Food chain networks as a leverage for innovation capacity

Bianka Kühne* & Xavier Gellynck

Ghent University

Faculty of Bioscience Engineering, Department of Agricultural Economics

Division Agro-Food Marketing

Coupure Links 653

B-9000 Gent, Belgium

Tel: +32 9 264 59 45

Fax: +32 9 264 62 46

*Corresponding author: Bianka.Kuhne@UGent.be

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1. Introduction

Chain networks of manufacturers of traditional food products comprehend a large majority of micro-, small-, and medium-sized enterprises (SMEs – firms employing less than 250 people). In a more and more globalised market with increasing competition, innovation is an important strategic tool for SMEs to achieve competitive advantage (Avermaete et al., 2004a, Gellynck et al., 2007, Murphy, 2002). Innovation can be defined as an ongoing process of learning, searching and exploring, resulting in new products, new techniques, new forms of organisation and new markets (Lundvall, 1995) which are new to the firm and to the industry ranging from incremental to radical innovations. Within our study traditional food products are defined according to four criteria: (1) the key production steps of a traditional food product must be performed in a certain area, which can be national, regional or local. (2) The traditional food product must be authentic in its recipe (mix of ingredients), origin of raw material, and/or production process. Further, (3) the traditional food product must have been commercially available for at least 50 years and (4) it must be part of the gastronomic heritage.

The introduction of innovations can be hampered by numerous problems. On the one hand, SMEs can encounter limited internal resources due to a lack of managerial competencies and experiences, and a lack of strategic vision (Avermaete et al., 2003; O'Regan et al., 2006; Scozzi et al., 2005). On the other hand, SMEs may face difficulties for the development and implementation of innovation if the firm has problems with the allocation and coordination of external resources related to the collection of relevant information and knowledge (Maravelakis et al., 2006; O'Regan et al., 2006; Scozzi et al., 2005).

However, the place of innovation is not the single firm anymore but increasingly the chain network the firm is embedded in (Omta, 2002, Pittaway et al., 2004, Powell et al., 1996). A chain network consists of at least three members: the food manufacturer, the supplier of the food manufacturer and the customer of the food manufacturer (Mentzer et al., 2001). These chain network members are involved in all upstream and downstream flows of products, services, finances, and information in a vertical network (Van der Vorst, 2000). In contrast to previous studies at chain level (e.g. Aramyan et al., 2007, Fischer et al., 2008, Hardman et al., 2002, Pannekoek et al., 2005), specific chains are investigated and compared to each other in our research.

Within a chain network the innovation capacity can be enhanced by networking and thus combining the complementary capacities and technologies of the different chain network members (Pittaway et al., 2004). By using complementary capacities and technologies within the chain network SMEs will be able to overcome problems related to the implementation of innovations identified by many researchers (Avermaete et al., 2003, Lazzarini et al., 2001, Maravelakis et al., 2006, O'Regan et al., 2006, Pittaway et al., 2004, Scozzi et al., 2005). However, networking relationships are influenced by several chain network related factors such as collaboration, conflict, dependency, level of integration of chain network partners, power, reputation, satisfaction, and trust (Jonsson and Zineldin, 2003, Mohr et al., 1996). Hence, the present paper aims to investigate which characteristics of the chain network influence the innovation capacity of SMEs.

This paper is structured as follow. In the subsequent section our conceptual framework is presented. In the third section, the methodology of our research is described followed by a discussion of the research results. Finally, conclusions are drawn.

2. Conceptual framework

For the measurement of innovation in SMEs it is less suitable to use indicators such as the number of patents, number of employees involved in R&D, or counts of incremental and radical innovations (Avermaete and Viaene, 2002, Maravelakis et al., 2006). In particular for SMEs in the food sector, which is a low-tech industry where innovations seldom draw on R&D activities, other indicators for measuring innovation must be applied such as human and financial efforts, new or improved products, processes, markets and organisational developments, as well as the contribution of these innovation activities to the business success (Gellynck et al., 2007).

Innovation capacity is the capacity to innovate, also in the future, along the whole innovation process (Gellynck et al., 2007). The innovation process is a continuous process characterised by three steps: efforts, activities and results. Efforts are all resources, such as human and financial resources, a firm is investing in innovation activities, such as R&D, training and study tours, and possible leading to innovations. Results are the effects of these activities on tangible (e.g. growth of market share, profit) as well as less tangible aspects (e.g. firm stability, efficiency, and reputation) (Gellynck et al., 2006).

Since the innovation capacity of a firm depends on the access to information (Avermaete et al., 2004b), internal and external resources to gain access to the information are an important factor for achieving enhanced innovation capacity and hence, sustainable competitive advantage. Internal resources contain a large number of firm characteristics, such as the R&D structure, qualified staff, experience of the manager, the openness toward new ideas, financial structure, and firm's size (Diederen et al., 2000, Fey and Birkinshaw, 2005, Grünert et al., 1997). External resources belong to the firm's strategic environment and include the potential of business-to-business relationships, available infrastructure for collaboration and networking, and access to support from research providers and government (Avermaete and Viaene, 2002, Scozzi et al., 2005, Ussman et al., 1999).

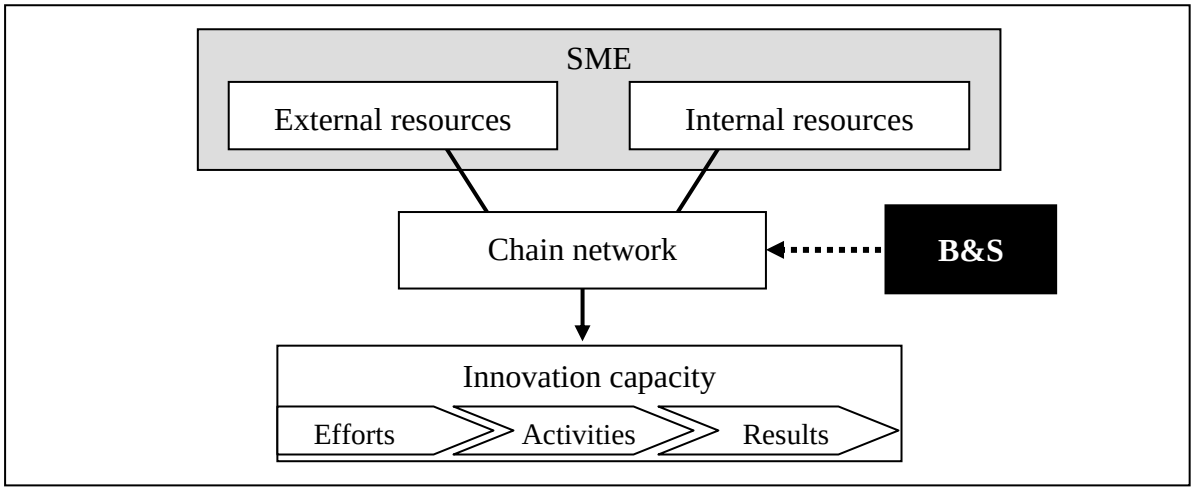

Figure 1: Conceptual framework for investigating bottlenecks and success factors (B&S) for achieving innovation capacity in traditional food chain networks, adapted from X. Gellynck, B. Vermeire, J. Viaene (2006)

Internal resources are difficult to develop when they are hindered by limited possibilities to realise economics of scale. Hence, SMEs need an environment improving the integration of both suppliers and customers in the innovation process (Ussman et al., 1999). This is supported by the fact that the place of innovation is no longer the individual firm but increasingly the network, such as a chain, in which the firm is embedded (Omta, 2002, Pittaway et al., 2004, Powell et al., 1996). An improved integration of all members in the chain network will support the innovation capacity and reduce the risk of implementing innovation, e.g. by joint cost management (Omta, 2002, Pittaway et al., 2004).

Consequently, the chain network plays an important role for SMEs in the process of developing innovation capacities (Figure 1). The chain network is the place where the

internal and external resources of a firm are combined and possibly transformed into innovation capacities (Gellynck et al., 2006). Through the optimal use of both internal and external resources in the chain network, a firm can become innovative and able to achieve sustainable competitive advantage (Cassiman and Veugelers, 2002, Lengnick-Hall, 1992). However, it is not always possible to optimally use the resources in the chain network. Hence, in this paper, the chain network's role for the development of innovation capacity is investigated, focusing on the related bottlenecks and success factors.

3. Methodology

3.1. Research method and sample description

Quantitative data were collected by means of 270 individual interviews with companies belonging to 90 traditional food chain networks across three European countries (Belgium, Hungary and Italy). Based on their socio-economic importance different food subsectors were selected in the three countries (Belgium: cheese and beer, Hungary: white pepper, dry sausage and bakery products, Italy: cheese and ham). In each subsector traditional food producers (focal company) were identified and selected for the interviews. During the interviews, each food manufacturer (further referred to as focal company, FC) was asked to identify suppliers and customers. Subsequently, one supplier and one customer were selected and interviewed (Annex 1). Data collection took placed between December 2007 and June 2008.

3.2. Measurement and scaling

Innovation capacity

Innovation capacity is measured by exploring human and financial efforts, innovation activities and innovation results of focal companies, suppliers and customers. Hence, the respondents were asked how often (7-point ordinal scale) the responsible person for research and development made an effort to improve his/her knowledge and skills, e.g. by courses and training or experimental trials. The respondents were also asked how structured they spent their financial resources for product, process, and organizational development and market research. Thus, whether they do not spent financial resources at all, whether they spent according to the necessity, but without being budgeted, whether they have a distinct budget

on project base, or whether they have a distinct budget on yearly base (4-point ordinal scale). Further, in relation to their innovation activities the respondents were asked whether or not they introduced any changes during the last three years related to product, market, or organizational innovation (binary scale yes/no). The statements have been selected based on a comprehensive literature review and qualitative research (focus groups and in-depth interviews, see Gellynck and Kühne, 2008). For product innovation, following items were selected: improvement of packaging, quality and convenience of the traditional food product. Regarding market innovation the items entering new geographical markets and improving marketing activities for the traditional food product were used. Finally, organizational innovation comprises the items introduction of new management tools, improving management practices of research and development, and increasing participation in networks. The same items were used for exploring the results of these innovation activities. The respondents had to indicate on a 7-point Likert-scale the extent they agree with that the innovation activities applied contributed significantly to the success of their company (Annex 2).

The innovation capacity was investigated on firm level of all three chain network members and combined to chain network level by the means of cluster analysis. Therefore, before the cluster analysis, for each respondent the items of the four innovation capacity elements were aggregated to a score for human efforts, financial efforts, innovation activities and innovation results. Furthermore, the data set was organized in the way that all three the members of a chain network belong to one case. In the subsequent cluster analysis the achieved four scores for innovation capacity of each member in a chain network were used.

Chain network characteristics

Suppliers, focal companies, and customers are asked to what extent they agree or disagree with statements about ten chain network related measures using a seven-point response scale ranging from completely disagree (1) to completely agree (7). The items used are 1) Trust, 2) economic satisfaction, 3) social satisfaction, 4) dependency, 5) non-coercive power, 6) coercive power, 7) reputation, 8) conflict, 9) level of integration, and 10) collaboration. These measures are selected based on previous research carried out by (Molnár et al., 2008). Furthermore, chain network characteristics such as size, business growth and profitability are included.

A positive relationship is expected between innovation capacity and collaboration, trust, social and economical satisfaction, and rewarding power. Further, a negative relationship is

assumed between innovation capacity and conflict, dependency and punishing power. For the level of integration, size, business growth and profitability no clear relationship can be assumed, since several researches showed different outcomes.

Again, these statements were presented to the focal companies and their individual suppliers and customers. The focal companies answered the statements related to their suppliers and customers. The same statements were used in the questionnaire of the suppliers and the customers but in relation to the focal companies. Details about the statements measuring the quality of chain network relationships are provided in Annex 3. The level of agreement of the focal company e.g. on the trust statements related to the individual supplier indicates the level of trust of the focal company in the individual supplier. Consequently, it corresponds with a perceived level of trust the focal company in its supplier. The same applies to the focal company in relation to the customer, to the supplier in relation to the focal company as well as to the customer in relation to the focal company.

3.3. Data analysis

First, based on the aggregated scores for innovation capacity for each member of a chain network, cluster analysis was conducted. The sample is composed of 90 chain networks. Subsequently ANOVA and Crosstab are used to provide a description of the achieved clusters. Finally, multinomial logistic regression was used to identify significant differences between the clusters and variables of chain network related characteristics.

4. Results

4.1. Innovation capacity

The cluster analysis resulted in a three-cluster solution. The clusters are about equally sized and the factors related to innovation capacity are significantly distinguishing between the clusters, except for the human efforts of the FC (Table 1). The different chain networks could be grouped into clusters of “Non-innovator chain networks”, “Customer-driven innovator chain networks”, and “Focal company-supplier-driven innovator chain networks”. Non-innovator chain networks achieved the lowest means on all factors of innovation capacity. In the customer-driven innovator chain networks the customers achieved the highest mean

values for the innovation capacity factors, while in the FC-supplier-driven innovator chain networks-cluster the respective chain network members achieved the highest mean values.

Table 1: Innovation capacity of traditional food chain networks, cluster analysis and ANOVA, n=90

	Cluster			
	1) Non-innovator chain networks	**2) Customer-driven innovator chain networks**	**3) FC-supplier-driven innovator chain networks**	**Sig.**
Nr of cases	35	21	34	
Human efforts FC	-0.60[a]	0.52[b]	**0.29[b]**	0.000
Financial efforts FC	-0.57[a]	0.67[c]	**0.17[b]**	0.000
Activities FC	-0.68[a]	0.72[c]	**0.25[b]**	0.000
Results FC	-0.55[a]	0.22[b]	**0.43[b]**	0.000
Human efforts S	-0.71[a]	0.60[b]	**0.36[b]**	0.000
Financial efforts S	-0.63[a]	0.08[b]	**0.59[c]**	0.000
Activities S	-0.66[a]	0.57[b]	**0.32[b]**	0.000
Results S	-0.62[a]	0.29[b]	**0.46[b]**	0.000
Human efforts C	-0.18[a]	**1.14[b]**	-0.51[a]	0.000
Financial efforts C	-0.31[a]	**1.27[b]**	-0.47[a]	0.000
Activities C	-0.17[a]	**0.93[b]**	-0.40[a]	0.000
Results C	-0.15[a]	**0.42[b]**	-0.11[a]	0.092

[a,b] Various superscripts indicate significant differences of group means in the post hoc Duncan test ($p < 0.05$)

Regarding the different items of the four innovation capacity factors some interesting results are revealed. Among the items for human efforts self-study is most applied in all chain networks and participation in seminars is done least. However, overall the customer-driven innovator chain networks apply more human efforts than the FC-supplier-driven innovator chain networks. Of course the non-innovator chain networks apply least human efforts as well as for any other innovation capacity factor. In relation to financial efforts all chain networks spend about equally resources, mainly according to a necessity without setting up a budget. Again, the customer-driven innovator chain networks spend generally more financial resources than the FC-supplier-driven innovator chain networks do. Contrary, related to innovation activities and results, FC-supplier-driven innovator chain networks achieve equal or better contribution to the success of their businesses with lower innovation activities than the customer-driven innovator chain networks. Among the different innovation activities, 'improving the quality of the traditional food product' is the most applied.

Table 2: Socio-economical description of the different clusters, Frequencies based on Crosstab

Cluster		1) Non-innovator chain networks	2) Customer-driven innovator chain networks	3) FC-supplier-driven innovator chain networks	Total		Sig.
Size of cluster	**N**	35	21	34	90		
	%	38.9	23.3	37.8	100		
Socio-economic variables		%	%	%	%	N	**Chi²**
Country							0.082
Italy		**48.6**	28.6	20.6	33.3	30	
Hungary		22.9	28.6	**47.1**	33.3	30	
Belgium		28.6	**42.9**	32.4	33.3	30	
Total		100	100	100	100	90	
Type of product							0.001[#]
Dried fermented sausage		5.7	9.5	**20.6**	12.5	11	
Processed white pepper		0	4.8	11.8	5.6	5	
Cheese - Italy		**37.1**	4.8	5.9	17.8	16	
Cheese - Belgium		**20.0**	**33.3**	2.9	16.7	15	
Beer		8.6	9.5	**29.4**	16.7	15	
Ham		11.4	**23.8**	14.7	15.6	14	
Bakery products		17.1	14.3	14.7	15.6	14	
Total		100	100	100	100	90	
Nr of employees – FC							0.001
< 10 employees		**71.4**	19.0	35.3	**45.6**	41	
11 - 50 employees		20.0	**47.6**	32.4	31.1	28	
50 - 250 employees		8.6	33.3	32.4	23.3	21	
Total		100	100	100	100	90	
Nr of employees - Supplier							0.002
< 10 employees		**60.0**	23.8	14.7	**34.4**	31	
11 - 50 employees		31.4	**38.1**	**38.2**	35.6	32	
50 - 250 employees		5.7	**33.3**	**38.2**	24.4	22	
> 250 employees		2.9	4.8	8.8	5.6	5	
Total		100	100	100	100	90	
Nr of employees - Customer							0.004
< 10 employees		**55.9**	15.0	**50.0**	**44.3**	39	
11 - 50 employees		29.4	**30.0**	35.3	31.8	28	
50 - 250 employees		11.8	**35.0**	14.7	18.2	16	
> 250 employees		2.9	**20.0**	0	5.7	5	
Total		100	100	100	100	90	

[#] No reliable significance, since more than 20% cells with expected count less than five occurred. Hence, interpretation of the statistical significance is not possible.

In relation to the socio-demographic characteristics of the clusters country and product specific differences were found (Table 2). The non-innovator chain networks contain mainly Italian chain networks, while the customer-driven innovator chain networks are mainly found

in Belgium. Finally, the FC-supplier-driven innovator chain networks are mainly situated in Hungary. The cheese chain networks form the largest part of the non-innovator chain networks. The customer-driven innovator chain networks consist mainly of ham and Belgian cheese chain networks and the FC-supplier-driven innovator chain networks contain mainly dried, fermented sausages and beer chain networks. However, there is no reliable assurance of the differences between product categories.

As to be due from the result of the cluster analysis the three clusters differ significantly according to the size of the suppliers and customers. In the cluster of non-innovator chain networks the supplier and customers are mainly firms with less than ten employees. In contrast the customer-driven innovator chain networks assemble primarily both small-sized and medium-sized suppliers and small- to large-sized customers. Finally, the FC-supplier-driven innovator chain networks contain for the most part small- and medium-sized suppliers and micro-sized customers.

4.2. Chain network characteristics

The three clusters are characterised by different aspects of chain network characteristics (Table 3). In general, in all traditional food chain networks reputation, satisfaction and trust are of main importance. However, there are specific differences among the different clusters. The non-innovator chain networks are mainly composed of chain network members with lowest profitability and business growth in the last three years. Furthermore, in such chain networks conflict and the degree of integration of chain network partners are higher in comparison to the other two clusters. In contrast, the customer-driven innovator chain networks are rather assembled of customers with higher business growth and higher profitability than the FC and the supplier. Customer-driven chain networks can be characterised by higher dependency, rewarding power, punishing power, reputation, economical and social satisfaction and collaboration. Finally, FC-supplier-driven chain networks are characterised by a high share of suppliers with FC and the suppliers which achieve higher business growth and profitability in the last three years in comparison to the customers. However, also the customers achieved fairly higher profitability and business growth. Furthermore, the FC-supplier-driven innovator chain networks are characterised by highest trust levels among the chain network members.

Table 3: Descriptive statistics related to chain network characteristics, based on Crosstab (means and proportions), n=90

Cluster	1) Non-innovator chain networks	2) C-driven innovator chain networks	3) FC-S-driven innovator chain networks	Total
Profitability FC	4.44	**5.29**	**5.24**	4.94
Business growth FC	4.54	**5.14**	**5.53**	5.06
Profitability S	5.00	4.86	**5.88**	5.30
Business growth S	4.57	5.24	**5.56**	5.10
Profitability C	4.69	**6.33**	5.44	5.36
Business growth C	5.06	**6.43**	5.24	5.45
Conflict	**2.96**	2.31	2.60	2.67
Dependency	3.52	**4.09**	3.77	3.75
SC-integration	**3.12**	3.06	2.73	2.96
Rewarding power	3.53	**3.76**	3.24	3.47
Punishing power	3.01	**3.15**	2.95	3.02
Reputation	5.59	**5.93**	5.84	5.77
Economical satisfaction	5.18	**5.38**	5.16	5.22
Social satisfaction	4.93	**5.20**	4.74	4.92
Trust	5.81	5.83	**5.94**	5.86
Collaboration*	1.33	**2.13**	1.56	1.60

* Maximum achievable score is 4, other chain network related characteristics maximum achievable score is 7.

Table 4 details the result of the multinomial logistic regression comparing the three clusters respectively. In this model the non-innovator chain networks are indicated as reference category for the first two comparisons. In the last comparison C-driven innovator chain networks is the reference category.

Comparing chain network characteristics between non-innovator chain networks and innovator chain networks different chain network characteristics are significantly distinguishing between the clusters. The non-innovator chain networks are compiled of suppliers with higher profitability but lower business growth, and customers with lower profitability than in the customer-driven innovator chain networks. Furthermore, the former trust each other significantly more, but collaborate less than the latter. Comparing non-innovator chain networks with FC-supplier-driven innovator chain networks, the former is assembled of FC and suppliers with significantly lower business growth and customers with lower profitability but higher business growth than in the FC-supplier-driven innovator chain networks. Moreover, dependency among chain network members is significantly lower for non-innovator chain networks than for FC-supplier-driven innovator chain networks while integration, rewarding power and social satisfaction are higher for the former.

Finally, the two innovator chain network clusters are compared with each other. As expected there are significant differences in relation to the supplier and customer. In the customer-driven innovator chain networks there are suppliers with lower profitability and customers with higher business growth than in the FC-supplier-driven innovator chain networks. At last, these two clusters only differ significantly in their trust levels, which are lower for the customer-driven innovator chain networks.

Table 4: Multinomial logistic regression model comparing Non-innovator chain networks, C-driven innovator chain networks, and FC_S-driven innovator chain networks

	Non-innovator chain networks vs. C-driven innovator chain networks	**Non-innovator chain networks vs. FC-S-driven innovator chain networks**	**C-driven innovator chain networks vs. FC-S-driven innovator chain networks**
Intercept	-5.548 (0.342)	0.249 (0.001)	5.797 (0.382)
Profitability FC	0.576 (2.649)	0.373 (1.941)	-0.204 (0.395)
Business growth FC	0.343 (1.211)	**0.673 (3.532)***	0.330 (0.816)
Profitability S	**-0.787 (4.134)****	0.285 (0.748)	**1.072 (7.360)*****
Business growth S	**0.587 (3.006)***	**0.753 (5.531)****	0.165 (0.204)
Profitability C	**1.074 (5.025)****	**1.157 (6.852)*****	0.082 (0.029)
Business growth C	0.013 (0.001)	**-1.090 (7.818)*****	**-1.103 (4.492)****
Conflict	-0.346 (0.258)	-0.160 (0.133)	0.186 (0.077)
Dependency	1.104 (1.729)	**1.639 (4.924)****	0.535 (0.458)
Integration	-0.686 (0.449)	**-1.538 (4.333)****	-0.853 (0.839)
Rewarding power	-0.262 (0.170)	**-0.917 (3.347)***	-0.655 (1.286)
Punishing power	-0.011 (0.000)	-0.202 (0.341)	-0.192 (0.134)
Reputation	0.793 (0.473)	-0.164 (0.051)	-0.957 (0.721)
Economical satisfaction	0.678 (0.373)	-0.644 (0.589)	-1.322 (1.619)
Social satisfaction	-0.563 (0.946)	**-1.287 (5.444)****	-0.724 (1.907)
Trust	**-2.237 (2.837)***	0.133 (0.018)	**2.370 (3.194)***
Collaboration	**1.713 (3.982)****	0.848 (1.416)	-0.865 (1.166)
Nagelkerke R^2	0.73		
-2 Log-likelihood	97.680		
Chi^2 (32 df)	91.900***		
N	88		

Figures in parentheses are Wald statistics. ***significant at 0.01, **significant at 0.05, * significant at 0.10.

5. Conclusions

Investigating the innovation capacity of food chain networks revealed three different types of innovators: non-innovator chain networks, customer-driven innovator chain networks and focal company-supplier-driven chain networks. These types of innovator chain networks differ significantly in relation to their characteristics. Between non-innovator and innovator chain networks the profitability and business growths of the supplier and the customer, as well as the level of dependency, integration, rewarding power, social satisfaction, trust and collaboration are distinguishing factors. Between customer-driven innovator chain networks and FC-supplier-driven chain networks also the profitability and business growths of the supplier and the customer are influencing the innovation capacity of the chain networks. Furthermore, only trust is significantly differing between these two chain networks.

In conclusion, the following characteristics form an important leverage for the innovation capacity of SMEs. Thus, SMEs with more than ten employees assembled in a chain network, higher dependency, a lower level of integration (non-contractual relationships) and lower levels of rewarding power, social satisfaction and collaboration are chain characteristics that have a positive relationship with innovation capacity.

Interestingly, the results of our paper show that there is a distinction between customer-driven and FC-supplier-driven innovator chain networks. In the first chain network the customers are significantly larger than in the latter chain network. Hence, there is a clear sign that larger customers can push their chain networks to more innovation capacity. Contrary, a larger supplier alone seems not to provide leverage for improving the innovation capacity. Our results give the impression to be a close mutual influence between the supplier and focal company is taking place in the FC-supplier-driven innovator chain networks.

There are few limitations related to our study, namely that rather subjective measures, e.g. for profitability and business growth, were used and hence a too positive assessment of these items could have occurred. Furthermore, we investigated only a limited number of chain network partners which is not providing a complete picture of the total chain network. Nevertheless, our study went further than other researches did in the past (e.g. Aramyan et al., 2007, Fischer et al., 2008, Hardman et al., 2002, Pannekoek et al., 2005). Thus, in future research, the degree of complexity of the studied system should gradually be increased, namely from a chain of three members to more complex chains and even larger networks.

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Annex

Annex 1: Sample description

BELGIUM: Cheese	15 S	7 micro, 4 small, 2 medium, 2 large
15 Chain networks	15 FC	11 micro, 2 small, 2 medium
45 Respondents	15 C	4 micro, 5 small, 2 medium, 4 large
BELGIUM: Beer	15 S	4 micro, 7 small, 1 medium, 3 large
15 Chain networks	15 FC	8 micro, 5 small, 2 medium
45 Respondents	15 C	9 micro, 5 small, 1 large
HUNGARY: White pepper	5 S	3 micro, 1 small, 1 medium
5 Chain networks	5 FC	1 micro, 2 small, 2 medium
15 Respondents	5 C	4 micro, 1 small
HUNGARY: Dry sausage	11 S	2 micro, 2 small, 7 medium
11 Chain networks	11 FC	2 micro, 3 small, 6 medium
33 Respondents	11 C	1 micro, 3 small, 7 medium
HUNGARY: Bakery products	14 S	2 micro, 7 small, 5 medium
14 Chain networks	14 FC	7 small, 7 medium
42 Respondents	14 C	8 micro, 3 small, 3 medium
ITALY: Cheese	16 S	10 micro, 6 small
16 Chain networks	16 FC	13 micro, 2 small, 1 medium
48 Respondents	16 C	11 micro, 5 small
ITALY: Ham	14 S	3 micro, 5 small, 6 medium
14 Chain networks	14 FC	6 micro, 7 small, 1 medium
42 Respondents	14 C	2 micro, 6 small, 4 medium, 2 large
TOTAL	90 S	31 micro, 32 small, 22 medium, 5 large
90 Chain networks	90 FC	41 micro, 28 small, 21 medium
270 Respondents	90 C	39 micro, 28 small, 16 medium, 7 large

Micro: micro sized enterprise: < 10 employees, Small: small sized enterprise: < 50 employees, Medium: medium sized enterprise: < 250 employees, Large: large sized enterprise > 250 employees

S= Supplier, FC = Focal company: food manufacturers, C = Customer

Annex 2: Items used for measuring innovation capacity

Human efforts (Frequency of spending time for improving human resources)
Courses and trainings
Self-study (reading professional literature)
Seminars
Fieldwork (e.g. study tours visiting other companies)
Experimental trials
Other (Please specify):
Financial efforts (Structuredness of spending financial resources)
Product development
Process development
Market research
Organisational development
Innovation activities (Yes-No of introduction of activities)
Our company improved the packaging of our traditional product
Our company improved the quality of our traditional product (through selected ingredients, raw materials, better uniformity of the product etc.)
Our company improved the convenience of our traditional product
Our company entered new geographical markets for our traditional product
Our company improved marketing activities for our traditional product
Our company introduced new management tools
Our company improved management practices of research and development
Our company increased participation in networks
Innovation results (Extend of significant contribution of applied innovation activity to business success
Improving the packaging of our traditional product
Improving the quality of our traditional product (through selected ingredients, raw materials, better uniformity of the product etc.)
Improving the convenience of our traditional product
Entering new geographical markets for our traditional product
Improving marketing activities for our traditional product
Introducing new management tools
Improving management practices of research and development
Increasing participation in networks

Annex 3: Chain network characteristics

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
SC-integration
Spot market
Non-contractual relationship with non-qualified partner
Non-contractual relationship with qualified partner
Contractual partnership

Relation-based alliance
Equity-based alliance
Vertical integration
Collaboration
Our company uses production equipments (e.g. machines for harvesting or packaging) jointly with our supplier/ customer
Our company shares knowledge with our supplier/ customer systematically (personally, by phone, via email, via the internet/ closed access data bases)
Our company has joint planning activities with our supplier/ customer (promotional activities, volume demands, sales forecasts etc.)
Our company is involved in joint research and development activities with our supplier/ customer/peers/3rd parties (related to product, process, market, and/or organisational improvements)

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