Food Innovation and Market Risk: A Case Study of the Interface Consumer Food Industry

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Food Innovation and Market Risk: A Case Study of the Interface Consumer Food Industry

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Abstract

Western society is suffering an increasing risk regarding the food chain for several reasons. Longer geographical distances between producers and consumers, more stakeholders in the supply chain, less capacity of national governments to regulate and protect consumers due to globalisation and the liberalization process, with pressure to innovate and increase competitively.. During the period 2004-06, there is being carried out a research project in Spain, coordinated by the Polytechnic University of Madrid and sponsored by INIA. The goal is to understand the consumer behaviour identifying the attributes of food products and to transmit the results to the food industry entrepreneurs, in order to increase their efficiency in innovation.

Key words: *Innovation, market risk, food industry, consumer attitude*

1. Introduction

The goal is to analyse the interface consumer behaviour - innovation in the food industry of three products: fresh beef (studied in this paper), cheese and vegetables. These are perishable products, and the consumer behaviour towards them differs. The capacity of innovation is different among them. The challenge is how to transmit the consumer preferences to the stakeholders of the food chain, who should be responsible to achieve the innovation, and how the risk of failure may be share among them. When we are dealing with certain attributes (tenderness, taste, colour) most of the innovation should be carried out by the producer (farmers, food industry) while others such as presentation, packing, etc., may be performed by distributors. Innovation is also related to the type of services provided by the logistic system. Consequently, marketing strategies should be designed according to these circumstances and to the consumer's profile. The lack of confidence in the Spanish society as a consequence of food scandals have determined quality control and traceability, with the adoption of commercial trade mark denomination of origin and others.

In this paper we show some empirical results from the mentioned research project which is being carried out during the period 2004-2006, and comparing it with other studies, trying to interact with the importance of innovation.

2.   Food innovation and market risk

Innovation should be analysed from several scenarios. In first place, from an economic oriented tradition one, which studies the evolution of technologies and the differences of pattern innovations across countries and others. Another scenario is the management oriented tradition with studies at micro and meso level of how new products are developed (Omta, O. 2004). In our study, we follow the second scenario with studies at micro level related to consumers at the first link of the food chain.

The Food and Drink Industries (FDI) are speeding up in the European markets, and innovation is not just one way of doing business, it's rather often a requirement for survival. We may consider innovation under different points of view (Traill, B.; Grunert, K.; 1997). Thus, a significant area of innovation is the marketing, trying to satisfy the consumer's needs, either real or potential. Here we have the "market-oriented" products or services. Other innovation is related to the technological changes along the food chain, with special attention to modern industry.

Besides the market orientation, there is another key element in the innovation process , which is the Research and Development that may condition the performance. Although it is not an easy question to identify the concept of innovation, we may consider the following definition (Kotler, P., 1991) "an innovation refers to any good, service or idea that is perceived by someone as new". Some authors (Tirole, J., 1988) make the distinction between product and process innovation. The first one includes the creation of new products and services appreciated by the users. Process innovation is more related to organization and cost reduction in the elaboration process, through new technology, equipment and skills. Both systems are strongly related because they should be market oriented.

Looking at the innovativeness of the Food and Beverage Industry in Spain, we may identify several categories, in a broad sense mentioned by some authors (Booz and al., 1982): absolutely new products in the world, new product lines, improvement in existing products, repositioning and costs reduction. In the F+B Spanish Industry the last three categories are the most frequent ones, although in the real market, consumers may appreciate the innovation process due to the liberalization and the great competitors. A significant point in innovation is the analysis of the success that may be evaluated in several ways. Perhaps the first one is how the innovation has contributed to get the main goals of the enterprise's strategy. The second one could be related to the way costumers have accepted the innovation as a real improvement in the market. Finally, we should consider the welfare situation in the society, as a balance between economic, social, and environmental activities.

Food Industry is consumption oriented and, consequently, consumer analysis is one of the key elements in the transmission of basic innovations through the food chain. There are significant studies trying to analyse the flows in several countries as United States (Scherer, F.M., 1982), Spain (Rama, R., 1996) and Great Britain (Townsed, J. et al., 1981), among others

We mentioned the importance of Research and Development (RandD) in innovation and business performance. However there are several risks involved in that activity (Yon, B., 1992): market risk, (in case of no acceptance by the customer), time risk, (when there is a delay in the research results and the costs are greater than benefits) the risk of not finding adequate

results(in spite of the effort), and the risk of the competitor,(able to get into the market the new product or process)

The main barrier in countries like Spain, which are not pioneers in basic technology and depend upon other markets, is the greater risk of entrepreneurs to face some of the mentioned problems. On one hand, with the new situation of market liberalization, Spanish enterprises are facing great problems and need to reorientate their production towards the market through some behavioural components (Narver and Slater, 1990), competitor and costumer orientation, looking at short and long term and maintaining the profitability of innovation. On the other hand, "new business opportunities may result from hybrid technologies bringing knowledge of several industrial fields and disciplines together" (Omta, O. page 205) what give us the chance to use different sources,but need additional experience and externalities.

3. Consumer behaviour as a source of innovation

andDynamic consumer demand, technological development and international competition are changing the food chain from production to trade and distribution (Trieneken, J. 2004). Innovation process may be focused at different levels: at supra-company level, at the company organization structure or at a single project level. Each level has their own problems and alternative solutions. In the Spanish case the last two situations are the most frequent.

In addition, in the framework of innovation, risk and food safety play a key role in the analysis of the consumer behaviour. Studies of the valuation process of the food safety in the purchase place have shown the necessity of a suitable provision of information (for example, the use of labels, marks, certifications of traceability, etc.) as a way to assure the consumer an adequate food safety in the product (Angulo and Gil, 2004; Henson and Northen, 2000; Mahon and Cowan, 2004). The consumer's demand to receive more information on the quality and food safety, forces the market to have transparency and traceability, so that the it can be followed each food along all the chain (Garcia Martinez and Poole, 2004). The efficiency of the food chain depends on its capacity to offer trustworthy information. A more efficient use of that information, may improve the efficiency in all the food chain (Kola and Latvala, 2003). An example of improvement of the efficiency in the food chain is the increasing use of labels and trade marks, with the objective to improve the evaluation of the quality of the product on the part of the consumer in the purchase place (Brunso et al. , 2002).

During the 60's and 70's entrepreneurs based their quality policies in product control without a direct connection to the consumption. However, at the moment the goal is to identify the consumer behaviour in measurable goals, the product attributes and try to be integrated in the productive process (Briz, J., 2003). Only those activities with positive effect on the demand should be giving priority in firm strategies.

With this framework, the research project going on in the Spanish market, develops in the first steps a qualitative and quantitative study of consumer behaviour and the results will be analysed later with the food industry entrepreneurs. Although there are three groups of products in the research (beef, cheese, fruit and vegetables) we will only focus on meat.

There were carried out several focus groups in the most significant Spanish cities which gave us the basis for a qualitative analysis and preparation of the quantitative study, which was 519 face to face interviews at national level.

If we look at the shopping place (Table 1), the butcher is the most important retailer, either as a single shop or in local markets. Other studies (Briz, J.; De Felipe, I., 2000) gave butchers 52% of the market share and were the ones which provided the highest confidence to the consumer. Similar situations are in Belgium and Italy. At this point we may identify the importance of innovation, because meat is sold directly from the butcher and not packed in trays. The most significant clues will rely on intrinsic attributes. However, younger people prefer to buy packed meat because they do not know the different parts of the carcase and do not cook all the meat pieces. Consequently, significant changes should be done in the coming future where self-service may be the usual way of shopping meat in Spain.

Table 1. Place of purchase (%)

	Beef [1]	Cheeses [2]	FandV IV and V range [3]
Independent retailer	15.2	8.0	3.0
Local market	49.3	31.5	11.6
Supermarket	22.0	39.4	55.1
Hypermarket	13.1	19.7	30.3
Others	4	1.4	
Total	100.0	100.0	100.0

[1] N=513;   [2] N = 498;   [3] N = 198   Source: Author's Empirical study

Another scenario of consumer behaviour analysis are the main factors for purchasing beef (Table 2). In the health area, there are three main reasons: the fact it is a healthful product, the nutritional value and quality. Other reasons (flavour, family requirements and pleasure) are under traditional scenario. As a way to get assurance of the mentioned attributes, the certification of the quality plays an important role (Table 3). In the area of safety and control, the reasons for buying are more control and greater safety, while in the confidence or belief we can mention nutritive value, environmental control and traceability. Some characteristics considered at the moment of purchase may be identified in Table 4. They could be useful for the producers (external fat, trademark, PDO.), retailers (expiration date, selling recommendations, appearance, price). In summary, we may observe the partial utilities appreciated by the consumer (Table 5). The way of presentation is in favour of the butcher, the presence of fat has a negative effect, the trade mark and price.

Table 2. Reasons for purchase of beef. Results factorial analysis

Reasons for purchase	Mean [1]	F1 Health and Safety	F2 Tradition	F3 Variation
Healthful	2.7	880	106	073
Nutritious value	2.66	813	275	162
Quality	2.78	616	-.125	-.502
Flavor	3.73	011	845	-.220
Family requirements	3.2	070	515	231
Convenience	2.23	182	419	092
Diet variation	3.2	157	-. 056	829
Price	2.31	0,057	-.415	-.514
% Variance		26,011	18,784	13,440

[1] (1: Nothing important; 2: Little important; 3: Important; 4: Quite important; 5: Very important)   Source: Author's Empirical analysis

Table 3. Perception certification is of quality. Results factorial analysis

Reasons for purchase	[8] Mean	F1 Safety and control	F2 Confidence or belief
More control [2]	3.60	741	323
Greater seg [5]	3.55	725	456
Publicity and promotion [7]	1.99	-.724	-.162
Higher price [1]	2.89	-.551	464
Nutritional value [4]	2.06	069	726
Environmental Control [3]	2.62	251	638
Traceability [6]	3.19	280	623
Variance		39,740	16,321

N = 511

Source: Author's Empirical study

[1] that talks about if they are perceived like more expensive products

[2] Better controlled by the sanitary authorities

[3] Produced following environmental respectful measures

[4] Products of higher nutritious value

[5] They offer higher safety and confidence

[6] There is traceability. It is necessary to aim that this concept like so was not used in the interviews, but a definition, like for example, a pursuit of the product from the producer to the final salesman.

[7] Single it consists of publicity and propaganda

[8] (1: Nothing in agreement; 5: Totally in agreement)

Table 4. Relation Consumption of quality certifications and characteristics valued at the moment of purchase

Characteristics valued at the moment of purchase	Consumption of meat of beef with Certifications of quality				
	Mean [1]	Normally Yes (34, 3%)	According to Price (15, 8%)	Never (23, 6%)	NS/NC (26, 3%)
Presence of DO [*]	2.44	3,24	2,41	1,83	1,96
Origin [*]	2.9	3,58	3,07	2,41	2,33
Distributing mark [*]	1.72	2,16	1,56	1,55	1,39
Nerves [**]	3.92	4,02	4,26	3,62	3,87
External fat [**]	3.96	4,13	4,12	3,77	3,84
Date of lapsing [*]	3.34	3,78	3,72	2,88	2,94
Court	3.31	3,41	3,32	3,36	3,13
Price [*]	2.91	2,69	3,63	2,81	2,86
Inf way preparation [***]	2.11	2,28	1,99	2,22	1,84
Recommendations selling	3.68	3,86	3,72	3,48	3,62
Appearance [*]	4.29	4,47	4,33	4,09	4,21

Source: Author's Empirical study

[1] (1: No value; 2: Small value; 3: Something; 4: Enough; 5: Very much)

[*] Level of meaning 0,01;   [**] Level of meaning 0.05   [***] Level sig. 0,10

Table 5. Partial utilities appreciated by the consumer

Attributes	Levels	Utility total
Presentation	In tray	-0,3098
	In butcher	0,3098
	Relative importance	*9,83%*
Fat	Presence	-0,8125
	Absence	0,8125
	Relative importance	*25,76%*
Trade mark	With DO	-0,6341
	Ecological	-1,2681
	Of the distributor	-1,9022
	Absence	-2,5362
	Relative importance	*30,16%*
Price	< 10 euros	-1,0802
	10 d x d 16 euros	-2,1605
	> 16 euros	-3,2407
	Relative importance	*34,25%*
Pearson's R		*0,975*
Kendall's tau		0,857

Source: Author's Empirical study

Although it is not an easy task to get significant innovation in fresh products as beef, there are some experiences in the Spanish market (Briz J. et al 2000.). Spanish consumers identify red meat with cholesterol and unhealthy conditions. There is a preference for baby beef (sucking calf), but only small percentage (20%) were available in the market. The reaction of the beef chain through the price system was to pay more for animals raised in feedlot and not in grass land. There was also the tentation to use illegal products to diminish the proportion of red color. The solution came in several ways: to get whiter meat through innovation in breeding and to change the consumer preferences moving towards red meat through advertising and promotion.

4. Conclusions

Food innovation is a condition for survival in a dynamic market. There is some inertia in food consumer behaviour related to traditional habits, to the way of living and culture. However, globalisation is moving some market segments towards new food products. Therefore, food industry should consider the strong relationship between innovation and competitiveness but also needs adequate information about the main factors to be included in their innovation process. Transparency and information through the food chain are necessary to improve both the efficiency and the interface consumer behaviour- food entrepreneur. Also, this is the first step to diminish the risk of innovation. As a way to facilitate that interaction we have shown here some results of the analysis of the Spanish beef consumer.

The results of the survey indicate that the consumption of beef meat generally varies between two to four times per week, which means that it is a common product in the diet. The year-old calf is the type of beef that is consumed in a 73.1% of the cases, within the beef consumption . The consumption of beef is related to hedonics elements, health and balanced diet. There is a concordance with the results of previous studies (Kaabia, B. et al. 2001; Bernués et al., 2003; Bredahl, 2003; Briz et al, 2001; Grunert, 1997, Werbeke, W., Viane J. 1999) with respect to the perception of the quality at the moment of purchase, price, and quality certification.

The analysis of perception of the quality and food safety is a complex process, since it is influenced not only by the product, but by other factors, as the socioeconomic characteristics and the consumption habits. In summary, at the moment of purchase the Spanish consumer mainly bases his preferences in two characteristics: the price and the presence of quality certifications. With respect to the price, it is not always associated a better quality with higher price; but quality certification is related to a superior quality. This indicates that the consumer needs an external indication which certifies that quality. We have to consider consumer behaviour as the driving force for innovation. Also, the innovation in the competitive market should be demand driven, since it is the final client. However, it is not an easy task to transmit the adequate signals to all the stakeholders in the food chain.

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