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Summary report on the quantification of the determinants of bottlenecks and success factors

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Table of content

1. Introduction

This report is part of subtask 5.1 dealing with the the quantification of the determinants of bottlenecks and success factors.

In current scientific debates, innovation is considered to be a key driver of economic growth and instrument to achieve sustainability and cohesion (Lagnevik et al., 2004; Mytelka and Smith, 2002;Pittaway et al., 2004). Thereby innovation is understood as a consequence of various non-linear learning processes involving different kinds of actors. The networking plays an important role in the innovation competence. The recent research results demonstrate that participation in networks explains differences in innovation competence in the agro-food sector (Vermeire et al., 2007).
The findings of the SMES Task Force of the ETP Food for Life (2007) showed that the barriers and constraints of innovation can be groped into the following main categories:
-emotional, cultural barriers
-trust, social capital,
-lack of information,
-lack of knowledge/skills,
-high cost compared to available resources,
-limited resources,
-time constraints,
-legal barriers,
-lack of customer responsiveness.
Networking and collaboration activities can help to overcome these barriers. Generally large companies have more financial and human resources to carry out innovation than SMEs. Many researchers analyzed the innovation capacity of the SMEs. Due to a survey conducted in Netherlands the following barriers of the innovation were explored: the organizational and cultural differences when the companies are cooperating with other partners, the administrative burdens, financing and knowledge transfer problems. (Vareska van de Vrande, 2008).
The main purpose of this report is to summarise the results achieved on the questionnaire survey conducted on the innovation capacity and collaboration of the traditional food chains. By analysing the results we would like to understand and measure the bottlenecks and success factors of traditional food products and to develop a method, which is suitable for their determination.
To achieve the main goal the innovation capacity was measured through the availability of resources including human efforts and financial efforts, the innovation projects implemented by the traditional food supply chain members and the results of the innovation activities. The collaboration was measured through joint activities of the supply chain members along the chain and collaboration between the supply chain members and third parties.

2. Research hypotheses

In this section the relevant research hypotheses for this report are presented. This is a selection of all developed research hypotheses in WP5.

H1) Different cultural backgrounds and political systems lead to different levels of and innovation capacity of SMEs.

H3) At traditional foods innovation in convenience, packaging, labeling, logistics, market is more acceptable than innovation in production/processing. However process innovation is acceptable if the key process and the key product attributes will not be changed.

H4) Organizational innovation leads to higher supply chain performance

H5) More intensive collaboration with other organizations in the supply chain (e.g. in terms of product, packaging, process improvement and development of related services and marketing) leads to higher innovation capacity.

H6) Higher level of integration in the supply chain leads to higher level of innovation capacity

H7) A minimum level of trust is necessary for collective activities (research, marketing, shared use of resources)

H8) A higher level of trust leads to more intensive collective activities (research, marketing, shared use of resources)

H9) Collective activities (collective research, collective marketing, collective purchasing and collective use of resources) lead to better supply chain performance.

H12) External knowledge sources of traditional food companies are located at different geographical scales, whereby the geographical scale will depend of the type of knowledge.

3. Methodology

3.1. Research method and research sample

Quantitative data were collected via individual interviews with 273 companies belonging to 91 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 traditional bakery products such as scones, Danish pastry curls with cocoa). 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 focal company was asked to identify their suppliers and their customers. In the next phase, one of their suppliers and one of their customers were selected and interviewed. In this way, a total of 91 traditional food chains (including 91 suppliers, 91 focal companies and 89 customers) were interviewed. The interviews were carried out between December 13, 2007 and June 20, 2008.

A questionnaire survey was carried out mainly through face-to face interviews. In Hungary in addition to the face-to-face interviews phone interviews and a few self-registered questionnaires were applied as well, to balance the very high rejection rate for the face-to-face interviews. In all cases the respondents had the opportunity to ask clarifications if they had difficulties in understanding some of the questions.

Since several interviewers were used in Hungary, a central review of the recorded answers was made and where missing data and unclear responses were found these were clarified with the respondents through phone.

The way applied for the interview was determined by the willingness and availability of the recruited companies, the majority of them (cca75%) chose phone interview in Hungary, but in Belgium and Italy the companies involved into the survey chose rather face- to- face interviews than phone interview.

Table 1: Sample description

Country/product/chain/respondents	Chain member	Size
ITALY: HAM, 15 CHAINS	15 S	Micro: 3, Small: 5, Medium: 16, Large: 1
45 RESPONDENTS	15 FC	Micro: 6, Small: 7, Medium: 1, Large: 1
	15 C	Micro: 2, Small: 6, Medium: 5, Large: 0, Missing:: 2
ITALY: CHEESE, **16 CHAINS**	16 S	Micro: 10, Small: 6, Medium: 0, Large: 0
	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 CHAINS	11 S	Micro: 2, Small: 2, Medium: 7, Large: 0
	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 CHAINS	5 S	Micro: 3, Small: 1, Medium: 1, Large: 0
	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 CHAINS	14 S	Micro: 2, Small: 7, Medium: 5, Large: 0
	14 FC	Micro: 0, Small: 7, Medium: 7, Large: 0
42 RESPONDENTS	14 C	Micro: 8, Small: 3, Medium: 3, Large: 0
BELGIUM: BEER15 CHAINS	15 S	Micro: 4, Small: 7, Medium: 1, Large: 3
	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 CHAINS	15 S	Micro: 7, Small: 4, Medium: 2, Large: 2
	15 FC	Micro: 11, Small: 2, Medium: 2, Large: 2
	15 C	Micro: 4, Small: 5, Medium: 2, Large: 0
45 RESPONDENTS		
TOTAL	91 S	Micro: 31, Small: 32, Medium: 22, Large: 6
	91 FC	Micro: 41, Small: 28, Medium: 21, Large: 1
	91 C	Micro: 39, Small: 28, Medium: 17, Large: 5 Missing:: 2

Micro: Micro sized enterprise: < 10 empl, Small: Small sized enterprise: < 50 empl, Medium: Medium sized enterprise: < 250 empl

3.3 Questionnaire

The questions related to the innovation capacity and collaboration covered the following aspects:

Innovation capacity
Human efforts were described by the amount of time that companies spend on different innovation related activities (courses, self studies, seminars, fieldwork, experimental trials).
Financial efforts were described by the way of financing product development, process development, market research and organisational development activities.
Innovation activities were described by different types of activities. These activities were grouped as product innovation (packaging, quality, convenience), market innovation (entering new markets, marketing activities), organisational innovation (new management tools, improving of management of R&D, participation in networks).
Results of innovation activities were measured on 7-point Likert scale.
Collaboration
Collaboration with partners means using production equipments jointly with partners, sharing knowledge systematically, and joint planning of different activities.
Collaboration in R &D: was characterized by the involvement of the chain member into joint R&D activities with other chain members and peers.

Other items described in the results – supply chain performance, supply chain trust and integration level within the chain –were introduced in the summary report on supply chain performance (D.5.3.8).

3.4 Data analysis

The data were analysed by a number of methods described below. Summary statistics were applied to get a general overview of the results. The different types of scales that were used for data capture are shown in Annex (Table 2.). The composition of the questionnaire and the coding of the data enabled us to characterize the level of innovation capacity and collaboration by a very simple way.
An innovation capacity score was introduced in the following way. The mean of the scores of human efforts, financial efforts and results of innovation and the total number (sum) of innovation activities were standardized for each chain members:
.

$$0 \le \frac{x - \min imum}{\max imum - \min imum} \le 1$$

Where: x *– actual mean*
Minimum – minimum point of the scale
Maximum – maximum point of the scale

The average of the standardized scores of the four variables were determined. This score describes the innovation capacity of a supply chain. If this value is 1 the supply chain has maximal innovation capacity, if it is 0, the supply chain has a minimal innovation capacity.

Collaboration: Scores describing the collaboration were summarized for each chain member and for each supply chain. Scores were standardized by the same method as used for the innovation capacity. This collaboration score describes the level of the collaboration of a

supply chain. If this value is 1, the supply chain collaborates very well if it is 0, the partners in the supply chain do not collaborate at all.

Chain performance: For chain performance the relationships between the focal company and it supplier and customer, respectively, were investigated. Hence, for each relationship (FC-S, FC-C, S-FC, C-FC) the mean score was calculated over the performance indicators, namely traditionalism, efficiency, responsiveness, quality, and chain balance. Finally, for the overall chain performance the mean over all four relationship types was calculated for each chain.

Integration level within the chain: The integration of chain partners with each other can be characterized by the following nomenclature: spot market, non-contractual relationship with non-qualified partner, non-contractual relationship with qualified partner, contractual relationship, relation-based alliance, equity-based alliance, and vertical integration. For the score on chain integration level the sum over all four types of relationships (FC-S, FC-C, S-FC, C-FC) was calculated for each chain.

Trust in the chain: For each relationship type (FC-S, FC-C, S-FC, C-FC) the mean score on the trust variables was calculated for each chain.

The Kruskal-Wallis test (α=5%) was used to identify whether there are significant differences between the innovation capacity of the chain members and also between the collaboration. The Mann-Whitney test (α=5%) was used to explore differences between 2 independent variables. The relationships between the variables were analysed with Spearman's correlation. K-means cluster analysis was used to identify typical groups of the supply chains with different level of innovation capacity.
The SPSS® 16.0 for Windows statistical software was used for the evaluation of the data.

4. Results

4.1. Summary statistics of innovation competence and collaboration

Innovation capacity
Innovation capacity was measured as the results of the efforts, both human and financial, activities and results related to the innovation.

Human efforts
Human efforts are described by the amount of time that companies spend on different innovation related activities (courses, self study, seminars, fieldwork, experimental trials). The Figure 1. shows that the customers less frequently spend time on self-studies and seminars than the focal companies and the suppliers. Self-studies are slightly preferred over courses and seminars.

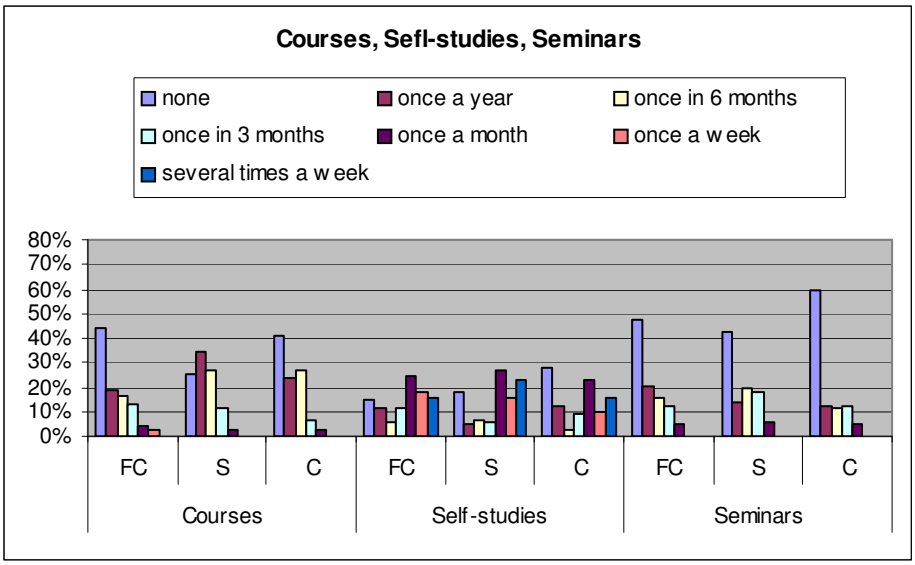

Figure 1. Frequency of courses, self-studies and seminars

Comparing the results on fieldwork and experimental trials we can establish that the majority of the customers do not carry out experimental trials, while the focal companies slightly less frequently carry out fieldwork (Figure 2.).

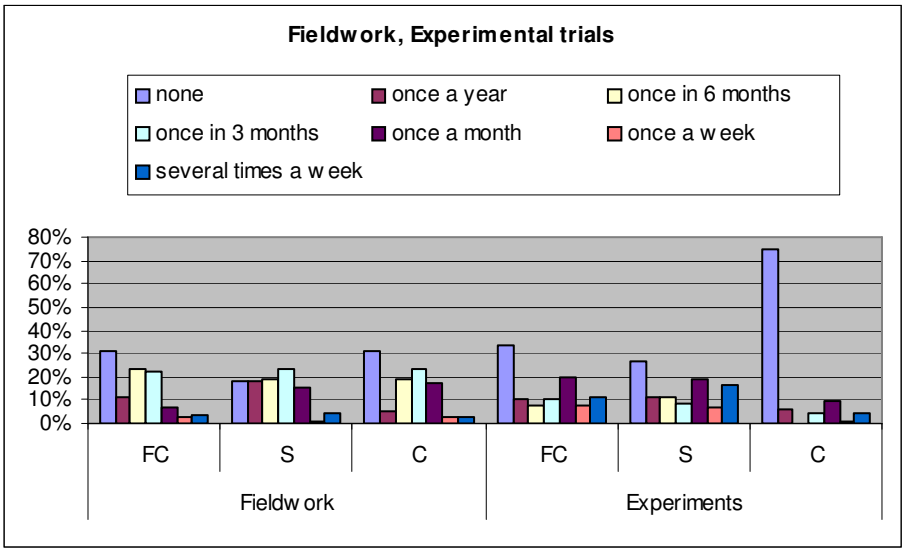

Figure 2. Frequency of fieldwork and experimental trials

Table 3. (Annex) shows that the self-study is the most frequently applied activity in each country for each chain member. Figure 3. shows that the Belgian supply chains invest remarkably more into human efforts, especially into self-studies than the Hungarian and Italian chains. The Belgian focal companies and the customers participate on seminars more frequently than the chains in Hungary and in Italy. The Italian chain members participate less frequently on seminars.

Table 4. (Annex) shows the proportion of chain members who do not invest into any types of human efforts. This proportion is the highest for each chain member in Hungary, and lowest in Belgium. Relatively high percentage of the Italian customers – similarly to Hungary – does not invest into any types of human efforts. It can be observed that the proportion of suppliers who do not invest at all human efforts into innovation is usually lower; the proportion of these types of customers is higher than that of the focal companies in each country. It can be stated that the proportion of customers, which do not invest into human efforts are remarkably lower in Belgium than in the other two countries.

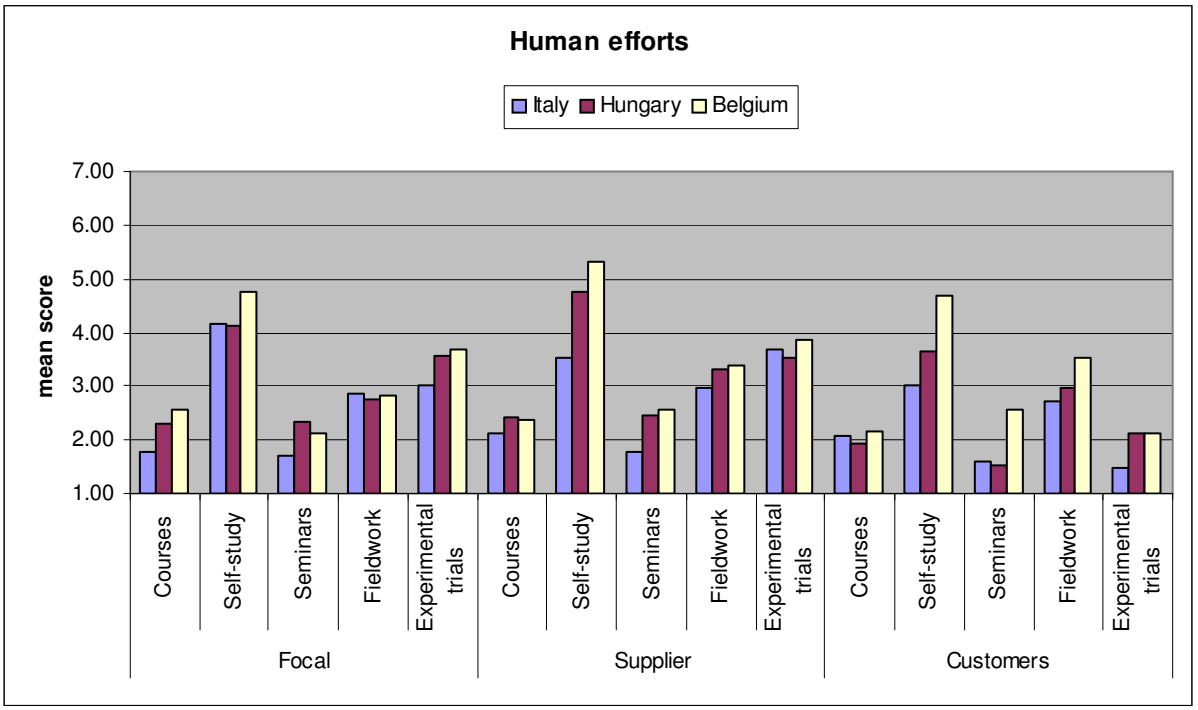

Figure 3. Mean scores of human efforts by chain members

Financial efforts

Financial efforts were described by the way of financing the product development, process development, market research and organisational development activities (Table 5. - Annex).
The different chain members show different patterns in the type of financing. A large proportion of the customers do not spend funds on product and process development, while at the focal companies the most typical type of financing of innovation is spending according to the necessity. Most of the companies do not have a separate budget for market research and organizational development, but they spend the money according to the necessity (Figure 4.).

Table 6. (Annex) shows the proportion of different chain members without any type of spending on innovation related activities. This proportion is the highest for each chain members in Italy. The proportion of the focal companies without any type of spending on innovation related activities is the same in Hungary and in Belgium, while for the suppliers in the Belgian sample shows slightly higher proportion. The proportion of customers without any type of spending on innovation related activities is higher in Hungary than in Belgium.

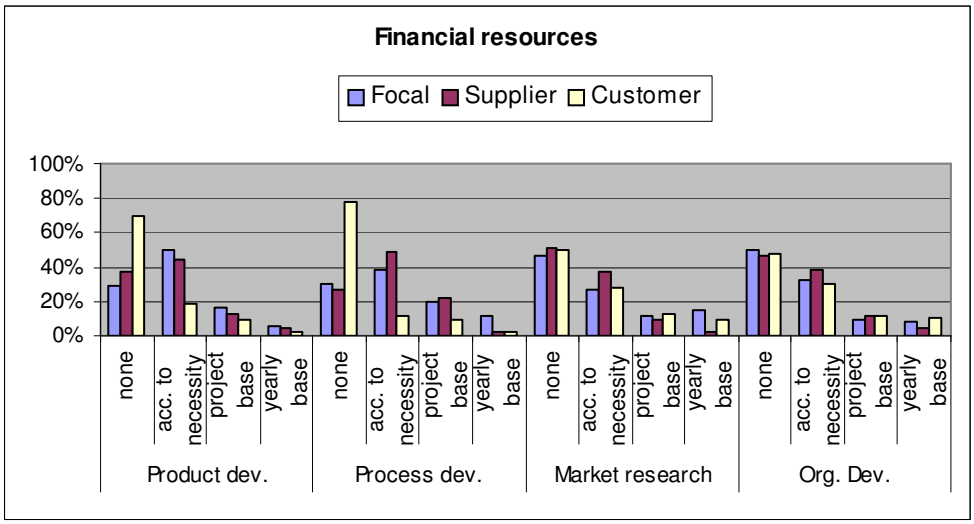

Figure 4. Frequency of different types of financing of innovation for different chain members

Comparing the types of financing of innovation by country we can establish that the majority of the focal companies in Italy do not have a yearly budget for their innovation activities, but they spend it on project base. In Hungary the focal companies mainly spend their financial resources according to the necessity but having a yearly budget is more frequent here than in Italy. In Belgium the focal companies mainly spend their resources according to the necessity but the proportion of these who use yearly budget is higher here than in Italy or in Hungary (Figure 5.). In Italy those who spent on innovation activities most frequently do it on project base, which is completely different from the tendency observed in the other 2 countries. Differences can be observed in financing according to the types of innovation.

For *product development* the most typical type of financing is spending according to the necessity, followed by the group not spending at all, spending on project base and the least typical is spending on a yearly budget. For *process development* the pattern is similar. At *market research* the most typical behaviour is not spending on it at all and it is valid for each group of chain members, followed by spending according to necessity. However at this activity the use of annual budget is nearly as frequent as the spending on project base. For *organisational development* similar pattern can be observed as for market research.

- Product development: the focal companies in Hungary mainly spend according to the necessity but this figure is also fairly high in Belgium.
- Process development: the companies in Belgium are more frequently spend on these activities (mainly according to necessity or to some extent on project or yearly base), than in Hungary, or in Italy.
- Market research: the companies in Hungary more frequently spend on these activities (financing mainly according to necessity), than in Belgium or in Italy. In Italy the proportion of companies without any spending is fairly high.
- Organisational development: a large proportion of the Italian companies do not spend on organisational development.

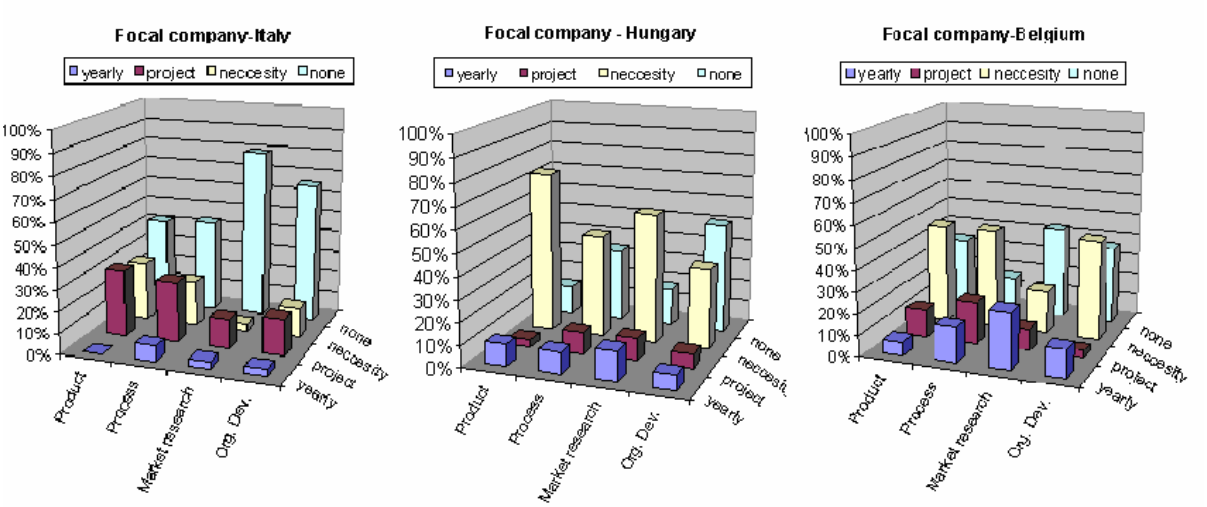

Figure 5.Type of financing-Focal companies

Innovation activities and results

The participants were asked what kinds of innovation they introduced in the last 3 years. The respondents evaluated the success of these innovations as well (Figure 6.).

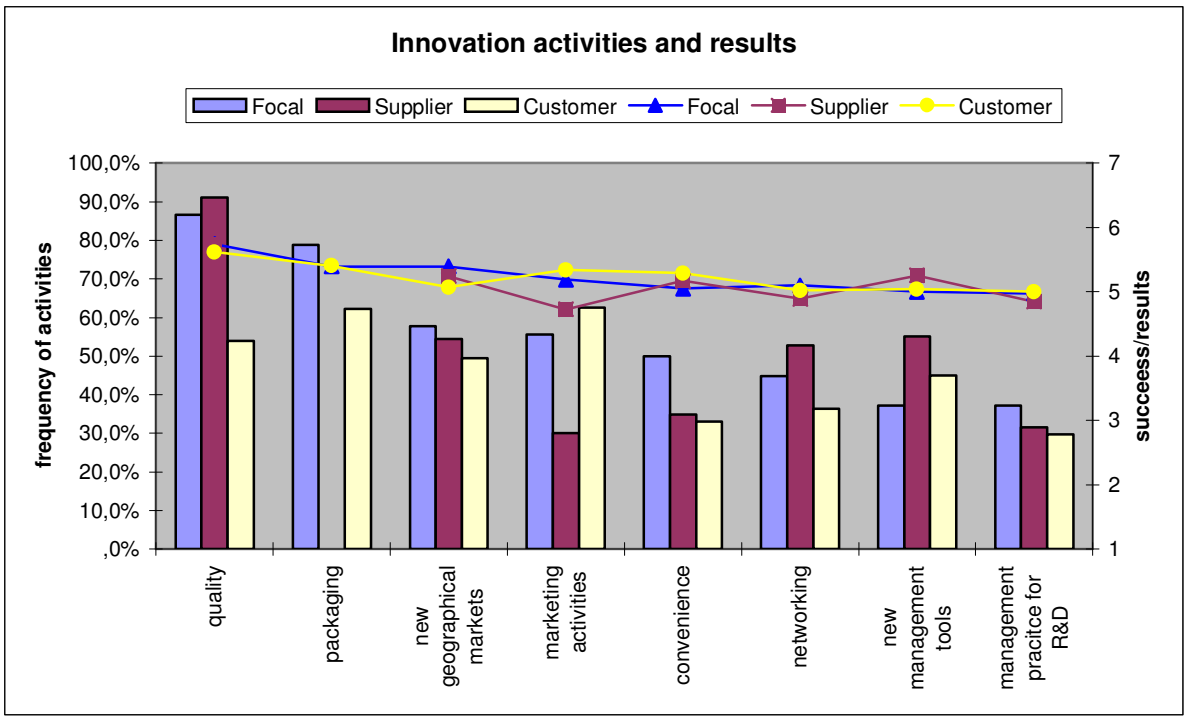

Figure 6. Innovation activities and results by chain members

Improving the quality was an important issue for the focal companies (86.7%) and the suppliers (91.1%), while lower proportion of customers (53.9%) introduced this type of innovation. Most of the focal companies (78.5%) and a majority of the customers (62.2%) improved the packaging of their traditional products in the last 3 years. (Packaging innovation was questioned only from focal companies and customers.) Approximately half of the respondents entered new markets recently. New marketing activities were more typical for focal companies (56.5%) and customers (62.6%), than for the suppliers. Improving

convenience, networking and applying new management tools were less frequently used types of innovations, but differences can be observed between the chain members. The focal companies improved the convenience of their products more frequently (50%) than the suppliers (34.8%) or customers (33%). On the other hand suppliers used networking (52.8%) and new management techniques (55.1%) more frequently than the focal companies and the customers. Introducing of new management techniques for R&D was the least frequently used type of innovation by all chain members. Differences between countries will be explained at Hypothesis 3.

Most of the respondents evaluated their innovation projects as being successful. There are no remarkable differences between the answers of the different chain members (Figure 6.). It has to be noted that the scores for success, based on self-evaluation of the innovation projects follow the frequency of the activities, which is worth for further investigation.

A cluster analysis was carried out on the standardized scores of four variables (human efforts, financial efforts, innovation activities and innovation results) of innovation capacity of the supply chains (Table 7. - Annex). Based on the evaluation of the results 3 clusters of the chains were identified with low, medium and high innovation capacity. The differences between these clusters are more remarkable at human and financial efforts than at innovation results (Figure 7.).

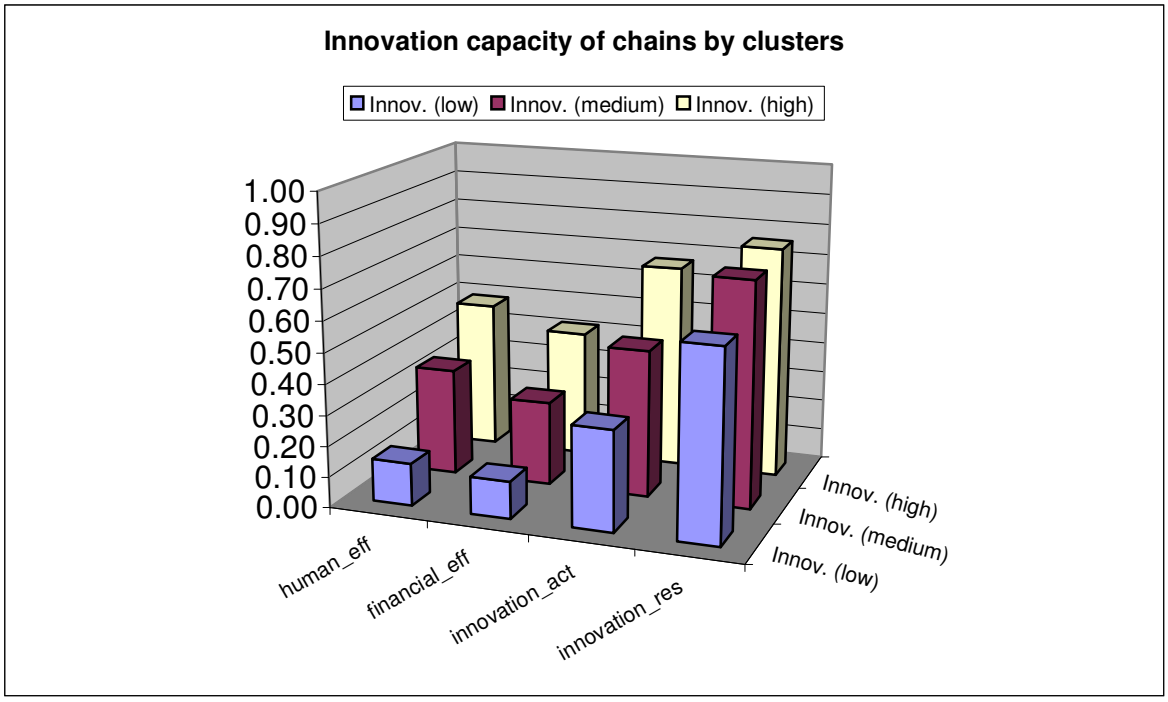

Figure 7. Innovation capacity of chains by clusters

The representation of chains from different countries within the different clusters showed (Table 8. - Annex) that that the cluster with the low innovation capacity contains mainly Italian (50%) and Hungarian (40.9%) supply chains, while only 9.1% of this cluster is represented by Belgian companies. The composition of the cluster with medium level of innovation capacity shows a more even distribution between the Hungarian (41.9%), Belgian (37%) and Italian (20.9%) chains. The cluster with high innovation capacity contains higher proportion of Italian (40%) and Belgian (35%) supply chains, than Hungarian (25%) ones.
The supply chains with low innovation capacity are less profitable and realized smaller business growth than the supply chains with medium or high innovation capacity. This

suggests that the level of innovation capacity have a remarkable effect on profitability and business growth (Figure 8.).

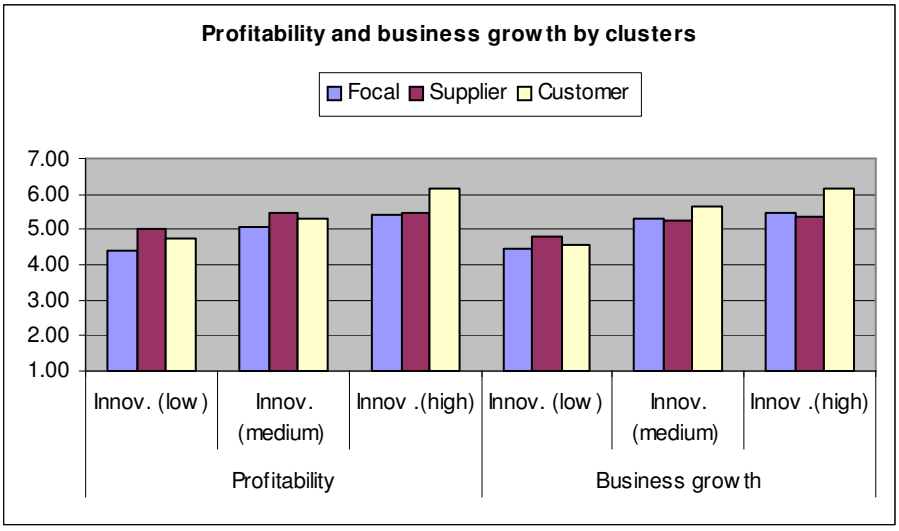

Figure 8. Relationship of innovation capacity, profitability and business growth

Collaboration

Collaboration was measured by the level of joint use of equipments, systematic sharing of knowledge, joint planning and joint R&D with suppliers and/or customers.

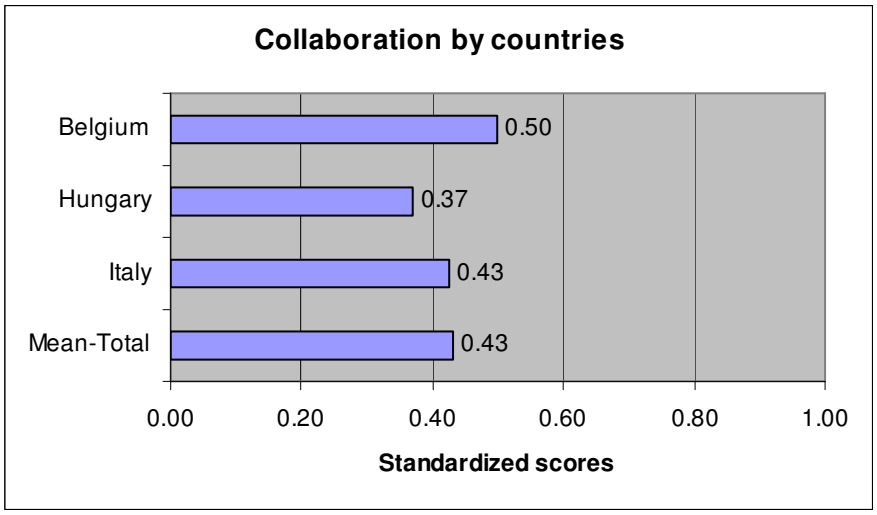

Figure 9. Standardized scores of collaboration by countries
(1=maximum level; 0=no collaboration)

The average level of the collaboration with suppliers and/or customers is 0.43 but there are significant differences between the countries (Figure 9.). The statistical analysis showed that the Belgian supply chains have statistically significantly higher level of collaboration than the Hungarian chains. The collaboration of the Italian chains did not differ significantly from the Belgian and Hungarian chains (Table 10. - Annex).

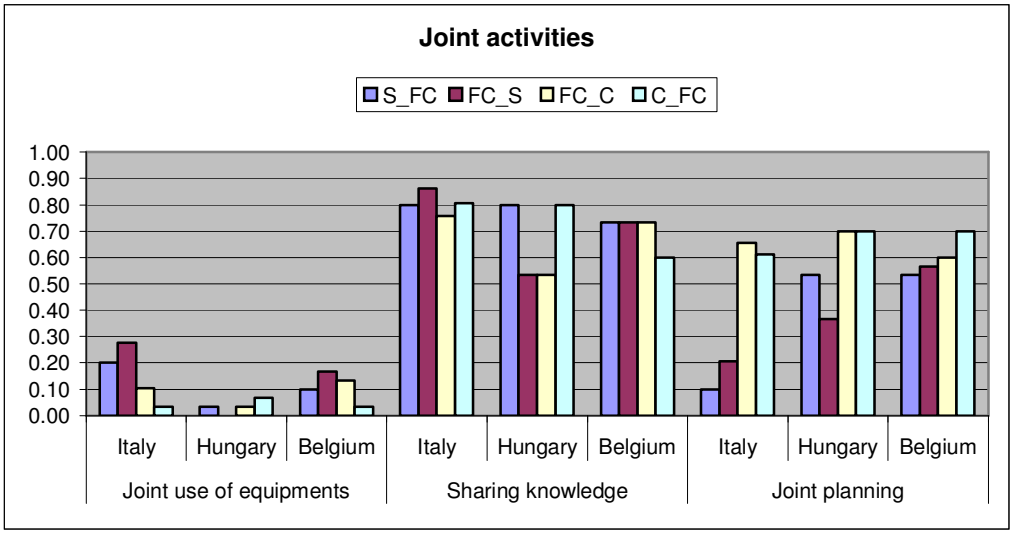

Figure 10. Joint activities

In general the most frequent joint activity is sharing knowledge, followed by planning joint activities and joint R&D consecutively. Joint use of equipments with other chain members is a rarely applied type of collaboration. It is worth to mention that significant differences can be observed between countries and different types of chain members (Figure 10.).

- The joint use of equipments was most frequent –but still not common- in Italy between the focal companies and suppliers and some of the focal companies and suppliers indicated common use of equipments mainly in Belgium. Joint use of equipments is not typical in Hungary.
- Sharing of knowledge is the most frequently used type of joint activities. Interestingly the focal companies in Hungary tend to share their knowledge less frequently with their suppliers and customers, compared to their suppliers and customers, which show some imbalance.
- Joint planning is more frequent between the focal companies and their customers than between the focal companies and suppliers in all countries. The difference is larger in Italy and Hungary, than in Belgium. In Italy this type of collaboration is particularly low. On the other hand the Belgian sample shows a more even picture.

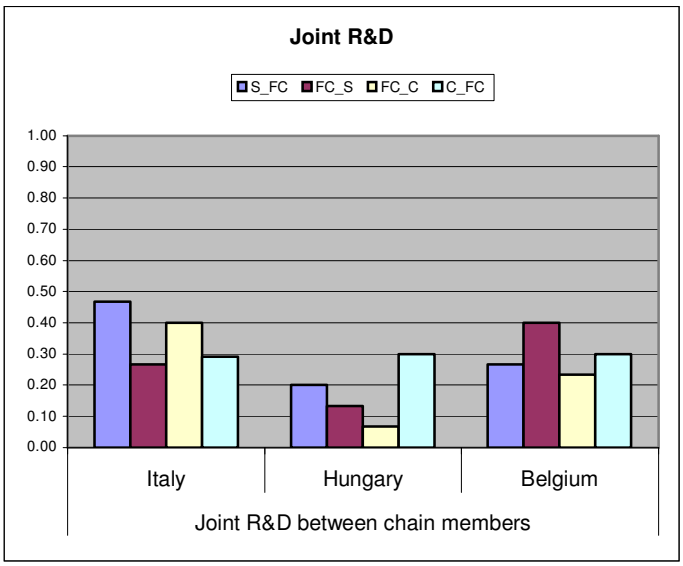

Figure 11. Joint R&D

Joint R&D is a less preferred type of collaboration in each country. Joint R&D is less frequent in Hungary compared to Belgium and Italy. There is some disagreement between the statements of the chain members, which may be due to the different interpretation of the joint activities (Figure 11.).

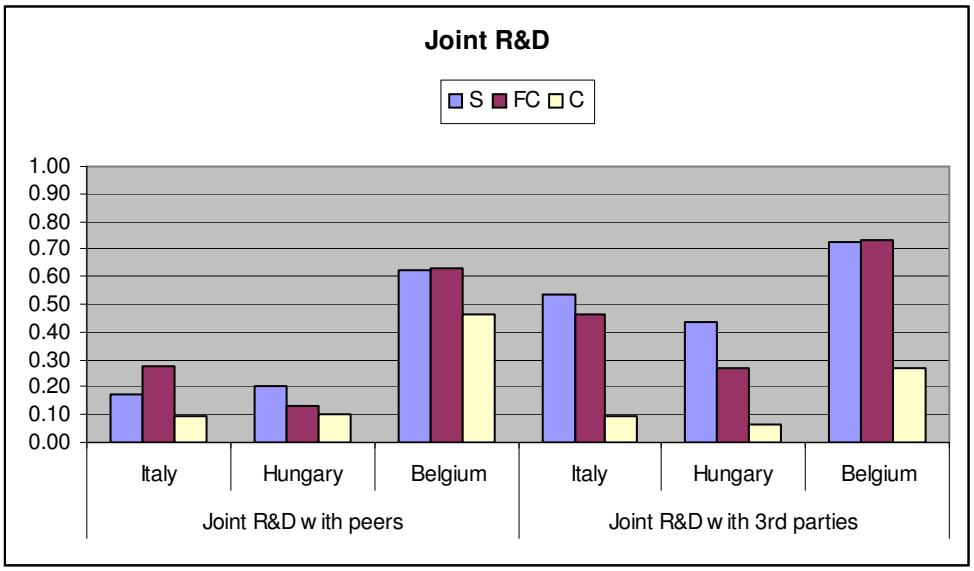

Figure 12. Joint R&D with peers and third party organisations

In general the Figure 12. shows that the customers less frequently carry out joint R&D with peers or third party organisations than the focal companies and suppliers. The joint R&D with peers and third parties show quite different picture by countries.

- Collaboration with peers and third party organisations is remarkably more frequent in Belgium than in Italy or Hungary.
- For both types of collaboration the Hungarian chain members show the lowest level.
- The collaboration on R&D is more frequent with third parties than with peers.

4.2 Discussion of research hypotheses

H1) Different cultural backgrounds and political systems lead to different levels of innovation capacity of SMEs.

The overall innovation capacity of the chains, based on the standardized scores is shown on Figure 13.

The average innovation capacity of the traditional food sectors, which were involved into the survey, was 0.44. The comparison of the scores did not reveal significant differences between the countries (Figure 13.).

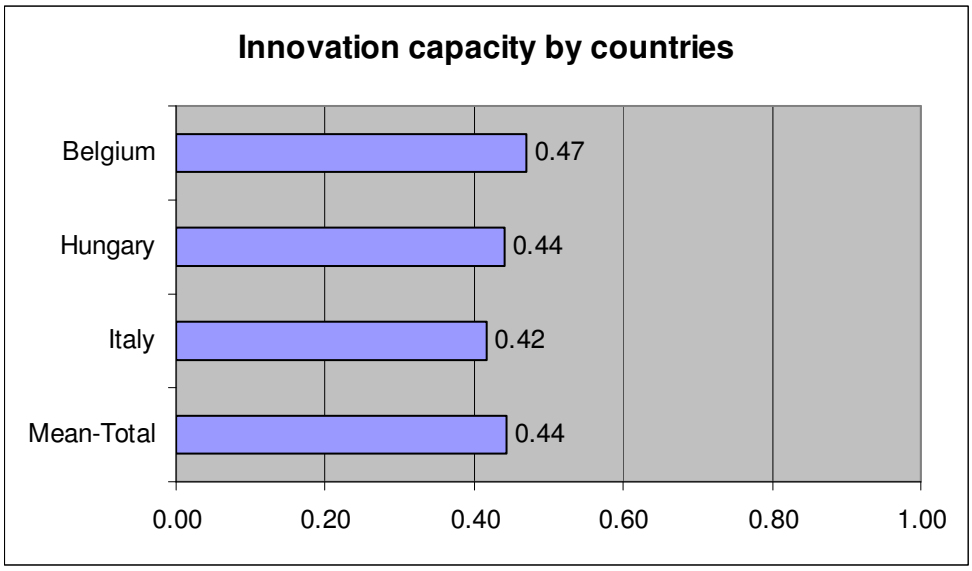

Figure 13. Standardized scores of total innovation capacity
(1=maximum level, 0=no capacity)

Although the total scores did not differ significantly, there is an obvious difference between the countries in the different aspects of innovation capacity (human efforts, financial efforts, innovation activities and results) (Table 11 - Annex).
The results show that the Belgian traditional food chains invest more into human efforts than the chains in Italy and in Hungary. The results of the innovation activities were also significantly different by countries. The standardized score of the results of innovation was the highest in Belgium, followed by Hungary and Italy, which suggests that the innovation activities had more contribution to the business success in Belgium than in Hungary, or Italy.
These results confirm that the different cultural background has an effect on the innovation capacity, but the results shall be considered by the different aspects of innovation. The amalgamation of the results on the different aspects may hide the differences.

H3) At traditional foods innovation in convenience, packaging, market is more acceptable than innovation in production/processing.

The most frequent innovation activity of the traditional food supply chains was the *improvement of quality*. The manufacturers frequently improved their *packaging* as well. The use of innovations on *marketing activities or entering new markets* was less frequent; approximately the half of the respondents introduced such types of changes. Only 38.8% percent of the companies improved the *convenience* of their product, which is surprisingly low and can be a not properly exploited opportunity.
On the basis of the results we cannot confirm that innovation in convenience, packaging, labelling, logistics, market is more acceptable than innovation in production/processing, thus this hypothesis has to be rejected.

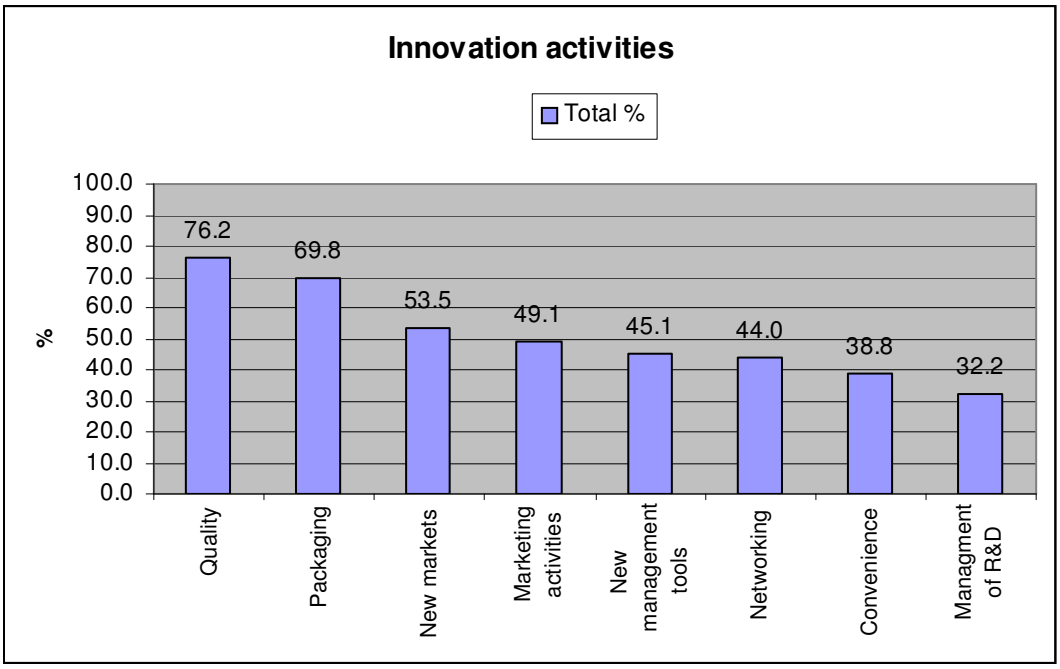

Figure 14. Frequency of different types of innovation activities

We compared the types of innovation activities by countries. The type of innovation activities shows quite different pattern in the different participating countries (Table 12. - Annex).
In Italy and in Hungary the most frequent types of innovation were introduced on the improvement of the quality and packaging, but in Hungary only 65%-67.8% of the respondents carried out these innovation activities, meanwhile in Italy these figures were significantly higher (87.1%-92.5%). The main innovation activities applied in Belgium are networking (70%), improving the quality (68%) and entering new geographical markets (61%). The proportion of networking is remarkably higher in Belgium than in Hungary (33.3%) or in Italy (29%).
These differences support Hypothesis 1 too, as shows that the main innovation activities differ by countries.

H4) Organizational innovation leads to higher supply chain performance

Correlation of the standardized scores of the total organizational innovations of the chain members (new management tools, management practices for R&D, networking) and supply chain performance was investigated (Table 13 - Annex). Significant but very weak correlation (correlation. coeff. 0.2) was found between the variables, thus Hypothesis 4 cannot be confirmed.
We studied also the differences between the 3 countries. There was no significant relationship between the variables in Belgium and Hungary. The correlation showed weak positive correlation between the variables in Italy.

H5) More intensive collaboration with other organizations in the supply chain (e.g. in terms of product, packaging, process improvement and development of related services and marketing) leads to higher innovation capacity.

The correlation between the standardized scores of innovation and collaboration showed positive relationship between the variables (Table 14.- Annex). Thus the Hypothesis 5, that more intensive collaboration results higher level of innovation capacity, can be accepted.

The Italian and the Hungarian sample showed significantly positive relationship between collaboration and innovation, while the correlation did not reveal any statistically significant relationship in Belgium. Comparing the differences between the countries the Italian results show stronger relationship between the variables than the Hungarian ones.

H6) Higher level of integration in the supply chain leads to higher level of innovation capacity

The correlation of the chain integration and the standardized score of innovation capacity did not show significant relationship in the sample, thus the Hypothesis 6 shall be rejected (Table 15 -Annex). This result might be caused by the fact that the relationships of the respondents were mainly based on contract or non-contractual relationship with qualified partners, thus only a part of the scale was represented in the sample (Table 16. - Annex).

By analyzing the Belgian and Hungarian sample, the results did not show significant correlation, while the Italian results had weak negative correlation between chain integration and innovation capacity.

H7) A minimum level of trust is necessary for collective activities (research, marketing, shared use of resources)
H8) A higher level of trust leads to more intensive collective activities (research, marketing, shared use of resources)

The trust between the chain members within the traditional supply chains was fairly high with 5.8 average score on a 7-point Likert scale. Supply chain scores were slightly, but statistically significant higher in Hungary, than in Belgium and in Italy (Figure 15.).

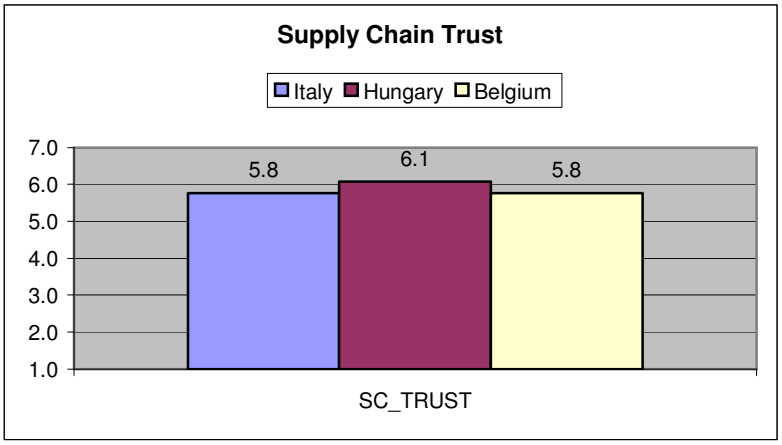

Figure 15. Supply chain trust

The correlation between the collaboration and the supply chain trust did not reveal significant relationship between the variables, thus the Hypothesises 7 and 8 have to be rejected in case of the merged data set. (Table 17. - Annex)

Differences between the countries can be observed because the Italian sample shows strong positive relationship between supply chain trust and collaboration, while in Belgium and Hungary the correlation was not statistically significant.

H9) Collective activities (collective research, collective marketing, collective purchasing and collective use of resources) lead to better supply chain performance.

The correlation of the collaboration and the supply chain performance resulted significant but very weak correlation (correlation coeff.: 0.25), thus the Hypothesis 9 cannot be confirmed (Table 18. -Annex).

The comparison of the countries reveals the differences, the Italian data show strong positive, the Belgian data show weak positive relationship between the variables, on the other hand the Hungarian data do not show any relationship between the supply chain performance and collaboration.

H12) External knowledge sources of traditional food companies are located at different geographical scales, whereby the geographical scale will depend of the type of knowledge.

Table 19 (Annex). shows the proportion of chain members, who do not use any external knowledge support. In general the proportion of customers who do not use external source of knowledge is remarkably higher than that of the suppliers. The most frequent users of the external knowledge source are the focal companies. The proportion of these focal companies, which do not use external sources of knowledge for innovation, is the highest in Italy. In Belgium and in Hungary only 3 percent of the focal companies indicated that they do not use any help for the different innovation areas. The proportion of suppliers who do not use help is the lowest in Italy. In Belgium and in Hungary high proportion of customers do not require any help, while this ratio is low in Italy.

The results show that the food manufacturers are seeking and receiving external knowledge support from a longer distance than the suppliers and customers (Table 20 -Annex).

- Product development:
  - The Hungarian and Belgian focal companies mainly get external knowledge support from national level, and the proportion of those who get support from national level or beyond in total are nearly 50% higher than those who get support from local and regional level. In Italy the support from local or regional level is the more frequent.
  - The Hungarian suppliers mainly get help from national level, while in Belgium the half of the suppliers do not use external knowledge support at all. The Italian suppliers use mainly local support.
  - The customers show a different pattern. The majority of the Hungarian and Belgian customers do not use external support for product development. However among those, who use external support, the assistance from national level is the most frequent one. In Italy the use of local support is typical in that group.
- Process development:
  - Most of the focal companies in Belgium and in Hungary seek support for process development mainly from national level; on the other hand the Italian companies prefer support from local or regional level.
  - The Hungarian suppliers get help for process development mainly from national level, while in Belgium 43% of the suppliers do not request external knowledge support and 30% mainly find assistance at European level. The Italian suppliers use mainly local support for process development.

- The customers show different pattern, as the majority of the Belgian and half of the Hungarian suppliers do not use external support for process development. The Italian customers are seeking mainly local help. Those customers in Hungary, who use external support for process development, get it from local level.

- Market research
  - For market research most of the focal companies in Hungary get help from national level. The companies in Belgium mainly use help from the regional and national level.
  - The suppliers show very different pattern regarding to the market research. A significant proportion of the Italian companies do not use help. The Hungarian suppliers get assistance from national level. Belgian suppliers do not use external support, or use knowledge support from European level.
  - The customers more frequently get support from local or national level in Hungary and in Belgium.
- Organisational development
  - High percentages of focal companies, suppliers and customers do not use help for organizational development at all, but if it is needed, focal companies in Italy mainly get it from local, while in Belgium from regional level. Suppliers show a similar pattern in the 3 countries. At customers the most typical source of support in Italy is the local, in Hungary equally the national and the local and in Belgium the national level.

The total frequencies for the 3 countries show that for the focal companies the support from national level has a significant role at product development, process development, and market research, but by amalgamation of the largely different results the overview can be biased.

The results confirm that the most preferred sources of the different types of knowledge are located at different geographical scale, hence the Hypothesis 12 can be accepted.

We compared the resource availability in the different clusters (Table 21 - Annex). The clusters with different level of innovation capacity –low, medium, high- show different pattern in terms of resource availability.

- The supply chains with <u>low level of innovation capacity</u> are typically seeking for help from less far distances. The focal companies in this cluster mainly get help from local or regional level, while the suppliers and customers prefer local consultants for each types of innovation.
- The supply chains with <u>medium and high innovation capacity</u> receive external knowledge support from farer geographical distance.
  - *Product development:* The focal companies most frequently receive help from regional and national level. The suppliers beside the national level get help from European level as well. Customers with medium or high innovation capacity mainly get help from national level. We can observe an interesting difference between clusters with medium and high innovation capacity. Companies with higher innovation capacity tend to use European knowledge support more frequently.
  - *Process development:* The focal companies with medium innovation capacity use support mainly from national level; while companies with high innovation capacity use regional, national and European knowledge sources. Most of the customers in these clusters do not use external assistance. The increase of the

distance of the used supporting organisation with the increase of the innovation capacity can be observed for this type of activity as well.

- *Market research:* Each chain members in the clusters with medium and high innovation capacity use mainly national external knowledge source for market research. While for the chain members in the low innovation capacity cluster the use of local sources is typical; the pattern of using external support resources from a longer distance with increasing innovation capacity can be observed at this type of activity as well.
- *Organizational development:* Nearly half of the companies do not use support for organizational development. In the low innovation capacity cluster the use of support from local level is the most typical at all groups of chain members, while with the increase of the innovation capacity there is an obvious shift towards regional and national level. Thus we can conclude that increased innovation capacity leads for using external knowledge support from a longer distance. However it is worth to explore in the future whether this relationship can be interpreted on different way, e.g. using support from national and external level leads to higher innovation capacity.

5. Conclusions

We measured the innovation capacity and the collaboration of the traditional food supply chains in three European countries and explored the main factors that influence the innovation capacity and the supply chain collaboration.

By multivariate analysis 3 clearly distinguishable clusters were identified by innovation capacity of the supply chain.

In summary, the total innovation capacity of the participating countries did not show significant differences but the comparison of the different aspects of innovation shows different patterns.

- We can conclude that the Belgian traditional food supply chains invest more effort into human resources.
- Although the financial efforts did not differ significantly by countries, comparing the way of financing of innovation activities we can conclude that in Italy the majority of the focal companies do not have separate annual budget, and when needed, they mainly spend money on project base, while in Hungary the companies mainly spend money according to necessity. In Belgium the focal companies mainly spend their resources according to the necessity but the proportion of those who use yearly budget is higher here than in Italy or in Hungary.
- The type of innovation activities shows quite different patterns in the investigated countries. In Italy and in Hungary the most frequent activity was the improvement of the quality and packaging. The main innovation activities applied in Belgium are networking, improving the quality and entering new geographical markets. It is important to mention that the frequency of networking is at a remarkable higher level in Belgium than in Italy or Hungary.
- The Belgian chains find their innovation activities more successful than in Italy or in Hungary.

The most frequent joint activity in the traditional food supply chains is sharing knowledge followed by joint planning of activities, joint R&D and joint used of equipments. In general the Belgian supply chains show the highest level of collaboration, while the level of the collaboration is the lowest in Hungary. Similarly the proportion of those who carry out joint R&D with peers and third parties are remarkable higher in Belgium compared to Hungary and Italy.

External knowledge sources of supply chain members are located at different geographical scales; the food manufacturers are seeking and receiving external knowledge from longer distances than the suppliers and the customers. The innovation capacity of the chains has an influence on the geographical distance of knowledge sources; the companies with low innovation capacity prefer local help, while the companies with higher innovation capacity find the support they need from longer geographical distances, mainly from national but to a certain extent at European level. The Italian sample shows a different pattern compared to Belgium and Hungary, most of the support tends to be local or regional and high percentages of the focal companies mentioned that they do not need help for the different types of innovations.

We explored what kinds of factors influence the innovation capacity of the traditional food supply chains.

- The collaboration has significant effect on innovation. The results show that the supply chain members that have higher level of collaboration show higher level of innovation capacity.
- The higher level of integration seems not to affect the innovation capacity. The reason of this result may be that the relationships of the respondents are mainly based on contract or non-contractual relationship with qualified partners.

As collaboration proved to be an important factor, which influences the innovation capacity, we studied the relationship between the collaboration and the trust within the supply chain but there was not significant relationship between the variables.

The organisational innovation and supply chain performance did not show significant relationship. The collaboration may have an effect on supply chain performance but the relationship between the variables was very weak.

6. References

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7. Annex

Table 2. Scales used for describing innovation capacity

Innovation		
	Scale used for data capture	
Human efforts	None	1
	Once a year	2
	Once in 6 months	3
	Once in 3 months	4
	At least once a month	5
	Once a week	6
	Several times a week	7
Financial efforts/resources	None	1
	Spent according to the necessity without being budgeted	2
	Distinctively budgeted on project base	3
	Distinctively budgeted on yearly base	4
Innovation activities	Yes	1
	No	2
	N.A.	3
Innovation result / contribution to success	Strongly disagree	1
	Moderately disagree	2
	Slightly disagree	3
	Neither agree, nor disagree	4
	Slightly agree	5
	Moderately agree	6
	Strongly agree	7
Collaboration		
	Scale used for data capture	
Joint activities with supplier and/or customer	yes	1
	no	0
Joint R&D activities with supplier and/or customer, peers, 3rd parties	yes	1
	no	0

Table 3. Human efforts for innovation

		Focal company			Supplier			Customer			Focal	Supplier	Customer
		Italy	Hungary	Belgium	Italy	Hungary	Belgium	Italy	Hungary	Belgium	Total	Total	Total
Courses and trainings	none	**60%**	40%	33%	33%	20%	23%	37%	47%	40%	44%	26%	41%
	once a year	**20%**	13%	**23%**	**30%**	**40%**	**33%**	**23%**	**27%**	**20%**	**19%**	**34%**	**23%**
	once in 6 months	10%	**30%**	**10%**	**27%**	**27%**	**27%**	**37%**	**20%**	**23%**	**17%**	**27%**	**27%**
	once in 3 months	7%	13%	**20%**	10%	7%	**17%**	3%	0%	17%	13%	11%	7%
	once a month	0%	0%	13%	0%	7%	0%	0%	7%	0%	4%	2%	2%
	once a week	3%	3%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%
	several times a week	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Self-study	none	17%	17%	10%	34%	17%	3%	38%	30%	17%	14%	18%	28%
	once a year	17%	10%	7%	14%	0%	0%	28%	7%	3%	11%	4%	12%
	once in 6 months	3%	7%	7%	10%	10%	0%	0%	7%	0%	6%	7%	2%
	once in 3 months	10%	17%	7%	0%	13%	3%	0%	13%	13%	11%	6%	9%
	once a month	**20%**	**23%**	**30%**	**10%**	**10%**	**60%**	**10%**	**27%**	**30%**	**24%**	**27%**	**22%**
	once a week	**17%**	**13%**	**23%**	**7%**	**23%**	**17%**	**14%**	**3%**	**13%**	**18%**	**16%**	10%
	several times a week	**17%**	**13%**	**17%**	**24%**	**27%**	**17%**	**10%**	**13%**	**23%**	**16%**	**22%**	16%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Seminars	none	**62%**	37%	43%	**64%**	30%	37%	69%	73%	37%	47%	42%	**60%**
	once a year	**10%**	**27%**	**23%**	8%	20%	13%	**10%**	**10%**	17%	**20%**	**14%**	**12%**
	once in 6 months	**21%**	**13%**	**13%**	16%	**27%**	**17%**	**14%**	**10%**	**10%**	**16%**	**20%**	**11%**
	once in 3 months	7%	**13%**	**17%**	8%	**20%**	**23%**	7%	3%	**27%**	12%	18%	12%
	once a month	0%	10%	3%	4%	3%	**10%**	0%	3%	10%	4%	6%	4%
	once a week	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	several times a week	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 3. Human efforts for innovation (continued form the previous page)

		Focal company			Supplier			Customer			Focal	Supplier	Customer
		Italy	Hungary	Belgium	Italy	Hungary	Belgium	Italy	Hungary	Belgium	Total	Total	Total
Fieldwork	none	43%	27%	23%	38%	10%	7%	42%	30%	20%	31%	18%	31%
	once a year	7%	13%	13%	10%	23%	20%	3%	7%	7%	11%	18%	5%
	once in 6 months	0%	**37%**	**33%**	0%	27%	**30%**	6%	**30%**	**20%**	**23%**	**19%**	**19%**
	once in 3 months	**30%**	**17%**	**20%**	**28%**	**10%**	**33%**	**39%**	**10%**	**20%**	**22%**	**24%**	**23%**
	once a month	13%	0%	7%	**21%**	**27%**	0%	**10%**	**20%**	**23%**	7%	**16%**	**18%**
	once a week	3%	0%	3%	0%	3%	0%	0%	0%	7%	2%	1%	2%
	several times a week	3%	7%	0%	3%	0%	10%	0%	3%	3%	3%	4%	2%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Experimental trials	none	47%	27%	27%	30%	30%	20%	**87%**	**73%**	**64%**	33%	27%	**75%**
	once a year	13%	10%	7%	3%	17%	13%	0%	3%	14%	10%	11%	6%
	once in 6 months	0%	10%	13%	13%	7%	13%	0%	0%	0%	8%	11%	0%
	once in 3 months	0%	**17%**	**13%**	7%	10%	**10%**	7%	7%	0%	**10%**	**9%**	5%
	once a month	**20%**	**20%**	**20%**	27%	**10%**	**20%**	7%	7%	14%	**20%**	**19%**	9%
	once a week	**13%**	3%	7%	**10%**	**7%**	**3%**	0%	0%	4%	8%	7%	1%
	several times a week	7%	13%	13%	**10%**	**20%**	**20%**	0%	10%	4%	11%	17%	5%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4. Proportion of chain members not invest into any type of human efforts for innovation

Chain members without any type of human efforts				
Chain members	Italy	Hungary	Belgium	Total
F	6%	13%	3%	8%
S	0%	7%	3%	3%
C	16%	17%	7%	13%

Table 5. Financial efforts for innovation

		Focal company			Supplier			Customer			Focal	Supplier	Customer
		Italy	Hungary	Belgium	Italy	Hungary	Belgium	Italy	Hungary	Belgium	Total	Total	Total
Product developement	none	**41%**	13%	33%	37%	30%	47%	**65%**	**72%**	**73%**	29%	38%	**70%**
	according to necessity	28%	**73%**	**47%**	**30%**	**57%**	**47%**	23%	14%	20%	**49%**	**44%**	19%
	on a project base	**31%**	3%	**13%**	**30%**	7%	3%	13%	7%	7%	16%	13%	9%
	on yearly base	0%	10%	7%	3%	7%	3%	0%	7%	0%	6%	4%	2%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Process developement	none	**43%**	33%	17%	27%	13%	**40%**	**77%**	**63%**	**93%**	31%	27%	**78%**
	according to necessity	21%	**47%**	**47%**	**37%**	**70%**	**40%**	7%	23%	3%	**39%**	**49%**	11%
	on a project base	**29%**	10%	**20%**	**37%**	17%	13%	17%	7%	3%	19%	22%	9%
	on yearly base	7%	10%	**17%**	0%	0%	7%	0%	7%	0%	11%	2%	2%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Market research	none	**79%**	17%	43%	**80%**	17%	**59%**	**52%**	**43%**	**57%**	47%	52%	51%
	according to necessity	3%	**59%**	**20%**	7%	**70%**	33%	19%	**37%**	**27%**	**27%**	**37%**	**27%**
	on a project base	**14%**	10%	**10%**	13%	13%	0%	**29%**	0%	10%	11%	9%	13%
	on yearly base	3%	14%	**27%**	0%	0%	7%	0%	20%	7%	15%	2%	9%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Organisational developement	none	**66%**	**50%**	37%	**53%**	**37%**	**48%**	**39%**	**70%**	**33%**	51%	46%	47%
	according to necessity	14%	**37%**	**47%**	**20%**	**57%**	**37%**	**35%**	20%	**37%**	**33%**	**38%**	**31%**
	on a project base	**17%**	7%	3%	23%	3%	7%	19%	3%	13%	9%	11%	12%
	on yearly base	3%	7%	**13%**	3%	3%	7%	6%	7%	17%	8%	5%	10%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 6. Chain members without any type of spending on innovation related activities

Chain members without any type of spending				
Chain members	Italy	Hungary	Belgium	Total
F	29	7	7	14
S	13	3	7	8
C	29	23	13	22

Table 7. Innovation capacity by clusters

	Cluster		
	Innov. (low)	Innov. (medium)	Innov. (high)
human_eff	0.14	0.35	0.49
financial_eff	0.12	0.27	0.42
innovation_act	0.32	0.48	0.67
innovation_res	0.61	0.73	0.76
N	22	43	20
Valid	85		
Missing	6		

Table 8. Composition of the different clusters by innovation capacity

		Innov. (low)	Innov. (medium)	Innov. (high)
Country codes	Italy	50.0%	20.9%	40.0%
	Hungary	40.9%	37.2%	25.0%
	Belgium	9.1%	41.9%	35.0%
	Total	100%	100%	100%

Table 9. Collaboration between chain members

Collaboration	Total	Italy	Hungary	Belgium
FC_Use of equipments with supplier	0.15	0.28	0.00	0.17
FC_Sharing konwledge with supplier	0.71	0.86	0.53	0.73
FC_Joint plannig with supplier	0.38	0.21	0.37	0.57
FC_Use of equipments with customer	0.09	0.10	0.03	0.13
FC_Sharing konwledge with customer	0.67	0.76	0.53	0.73
FC_Joint plannig with customer	0.65	0.66	0.70	0.60
FC_Joint R&D with supplier	0.27	0.27	0.13	0.40
FC_Joint R&D with customer	0.23	0.40	0.07	0.23
FC_Joint R&D with peers	0.35	0.28	0.13	0.63
FC_Joint R&D with 3rd parties	0.49	0.47	0.27	0.73
S_Use of equipments with client	0.11	0.20	0.03	0.10
S_Sharing konwledge with client	0.78	0.80	0.80	0.73
S_Joint plannig with client	0.39	0.10	0.53	0.53
S_Joint R&D with client	0.31	0.47	0.20	0.27
S_Joint R&D with peers	0.33	0.17	0.20	0.62
S_Joint R&D with 3rd parties	0.56	0.53	0.43	0.72
C_Use of equipments with supplier	0.04	0.03	0.07	0.03
C_Sharing konwledge with supplier	0.74	0.81	0.80	0.60
C_Joint plannig with supplier	0.67	0.61	0.70	0.70
C_Joint R&D with supplier	0.30	0.29	0.30	0.30
C_Joint R&D with peers	0.22	0.10	0.10	0.47
C_Joint R&D with 3rd parties	0.14	0.10	0.07	0.27
Total (standardized score)	0.43	0.43	0.37	0.50
N	85	26	30	29

Table 10 Collaboration along the chain– Results of Kruskall-Wallis and Mann-Whitney test

	Italy	Hungary	Belgium	Asymp. Sig.
Collaboration	0.43 AB	0.37 B	0.5 A	.007

Table 11.Innovation capacity by countries - Results of Kruskall-Wallis and Mann-Whitney test

Standardized data	Italy	Hungary	Belgium	Mean-Total	Asymp. Sig. (2-tailed)
human_eff	0.27 B	0.32 B	0.38 A	0.32*	0.351
financial_eff	0.24	0.28	0.26	0.26	0.574
innovation_act	0.50	0.44	0.49	0.48	0.225
innovation_res	0.65 C	0.73 B	0.74 A	0.71*	0.008
Average	0.42	0.44	0.47	0.44	

Table 12.Frequency of innovation activities by countries

	Italy (%)	Hungary (%)	Belgium (%)	Total (%)
Packaging	87.1	65.0	56.7	69.8
Quality	92.5	67.8	67.8	76.2
Convenience	44.1	40.0	32.2	38.8
New markets	44.1	55.6	61.1	53.5
Marketing activities	53.8	53.3	40.0	49.1
New management tools	50.5	41.1	43.3	45.1
Managment of R&D	43.0	21.1	32.2	32.2
Networking	29.0	33.3	70.0	44.0

Table 13. Correlation between supply chain performance and organisational innovation

Correlations (Spearman's rho)			
			Organisational innovation (Q6_activities_org_std)
Total	SCP1	Correlation Coefficient	0.208*
		Sig. (2-tailed)	0.048
		N	91
Italy	SCP1	Correlation Coefficient	0.418*
		Sig. (2-tailed)	0.019
		N	31
Hungary	SCP1	Correlation Coefficient	0.209
		Sig. (2-tailed)	0.269
		N	30
Belgium	SCP1	Correlation Coefficient	0.201
		Sig. (2-tailed)	0.287
		N	30
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 14. Correlation between innovation capacity and collaboration

Correlations (Spearman's rho)			
			collaboration
Total	innovation	Correlation Coefficient	0.573**
		Sig. (2-tailed)	0.000
		N	78
Italy	innovation	Correlation Coefficient	0.759**
		Sig. (2-tailed)	0.000
		N	25
Hungary	innovation	Correlation Coefficient	0.478*
		Sig. (2-tailed)	0.012
		N	27
Belgium	innovation	Correlation Coefficient	0.258
		Sig. (2-tailed)	0.203
		N	26
**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).			

Table 15. Correlation between innovation capacity and level of integration.

Correlations (Spearman's rho)			
			SC_Integration
Total	innovation	Correlation Coefficient	-0.078
		Sig. (2-tailed)	0.484
		N	82
Italy	innovation	Correlation Coefficient	-0.401*
		Sig. (2-tailed)	0.034
		N	28
Hungary	innovation	Correlation Coefficient	0.113
		Sig. (2-tailed)	0.573
		N	27
Belgium	innovation	Correlation Coefficient	0.224
		Sig. (2-tailed)	0.262
		N	27
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 16. Types of relationships

	F_S	F_C	S	C
	Percent	Percent	Percent	Percent
Spot market	14.3	5.5	31.9	9.9
Non-contractual relationship with non-qualified partner	24.2	15.4	20.9	26.4
Non-contractual relationship with qualified partner	**16.5**	**30.8**	**45.1**	**19.8**
Contractual relationship	**35.2**	**39.6**	0	**34.1**
Relation-based alliance	2.2	6.6	2.2	5.5
Equity-based alliance	2.2	2.2	0	3.3
Vertical integration	5.5	0	0	1.1
Total	100.0	100.0	100.0	100.0

Table 17.Correlation between collaboration and trust along the supply chain

Correlations (Spearman's rho)			
			SC_TRUST
Total	collaboration	Correlation Coefficient	0.052
		Sig. (2-tailed)	0.637
		N	85
Italy	collaboration	Correlation Coefficient	0.639**
		Sig. (2-tailed)	0.000
		N	26
Hungary	collaboration	Correlation Coefficient	-0.355
		Sig. (2-tailed)	0.054
		N	30
Belgium	collaboration	Correlation Coefficient	0.122
		Sig. (2-tailed)	0.530
		N	29
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 18. Correlation between collaboration and supply chain performance

Correlations (Spearman's rho)			
			Supply chain performance SCP1
Total	collaboration	Correlation Coefficient	0.247*
		Sig. (2-tailed)	0.023
		N	85
Italy	collaboration	Correlation Coefficient	0.612**
		Sig. (2-tailed)	0.001
		N	26
Hungary	collaboration	Correlation Coefficient	0.025
		Sig. (2-tailed)	0.894
		N	30
Belgium	collaboration	Correlation Coefficient	0.377*
		Sig. (2-tailed)	0.044
		N	29
**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).			

Table 19. Proportion of chain members not using any type of external knowledge source

Chain members without any type of external knowledge source				
Chain members	Italy	Hungary	Belgium	Total
F	10	3	3	5
S	3	13	13	10
C	3	27	40	23

Table 20. Resource availability

		Focal company			Supplier			Customer			Total		
		Italy	Hungary	Belgium	Italy	Hungary	Belgium	Italy	Hungary	Belgium	Focal	Supplier	Customer
Support-product developement	no need for support	17%	15%	21%	13%	33%	**50%**	7%	**65%**	**69%**	17%	32%	46%
	local	**43%**	7%	3%	**43%**	15%	23%	**62%**	13%	7%	19%	**28%**	**28%**
	regional	**30%**	26%	28%	30%	7%	10%	3%	4%	3%	**28%**	16%	4%
	national	0%	**41%**	**41%**	3%	**33%**	0%	24%	**17%**	**10%**	**27%**	11%	17%
	in Europe	7%	11%	7%	7%	11%	17%	3%	0%	10%	8%	11%	5%
	outside Europe	3%	0%	0%	3%	0%	0%	0%	0%	0%	1%	1%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Support-process developement	no need for support	40%	25%	20%	20%	35%	43%	45%	58%	**76%**	28%	33%	60%
	local	**30%**	11%	3%	**40%**	15%	3%	**41%**	**25%**	3%	15%	**20%**	**23%**
	regional	**17%**	7%	23%	23%	8%	13%	3%	8%	3%	16%	15%	5%
	national	13%	**54%**	**33%**	10%	**23%**	0%	10%	8%	**14%**	**33%**	10%	11%
	in Europe	0%	4%	17%	7%	19%	**30%**	0%	0%	3%	7%	19%	1%
	outside Europe	0%	0%	3%	0%	0%	10%	0%	0%	0%	1%	3%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Support-market research	no need for support	60%	19%	37%	**57%**	33%	**53%**	23%	44%	47%	39%	48%	38%
	local	**17%**	11%	7%	20%	4%	0%	43%	**24%**	7%	11%	8%	25%
	regional	**10%**	26%	**23%**	10%	7%	3%	3%	8%	10%	**20%**	7%	7%
	national	13%	**44%**	**20%**	13%	**37%**	7%	27%	**20%**	**23%**	**25%**	**18%**	**24%**
	in Europe	0%	0%	10%	0%	19%	**23%**	3%	4%	13%	3%	14%	7%
	outside Europe	0%	0%	3%	0%	0%	13%	0%	0%	0%	1%	5%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Support-organisational developement	no need for support	60%	46%	43%	57%	54%	37%	53%	59%	53%	50%	49%	55%
	local	**30%**	**18%**	13%	**27%**	**23%**	0%	**30%**	**18%**	7%	**20%**	**16%**	**18%**
	regional	0%	14%	**27%**	7%	0%	**30%**	10%	5%	3%	14%	13%	6%

		Focal company			Supplier			Customer			Total		
		Italy	Hungary	Belgium	Italy	Hungary	Belgium	Italy	Hungary	Belgium	Focal	Supplier	Customer
	national	10%	**21%**	13%	10%	**19%**	3%	7%	18%	**33%**	15%	10%	20%
	in Europe	0%	0%	3%	0%	4%	20%	0%	0%	3%	1%	8%	1%
	outside Europe	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	3%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 21. Resource availability by innovation capacity

	Product development			Process development			Market research			Organizational development		
	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high
no need for support	10.0%	24.4%	10.0%	25.0%	34.9%	20.0%	30.0%	42.9%	40.0%	50.0%	55.8%	35.0%
local	**40.0%**	12.2%	15.0%	**35.0%**	7.0%	15.0%	**35.0%**	4.8%	5.0%	**35.0%**	11.6%	**30.0%**
regional	**30.0%**	**24.4%**	**35.0%**	15.0%	9.3%	**25.0%**	**30.0%**	**16.7%**	**15.0%**	10.0%	**14.0%**	**15.0%**
national	20.0%	**31.7%**	**20.0%**	**25.0%**	**41.9%**	**25.0%**	5.0%	**31.0%**	**30.0%**	5.0%	**18.6%**	**15.0%**
in Europe	.0%	4.9%	**20.0%**	.0%	4.7%	15.0%	.0%	2.4%	10.0%	.0%	.0%	5.0%
outside Europe	.0%	2.4%	.0%	.0%	2.3%	.0%	.0%	2.4%	.0%	.0%	.0%	.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	S_Product development			S_Process development			S_Market research			S_Organisational development		
	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high
no need for support	45.5%	26.8%	26.3%	23.8%	34.1%	31.6%	31.8%	56.1%	47.4%	52.4%	48.8%	42.1%
local	**36.4%**	26.8%	**21.1%**	**47.6%**	12.2%	10.5%	**31.8%**	.0%	.0%	**33.3%**	**14.6%**	5.3%
regional	13.6%	9.8%	**26.3%**	19.0%	12.2%	**21.1%**	18.2%	2.4%	5.3%	9.5%	**12.2%**	**15.8%**
national	4.5%	**19.5%**	5.3%	9.5%	9.8%	10.5%	9.1%	**19.5%**	**26.3%**	4.8%	7.3%	**21.1%**
in Europe	.0%	**14.6%**	**21.1%**	.0%	**24.4%**	**26.3%**	9.1%	12.2%	**21.1%**	.0%	9.8%	15.8%
outside Europe	.0%	2.4%	.0%	.0%	7.3%	.0%	.0%	9.8%	.0%	.0%	7.3%	.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	C_Product development			C_Process development			C_Market research			C_Organisational development		
	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high
no need for support	23.5%	60.5%	30.0%	33.3%	69.2%	63.2%	26.3%	45.0%	25.0%	58.8%	51.3%	50.0%

	C_Product development			C_Process development			C_Market research			C_Organisational development		
	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high	Innov.-low	Innov.-medium	Innov.-high
local	**70.6%**	10.5%	25.0%	**50.0%**	**15.4%**	10.5%	**63.2%**	12.5%	10.0%	**29.4%**	15.4%	15.0%
regional	5.9%	2.6%	5.0%	16.7%	2.6%	.0%	10.5%	7.5%	5.0%	11.8%	5.1%	5.0%
national	.0%	**26.3%**	**20.0%**	.0%	12.8%	**21.1%**	.0%	**27.5%**	**45.0%**	.0%	**28.2%**	**25.0%**
in Europe	.0%	.0%	**20.0%**	.0%	.0%	5.3%	.0%	7.5%	15.0%	.0%	.0%	5.0%
outside Europe	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%