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Summary report on supply chain performance

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National reports on supply chain performance

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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 per-

[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;

formance looking for country and chain member differences and 2) by identifying the main relationship measures discriminating between low, medium and high performing chains.

As a result, the following research questions are formulated:

1. What is the relationship between the type of chain members (suppliers, focal companies, customers) and chain performance?
2. What is the relationship between cultural backgrounds/political systems and chain performance?
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 and by company size?

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 mostly via individual interviews, phone interviews and self registration with 271 companies belonging to traditional food chains across three European countries (Belgium, Italy and Hungary). (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 misunderstandings). 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) (In case of Hungary, the willingness taking part in the survey was significantly lower in the case of white pepper than in case of sausage, therefore traditional bakery products were also involved in the survey). 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.

Table 1: Sample description

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 performance
2) Perceived customer's contribution to focal company's performance
3) Perceived focal company's contribution to supplier's performance
4) Perceived focal company's contribution to customer's performance

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.

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

Again, these statements were presented to the focal companies and their individual suppliers and customers. The focal companies an-

swered 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.

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 and different stakeholders for chain performance have been investigated. This is 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 (country) by conducting Crosstabs in order to find out whether or not the rela-

tionship between the relationship measures and chain performance is influenced them.

As a result, the following research hypotheses are formulated:

1. Different chain members have significantly different performance
2. Different cultural backgrounds and political systems lead to different levels of chain performance
3. Chains characterized by better quality of chain relationships realize higher performance
4. Sample characteristics (country) influence the relationship between the quality of chain relationships and chain performance

3. Results

3.1. Performance imbalances in the chain

The first question to be answered before proceeding any further in chain level analysis of the data is whether the different chain members (suppliers, focal companies, customers) score significantly different on each of the performance statements. This question can be answered by comparing the mean scores for the different chain members. The mean scores for the focal companies are separately computed according to their perception of their individual suppliers and customers. If significant differences are found between the different chain members, then the chains are performing in an imbalanced way. In the context of our paper, six types of chain imbalances are distinguished:

- Dyadic upper: focal company's perception score related to the supplier (FC_S) differs from supplier's perception score related to the focal company (S);

- Dyadic lower: focal company's perception score related to the customer (FC_C) differs from customer's perception score related to the focal company (C);
- Upstream: focal company's perception score related to the customer (FC_C) differs from the supplier's perception score related to the focal company (S);
- Downstream: focal company's perception score related to the supplier (FC_S) differs from the customer's perception score related to the focal company (C);
- Internal: focal company's perception score related to the supplier (FC_S) differs from focal company's perception score related to the customer (FC_C);
- External: supplier's perception score related to the focal company (S) differs from customer's perception score related to the focal company (C);

There is no significant difference in the total performance of the different chain members, although significant differences are found on the following performance statements: logistic cost (p=0.02), lead time (p=0,023), safety (p=0,000), attractiveness (p=0,00) and chain understanding (p=0,043) by conducting Kruskal-Wallis test (Table 2). In addition, a post-hoc Mann-Whitney U test identifies differences between chain members and consequently highlights the type of imbalance in the chain.

Focal companies contribute significantly less to lower logistic costs of both their suppliers (mean=4,28) and customers (mean=4,31) than the other way around (mean respectively 5,13 and 4,97). This illustrates the presence of both upper (p=0.02) and lower (p=0.015) dyadic imbalance in the chain. The former could be explained by the fact that suppliers often bring the raw materials to the site of the focal company or is often located in the neighbourhood (e.g. dairy farmers being closely located to the traditional cheese processing plant). The latter is linked to the fact that traditional food producers often have poor distribution systems resulting in situations where customers pick up themselves the products rather than the other way around.

Further, both down- and upstream imbalances are noticed related to logistic costs. The former refers to customers evaluating focal companies' contribution to lowering their logistic costs (mean=4,31) as less important (p=0.02) than focal companies do in relation to their suppliers (mean=5,13). The latter relates to customers being perceived by focal companies to contribute less (p=0,027) to lower their logistics costs (mean=4,97) than suppliers do in relation to the focal companies (mean=4,28). Both down- and upstream imbalance confirm the previous reasoning where on the one hand traditional food producers are characterised by having a poor distribution system and relying often on customers for logistics. On the other hand, suppliers provide additional service by being responsible for transport of raw materials or are located in the neighbourhood, which might explain their higher score obtained from focal companies.

Suppliers perform significantly better in reducing lead time of their focal companies (mean=5,67) than focal companies perform in reducing lead time of their customers (mean=5,02; p=0,03). This again refers to downstream imbalance and illustrates the focal company being the weakest link in the chain when it comes to reducing lead time.

Table 6: Performance scores for the different chain members, mean scores and standard deviations (SD).

Performance	FC_S n=85 Mean (SD)	FC_C n=83 Mean (SD)	S n=76 Mean (SD)	C n=79 Mean (SD)	Sample n=323 Mean (SD)
Traditionalism					
Authenticity	5,75 (1,69)	5,24 (1,69)	5,44 (1,64)	5,62 (1,52)	5,51 (1,64)
Gastronomic heritage	5,29 (1,78)	5,20 (1,63)	5,53 (1,66)	5,54 (1,51)	5,39 (1,65)
Efficiency					
Logistic cost	5,13 (1,56)b	4,97 (1,52)b	4,28 (1,90)a	4,31 (1,85)a	4,67 (1,75)
Profit	5,29 (1,25)	5,17 (1,32)	5,00 (1,41)	4,98 (1,55)	5,11 (1,39)
Responsiveness					
Lead time	5,67 (1,50)b	5,48 (1,27)a,b	5,31 (1,59)a,b	5,02 (1,62)a	5,37 (1,52)
Customer complaints	5,74 (1,20)	5,50 (1,21)	5,31 (1,59)	5,40 (1,46)	5,49 (1,38)
Quality					
Safety	6,16 (1,20)b	5,14 (1,37)a	5,08 (1,78)a	5,37 (1,53)a	5,44 (1,54)
Attractiveness	4,67 (1,79)a	5,34 (1,52)b	4,48 (1,81)a	5,62 (1,27)b	5,04 (1,66)
Environmental friendliness	5,18 (1,81)	4,74 (1,60)	4,66 (1,81)	4,65 (1,57)	4,81 (1,71)
Chain balance					
Distribution of risks and	5,29 (1,48)	5,17 (1,45)	5,06 (1,53)	4,86 (1,58)	5,09 (1,51)
Chain understanding	5,20 (1,23)a,b	5,47 (1,35)b	5,30 (1,20)a,b	4,86 (1,55)a	5,21 (1,35)
Total	5,39 (0,84)	5,23 (0,82)	5,06 (1,01)	5,14 (1,00)	5,20 (0,93)

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

Further, upper dyadic imbalance exists related to safety where focal companies judge their suppliers as being more important (p=0,00) than vice versa. It again illustrates the less dominant role of the traditional food producer, now in relation to food safety and is further shown by the presence of downstream imbalance. Here, customers judge the role of focal companies of minor importance as compared to the role of suppliers for focal companies (p=0,00). In addition, safety is characterised by internal imbalance where the role of the supplier is estimated by the focal company to be much more important than the customer's one (p=0,00).

In terms of attractiveness, both down- and upstream imbalance are noticed. While focal companies are considered by their customers to be highly important in providing attractive products (mean=5,62), suppliers are estimated by focal companies to be less important (mean=4,67; p=0,00), which clearly illustrates downstream imbalance. It highlights the focal company being perceived as having the major role in providing attractive products. Further, upstream imbalance indicates that focal companies consider customers as being important factors in encouraging them to produce more attractive products (mean=5,34), while suppliers attach significantly less importance to focal companies in encouraging them to deliver more attractive products (mean=4,48; p=0,01). In line with these findings, internal imbalance indicates that focal companies consider the input from customers to the production of attractive products to be more important (mean=5,34) than the one from suppliers (mean=4,67; p=0,000).

Related to chain understanding, traditional food chains are characterised by lower dyadic imbalance. Focal companies estimate that customers contribute more to their understanding of other chain members' interest (mean=5,47) than vice versa (mean=4,86) (p=0,005). This dyadic imbalance can be explained by the customers being perceived as having more bargaining power and easier access to market information than the other chain members.

Concluding from the results, Hypotheses 1 is accepted, because different chain members have significantly different performance, although this is

only true for logistic cost, lead time, safety, attractiveness and chain understanding.

3.2. Performance differences between the participating countries

First, we investigate, how Belgian, Hungarian and Italian 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.

Investigating the different areas of performance in the sample, traditional food chains are the best performing in authenticity (nr. 1), customer complains (nr. 2), safety (nr. 3) and gastronomic heritage (nr. 4). Traditional food chains perform the lowest on environmental friendliness (nr. 10) and logistic cost (nr. 9) (Table 7).

Further, Belgian chains are the best performers on authenticity, while Italian chains are the best performers on gastronomic heritage, logistic cost and environmental friendliness. It is important to stress that on the total sample, logistic cost and environmental friendliness was a relatively weak area, and in this weak area, Italian chains are still performing well compared to the other two countries. In Hungary, the investigated chains show significantly higher performance than the Italian and Belgian ones on profit, lead time, customer complaints, safety, attractiveness, distribution of risks and benefits and chain understanding. Nevertheless, these differences are only significant in case of the following indicators: gastronomic heritage, profit, lead time, customer complaints, safety, attractiveness and environmental friendliness (Table 7). Considering the total performance of the traditional food chains from the different countries, Hungary is performing the highest (mean=5,36), although considering that Belgium score 5,00 on a seven-point scale (and as a result is considered as the weakest performer), generally speaking the performance of the traditional food chains even in Belgium is satisfying.

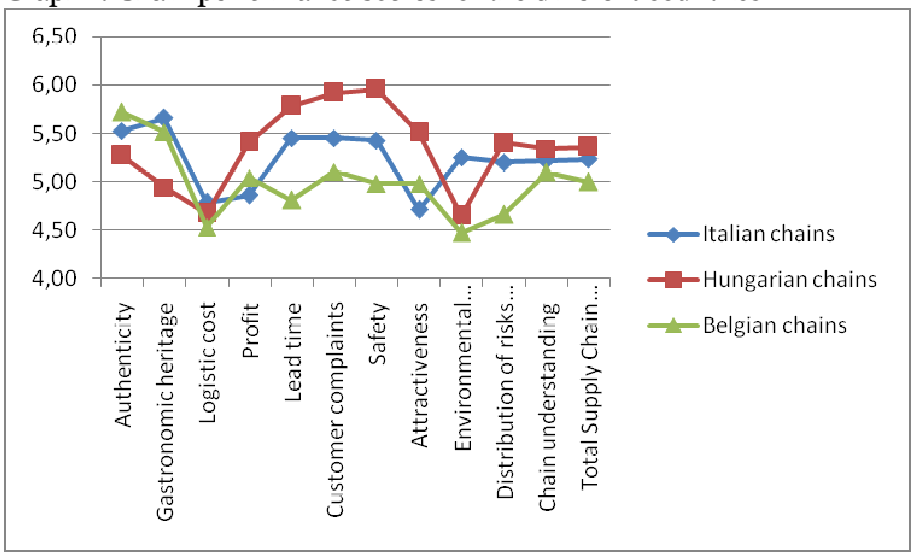
Table 7: Chain performance scores for the different countries, mean scores and standard deviations (SD)

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)

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

As a result, Hypothesis 2 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



3.3. Determinants of high, medium and low 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.

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.

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 on the scale 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.

Table 9 examines possible links between some sample characteristics and performance. The figures reveal no significant differences between origin, sector and company size. It means that these characteristics or variables do not help explaining performance differences in the traditional food sector.

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.

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

	Low n=31	Medium	High n=30	Sample	
	Percentages	Percentages	Percentages	Percentages	Statistics
Country					
Italy	30,0	32,2	40,0	34,0	P=0,14
Hungary	20,0	41,9	36,6	32,9	Cramer's
Belgium	50,0	25,8	23,3	32,9	V=0,14

Significant difference calculated using Crosstabs

Therefore, Hypothesis 4 is rejected, since sample characteristics (country) do not influence the relationship between the quality of chain relationships and chain performance

4. Conclusion

In the frame of this report we measured traditional food chain performance looking for country and chain member differences and we identified the main relationship measures discriminating between low, medium and high performing chains. It is realised with the help of quantitative data collected from 271 chain members representing 91

traditional food chains from three European countries representing six different traditional food product categories.

Chain imbalances lead to lower performance. Chains are performing in an imbalanced way when differences exist between chain members' performance. Hereby, six different types of chain imbalances are distinguished: dyadic upper and lower, up- and downstream, internal and external. Most chain imbalances are noticed in relation to lowering logistic costs and to reducing lead time. Also in relation to the performance area quality important imbalances are noticed for safety and attractiveness. These findings allow chain members and policy makers to make specific and tailor made efforts for the traditional food sector to enhance specific performance areas at specific location of the chains. These findings allow us to accept Hypothesis 1, and state that different chain members have significantly different performance.

Traditional food chains of Belgium, Hungary and Italy do not show significant differences in case of total chain performance, although significant differences are recognised in case of the following indicators: gastronomic heritage, profit, lead time, customer complaints, safety, attractiveness and environmental friendliness. As a result, Hypothesis 2 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).

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.

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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