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Innovation in traditional food products in Europe: Do sector innovation activities match consumers' acceptance?

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ABSTRACT

Traditional food products are subject to an increased interest in Europe. Innovations, though controversial in the context of traditional food, are essential to maximally cope with this opportunity. So far, only few studies have concentrated on innovation in the traditional food sector. In this paper sector and consumer data are combined in order to validate to what extent innovations in the traditional food sector match with consumers' acceptance. Sector innovations were explored through 270 interviews, covering 90 traditional food chains in three European countries (Belgium, Italy and Hungary). Consumers' innovation acceptance was investigated using a quantitative survey approach with 2429 respondents in Belgium, Italy and Poland. In general, both the sector and the consumers were open towards innovations in traditional food products. In addition, the innovation activities of the sector were matching well with the innovations accepted by consumers. Throughout, preserving the traditional character of the food was stressed as a prerequisite for innovations in traditional food products.

1. Introduction

The objective of each future-oriented company is to successfully develop and introduce new products and services to the market. Innovation is a broad and multi-dimensional concept, and can be defined as the capacity to innovate, also in the future, along the whole innovation process of ongoing learning, searching and exploring, resulting in new products, new processes, new forms of organisation and new markets (Lundvall, 1995). Thereby, the place of innovation is not the single company alone, but more and more the network the company is embedded (Fearne & Hughes, 1999; Omta, 2002; Pittaway, Robertson, Munir, Denyer, & Neely, 2004; Powell, Koput, & Smith-Doerr, 1996). For a company several network contexts exist, such as the level of the chain, the region or the industry cluster (Macpherson & Holt, 2007; Pittaway et al., 2004). In the present paper, which is focused on traditional food, network activities are considered at chain level, including the food manufacturer and its supplier and customer. As such, we improve the understanding of activities at chain level by investigating and comparing multiple individual chains horizontally with each other, extending the findings of previous studies at chain level (e.g. Aramyan, Oude Lansink, Van der Vorst, & Van Kooten, 2007; Fischer et al., 2008; Hardman, Darroch, & Ortmann, 2002; Pannekoek, Van Kooten, Kemp, & Omta, 2005). Traditional food products as a food category are not yet extensively analysed from the chain perspective, with some notable exceptions (Gellynck & Kühne, 2008; Gellynck, Molnár, & Aramyan, 2008; Raynaud, Sauvee, & Valceschini, 2005). The integration of chain partners in the innovation process enhances the capacity to innovate and reduces the risks involved in implementing innovation (Earle, 1997; Gellynck & Kühne, 2008; Omta, 2002; Pittaway et al., 2004). From this perspective, incorporating the opinion of customers and consumers further supports the realisation of competitive advantage through innovation implementation (Dougherty, 1992; Earle, 1997).

The agri-business sector is characterised by a large number of micro, small, and medium sized enterprises (SMEs), and as a low-tech industry. This applies for the traditional food sector in particular. Thereby, traditional food products are food products of which (1) the key production steps are performed in a certain area at national, regional or local level, (2) which are authentic in their recipe (mix of ingredients), origin of raw material, and/or production process, (3) which are commercially available for about 50 years and (4) which are part of the gastronomic heritage (Gellynck & Kühne, 2008). The majority of these traditional food products do not possess any form of origin label.

In the current increasingly globalising food market, innovation is an essential strategic tool for SMEs to achieve competitive advantage (Avermaete, Viaene, Morgan, & Crawford, 2004; Gellynck, Vermeire, & Viaene, 2007; Murphy, 2002). This also applies for traditional food products, despite the seeming controversy between innovation and tradition (EC, 2007; Jordana, 2000) and the challenge this controversy involves (Amilien, Torjusen, &

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Vittersø, 2005; Gellynck & Kühne, 2008; Jordana, 2000). So far, only few studies are published that focus particularly on innovations in traditional food products (Jordana, 2000). Innovations in the traditional food sector strengthen and widen the market for traditional food products in accordance to the emerging problems, such as poor imitations and changing preferences and eating patterns towards more manufactured foods and convenience (Trichopoulou, Vasilopoulou, Georga, Soukara, & Dilis, 2006). Innovations in traditional food mainly pertain to product innovations, such as packaging innovations and changes in product composition, product size and form or new ways of using the product (Gellynck & Kühne, 2008). Process innovations are less common, given their impact on the authentic identity of the product and its production process. Feasible applications relate to improving the production process in order to assure quality and traceability. Finally, the implementation of market and organizational innovations can be valuable for traditional food products but their potential is not yet realized or recognized by all chain members in the traditional food sector (Gellynck & Kühne, 2008).

Further, for the successful introduction of innovations in traditional food products, it is also important to have a good understanding of consumers' perceptions, expectations and attitudes towards traditional food products and of consumers' attitudes towards innovations in traditional food products (Linnemann, Benner, Verkerk, & van Boekel, 2006). Consumer research prior to developing and introducing innovation is generally acknowledged to be useful, given that public perceptions of innovations and related risks associated with innovations are likely to differ from the technical estimates provided by experts (Frewer, Howard, Hedderley, & Shepherd, 1997; Verbeke, Frewer, Scholderer, & De Brabander, 2007). In addition, the controversy between tradition and innovation can cause confusion at consumer level when used in combination. Recent efforts to assess the pan-European consumer interpretation of the concept of traditional food products through qualitative research in six European countries (i.e. Belgium, Italy, Norway, Poland, France and Spain) resulted in the following definition (Guerrero et al., 2009): "A traditional food product is a product frequently consumed or associated with specific celebrations and/or seasons, normally transmitted from one generation to another, made accurately in a specific way according to the gastronomic heritage, with little or no processing/manipulation, distinguished and known because of its sensory properties and associated to a certain local area, region or country." In the same research paper, consumer acceptance towards innovations in traditional food was discussed. Especially product innovations were mentioned. Consumers were particularly positive towards packaging innovations. A different package does not modify the core characteristics of the traditional food product (i.e. the characteristics captured in the definition that differentiate traditional food from other food products), and provides sought benefits, e.g. longer shelf life. Further, approval of nutrition-related innovations stemmed from a positive association with pronounced tangible benefits and corresponded with earlier studies on specific traditional food products (e.g. Bruhn et al., 1992; Caporale & Monteleone, 2004; Cayot, 2007). Next, positive acceptance in regard to convenience-oriented innovations was associated with opportunities, if this did not involve too remarkable changes in the product. Finally, product innovations with implications for the sensory properties were strongly rejected (see also Cayot, 2007).

With our study we aim to combine sector and consumer data in order to verify to what extent sector innovations match consumers' acceptance. In the next section we present the methodology of both surveys. Then, in the result part, first the innovations applied in the traditional food sector, followed by consumers' acceptance of innovations in traditional food products will be dealt with. Finally, both insights will be combined and conclusions will be drawn.

2. Methodology

2.1. Sector survey

2.1.1. Research method and sampling

Quantitative data were collected by means of survey involving 270 individual face-to-face interviews among traditional food manufacturers, and their suppliers and customers, covering 90 traditional food chains across three European countries, Belgium, Hungary and Italy (Table 1). The chain members were involved in upstream and downstream flows of products, services, finances, and information (Van der Vorst, 2000). In all three countries the chains for traditional food products are rather small, including mainly five to six tiers (Gellynck et al., 2006). However, in our study the focus is on the direct chain, which involves only three chain partners, the supplier, the traditional food manufacturer and the customer (Mentzer et al., 2001).

In each country, two or three agri-business subsectors with a substantial socio-economic importance regarding number and size of enterprises, employment rates (direct and indirect), value added, turnover, investments, import/export, and consumption rates were selected (Belgium: cheese and beer, Hungary: white pepper, dry sausage and bakery products, Italy: cheese and ham).

In a first step, traditional food manufacturers within each subsector were identified and selected for the interviews according to the characteristics of traditional food products described by

Table 1
Sample description of chain members in the sector of traditional food.

Country: product N_{total} chains/ respondents	*N* chain members	Size
Belgium: cheese	15 S	7 micro, 4 small, 2 medium, 2 large
15 Chains	15 FM	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 Chains	15 FM	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 Chains	5 FM	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 Chains	11 FM	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 Chains	14 FM	7 small, 7 medium
42 Respondents	14 C	8 micro, 3 small, 3 medium
Italy: cheese	16 S	10 micro, 6 small
16 Chains	16 FM	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 Chains	14 FM	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 Chains	90 FM	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 = suppliers, FM = food manufacturers, C = customers.

Gellynck and Kühne (2008). Moreover, as an inclusion criterion, in this study the food manufacturers had to be an SME (companies that employ fewer than 250 people and have a maximum turnover of 50 million Euros). The second step, i.e. the selection of suppliers and customers, was informed by the manufacturers. During the interviews, the food manufacturers were asked to identify their main supplier and customer and to answer questions with respect to this specific supplier and customer. Subsequently, both this supplier and customer were interviewed following the same procedure as for the food manufacturer. Data collection was performed between December 2007 and June 2008.

2.1.2. Measurement and scaling

All interviewees were questioned about the innovation capacity of their respective company. The questionnaire was developed based on an extended literature review and preceding qualitative research (see Gellynck & Kühne, 2008). Innovation capacity was measured by exploring innovation efforts (human and financial), innovation activities and innovation results (see Appendix A). For measuring human efforts the respondents were asked how often the responsible person for research and development made an effort to improve his/her knowledge and skills, e.g. by following courses and training or conducting experimental trials. A 7-point frequency scale ranging from 'never' (1) to 'several times a week' (7) was used. For investigating financial efforts the respondents were asked how structured they spent their financial resources for any of the four innovation types, on a four point scale with anchor points 'do not spend financial resources at all' (1), 'do spend according to the necessity, but without being budgeted' (2), 'do have a distinct budget on project base' (3), or 'do have a distinct budget on yearly base' (4). 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. Product innovations were improvements in packaging, quality and convenience. Market innovations pertained to 'entering new geographical markets' and 'improving marketing activities for the traditional food product'. Finally, organizational innovation comprised the 'introduction of new management tools', 'improvements of management practices for research and development', and the 'increased participation in networks'. These innovation activities were measured on a 3-point scale with "no (0)", "yes (1)" and "not applicable (2)". 'Not applicable' refers thereby to innovation activities which are not applicable for the particular respondent. For instance, a supplier is probably not involved in market innovations. Identical innovation types were used to assess the innovation results. The respondents were asked to indicate on a 7-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (7) their agreement with the statement that the application of the respective innovation activity had a significant contribution to the success of their company.

In addition, an indicator for the collaboration among chain members with regard to innovation was included. The respondents were asked to indicate whether or not they were involved in joint activities for research and development. Thereby, the food manufacturer answered whether he/she was collaborating with his/her supplier and with his/her customer, while the supplier and customer answered related to their collaboration with their food manufacturer. The collaboration efforts were measured on a binary "no (0)"/"yes (1)" scale.

For the socio-economic description, the following variables were included: country, number of employees, business growth, profitability and the type of product manufactured. Business growth and profitability was measured as a subjective self-assessment. The respondents were asked to report to what extent their business was profitable and to what extent they achieved growth in the last three years on a 7-point Likert scale indicating the extent of agreement for profitability and business growth from "strongly disagree (1)" to "strongly agree (7)". This approach was chosen based on the results of a pilot test of the survey which indicated that exact figures are not provided due to confidentiality issues.

2.1.3. Data analysis

The data were analysed using SPSS 15.0 and R 2.1.9. Although the level of data collection was at the individual company, the level at which analyses were performed, is the chain. Therefore, the innovation capacity was investigated at chain level by means of cluster analysis. Cluster analysis was conducted to differentiate the 90 chains into groups with similar innovation capacity.

Before the cluster analysis and based on satisfactory Cronbach's alpha for human innovation efforts, financial innovation efforts and innovation results (Cronbach's alpha > 0.6, Hair, Black, Babin, Anderson, & Tatham, 2006), the items of these three innovation capacity dimensions were aggregated to a construct score for human efforts, financial efforts, and innovation results for each respondent individually. Further, the scores for human efforts, financial efforts and innovation results were standardized.

The scores for innovation activity were calculated by dividing the number of introduced innovation types by the number of applicable innovation types and hence ranging innovation activity for each respondent onto [0, 1]. Thus, a respondent who is applying e.g. 6 innovation activities out of 9 possible innovations (score = 0.67) is less innovative than a respondent who is applying 6 innovation activities out of 6 totally possible (score = 1.00).

Based on the aggregated and standardized scores for the elements of innovation capacity and the binary variables for innovation collaboration, hierarchical and k-medoid cluster analysis were conducted. 'Gower' was used as distance matrix, since it is an appropriate dissimilarity measure for mixed data (binary and polychotomous variables). For the hierarchical clustering agnes-*R* and Ward's method were applied to indicate the number of clusters. Then, Partitioning Around Medoid (PAM) was used as k-medoid cluster analysis.

Subsequently, non-parametric (Kruskal–Wallis and Mann–Whitney-*U* post hoc test) and parametric (one-way ANOVA comparison of means) tests, as well as cross-tabulation with χ^2-statistics were used to profile the resulting clusters and to present the innovation activities in the traditional food sector. For reasons of matching with the consumer data, only the relevant innovation types were selected for the cluster description.

2.2. Consumer survey

2.2.1. Research method and sampling

Consumer insights are based on cross-sectional consumer survey data with samples representative for age, gender and region in Belgium, Italy and Poland. Whereas consumer and sector data can be directly compared one to another in Belgium and Italy, Hungarian chain data will be compared to Polish consumer data as representatives of the Central European new EU Member States, due to a lack of Hungarian consumer data in our study. Although Polish and Hungarian consumers are not completely comparable, some studies underline distinctive consumption patterns of Eastern European consumers (including Hungary and Poland) in comparison to Western European consumers (including Belgium and Italy) (see Petrovici, Ritson, & Ness, 2005). Nevertheless, we point out that this comparison needs to be treated carefully. The age range of the population was defined 20–70 years. In each country, around 800 respondents were sampled, yielding a total sample size of 2429 respondents. Participants were randomly selected from the representative TNS European Online Access Panel (Malhotra &

Table 2
Socio-demographic characteristics of the consumer sample.

	Pooled sample, $n = 2429$	Belgium, $n = 826$	Italy, $n = 800$	Poland, $n = 803$
Gender (%)				
Female	49.2	49.4	47.3	50.2
Male	50.8	50.6	52.7	49.8
Age (years)				
<35	34.1	28.5	35.0	37.9
35–55	46.4	46.4	45.8	44.8
>55	19.5	25.1	19.2	17.3
Mean	41.5	43.7	41.2	40.6
SD	12.8	13.3	12.8	12.8
Household size (number)				
Mean	2.9	2.7	3.2	3.0
SD	1.3	1.3	1.3	1.4
Financial situation (%)				
Difficult – moderate	24.6	17.8	29.8	21.3
Moderate	32.1	28.6	32.8	31.0
Moderate – well-off	43.3	53.6	37.4	47.7
Education level (%)				
Beyond age of 18	51.2	56.6	26.2	70.7

Table 3
List of innovations used for measuring consumer's acceptance.

Innovation categories	
Quality innovations	*Packaging innovations*
Reduction of fat content	Packaging preserving sensory quality
Reduction of sugar content	Reclosable packaging
Reduction of salt content	Packaging useable for microwave
Addition of beneficial ingredients	*Market Innovations*
Using organic raw material	Vending machines
New process improving safety	Home delivery
Convenience Innovations	Take-away from specialty shop
Individual portions	Manufacturer[b]
Availability all over the year	*Assortment expansion*
Frozen food	More variety
Pre-cooked food	New combinations of ingredients
Package deal	Diversification of shapes and texture
Packaging useable for microwave[a]	
Marketing efforts	
Label with guarantee of origin	
Introduction under strong brand name	

Division of innovations in categories is based on the authors' opinion.
[a] The categorisations of 'Packaging useable for microwave' under 'Convenience Innovations' instead of 'Packaging Innovations' was informed by the reliability test.
[b] Not included in the factor 'Market Innovations'.

Peterson, 2006, p. 190) in line with the national population distributions with respect to age, gender and region. All contact and questionnaire administration procedures were electronic. Data collection was performed during the period from October 25th until November 9th, 2007. Further details about the methodology of the consumer study are provided in Guerrero et al. (2009, 2010) and Vanhonacker, Verbeke, Lengard, Guerrero, and Hersleth (2008). Detailed socio-demographic characteristics of the national and pooled samples are provided in Table 2. Gender is equally distributed, which reflects that the population was intentionally not restricted to the main responsible person for food purchasing. Age distributions, mean age and mean household sizes match closely with the national census data of the respective countries. It should be noted that about half of the sample (51.2%) received education beyond the age of 18 years (high school or university), while 48.8% had a lower level of education (primary or secondary school education only). The sample is herewith slightly biased towards higher education, which may be attributed to the use of an electronic survey method. Also, strong between-country differences in education levels appeared, especially comparing Polish and Italian respondents.

Consumer acceptance for a list of 23 specific innovations in traditional food products was investigated. The list was based on preceding qualitative research, by means of consumer focus group discussions, in several European countries, among them Belgium, Italy and Poland (see Guerrero et al., 2009). Acceptance was probed for in terms of consumption intention. Respondents were asked to indicate on a 7-point interval scale the extent to which their consumption of traditional food would be affected if the specific innovation was applied, ranging from 'this innovation would strongly decrease my intention to eat traditional food' (1) to 'this innovation would strongly increase my intention to eat traditional food' (7). The mid-point of the scales corresponded with 'this innovation would not influence my intention to eat traditional food'. The 23 innovations were classified in 6 categories, for matching purposes with the sector's data. Quality innovations were composed of improvements oriented on health and safety. Based on the positive association between organic and product health and safety at consumer level (Dean, Raats, & Shepherd, 2008; Shepherd, Magnusson, & Sjödén, 2005; Viester, 2003), 'using organic raw materials' was also assigned to this group. These innovations yielded a satisfactory reliability statistic and were aggregated in 'Quality Innovations'. Further satisfactory reliability statistics allowed to aggregate two items in 'Packing Innovations', six items in 'Convenience Innovations', and three items 'Assortment expansion Innovation' (Table 3). The factor 'Market Innovation' had better reliability statistics excluding 'Manufacturer' as distribution channel, thus constituting of three items. Finally two items were placed under the nominator 'Marketing efforts', though were not aggregated based on low Cronbach's alpha (CA = 0.44).

2.2.2. Data analysis

Consumer data were analysed using SPSS 15.0. Descriptives providing mean values and standard deviations format will be presented in table format to discuss consumers' acceptance of different innovations in traditional food in general terms, i.e. at sample level. The construct scores for quality innovations, convenience innovations, packaging innovations, market innovations and assortment expansion were used as segmentation variables in a cluster analysis. Hierarchical clustering using Ward's cluster method, and K-means cluster analysis were performed consecutively to identify market segments that differ with respect to their innovation acceptance. Bivariate analyses including cross-tabulation with χ^2-statistics and one-way ANOVA comparison of means were used to profile the market segments.

3. Results and discussion

3.1. Innovation activities in the traditional food sector

Cluster analysis grouped the traditional food chains in three clusters based on differences in innovation capacity and chain collaboration oriented towards innovation (Table 4). The first cluster, with 31 chains accounting for 34.4% of all chains, is characterised by a lower innovation capacity as compared to the two other clusters. Considering the modest reported collaboration for innovation reported within this cluster, it is termed "Non-innovator chains". The second cluster is the largest cluster with 49 chains or 54.4 percent of all chains considered. In absolute values, it is situated in-between the two other clusters with regard to the items reflecting

Table 4
Innovation capacity of traditional food chains, k-medoid cluster analysis with standardized variables (range 0–1) and Kruskal–Wallis test, $n = 90$.

	Cluster 1 Non-innovator chains	Cluster 2 Non-collaborating innovator chains	Cluster 3 High-collaborating innovator chains	Sig.
Human efforts FM	0.191[a]	0.315[b]	0.467[c]	0.002
Human efforts S	0.151[a]	0.388[b]	0.558[c]	0.000
Human efforts C	0.185[a]	0.224[a]	0.367[a]	0.069
Financial efforts FM	0.140[a]	0.350[b]	0.500[b]	0.000
Financial efforts S	0.118[a]	0.344[b]	0.283[b]	0.000
Financial efforts C	0.108[a]	0.167[a]	0.467[b]	0.000
Activities FM	0.388[a]	0.518[b]	0.678[c]	0.001
Activities S	0.286[a]	0.460[b]	0.516[b]	0.000
Activities C	0.391[a]	0.422[a]	0.705[b]	0.002
Results FM	0.672[a]	0.757[a]	0.783[a]	0.094
Results S	0.586[a]	0.777[b]	0.742[b]	0.000
Results C	0.626[a]	0.679[a]	0.683[a]	0.215
Innovation collaboration FM–S[A]	0.233[a]	0.167[a]	0.800[b]	0.000
Innovation collaboration FM–C[A]	0.167[a]	0.163[a]	0.700[b]	0.001
Innovation collaboration S–FM[A]	0.167[a]	0.271[a]	0.900[b]	0.000
Innovation collaboration C–FM[A]	0.129[a]	0. 306[a]	0.700[b]	0.002
Cluster size, *n* (%)	31 (34.4)	49 (54.4)	10 (11.1)	

FM: food manufacturers, S: suppliers, C: customers.
[a,b] Various superscripts indicate significant differences of group means in the Mann–Whitney-*U* post hoc test ($p < 0.05$).
[A] Indicates the collaboration for innovation between two chain members, whereby the first mentioned is answering whether he/she collaborates with the second mentioned, e.g. 'FM–S' refers to the answers of the food manufacturer towards his/her supplier.

innovation capacity. This position did not always involve a significant differentiation from one of both other clusters. Furthermore, collaboration oriented on innovation within this cluster did not differ from the "Non-innovator chains", though was significantly lower than the third cluster. Therefore, this cluster is called "Non-collaborating innovator chains". Finally, the third cluster is composed of chains where chain members indicate the highest innovation capacity and the most intense collaboration oriented towards innovation. Consequently, this cluster is named "High-collaborating innovator chains".

The three clusters differ significantly with respect to country composition, and have a tendency to differ in terms of company

Table 5
Socio-economic profile of the different clusters.

	Cluster 1 Non-innovator chains	Cluster 2 Non-collaborating innovator chains	Cluster 3 High-collaborating innovator chains	Total	Sig.
Country (%)					0.006
Italy	51.6	16.3	60.0	33.3	
Hungary	22.6	42.9	20.0	33.3	
Belgium	25.8	40.8	20.0	33.3	
Total	100	100	100	100	
No. of employees – FM (%)					0.070
<10 employees	64.5	34.7	40.0	45.6	
11–50 employees	22.6	38.8	20.0	31.1	
51–250 employees	12.9	26.5	40.0	23.3	
Total	100	100	100	100	
No. of employees – Supplier (%)					0.004
<10 employees	54.8	26.5	10.0	34.4	
11–50 employees	35.5	30.6	60.0	35.6	
51–250 and more employees	9.7	42.9	30.0	30.0	
Total	100	100	100	100	
No. of employees – Customer (%)					0.074
<10 employees	56.7	42.9	11.1	44.3	
11–50 employees	30.0	32.7	33.3	31.8	
51 – 250 and more employees	13.3	24.5	55.6	23.9	
Total	100	100	100	100	
Business growth[A] (Mean)	4.81[a]	5.33[a,b]	5.87[b]	5.21	0.013
Profitability[A] (Mean)	4.73[a]	5.38[b]	5.83[b]	5.21	0.003
Type of product (%)					n.a.
Dried fermented sausage	3.2	18.4	10.0	12.2	
Ham	9.7	14.3	40.0	15.6	
Beer	0	30.6	0	16.7	
Hard and half-hard cheese	67.7	12.2	40.0	34.4	
Bakery	16.1	16.3	10.0	15.6	
White pepper	3.2	8.2	0	5.6	
Total	100	100	100	100	
Size of cluster, *N* (%)	31 (34.4)	49 (54.4)	10 (11.1)	90 (100)	

FM: food manufacturer.
n.a. For the comparison of Types of products no significance can be presented due to the small number of cases in each cell (more than 20% of the cells have values less than 5).
[a,b] Various superscripts indicate significant differences of group means in the post hoc Duncan test ($p < 0.05$).
[A] Measured on 7-point Likert scale, values express means at chain level.

Table 6
Innovation activities in traditional food chains, in%.

	Cluster 1 Non-innovator chains	Cluster 2 Non-collaborating innovator chains	Cluster 3 High-collaborating innovator chains	Total sample
Quality	100	100	100	100
Packaging	87.1	93.9	100	92.2[a]
New markets	64.5	91.8	100	83.3
Marketing	71.0	83.7	100	81.1
Convenience	58.1	79.6	100	74.4

[a] Only applicable for food manufacturer and customer, supplier excluded.

size (Table 5). About 50% and 60% of the Non-innovator and High-collaborating innovator chains, respectively, are found in Italy, while Non-collaborating innovator chains are mainly composed of Belgian and Hungarian chains. Further, Non-innovator chains are mainly composed of micro-sized enterprises (<10 employees). In comparison, Non-collaborating innovator chains are primarily composed of larger food manufacturers and suppliers. High-collaborating innovator chains are mostly composed of small suppliers and large customers, while the food manufactures are either micro-sized or large-sized. Hence, there seems to be a relationship between company size and innovation capacity that is disadvantageous for micro-sized enterprises. However, at the same time, our results also indicate that being a micro-sized food manufacturer does not necessarily imply low innovation capacity if there is intensive collaboration for innovation among the chain members involving larger customers and/or suppliers (Table 5).

Non-innovator chains reported a lower business growth as compared to High-collaborating innovator chains and the lowest profitability among all chains (Table 5). Both clusters of Innovator chains could not be differentiated on these points. Our results suggest that a certain degree of innovation is associated with achieving higher business growth and profitability levels.

Finally, an overview is presented of the types of products which are investigated in our study. Although the differences are not significant, the distribution of the type of products among the clusters provides an insightful reflection of the country presentation discussed above. While most product types are found to be Non-collaborating innovator chains the Italian meat chains are mainly found to be in the High-collaborating innovator chains, while Italian and Belgian dairy products (hard and half-hard cheese) are mainly seen in the Non-innovator or High-collaborating innovator chains.

Independent of the cluster membership, improving the quality of the traditional food product through selected ingredients, raw materials, and better uniformity of the product and the packaging is indicated as primary innovation activity in the traditional food chain (Table 6). Further, the 'improvement of the packaging of the traditional food product' is also highly applied in traditional food chains. These results are in line with Gellynck and Kühne (2008), who pointed out that changes in product composition, product form and packaging are the most frequently applied innovations related to traditional food products, while other innovation types, such as market innovations are less frequently applied.

The Non-innovator chains do not focus to the same extent on other innovation activities than improvement of the product's quality or packaging as compared to the two clusters of Innovator chains (Table 6). However, in these chains mainly the food manufacturer contributes to the application of the different innovation types (Fig. 1). Meanwhile, the supplier is mainly contributing to the 'product's quality', while the customer is mainly contributing to the 'marketing of the traditional food product'. This is in line with the competences these chain members possess according to their position and function in the chain. The supplier can contribute to the product's quality by providing the food manufacturer with raw materials of higher quality, while the customer is more able to contribute to the marketing activities because he is closest to the final consumer and hence, has the best access to market information. Since the Non-innovator chains are mainly composed of micro-sized companies, there might exist a lack of management and coordination skills in combination with a lack of time to apply any kind of innovation activity in these chains (Avermaete, Viaene, Morgan, & Crawford, 2003; Maravelakis, Bilalis, Antoniadis, Jones, & Moustakis, 2006; O'Regan, Ghobadian, & Sims, 2006; Scozzi, Garavelli, & Crowston, 2005).

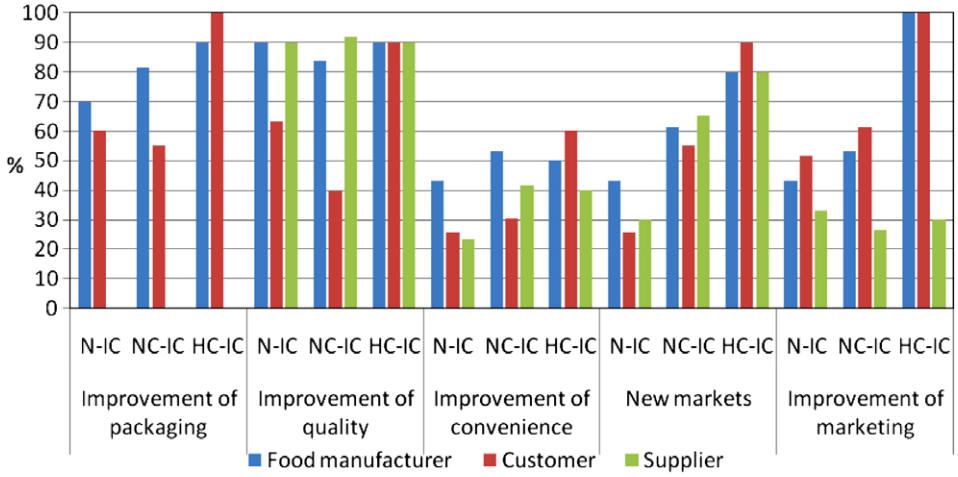

Fig. 1. Frequency of the different innovations applied per member of the different traditional food chain clusters (N-IC: Non-innovator chains, NC-IC: Non-collaborating innovator chains, HC-IC: High-collaborating innovator chains).

On the contrary, in the Non-collaborating innovator chains the food manufacturer and the supplier contribute most to the application of the different innovation types (Fig. 1). Thereby, the supplier is the main contributor to the 'improvement of the quality of the traditional food product'. Surprisingly, for the 'entering of new markets for the traditional food product' the suppliers are more contributing than the customers. This might be related to the comparably larger sized suppliers in comparison to the rather micro-sized customers and the fact that size is positively related to innovation activity (Avermaete et al., 2003, 2004; Coppola & Pascucci, 2008). Nevertheless, chains can be innovative without a strong customer. In such cases the food manufacturer and the supplier need to contribute equally to the innovation process under conditions of strong mutual trust (Kühne & Gellynck, 2009).

In the High-collaborating innovator chains all three chain members are equally participating in all innovation activities, with the exception of the supplier for improvement of marketing (Figure 1). However, the customer is the most active among the chain members. As expected, in the High-collaborating innovator chains the customer is more contributing to 'entering new markets for the traditional food product' than the food manufacturers. Several other studies found that the customers are usually more internationally oriented (e.g. Theuvsen, 2004) and that an international market orientation of any member of the chain is enhancing the innovation capacity of the chain (Aylward & Glynn, 2006; Gellynck et al., 2007). Furthermore, customers in these chains are larger sized compared to the other traditional food chains. This is in line with other studies, which found that the company size is positively related to the innovation capacity (Avermaete et al., 2003, 2004; Coppola & Pascucci, 2008).

3.2. Consumer's acceptance of innovations in traditional food products

Positive acceptance scores for quality innovations (Table 7) match with the growing consumer interest for healthy and safe food (Pieniak, Verbeke, Scholderer, Brunso, & Olsen, 2008) and corroborate earlier findings from Guerrero et al. (2009) and Bruhn et al. (1992). The latter specifically indicated a strong acceptance of a fat replacer in traditional dairy products under the condition that the sensory properties were not modified. This corresponds with the highest acceptance rates found in the present consumer study for a health innovation reducing the fat level. Similarly, innovations aiming at improving safety were highly accepted.

Further, innovations related to packaging also received high acceptance rates, in absolute (mean value) as well as relative (compared to other innovations) values. Explanation pertains to a positive impact on the product's quality from the selected packaging innovations.

Acceptance of innovations oriented on improving the product's convenience varied depending on the respective innovation. Individual portions are well accepted and respond to the shifting tendency towards a higher share of single living individuals in society. Pre-cooked food or ready-to-eat dishes, together with frozen foods, did not share the same market opportunities. These lower acceptability scores are probably related to the high quality perception of traditional food. Often traditional food products are consumed at special occasions, in a social context with the family and/or friends.

Concerning marketing efforts, high acceptance rates were attributed to a label that guarantees the origin. This corresponds with earlier findings from Caporale and Monteleone (2001) and Iaccarino, Di Monaco, Mincione, Cavella, and Masi (2006). Both studies pointed on the positive quality expectations that were created by informing consumers about the origin of a product, with consumers expressing higher expectations for products from their own region. The more moderate score for the introduction of a traditional food product under a strong brand name could be due to the higher price perception of brands and/or to the strong association of traditional food products with an artisanal production, which may contradict a perceived more global image of a brand.

With regard to the innovations in terms of alternative distribution channels the possibility of home delivery or vending machines was rated very low. Given that these innovations do not impact on the product characteristics, explanations have to be searched in the image these "non-personal" point of sales may have among consumers. Both point of sales are most probably associated with more unhealthy, lower quality food, often consumed as a snack. Vending machines typically provide soft drinks, potato chips, chocolate and candy bars, while home delivery food is a convenient solution for a person who does not have time or the willingness to prepare food, thus opposing typical situations in which traditional food products are consumed. By contrast, the possibility of the manufacturer as point of purchase was well accepted.

Regarding the innovations related to expansion of the assortment, acceptance levels depend on the respective innovation. Moderate and low acceptance scores were found for innovations that change the conformity of the product and that combine existing ingredients in new products. More variety in the offer and the use of organic raw material to the contrast were valued more positively, corresponding with the increased variety-seeking

Table 7
Consumer acceptance of innovations in traditional food products. Mean values (on a 7-point Likert scale) and standard deviations for the full sample (n = 2429).

	Sample Mean (SD)		Sample Mean (SD)
Quality innovations		*Marketing efforts*	
Reduction of fat content	5.29 (1.37)	Label with guarantee of origin	5.66 (1.19)
Reduction of sugar content	5.08 (1.36)	Introduction under strong brand name	4.65 (1.31)
Reduction of salt content	5.08 (1.36)	*Market innovations*	
Addition of beneficial ingredients	5.06 (1.33)	Vending machines	3.18 (1.61)
Using organic raw material	5.35 (1.36)	Home delivery	4.06 (1.57)
New process improving safety	5.34 (1.22)	Take-away from specialty shop	4.65 (1.41)
Packaging innovations		Manufacturer	5.18 (1.30)
Packaging preserving sensory quality	5.46 (1.28)	*Assortment expansion*	
Reclosable packaging	5.55 (1.29)	More variety	5.37 (1.25)
Convenience innovations		New combinations of ingredients	4.49 (1.51)
Individual portions	4.95 (1.46)	Diversification of shapes and texture	4.17 (1.30)
Availability all over the year	5.23 (1.45)		
Frozen food	4.59 (1.53)		
Pre-cooked food	4.08 (1.69)		
Package deal	4.81 (1.50)		
Packaging useable for microwave	4.97 (1.56)		

Table 8
Profile of consumer clusters on segmentation variables.

	Segment 1, Quality oriented	Segment 2, Innovation averse	Segment 3, Innovation open
Quality innovation	5.29	4.44	6.03
Packaging innovation	5.81	4.37	6.43
Convenience innovation	4.76	3.87	5.96
Market innovation	3.83	3.32	5.03
Assortment expansion	4.61	3.84	5.86
Segment size (%)	44.1	31.5	24.4

behaviour of consumers and the positive image organic food has in terms of health and artisanal production method.

Cluster analysis grouped the consumers in three segments based on reported acceptance levels for the different types of innovations (Table 8). Segment 1 (44.1% of the sample) is characterised by an average scoring profile as compared to both other clusters. Pronounced positive acceptance scores were found for packaging and quality innovations only. Given that the packaging innovations were related to preserving the quality of the product, this segment is further referred to as "Quality oriented segment". Segment 2 (31.5% of the sample) was more reluctant towards innovations in traditional food and is called "Innovation averse". Only quality and packaging innovations were associated with a (limited) positive acceptance score. Finally, segment 3 (24.4% of the sample) appeared to be open for all innovation constructs ("Innovation open").

The segments differed significantly in country composition ($\chi^2 = 183.90$; $p < 0.001$). Whereas the three countries were rather equally represented in the Quality oriented segment, differences are seen in the Innovation averse and the Innovation open segment, especially opposing Poles and Belgians (Table 9). Polish consumers appeared to be more open to innovations in traditional food, whereas Belgian consumers were more innovation averse. Guerrero et al. (2009) on the contrast concluded based on qualitative research that Polish consumers were the most reluctant to accept innovations in food in general. More specific with regard to traditional food however, they indicated general good acceptance levels for packaging, health improvement and convenience innovations; under the condition such innovations do not dramatically change the product. Our innovation list consists mainly of such innovations, which could refute the seemingly contradiction with earlier findings. Possibly there might be an effect due to an idiosyncratic use of the scale. Nonetheless, more important than this possible scale-use bias is the acknowledgement of within-country variation.

Further, females and urban consumers were more prone to accept innovations in traditional food, which again corroborates earlier findings (Guerrero et al., 2009). Financial situation and age also differed significantly between segments, although not having a high effect size.

Table 9
Profile of consumer segments on some socio-demographics and self-reported consumption of traditional food products (TFP).

	Segment 1, quality oriented	Segment 2, innovation averse	Segment 3, innovation open
Country (%)			
Belgium	42.7	44.9	12.3
Italy	46.8	29.0	24.3
Poland	42.7	20.3	37.0
Gender (%)			
Male	43.4	37.6	19.0
Female	44.7	25.2	30.1
Age			
Mean	42.3^{b}	40.2^{a}	43.2^{b}
Living environment[A]			
Mean	5.00^{a}	4.76^{b}	$5.46^{a,b}$
Financial situation[B]			
Mean	$4.28^{a,b}$	4.43^{b}	4.23^{a}
Consumption of TFP[C]			
Mean	5.00^{b}	4.78^{a}	5.23^{c}
Segment size (%)			
	44.1	31.5	24.4

[a,b,c] Various superscripts indicate significant differences of group means in the post hoc Duncan test ($p < 0.05$).
[A] Measured on a 7-point interval scale ranging from rural (1) to urban (7).
[B] Measured on a 7-point interval scale ranging from difficult (1) to well-off (7).
[C] Measured on a 7-point interval scale ranging from not at all (1) to very much (7).

4. Conclusions

Tradition and innovation are considered antonyms, which makes innovating traditional food products very challenging (Amilien et al., 2005; Gellynck & Kühne, 2008; Jordana, 2000). Traditional food products cannot be changed too much in their recipe, choice of raw materials or production process. Furthermore, it is important to consider consumer needs and preferences when applying even small innovations to the traditional food product. Nonetheless, the study reported in this paper reveals some opportunities with respect to innovations based on matching results from a sector and consumer analysis (Table 10).

First, improvements with respect to product quality were commonly mentioned and appreciated by the sector and the consumers. Thereby, consumers accept packaging innovation which preserves the sensory quality and which improves the shelf life (e.g. reclosable packaging). Second, corresponding with the consumers' acceptance of innovations oriented on healthier and safer products, the sector invests efforts in achieving this goal through selected ingredients, raw materials and better uniformity of the product. However the sensory properties of the traditional food products should not be compromised by such improvements. This is in line with Verbeke (2006) who reported that consumer's willingness to compromise on taste for health is low.

Third, the sector is also investing in market and marketing innovations. The consumers' acceptance of labels with guarantee of origin and more product variety is matching with the sector's efforts to enter new markets and to improve the marketing of their traditional food products.

Finally, consumers' acceptance of convenience-oriented innovations was not equally translated in the sector's strategies, leaving some market opportunities to be further explored and exploited.

Table 10
Does the innovation activities of the traditional food sector match with consumers' acceptance?

Ranking of sector's innovation activity	Ranking of consumers' innovation acceptance
Quality innovations	Packaging innovations
Packaging innovations	Quality innovations
Market innovations	Convenience innovations
Marketing innovations	Assortment expansion
Convenience innovations	Market innovations

Examples are individual portions and a year-through product availability.

This study indicates that not all chains and chain members contribute equally to the sector's innovation activity and that not all consumers are open to innovations in traditional food products. Thus, first of all for a traditional food manufacturer it is important to have a clear understanding of the characteristics consumers seek in the traditional food product. Our study has shown that there are different consumer segments in terms of innovation acceptance in traditional food products, as well between countries and within countries. Hence, access to market research is of importance especially for SMEs which often lack budget and/or priority to perform ad hoc market research. One access point to market information is the involvement of the customer into the innovation process. Owing to their place in the supply chain close to the end user, customers possess direct information from the consumers and are able to have a clear view on consumer preferences. Nevertheless, also the involvement of the supplier into the innovation process is important, as he/she can be a facilitator for improved product quality. Last but not least, also research and knowledge providers can contribute to the innovation process of traditional food products, by providing sound data about consumer preferences related to sensory and other product characteristics, such as health and quality attributes.

Future research could focus more on the cultural differences of innovation acceptance and the application of innovation in traditional food products both within and between European countries. Further, it is recommended to extend the range of traditional food products, chains and countries in order to achieve a more representative description of the whole European food market.

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Appendix A. Items used for measuring innovation capacity

Human efforts (frequency of spending time for improving human resources, 7-point frequency scale)
- 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, 4-point scale)
- Product development
- Process development
- Market research
- Organisational development

Innovation activities (yes–no-non applicable for introduction of innovation 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 growth, 7-point Likert scale)
- 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

Innovation collaboration (indication of joint activities for research and development – yes/no)
- Our company (FM) is involved in joint research and development activities with our supplier
- Our company (FM) is involved in joint research and development activities with our customer
- Our company (S) is involved in joint research and development activities with our client (FM)
- Our company (C) is involved in joint research and development activities with our supplier (FM)

FM: food manufacturer, S: supplier, C: customer.

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