1. Introduction

The role of the food industry is crucial to the European economy, as it accounted for about 2% of EU GDP in 2010, and the whole food chain, i.e. the agricultural sector, the food and drink industry and the distribution sector, generates a value added of approximately 561 billion Euros, equivalent to 5% of EU value added, according to recent estimates by the European Association of the Food and Drink Industry (CIA, 2011).

Moreover, 4.1 million people are employed in the food industry, representing more than 14.5% of total manufacturing employees and about 18% of manufacturing firms. The whole food chain employs almost 24 million workers, corresponding to about 10% of EU employment.

In terms of turnover, the food and drink industry generates a volume of almost 930 billion EUR (about 16% of total manufacturing turnover); food and drink retail generates more than 1,000 billion EUR, agricultural holdings generate over 330 billion, and total sales of agricultural and food products generated more than 970 billion in 2009.

The role of the food industry is also crucial to the whole Italian economy and, in particular, to the manufacturing sector. This industry accounts for about 10% and 11% of total manufacturing employment and value added respectively. It represents more than 21% of the total number of manufacturing firms, with an average size of about 7 employees, compared to 9.5 for the whole manufacturing sector (ISTAT, 2011).

By looking at the balance between job creation and job loss in this sector over the last four years, a relatively positive picture emerges; this balance is positive or at least not negative, meaning that the food industry has maintained its productive capacity despite the deep economic crisis experienced by the whole European economy.

It is worthwhile noting that this result, i.e. the equilibrium between job creation and loss, contrasts with that found for the manufacturing sector as a whole, which has experienced a significant negative balance.

One possible explanation for this may be the good performance in
terms of exports of the food industry during the period 2011-12. Food industry firms returned to pre-crisis levels and have experienced an increase of 11.2% in exports between mid-2011 and 2012, thus suggesting that the ability to compete in international markets is a key factor for promoting firms’ growth and at least maintaining current employment levels.

![Graph showing real disposable income in Italy](image)

**Figure 1.1: The decline of real disposable income in Italy**

This evidence is even more relevant if one considers the fact that the internal market is facing significant threats, which have been exacerbated during the current crisis. In particular, it has to be emphasized that consumption is only constant, if not declining, and recent surveys have shown that households are significantly reducing food and drink product purchases as the crises deepens (ISTAT, 2012a, 2012b).¹

In addition, and even more importantly, real disposable income in Italy has declined to levels which were observed at the beginning of the 2000s. This is the most remarkable fact and suggests that families’ living standards have dramatically declined over the last decade. The recent crisis has only intensified a structural phenomenon which originated at

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¹A recent household consumption survey emphasized that almost 36% of households have reduced the quantity of food and drink products purchased. Of these households 65% declare a reduction in quantity only, while more than 13% also declare a decrease in the quality of goods purchased.
the end of the 90s. External demand is, therefore, a crucial driver for expanding production and increasing a firm's competitiveness, and also for increasing its ability to produce new and better-quality products.

It is therefore crucial to analyze the patterns of technological innovation in the food sector, in order to identify its main characteristics and thus determine both the opportunities and the threats which firms may face. To this end, we present an in-depth analysis of innovation activities in the food manufacturing and specialized food retail sector. Using the responses to the most recent Community Innovation Survey (CIS6), in Section 2 we provide a comprehensive description of technological and non-technological innovation activities characterizing the food supply chain. With reference to technological innovation, we also provide a description of regional patterns of innovation, with specific focus on the investments in innovation undertaken by firms. Our investigation also provides a tentative description of the environmental implications of firms' innovation activities and of the relationship between innovation propensity and corporate structure, distinguishing between domestic- and foreign-owned firms.

In the following sections we focus specifically on innovation activities performed by food manufacturing firms. By combining the CIS data with accounting information available from firms' balance sheets, it is possible to explore at the firm level relationships between innovation activity, on the one hand, and economic and financial performance, on the other. In Section 3 the determinants of technological and marketing innovation are analyzed empirically using a logistic discriminant approach, while complementarity patterns between product innovation and marketing innovation are tested for in Section 4 by using a recursive bivariate probit model. Research activity and the roles of firm profitability and availability of funding in enhancing in-house R&D investments are investigated in Section 5 by using a Tobit equation with selection. Our general conclusions are given in Section 6.

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