppliers help to manage product safety.
- Customers show significantly stronger agreement than manufacturers that doing business with the focal companies contributes to product safety.
- The opinion of focal companies is significantly different about their suppliers and customers. Focal companies believes that doing business with their supplier contributes more to the product safety then the business relationship with their customers.

Attractive products
Suppliers and focal companies slightly agreed that doing business with their partners helps them to produce more attractive products, while the customers showed stronger agreement with this statement.

- The higher scores that were recorded by the customers suggest that they strongly believe that the business relationship with their suppliers enables them to supply attractive products.

Environmental friendliness
Contribution to environmental friendliness was one of the least agreed statements. Suppliers and focal companies showed slight agreement that their business relationship with their chain partners helps environmental friendliness, on contrary the majority of customers neither agreed nor disagreed with this statement.

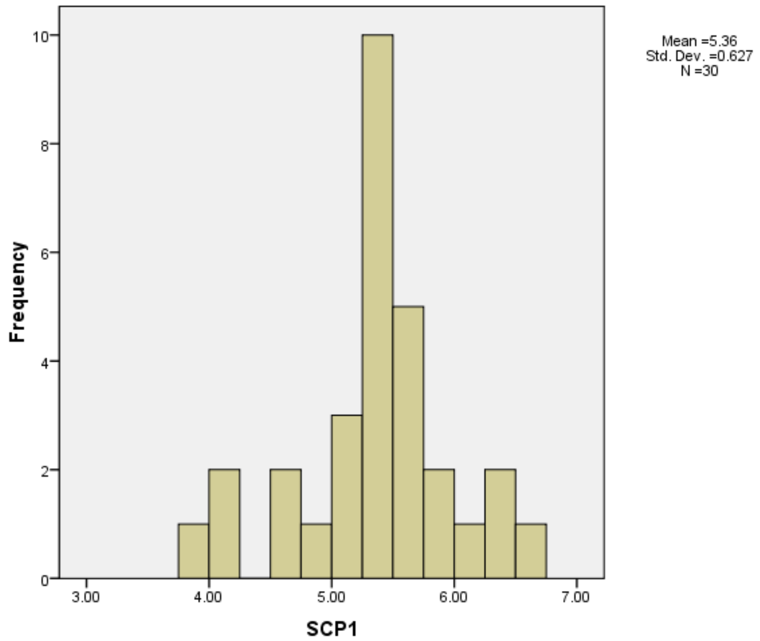
Balance distribution of risks and benefits
Respondents slightly agreed that doing business with their partner contributes to balanced distribution of risks and benefits. There were no significant differences between stakeholders regarding to distribution of risks and benefits.

Understanding other chain member interests
Moderate agreement characterized the participants' opinion about chain balance. There were not significant differences between the opinions of different stakeholders.

To sum up, most of the statements were highly agreed, the least agreed statements connected to environmental friendliness and logistic costs. The focal companies strongly rely on the suppliers in case of authenticity and food safety, while the suppliers evaluated their relationship with the focal companies less important in case of these issues. A stronger reliance of the customers on the focal companies was observed in case of food safety and producing attractive products, while the focal companies have not attached major importance to their business relationship with their customers in case of these issues.

The total supply chain performance (SCP) was characterized with the mean value of the 11 previous statements for each supply chain. The results let us to conclude that the supply chains that participated in the survey showed a fairly good overall performance.

Figure 1: Total supply chain performance - Hungary



Trust

Four statements characterized trust. In general it can be established that the statements related to keeping promises, high confidence, providing correct information received higher scores than that statement, which was related to considering the effects of decisions. The mean value of these statements characterized the degree of trust among the participants. Trust achieved fairly high scores that refer to good relationships between the participants but beside this some differences can be observed between the stakeholders.

- While there were not significant differences between the answers of suppliers and focal companies regarding to their suppliers, the opinion of the focal companies about their customer and the opinion of the customer show significant difference. The results show that the customers have higher level of trust in the focal company than the focal companies in their customers.

Satisfaction

Satisfaction can be characterized with 2 constructs: the economical and social satisfaction.

Economic satisfaction

Participant recorded moderate economic satisfaction level. The different stakeholders did not have significantly different opinion about the economic satisfaction.

Social satisfaction

The stakeholders had less high social satisfaction level. We could observe significant differences between the participants in the level of social satisfaction.

- The focal companies were less satisfied with their customers, while the customers showed reasonable level of satisfaction towards the focal companies supplying them.

Dependency

Scores of this construct have not indicted high level of dependency between the participants. Scores given by the suppliers, focal companies and customers did not differ significantly.

Power

Rewarding power (non- coercive power)

Participants disagreed with the statements on non-coercive power, which suggests that the use of “rewarding power” is not widespread in the Hungarian supply chains. The different stakeholders did not show significantly different opinion about use of reward power.

Punishing power (coercive power)

The results show that the use of coercive power is not typical at the supply chains that participated in the survey. The opinions, expressed by focal companies and suppliers about each other, did not show differences. On the other hand, focal companies’ and customers’ opinions about each other are significantly different.

- In the opinion of focal companies it is more likely that the customers use coercive power, while low scores of customers indicates that the focal companies rarely use punishing power towards the customers.

Reputation

Respondents recorded moderate level of reputation. Significant differences can be observed in the opinion of different stakeholders.

- Focal companies indicated less high level of reputation towards to customers, while in the opinion of customers the focal companies have high reputation.
- The opinion of focal companies and suppliers about each other did not differ significantly.

Conflict

Most of the respondents indicated some level of conflict. The scores for conflict suggest that conflicts are not frequent between the stakeholders. There were not significant differences between the stakeholders but the focal companies recorded slightly higher score for conflicts than the suppliers or the customers.

Governance structures

To analyze the results, an automatic calculation procedure based on different combination of preconditions was established that could attribute the relationship to the 7 identified kinds of interrelationships (Spot market, non-contractual relationships with non-qualified partners, non contractual relationship with qualified partner, contractual relationship, relation and equity based alliance, vertical integration).

The relationship of focal companies with suppliers and customers is mainly based on contracts. Beside this, 20% of focal companies use suppliers from spot market. Lower level of integration can be observed in case of suppliers; their answers show that their relationship with the focal companies can be characterized as spot market or non-contractual relationship. Customers’ answers showed similar pattern as focal companies’ response. Their relationship towards the focal companies can be described mainly as contractual relationship but a remarkable proportion showed lower level of integration as 43,3% characterized their relationship as spot market or non-contractual relationship.

Table 7. Governance structures

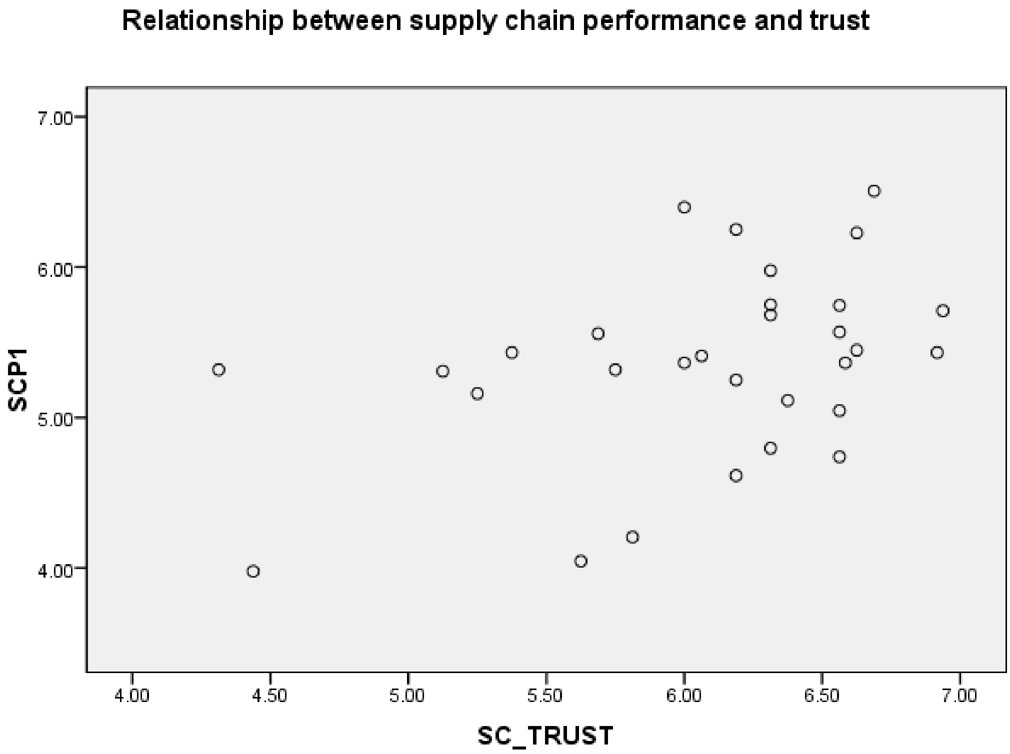
	Suppliers (%)	Focal companies about supplier (%)	Focal companies about customers (%)	Customers (%)
Spot market	56,7	20,0	3,3	16,7
Non contractual with non qualified partner	6,7	10,0	10,0	13,3
Non contractual with qualified partner	36,7	13,3	20,0	13,3
Contractual	0	50,0	60,0	50,0
Relation based alliance	0	0	3,3	0
Equity based alliance	0	3,3	3,3	3,3
Vertical integration	0	3,3	0	3,3

4.2. Relationships between supply chain performance and relational variables

We studied the relationships between the different constructs. The main aim was to determine which constructs have significant effect on the supply chain performance. (Table 8.)

Supply chain performance and trust
The Figure 2. suggests that there is positive relationship between supply chain performance and supply chain trust. The respondents with higher supply chain trust recorded higher total supply chain performance. The correlation showed significantly positive but not strong relationship between the variables. (Table 8.)

Figure 2.



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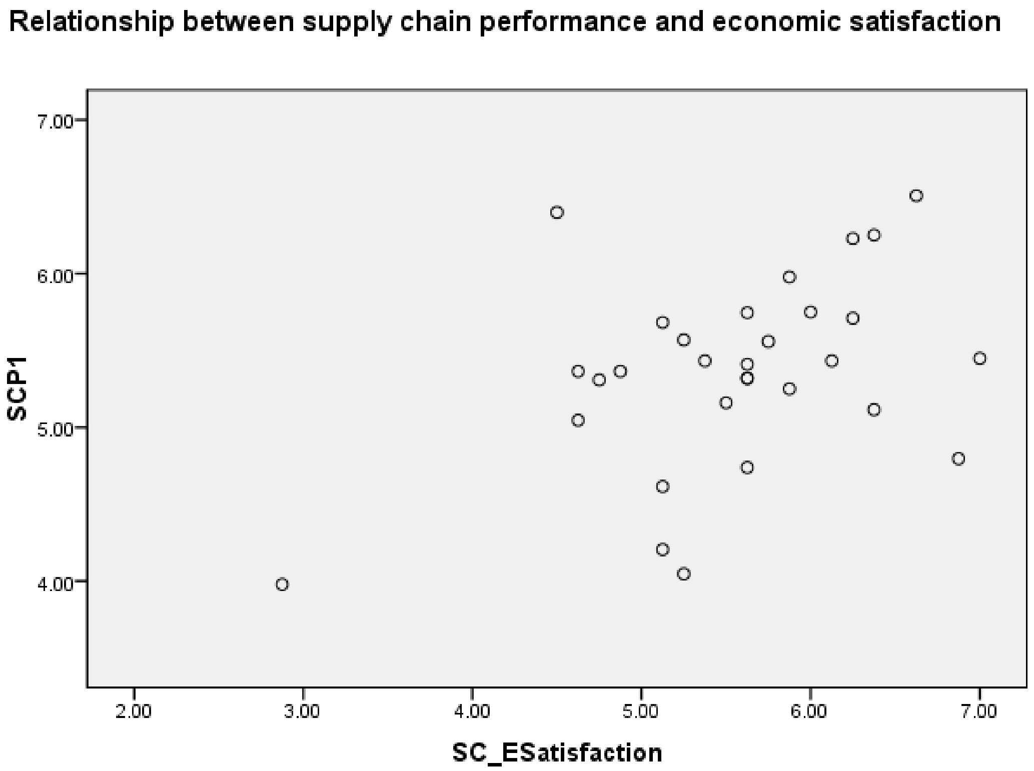
Supply chain performance and economic satisfaction
Economic satisfaction and supply chain performance clearly showed positive relationship. Supply chains that were characterized with higher economic satisfaction, recorded higher scores for performance as well. This lets us conclude that getting fair prices and the profitable business have effect on supply chain performance.

Figure 3.



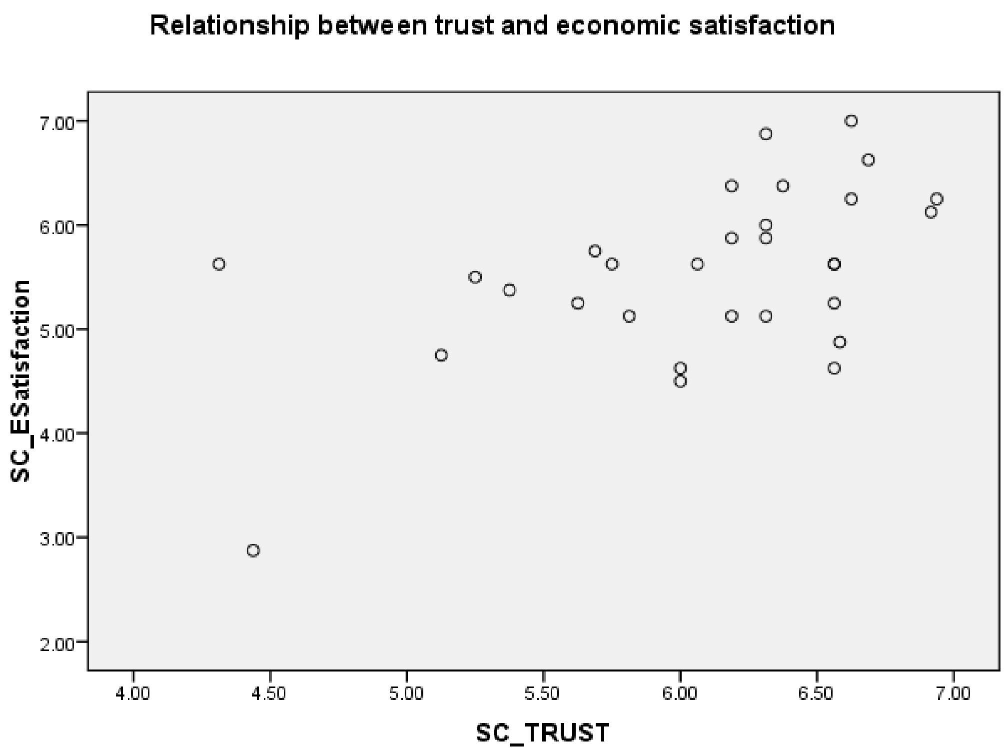
Supply chain performance and other constructs
We studied the relationship between supply chain performance and other constructs (social satisfaction, dependency, rewarding power, punishing power, reputation and conflict, governance structures) but none of them showed remarkable influence on supply chain performance.

Relationship between trust and other constructs
Trust was determined as a very important factor in the supply chain. This is the reason why we decided to examine its relationship with other constructs. (Table 8.)

Beside supply chain performance, 4 other constructs showed significant relationship with trust.

Trust and economic satisfaction
Trust and economic satisfaction are positively related. The figure shows that supply chains with higher level of trust recorded higher level of economic satisfaction as well.

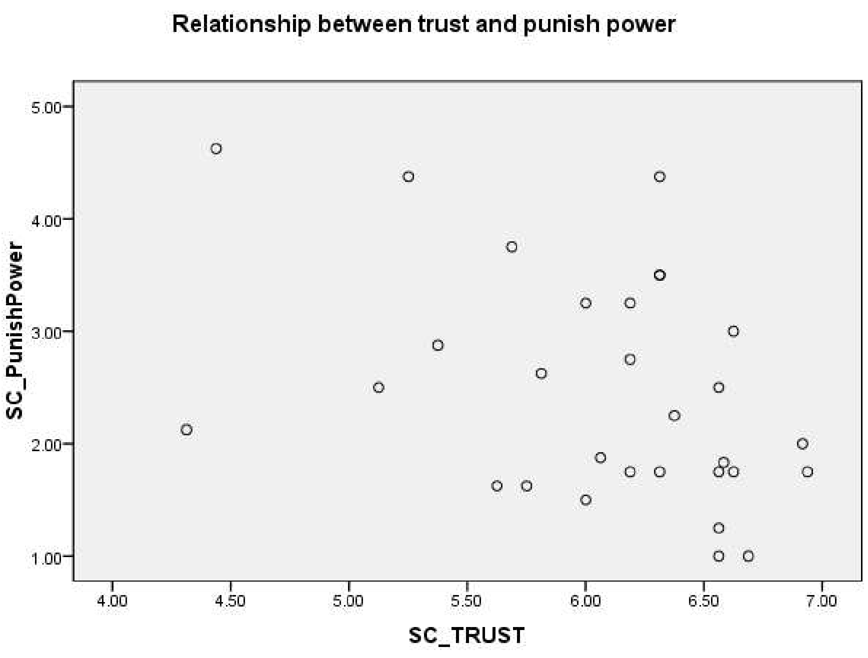
Figure 4.



Trust and punishing power

The figure shows clearly negative but not strong relationships between punishing power and trust. If the level of trust is high in the supply chain, it is less likely to use punishing power.

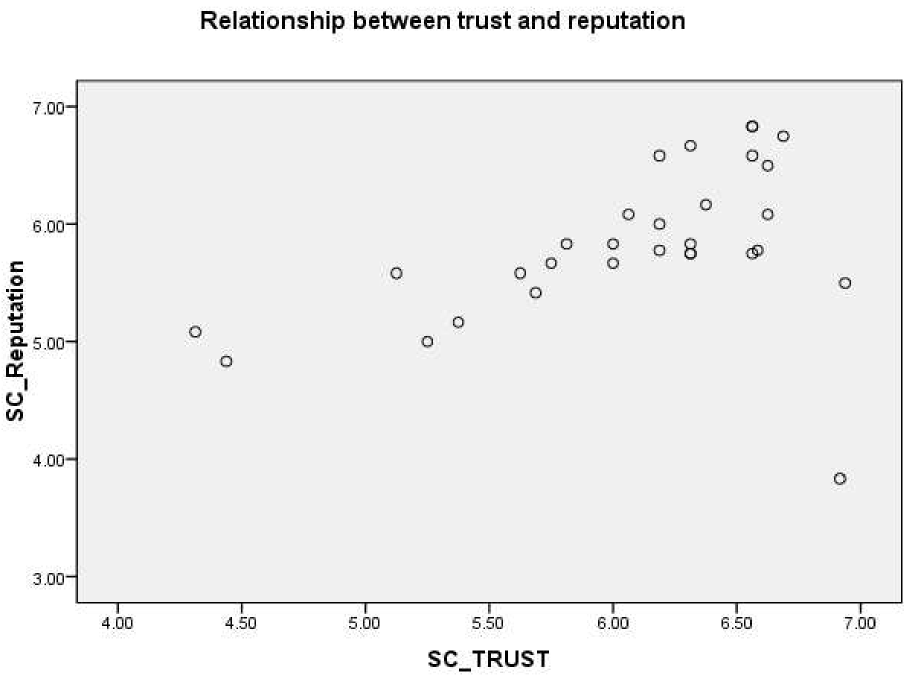
Figure 5.



Trust and reputation

Trust and reputation show positive relationship. Supply chains that recorded higher trust, had higher reputation as well.

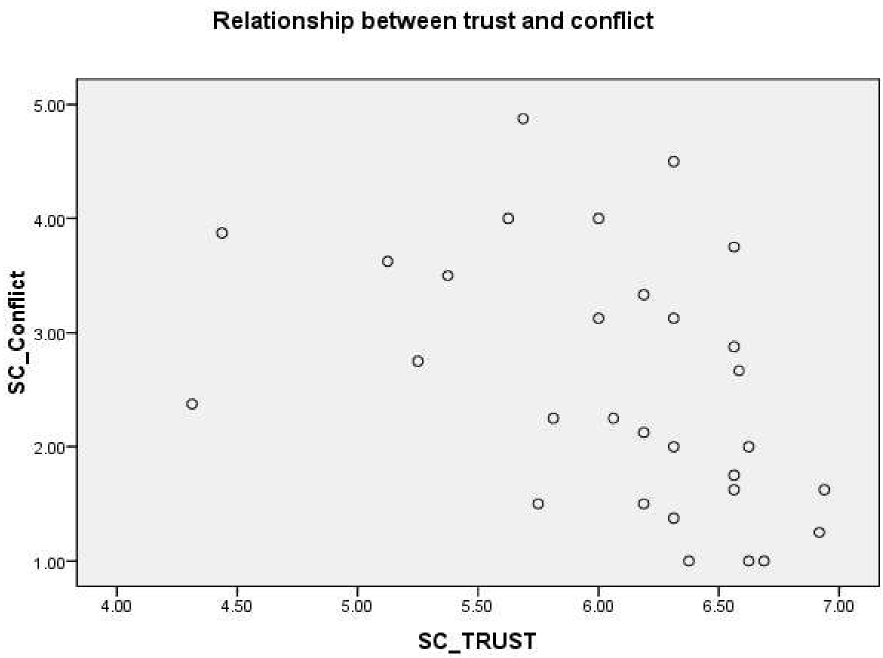
Figure 5**.**



Trust and conflicts

Trust and conflicts related negatively but this relationship was not strong. The Figure 6. suggests that higher level of trust results less of conflicts.

Figure 6.



5. Conclusions

Altogether 30 Hungarian supply chain participated in the survey. The evaluation of the results shows that these supply chains can be characterized with fairly good general performance. The statements, which related to the supply chain performance, were highly agreed. Constructs related to product safety, avoiding customer complaints and reducing lead-time showed stronger agreement than those, which related to environmental issues or reducing logistic costs.

Participants expressed their opinion about each other, so we got an in-depth view about their relationships. The focal companies strongly rely on the suppliers in case of authenticity and food safety, while the suppliers evaluated their relationship with the focal companies less important in case of these issues. A stronger reliance of the customers on the focal companies was observed in case of food safety and producing attractive products, while the focal companies have not attached major importance to their business relationship with their customers in case of these issues.

The relational variables–trust, satisfaction, dependency, power, reputation, and conflicts – which were used to describe differences in supply chain performance also showed good overall picture. The results showed that the participants trust each other and they recorded reasonable economic satisfaction level as well. The stakeholders had less high level of social satisfaction and they did not indicated high level of dependency. Participants disagreed with the statements connected to rewarding power and punishing power, which shows that these types of powers are not frequently used among the participants. The stakeholders indicated a good reputation on supply chain level and not too frequent conflicts.

These results show that all types of stakeholders had a good overall relationship with their partners. The reason of this outcome may originate in the method of survey, as focal companies were asked to nominate and choose their suppliers and customers. The participants presumably had chosen those suppliers and customers with whom they have good relationship. Beside this, our experience was that the focal companies were really interested in the research and they wanted to make sure that their whole supply chain would be present in the sample, thus in the analysis. This can be the reason that they tended to choose their supplier and customer who were supposed to participate in the survey. This raises an issue regarding to the methodology. If the interviewer chooses the suppliers and customers of focal companies randomly, we might get different picture of the relationships and supply chain performance. On the other hand in this case we might get worse response rate, as there is a risk that suppliers/customers whose relationships with focal company is less good, refuse the participation, which results higher number of not complete, “half supply chain” data.

Despite of the good overall results, different patterns can be observed between stakeholders.

- In general the customers have higher level of trust in the focal companies, than the focal companies have in their customers.
- The focal companies recorded lower level of social satisfaction towards their customers while the customers showed reasonable level of satisfaction towards the focal companies.
- In the opinion of the focal companies the customers more likely to use coercive power than their suppliers.
- The customers have less high reputation in the point of view of the focal companies, while the focal companies have high reputation in the opinion of the customers.

On basis of these results we can conclude that the relationship between the focal companies and customers can be characterised with more insecurity than their relationship with their suppliers.

This result underlines that the focal companies in Hungary are exposed to customers. It is typical in Hungary that retailers give low prices for goods and if the focal companies (manufacturers) want to remain their supplier they need to accept lower prices.

The governance structure of the stakeholders did not show high level of integrity. The relationship of the focal companies and customers is mainly based on contract. Suppliers' business relationship can be characterized as spot market or non-contractual relationship, which refer even lower integrity. This shows that suppliers avoid committing themselves to focal companies for longer time, and if they hope that they might find better business conditions. On the other hand as focal companies more exposed to the customer they try to defend themselves with contracted works, so this relationship shows higher level of integration.

Beside exploring the relationships between stakeholders, the main aim of the survey was to determine what types of variables have an effect on supply chain performance therefore we investigated the relationships between supply chain performance and relational variables. Two constructs showed significant but not strong correlation with supply chain performance.

- Supply chains with higher level of trust showed higher supply chain performance.
- Supply chains characterized with higher economic satisfaction recorded higher performance as well.

Other relational variables, such as social satisfaction, dependency, rewarding and punishing power, reputation and conflicts, did not show significant relationship with Hungarian supply chain performance.

6. ANNEX

Table 3. Comparison of mean values of level of agreement regarding to supply chain performance

Statements	Focal companies about suppliers	Suppliers	Asymp. Sig. (2-tailed)*
Helps maintaining authenticity	5.6	4.8	0.036
Helps to be part gastronomy heritage	4.9	4.7	0.813
Helps to lower logistic costs	4.7	4.4	0.396
Helps maintaining profitability	5.3	5.5	0.637
Helps reducing lead time	5.7	5.8	0.785
Helps avoiding complaints	5.9	5.6	0.538
Helps managing products safety	6.3	5.2	0.012
Helps to produce attractive products	5.4	4.9	0.337
Helps environmental friendliness	4.9	4.6	0.619
Balanced distribution of risk and benefits	5.4	5.2	0.988
Better understanding	5.2	5.6	0.168

**Mann-Whitney test –[if Asymp. Sig. (2-tailed)*< 0,05, significant difference can be observed between levels]*

Table 4. Comparison of mean values of level of agreement regarding to supply chain performance

	Focal companies about customers	Customers	Asymp. Sig. (2-tailed)*
Helps maintaining authenticity	5.1	5.0	0.525
Helps to be part gastronomy heritage	4.9	4.9	0.482
Helps to lower logistic costs	5.2	4.6	0.877
Helps maintaining profitability	5.2	5.7	0.136

Helps reducing lead time	5.6	5.9	0.654
Helps avoiding complaints	5.9	6.0	0.379
Helps managing products safety	5.9	6.2	0.040
Helps to produce attractive products	5.4	6.2	0.044
Helps environmental friendliness	5.1	3.9	0.005
Balanced distribution of risk and benefits	5.7	5.3	0.691
Better understanding	5.5	5.1	0.653

**Mann-Whitney test –[if Asymp. Sig. (2-tailed)*< 0,05, significant difference can be observed between levels]*

Table 5.Comparison of mean values of level of agreement regarding to total supply chain performance (SCP) and relational variables

	Suppliers	Focal companies about suppliers	Asymp. Sig. (2-tailed)	Focal companies about customers		Asymp. Sig. (2-tailed)
Supply Chain Performance	5.2	5.4	0.584	5.4	5.5	0.574
Trust	6.0	6.1	0.541	5.8	6.3	0.021
Economic Satisfaction	5.5	5.4	0.759	5.5	5.8	0.120
Social Satisfaction	5.0	4.7	0.418	4.4	5.4	0.004
Dependency	4.0	4.4	0.268	4.2	4.4	0.357
Rewarding Power	2.9	3.5	0.146	3.6	3.8	0.778
Punishing Power	2.6	2.6	0.903	3.2	1.7	0.000
Reputation	5.9	5.8	0.878	5.4	6.2	0.003
Conflict	2.2	2.9	0.100	2.8	2.3	0.212

**Mann-Whitney test –[if Asymp. Sig. (2-tailed)*< 0,05, significant difference can be observed between levels]*

Table 6. Comparison of mean values of relational variables – Focal companies opinion about suppliers and customers

	Focal companies about suppliers	Focal companies about customers	Asymp. Sig. (2-tailed)
Trust	6.1	5.8	0.26
Economic Satisfaction	5.4	5.5	0.76
Social Satisfaction	4.7	4.4	0.35
Dependency	4.4	4.2	0.57
Rewarding Power	3.5	3.6	0.94
Punishing Power	2.6	3.2	0.01
Reputation	5.8	5.4	0.00
Conflict	2.9	2.8	0.62

**Wilcoxon sign rank test –[if Asymp. Sig. (2-tailed)*< 0,05, significant difference can be observed between levels]*

Table 8. Correlation between supply chain performance (SCP) and supply chain trust (SC_Trust)

			SCP	SC_TRUST
Spearman's rho	SCP	Correlation Coefficient		
		Sig. (2-tailed)		
		N		
	SC_TRUST	Correlation Coefficient	0.415*	
		Sig. (2-tailed)	0.022	
		N	30	
	SC_Economic Satisfaction	Correlation Coefficient	0.368*	0.488**
		Sig. (2-tailed)	.045	.006
		N	30	30
	SC_Social Satisfaction	Correlation Coefficient	-00.002	0.210
		Sig. (2-tailed)	0.991	0.266
		N	30	30
	SC_Dependency	Correlation Coefficient	0.020	0.164
		Sig. (2-tailed)	0.918	0.386
		N	30	30
	SC_Rewarding Power	Correlation Coefficient	0.077	-0.003
		Sig. (2-tailed)	0.685	0.988
		N	30	30
	SC_Punishing Power	Correlation Coefficient	-0.181	-0.375*
		Sig. (2-tailed)	0.338	0.041
		N	30	30
	SC_Reputation	Correlation Coefficient	0.160	0.498**
		Sig. (2-tailed)	0.398	0.005
		N	30	30
	SC_Conflict	Correlation Coefficient	-0.204	-0.560**
		Sig. (2-tailed)	0.280	0.001
		N	30	30
	SC_Integration	Correlation Coefficient	-0.187	-0.198
		Sig. (2-tailed)	0.324	0.293
		N	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

ITALY

1. Introduction

This text reports assumptions, methodology and results of a research programme aimed to understanding and measure the determinants of high and weak performance of the supply chain of traditional food products. On this basis a method has been extracted for the determination of the performance of the whole supply chain.

The analysis is based on a profiling of the notion of performance (respectively “high” and “weak”) obtainable through the study in context of a number of indicators organised in specific “constructs”. Among the indicators the following can be mentioned: cost reduction, revenue increase, market orientation, profitability increase, value added, time to market, quality, reliability, flexibility, etc. Additional indicators, such as geographic location, type of product, structure of the supply chains, type of relationships, kind or relationships (satisfaction, risk, trust, power, dependence, relationship bonds etc.) also entered as determination factors into the analysis.

2. Research hypotheses

The adopted tool has been a questionnaire survey targeted on the business aspects of traditional food manufacturers as “seen and observed”. The survey has been carried out in Italy, Belgium and Hungary. In this cross-cultural survey the same research method, questionnaire, recruitment criteria and data collection, analysis method were used.

In each of the three participating countries a total of 15 chains were selected for each selected products that are 15 focal companies and one of their suppliers and customers. This means that 30 supplier-focal company-customer triplets have filed in the questionnaire.

In Italy, the analysis was conducted in a total of 4 regions in Northern Central and Southern Italy, chosen among the most important food production areas of the Country: (Emilia Romagna, Friuli, Toscana and Calabria). The selected products were **dried ham** and **cheese**.

The research hypothesis was the exploration of the key factors that might reasonably influence the supply chain performance, and so, establish a causal link between certain assumptions and the output in terms of performance of the associated chain. Selected factors included in questionnaire relate to: trust, supply chain satisfaction balance, power, dependency, reputation, conflict, and governance structure.

3. Methodology

3.1. Data collection method

For the Italian survey, the method adopted was a mostly **face-to face assisted interviews**. Occasionally, and in dependence of unavailability of the chosen day of the company officer in charge or responsible for the investigated aspect, self registered questionnaires were filled in. In a Minority of cases phone interviews have also been used. The approach based on different techniques was made necessary to secure the agreed number of respondents according to the common protocol. In all cases the respondents have had the opportunity to clarify the logic of the questionnaire and potential response problems triggered by the formulation of some questions thanks to the assistance of a working team member.

In order to avoid any data collection biases and missing data interviewers were checked by working team members.

In any case the vast majority of the questionnaires submitted have been registered in direct vis-à–vis sessions. By using of face-to-face interview the communication with the respondents proved definitely clearer (= stronger clarification of potential misunderstandings).

3.2. Descriptive statistics of the national sample

The two selected supply chains in Italy were:

- **Dry Ham** supply chain
- **Hard, half hard and mozzarella** cheese supply chain

The dry ham producing companies were all of the Parma ham variety. The cheese companies were exclusively located in Calabria. Dry ham companies were recruited in all the four regions. Occasionally some companies producing other local variety of dry ham have been involved

3.2.1. Distribution of respondents by product

In Italy, the distribution of full chains with respect to product type is the following:

Table 1. Number of chains by product

		Italy
Type of product	Dried, fermented sausage	0
	Processed white pepper products	0
	Hard and half hard cheese	16
	Beer	0
	Ham	15
	Bakery	0
	Total	31

In terms of respondents, the structure of the sample is as follows.

Table 2. Composition of sample of the interviewed supply chains

Number of companies in the sample		
Type of company	Hard and half hard cheese	Ham
Focal company	16	15
Supplier	16	15
Customer	16	15

It is important to mention that sometimes the same supplier or the same customer was identified in different supply chains (same additive supplier of the dried fermented sausage or same large retailer as customers). In order to avoid biases the contribution of one chain member/respondents was limited to maximum 3 in the different chains.

3.2.2. Distribution of respondents by size

In terms of the dimension of the respondents, the distribution of the sample is the following

Table 3. Composition of sample of the interviewed firms in terms on number of employees

	Focal Companies	Suppliers	Customers	Total
<=10 employees	19	13	13	45
11-50 employees	9	11	11	31
51-250 employees	2	6	5	13
>250 employees	1	1	0	2
Missing			2	2
Total	31	31	31	93

The resulting distribution reflects the well known problem of size threshold for food manufacturing companies, with a vast majority if them in the small to very small size interval.

3.2.3. Distribution of respondents by profitability

Table 4. Composition of sample of the interviewed firms in terms of level of agreement with the statement "My company was profitable in the last 3 years"

	Focal Companies	Suppliers	Customers	Total
strongly disagree			1	1
moderately disagree	1			1
Slightly disagree		2	1	3
neither agree nor disagree	7	4	16	27
Slightly agree	6	11	3	20
moderately agree	14	11	10	35
strongly agree	3	3		6
Missing				
Total	31	31	31	93

The interviewed companies show a relatively good degree of satisfaction with their turnover in recent times. Although the trend is mostly with slow to moderate, companies can claim a balanced satisfaction. Focal companies are in proportion more satisfied than providers and distributors.

3.2.4. Distribution of respondents by business growth

Table 5. Composition of sample of the interviewed firms in terms of level of agreement with the statement "My company achieved business growth in the last 3 years"

	Focal Companies	Suppliers	Customers	Total
strongly disagree			3	3
moderately disagree	2			2
slightly disagree		1	2	3
neither agree nor disagree	7	8	9	24
slightly agree	7	8	5	20
moderately agree	12	13	9	34
strongly agree	3	1	3	7
Missing				
Total	31	31	31	93

With reference to their expectations, the growth experienced by the interviewed sample the results show a significant increase in growth in recent times. Focal companies lead the good performance followed by the category of suppliers. But also customers are doing well.

3.2.5. Distribution of respondents by profitability and by size

The cross-tabulation between profitability and company size is shown in the following tables:

Table 6.1. Focal companies on their profitability by number of employees

Number of employees * Profitability in last 3 years Crosstabulation

		Profitability in last 3 years					
		moderately disagree	neither agree nor disagree	slightly agree	moderately agree	strongly agree	Total
Number of employees	<=10 employees	1	6	5	6	1	19
	11-50 employees	0	1	1	6	1	9
	51-250 employees	0	0	0	2	0	2
	>250 employees	0	0	0	0	1	1
	Total	1	7	6	14	3	31

Table 6.2. Suppliers on their profitability by number of employees

S_Number of employees * S_Profitability in last 3 years Crosstabulation

		slightly dis-agree	neither agree nor disagree	slightly agree	moderately agree	strongly agree	Total
S_Number of employees	<=10 employees	2	2	6	2	1	13
	11-50 employees	0	2	5	3	1	11
	51-250 employees	0	0	0	6	0	6
	>250 employees	0	0	0	0	1	1
	Total	2	4	11	11	3	31

Table 6.3. Customer on their profitability by number of employees

C_Number of employees * C_Profitability in last 3 years Crosstabulation

		C_Profitability in last 3 years					
		strongly disagree	slightly disagree	neither agree nor disagree	slightly agree	moderately agree	Total
C_Number of employees	<=10 employees	0	1	10	2	0	13
	11-50 employees	1	0	6	0	4	11
	51-250 employees	0	0	0	0	5	5
	Total	1	1	16	2	9	29

Cross tabulations show the relations linking company size and performance (profitability and growth) . Firms as an average showing a good profitability related to the last three years are mostly located in the slight to moderate satisfaction interval. All this results also in a good average performance of suppliers, while the performance of Customers tends to be positively correlated with larger firm size.

3.2.6. Distribution of respondents by business growth and by size

The cross-tabulation between business growth and company size by type of stakeholder is the following:

Table 7.1. Focal companies on their business growth by number of employees

Number of employees * Business growth in last 3 years Crosstabulation

Count

		Business growth in last 3 years					
		moderately disagree	neither agree nor disagree	slightly agree	moderately agree	strongly agree	Total
Number of employees	<=10 employees	1	6	6	5	1	19
	11-50 employees	1	1	1	5	1	9
	51-250 employees	0	0	0	2	0	2
	>250 employees	0	0	0	0	1	1
	Total	2	7	7	12	3	31

Table 7.2. Suppliers on their business growth by number of employees

Number of employees * Business growth in last 3 years Crosstabulation

		Business growth in last 3 years					
		moderately disagree	neither agree nor disagree	slightly agree	moderately agree	strongly agree	Total
Number of employees	<=10 employees	1	6	6	5	1	19
	11-50 employees	1	1	1	5	1	9
	51-250 employees	0	0	0	2	0	2
	>250 employees	0	0	0	0	1	1
	Total	2	7	7	12	3	31

Table 7.3. Customers on their business growth by number of employees

C_Number of employees * C_Business growth in last 3 years Crosstabulation

		C_Business growth in last 3 years						
		strongly dis-agree	slightly dis-agree	neither agree nor disagree	Slightly agree	moderately agree	strongly agree	Total
C_Number of employees	<=10 employees	0	2	8	2	0	1	13
	11-50 employees	3	0	1	2	4	1	11
	51-250 employees	0	0	0	1	3	1	5
	Total	3	2	9	5	7	3	29

Business growth as a proxy of the dynamics of the economical activity of interviewed firms manifest a good correlation with very small to small companies (in the case of focal ones), and is more moderate for suppliers and customers in the triplets. Larger companies in general fare quite well in all the three categories.

3.3. Data analysis

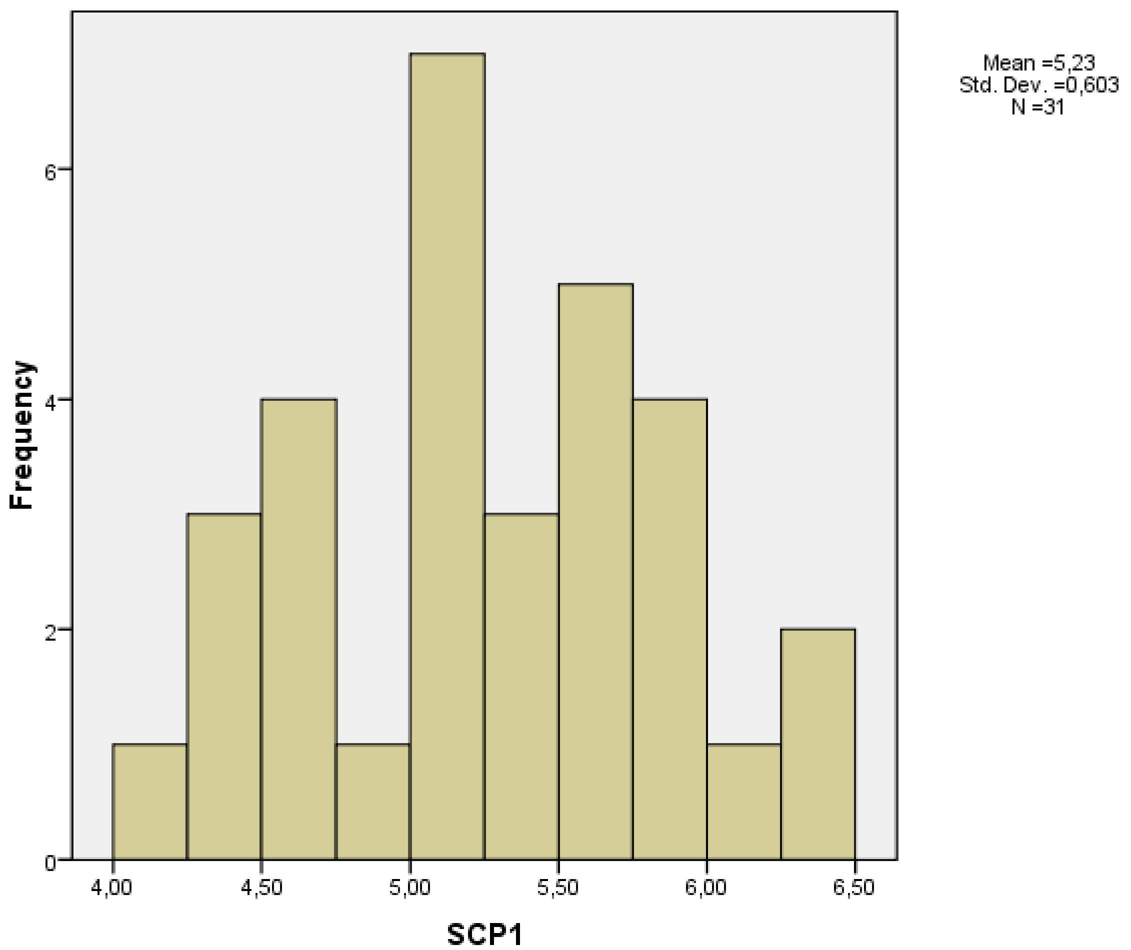
The common questionnaire contained, for the constructs of interest in this report, items in a 7-item ordered Likert scale, with 1= minimum and 7= maximum. Additional information about the respondent, its size and self-assessed company-wide business parameters were present as well. Data from the questionnaire were gathered in an MS Excel file (a common template) to be transformed in a SPSS file for more thorough statistical analysis.

4. Results

4. 1. Summary statistic of supply chain performance and relational variables by different stakeholders

In Italy, the distribution of total Supply Chain Performance (across the 11 components and summing up the 2 interrelations viewed by the two members) is the following:

Figure 1: Total supply chain performance - Italy



The exact values are here:

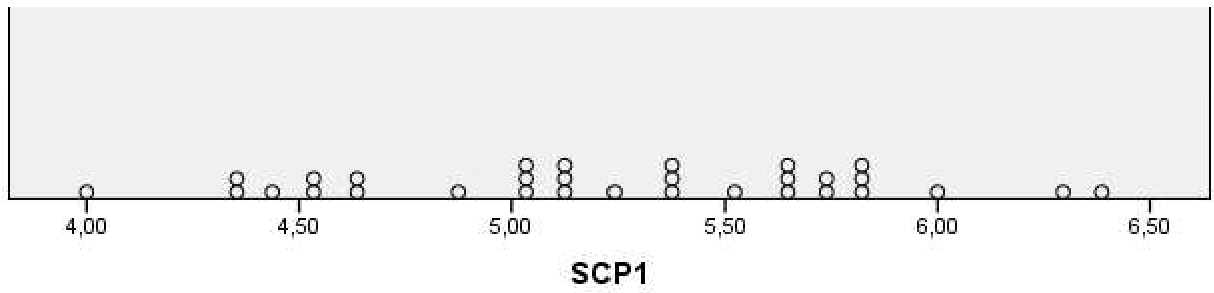
Table 8. Supply chain performance individual values

SCP1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4,00	1	3,2	3,2	3,2
	4,32	1	3,2	3,2	6,5
	4,39	1	3,2	3,2	9,7
	4,43	1	3,2	3,2	12,9
	4,52	1	3,2	3,2	16,1
	4,55	1	3,2	3,2	19,4
	4,61	1	3,2	3,2	22,6
	4,66	1	3,2	3,2	25,8
	4,88	1	3,2	3,2	29,0
	5,00	1	3,2	3,2	32,3
	5,07	2	6,5	6,5	38,7
	5,09	1	3,2	3,2	41,9
	5,11	1	3,2	3,2	45,2
	5,16	1	3,2	3,2	48,4
	5,24	1	3,2	3,2	51,6
	5,36	2	6,5	6,5	58,1
	5,39	1	3,2	3,2	61,3
	5,52	1	3,2	3,2	64,5
	5,61	2	6,5	6,5	71,0
	5,68	1	3,2	3,2	74,2
	5,70	1	3,2	3,2	77,4
	5,77	1	3,2	3,2	80,6
	5,80	1	3,2	3,2	83,9
	5,82	1	3,2	3,2	87,1
	5,84	1	3,2	3,2	90,3
	6,00	1	3,2	3,2	93,5
	6,30	1	3,2	3,2	96,8
	6,39	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

These values are shown in this Simple Dot Graph.

Figure 2: Total supply chain performance – Italy – a Simple Dot Graph



As for summary statistics of this distribution, see here:

Table 9. Kurtosis, Skewness and other summary statistics of the distribution of supply chain performance in Italy

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SCP1	31	4,00	6,39	5,2340	,60280	,363	-,112	,421	-,655	,821
Valid N (listwise)	31									

The distribution turns out to be fairly wide (from 4 to 6.39) with performance being from neutral to very positive values. It is asymmetrically distributed to the left, without following a neat Gaussian normal distribution.

To deepen the analysis one should recall that, in its turn, supply chain performance is built from 11 constructs (authenticity, gastronomic heritage, logistic costs, profitability,…)[3], each computed for the 2 bilateral relationship (supplier-manufacturer and manufacturer-customer) in the perception of the two members of the chain (in total 11 x 4 values per chain).

The **average** score across the supply chains in Italy of performance components are summarised in the following table.

[3] Each construct is made of only one question for the respondent (the 11 items of question 9).

Table 10. The components of performance along the supply chain

Construct	Supplier-Focal Company		Focal Company-Customer	
	in the view of S	in the view of FC	in the view of FC	in the view of C
Helps maintaining authenticity	6.13	5.53	4.93	5.65
Helps to be part gastronomy heritage	5.53	5.87	5.47	5.90
Helps to lower logistic costs	4.67	5.24	4.69	4.58
Helps maintaining profitability	4.67	5.27	4.93	4.55
Helps reducing lead time	5.63	5.87	5.50	4.87
Helps avoiding complaints	5.33	5.83	5.40	5.35
Helps managing products safety	5.33	6.14	5	5.35
Helps to produce attractive products	3.87	4.40	5.50	5.13
Helps environmental friendliness	4.90	6.00	4.80	5.53
Balanced distribution of risk and benefits	5.07	5.63	5.33	4.87
Better understanding	5.03	5.43	5.73	4.77

Suppliers were judged by focal companies as particularly relevant in managing safety and insisting on environmental friendliness whereas they were perceived as less effective to achieve attractive products. Conversely, focal companies were viewed by their supplier as helpful in maintaining authenticity and helpful to reduce lead time.

Customers were judged by focal companies as particularly important for the gastronomic heritage and authenticity as well as focused on environmental friendliness, safety and on avoiding complaints; however they are less prone to understand the other chain members' interests.

In turn, customers recognised the important role of focal companies in insisting on understanding of the interests, in producing attractive products, in reducing lead time.

As potential explanatory variables of performance, several relational constructs have been inserted in the questionnaire.

Table 11. Key constructs potentially linked to performance

Trust
Our supplier/ customer keeps promises
Our company has high confidence in our supplier/ customer
We believe that the information our supplier/ customer provides us is correct
Our supplier/ customer considers how its decisions/ actions may affect us
Economic satisfaction
Our business relationship with our supplier/ customer significantly contributes to our profitability
Our business relationship with our supplier/ customer is very attractive because of getting fair prices
Social satisfaction
Our supplier/ customer hardly considers our arguments when changing prices
Our supplier/ customer leaves our company in the dark about what we ought to know
Dependency
Our company is not significantly dependent on our supplier's/ customer's resources (e.g. raw materials, packaging machines, transport facilities)
Our company is significantly dependent on our supplier's/ customer's capabilities (soft skills, such as expertise)
Our company can easily replace our supplier/ customer
Non-coercive power
Our company receives benefits from our supplier/ customer when we regularly meet their needs /requirements (technical support/ free advice/ financial support/ market information etc.)
Our supplier/customer rewards our company without requiring specific behaviour in return (technical support/ free advice/ financial support/ market information etc.)
Coercive power
We can be sure that our supplier/customer will not retaliate our company when we do not accept our suppliers' / customers' business proposal (keep back important information / terminates contract, press down price, etc)
We can be sure that our supplier / customer will not neglect our interests even if we fully meet the conditions detailed in the contract with our supplier / customer (keep back important information / terminates contract, press down price, etc)
Reputation
Our supplier/ customer is well-known for caring about its business partners
Our supplier/ customer is well-known for its expertise
Our supplier/ customer is well-known for its accuracy
Conflict
We disagree with our supplier/ customer on critical issues
Our business interest doesn't match with that of our supplier/ customer

They are measured in 7-points Likert scale so that they are immediately comparable with the performance components.

The average values of the construct by stakeholders and as an aggregation over the entire supply chains are given in the following table:

Table 12. The relational variables along the supply chain

Construct	S-FC		FC-C		SC
	in view of S	in view of FC	in view of FC	in view of C	
Trust	5,84	6,05	5,63	5,59	5,77
Economic satisfaction	4,82	5,20	5,08	4,79	4,96
Social satisfaction	5,43	5,37	5,18	4,98	5,20
Dependency	4,08	3,21	2,76	3,00	3,26
Rewarding_power	3,78	4,12	3,80	3,94	3,92
Punish_Power	1,88	1,90	2,22	2,19	2,11
Reputation	6,06	6,05	6,17	6,03	6,08
Conflict	2,92	2,82	3,03	2,77	2,88

On average, suppliers were judged by focal companies as having good trust and reputation. Similarly, focal companies were viewed by their supplier as particularly good in reputation and trust, whereas they were perceived as less prone to exert punish power and conflict.

These broad judgements are shared also in the FC-C relation as well at the overall chain.

Another view on the quality of the relationship within the chain is given by the governance structure of it. Based on a taxonomy developed in earlier deliverables of the project, the empirical elicitation of governance structure has produced the following distribution:

Table 13. Governance structures in Italy by stakeholder type

	Suppliers (%)	Focal companies about supplier (%)	Focal companies about customers (%)	Customers (%)
Spot market	12,9	16,1	3,2	3,2
Non contractual with non qualified partner	32,3	48,4	12,9	29,0
Non contractual with qualified partner	51,6	9,7	41,9	29,0
Contractual		6,5	32,3	29,0
Relation based alliance	3,2	6,5	9,7	6,5
Equity based alliance				3,2
Vertical integration	12,9			

Supplier are usually (51,6%) selected in qualified non-contractual relationship whereas focal companies do not need (48,4%) to qualify to enter in non-contractual relationship with them. Contractual relations are much more frequent in the relation between focal company and customer, whereas spotmarket is proportionally more used in the backward relation (supplier-focal company), where, by contrast, is also present vertical integration.

4.2. Relationships between supply chain performance and relational variables

Let's now investigate the statistical relations between overall supply chain performance and a few potential determinants, based on correlation and visual regression.

The overall matrix of bivariate correlation of SCP1 (supply chain performance) and each of the construct is given in the following page.

By ranking from the highest to the lowest correlation one gets the following table[4]:

Table 14. Ordered Spearsman correlation rho of supply chain performance with relational variables

	Correlation with Supply Chain Performance
SC_TRUST	0,8
SC_Reputation	0,7
SC_RewardPower	0,6
SC_SSatisfaction	0,5
SC_ESatisfaction	0,3
SC_Dependency	-0,1
SC_PunishPower	-0,3
SC_Conflict	-0,6

The strongest positive correlation with performance is exhibited by trust, followed by reputation and rewarding power. Punish power and, even more, Conflict are negatively correlated with performance.

A positive loop is clearly present where "good" relationships lead to high performance wheras probably also the opposite is true: good performance can "pay" for positive relationships.

[4] Values rounded to the first decimal.

Table 15. Full matrix of correlation rho of supply chain performance with relational variables

Correlations

			SCP1	SC_TRUST	SC_ ESatisfaction	SC_ SSatisfaction	SC_ Depdendency	SC_Reward Power	SC_Punish Power	SC_ Reputation	SC_Conflict
Spearman's rho	SCP1	Correlation Coefficient	1,000	,823**	,283	,455*	-,056	,610**	-,271	,742**	-,615**
		Sig. (2-tailed)	.	,000	,124	,010	,766	,000	,140	,000	,000
		N	31	31	31	31	31	31	31	31	31
	SC_TRUST	Correlation Coefficient	,823**	1,000	,035	,605**	-,088	,551**	-,282	,801**	-,793**
		Sig. (2-tailed)	,000	.	,854	,000	,638	,001	,124	,000	,000
		N	31	31	31	31	31	31	31	31	31
	SC_ESatisfaction	Correlation Coefficient	,283	,035	1,000	-,203	,483**	,013	-,088	-,112	,146
		Sig. (2-tailed)	,124	,854	.	,273	,006	,947	,636	,550	,432
		N	31	31	31	31	31	31	31	31	31
	SC_SSatisfaction	Correlation Coefficient	,455*	,605**	-,203	1,000	-,213	,511**	-,455*	,727**	-,805**
		Sig. (2-tailed)	,010	,000	,273	.	,249	,003	,010	,000	,000
		N	31	31	31	31	31	31	31	31	31
	SC_Depdendency	Correlation Coefficient	-,056	-,088	,483**	-,213	1,000	,062	-,076	-,295	,133
		Sig. (2-tailed)	,766	,638	,006	,249	.	,741	,684	,107	,476
		N	31	31	31	31	31	31	31	31	31
	SC_RewardPower	Correlation Coefficient	,610**	,551**	,013	,511**	,062	1,000	,061	,648**	-,540**
		Sig. (2-tailed)	,000	,001	,947	,003	,741	.	,744	,000	,002
		N	31	31	31	31	31	31	31	31	31
	SC_PunishPower	Correlation Coefficient	-,271	-,282	-,088	-,455*	-,076	,061	1,000	-,315	,254
		Sig. (2-tailed)	,140	,124	,636	,010	,684	,744	.	,084	,168
		N	31	31	31	31	31	31	31	31	31
	SC_Reputation	Correlation Coefficient	,742**	,801**	-,112	,727**	-,295	,648**	-,315	1,000	-,836**
		Sig. (2-tailed)	,000	,000	,550	,000	,107	,000	,084	.	,000
		N	31	31	31	31	31	31	31	31	31
	SC_Conflict	Correlation Coefficient	-,615**	-,793**	,146	-,805**	,133	-,540**	,254	-,836**	1,000
		Sig. (2-tailed)	,000	,000	,432	,000	,476	,002	,168	,000	.
		N	31	31	31	31	31	31	31	31	31

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A simplified matrix of all correlation, obtained by taking just the first decimal of Spearman's rho and by formatting in bold the values higher than 0.5, is here:

Table 15. Simplified matrix of Spearsman correlation rho of supply chain performance with relational variables

	SCP1	SC_TRUST	SC_ESatisfaction	SC_SSatisfaction	SC_Dependency	SC_RewardPower	SC_PunishPower	SC_Reputation
SCP1								
SC_TRUST	**0,8**							
SC_ESatisfaction	0,3	0,0						
SC_SSatisfaction	0,5	**0,6**	-0,2					
SC_Dependency	-0,1	-0,1	0,5	-0,2				
SC_RewardPower	**0,6**	**0,6**	0,0	**0,5**	0,1			
SC_PunishPower	-0,3	-0,3	-0,1	-0,5	-0,1	0,1		
SC_Reputation	**0,7**	**0,8**	-0,1	**0,7**	-0,3	**0,6**	-0,3	
SC_Conflict	-0,6	-0,8	0,1	-0,8	0,1	-0,5	0,3	-0,8

The overall ranking of correlations from the highest to the lowest is here[5]:

Table 16. Ranked Spearsman correlation rho of supply chain performance and relational variables

Variable 1	Variable 2	**Correlation between Variable1 and Variable2**
SCP	SC_TRUST	**0,82**
SC_TRUST	SC_Reputation	**0,80**
SCP	SC_Reputation	**0,74**
SC_Ssatisfaction	SC_Reputation	**0,73**
SC_RewardPower	SC_Reputation	**0,65**
SCP	SC_RewardPower	**0,61**
SC_TRUST	SC_SSatisfaction	**0,60**
SC_TRUST	SC_RewardPower	**0,55**
SC_Ssatisfaction	SC_RewardPower	0,51
SC_Esatisfaction	SC_Dependency	0,48
SCP	SC_SSatisfaction	0,46
SCP	SC_ESatisfaction	0,28
SC_PunishPower	SC_Conflict	0,25
SC_Esatisfaction	SC_Conflict	0,15
SC_Dependency	SC_Conflict	0,13
SC_Dependency	SC_RewardPower	0,06

[5] Values rounded to the second decimal. Values higher than 0.5 and lower than –0.5 in bold.

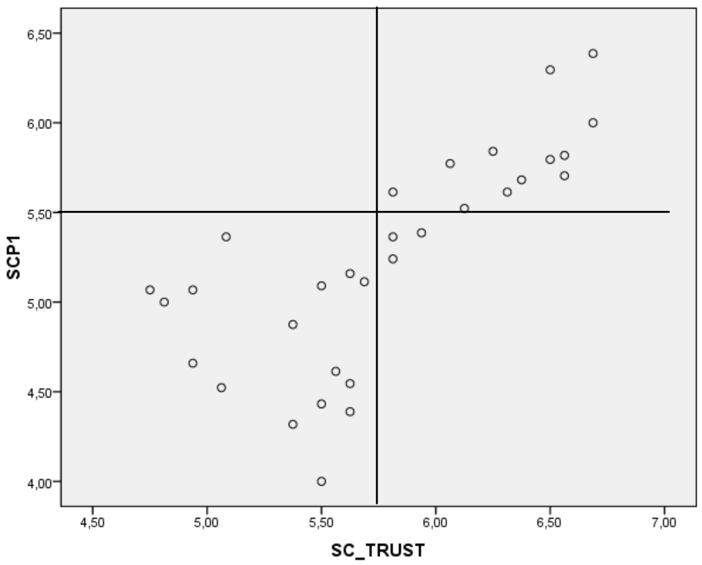
SC_RewardPower	SC_PunishPower	0,06
SC_TRUST	SC_ESatisfaction	0,03
SC_Esatisfaction	SC_RewardPower	0,01
SCP	SC_Dependency	-0,06
SC_Dependency	SC_PunishPower	-0,08
SC_TRUST	SC_Dependency	-0,09
SC_Esatisfaction	SC_PunishPower	-0,09
SC_Esatisfaction	SC_Reputation	-0,11
SC_Esatisfaction	SC_SSatisfaction	-0,20
SC_Ssatisfaction	SC_Dependency	-0,21
SCP	SC_PunishPower	-0,27
SC_TRUST	SC_PunishPower	-0,28
SC_Dependency	SC_Reputation	-0,29
SC_PunishPower	SC_Reputation	-0,32
SC_Ssatisfaction	SC_PunishPower	-0,45
SC_RewardPower	SC_Conflict	**-0,54**
SCP	SC_Conflict	**-0,62**
SC_TRUST	SC_Conflict	**-0,79**
SC_Ssatisfaction	SC_Conflict	**-0,80**
SC_Reputation	SC_Conflict	**-0,84**

The positive loop among performance, trust and reputation is indeed confirmed as structuring the relationships, with more elements in the picture: in this loop, reputation is linked to Rewarding power and Social Satisfaction, as it happens with Trust.

Conflict and reputation are the two variables most opposed, with conflict being in contrast with many other crucial variables. Interestingly, conflict and Punish power are not strongly linked to each other as one might expect, showing that conflict has other ways to express.

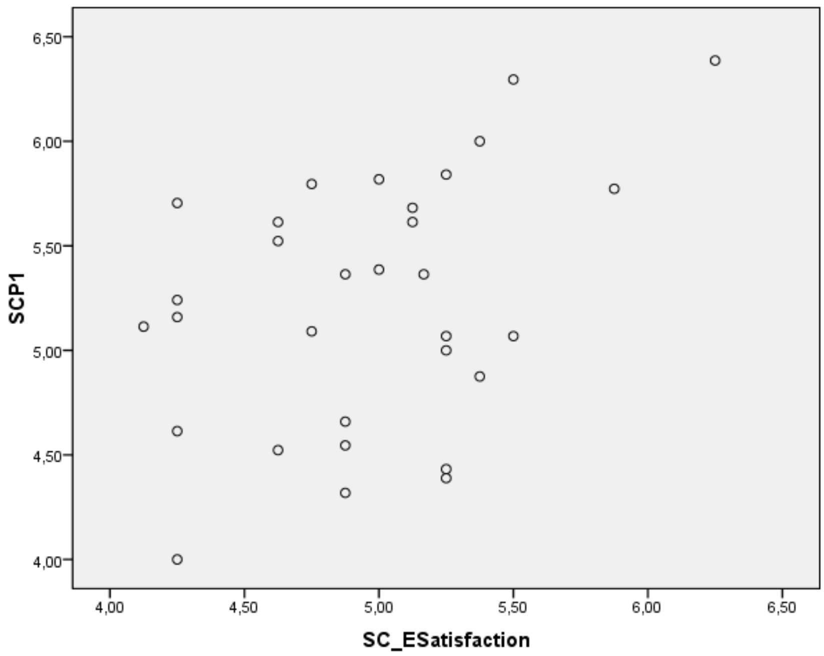
Widening the numerical analysis to graphical scattered points, the main relations are explored in the following graphs.

Figure 3: Trust and Supply Chain Performance



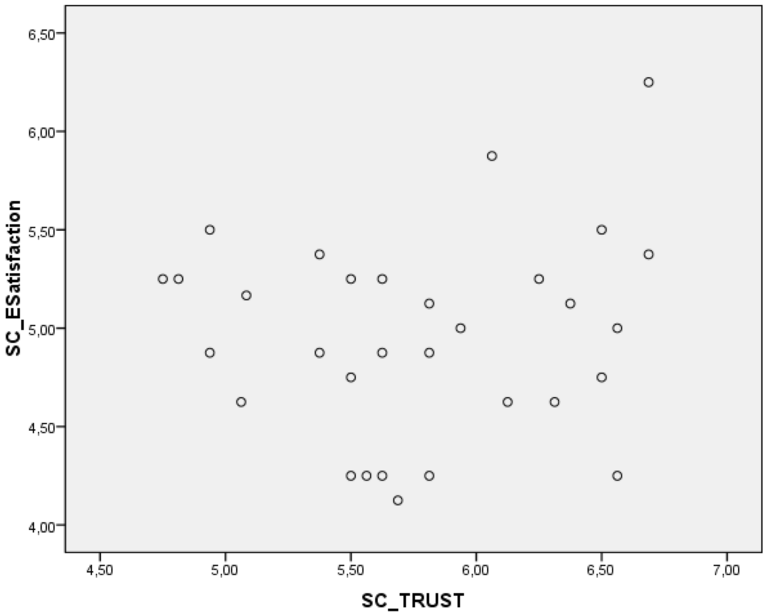
The relations between trust and scp is clearly positive, with value of trust higher than 5.75 if performance has to be at least 5.50. However, for lower level of trust, a more dispersed results in scp are possible, implicitly pointing at the importance then of other variables. When trust is low, other mechanisms are required to keep performance at relatively acceptable values.

Figure 4: Economic Satisfaction and Supply Chain Performance



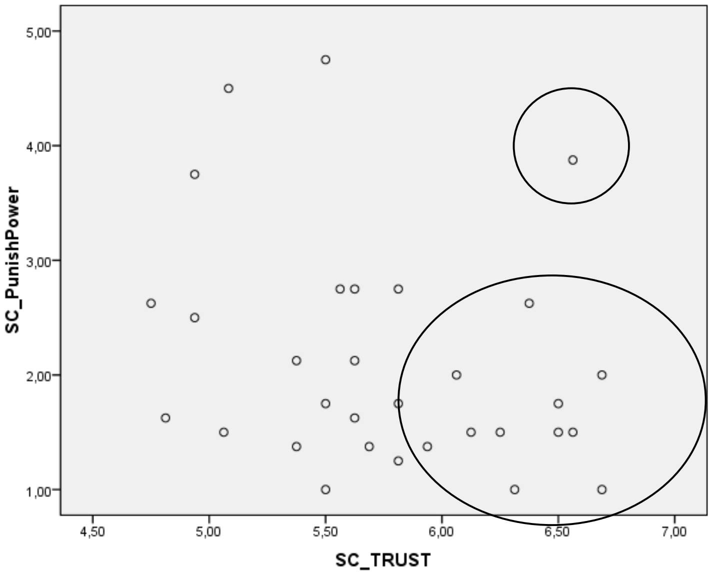
Albeit overall positively linked, economic satisfaction and overall performance are not so perfectly correlated as a narrow view of the objectives of the firm would suggest.

Figure 5: Trust and Economic Satisfaction



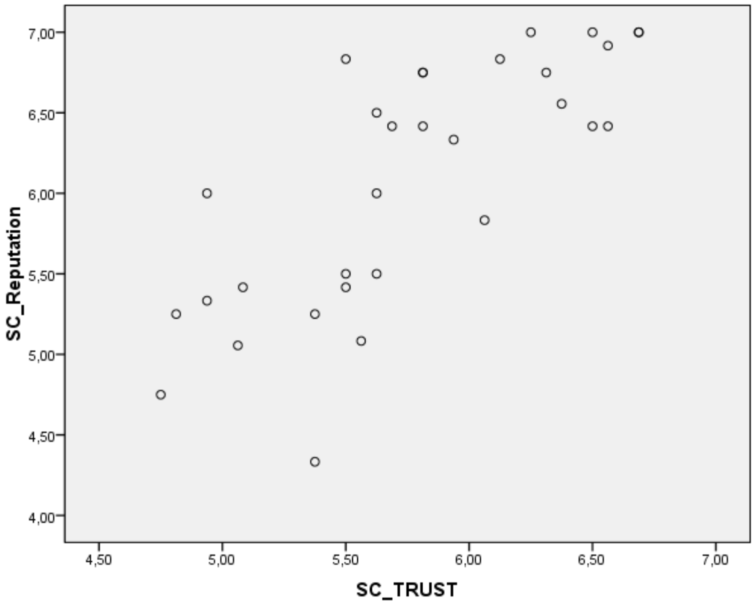
Even more pronouncedly, the relationship between trust and economic satisfaction is far from deterministic.

Figure 6: Trust and Punishing Power



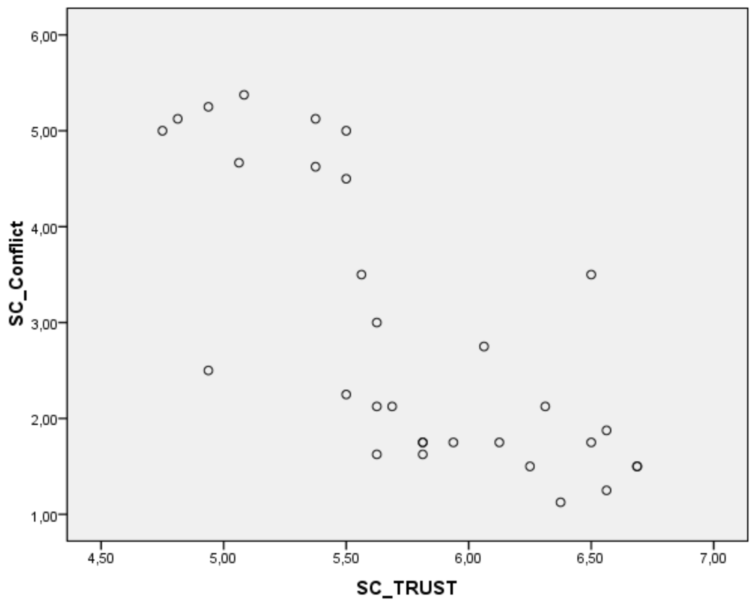
As evidenced by overlapped circle we added, with one exception, high trust is linked to low punishment power, however the relationship is widely disturbed, implying many intermediate steps linking the two.

Figure 7: Trust and Reputation



Reputation and trust have a neat positive relation, as by contrast trust and conflict have a negative relation:

Figure 8: Trust and Conflict



5. Conclusion

Italian supply chains exhibit a wide range of overall performance from 4 to 6.39 in a scale from 1 = minimum and 7= maximum. No single factor can explain their performance; however a “positive loop” linking performance with trust and reputation can be elicited from the data, with these two variables, in turn linked, to social satisfaction and the exercise of rewarding power.

Economic satisfaction, that in a narrow view of the expectations and motivation of business agents would determine the overall performance, is found relatively less linked with it, with a positive correlation of 0.3.

The “soft” elements of the relations between economic agents should thus be emphasised and targeted in strategies aimed at increasing performance. In particular, the reduction of conflict can be seen as the most powerful leverage, since conflict is negatively linked with the positive loop.

Understanding the roots of conflict in the supply chain becomes then an important task in the subsequent analyses.