Extra-Core Production and Capabilities: Where is the Food Industry Going?

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Abstract

Through the lens of resource-based theory, this study examines the extra-core food industry capabilities needed to diversify secondary production (heterogeneity) in order to overcome entry barriers into destination markets (mobility). Using a well-structured database of Eurostat supply tables (EU-27), results demonstrate: a) entering a food core business need not be difficult for newcomers; b) The EU Food Industry has capabilities to undertake extra-core business activities below the average of the EU-27 system; and, c) the food industry's secondary production is too heterogeneous and distributed over a wide range of activities. This study highlights productive trends, hypothesizing capacity needs and creates the necessary framework for further investigation.

Keywords: food industry, secondary productions and markets, resource-based theory, portfolio diversification, capabilities

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Introduction

In general, industries aim to maintain strong positions in their core business markets while developing other types of new business opportunities as they arise. Extra-core business diversification is largely the result of managerial choice and is performed by adding secondary production to the primary business operations. Secondary production is relatively an under-investigated field of research primarily due to the difficulty of separating the value of primary, from secondary production in each sub-sector. For this reason, evaluations are often limited to specific products, unstructured, un-standardized through homologated classifications, and/or subject to duplications (Kneafsey et al. 2013, 76). In order to enable both managers and scholars to benefit from these studies, it is necessary to start with a complete, standardized, and certified database, without duplication. After extensive research, Eurostat found a solution to this age-old methodological and accounting problem within the framework of the ESA-95 system, and it works well with the UN-System of National Accounts (Eurostat 2008). Over the last five years, Eurostat has also disseminated a new set of input-output tables which they named *Supply and Use*. They are consistent with the NACE and CPA Classifications and are compatible with the UN - ISIC classifications. The supply table (by product and industry) provides the value of main production for each industry, as well as secondary productions that are in the core competences of other industries. It also provides the value of an entire group of homogeneous products (e.g. food products) supplied to the economy as a whole by each industry and broken down by the industries that deliver it as a principal product.

This study analyzes available data under the lens of the resource-based theory – RBT (Penrose 1959, Wernerfelt 1984, Barney 1991, Peteraf 1993, Barney et al. 2011), and of its spin-off, the knowledge-based view – KBV (Grant 1996), focusing on the importance of competitive advantage defensibility (Porter 1980, Porter 1985, Grant 1999, Valdani 2003).

Once a product a competitive advantage is achieved, it should continue to exist, becoming "sustained" despite attempts by others to duplicate it (Barney 1991, Lippman and Rumelt 1982, Rumelt 1984). The organizations should be deployed resources, such as knowledge and 'dynamic capabilities', in a controlled manner to assure the maintenance of heterogeneity and to prevent the increase of mobility to other businesses (Penrose 1959, Grant 1996, Teece et al. 1997). In the context of the RBT, the definition of a firm's strategy requires resources to be both acquired (Combs et al. 2011, Wernerfelt 2011, Maritan and Peteraf 2011, Makadok and Barney 2001), and developed (Sirmon et al. 2011, Zahra et al. 2009, Sun et al. 2010). Market share can represent a resource for the firm, but it does not have a value in itself. This leads to a controversial relationship between a firm's market share and its profits. Market share "is a symptom of valuability, and can become a means of obtaining something valuable." (Wernerfelt 2005, 11).

Presently, there are no outstanding studies which have adopted business-to-business (B2B) market share to map extra-core capabilities for food firms within the RBT. The main objectives of this study are: 1) to quantify the value of activities included in the food industry portfolio that are classified by Eurostat as primary and secondary production which pertain to the core business of other industries. This may reveal the degree of heterogeneity of the food industry; 2) to create a specific Boston Consulting Group (BCG) Growth-Share Matrix in order to verify food industry

choices and expectations regarding its paths of diversification (Henderson 1970), and 3) to evaluate, through the construction of entry barrier and invasion indexes, the difficulties facing the food industry in its attempts to diversify its portfolio. Suggestions about potential opportunities for developing extra-core business activities are outlined taking into account what hinders the mobility of the resources towards extra-core business. This foundation makes it possible to deduce something about how well extra-core capabilities work and determine how much the knowledge existing food firms require to assure competitive survival and support their sustained competitive advantage – especially in the most lucrative extra-core downstream activities representing a "profit imperative" in the manufacturing industry (Wise and Baumgartner 1999, 133).

The study is organized as follows: theoretical approach, materials, methods, and findings. Finally, a discussion and concluding remarks are presented.

Theoretical Approach: Resources, Capabilities, and Mobility Barriers in the Framework of the Knowledge-Based View

In the context of the RBT, the definition of a firm's strategy requires the acquisition and development of specific resources to guarantee competitive survival and to create a sustained competitive advantage. These resources are sub-divided into actual resources—in the strict sense, and capabilities (Makadok 2001, Amit and Schoemaker 1993). The former are stocks of available factors that are owned or controlled by the firm, while the latter are capacities which are necessary to exploit and preserve resources (Amit and Schoemaker 1993, 35). Following the traditional management approach, foresight may enable managers to achieve the firm's goals, seize opportunities and adapt the production to its core and extra-core business (Hamel and Prahalad 1994). Capability is a special type of firm-specific resource (organizational, embedded, and non-transferable) that is utilized to improve the productivity of the other resources possessed by that business (Makadok 2001, 389). The firm's extra-core capabilities may be best defined as organizational resources that can be deployed to create value outside the generating industry. These tangible and intangible resources represent the link that connects firm's strategies, tactics, and technologies to the productivity of its marketing management initiatives. When robust enough and acknowledged, that link may facilitate the horizontal and vertical integration of productive processes downstream towards the final clients.

Following the RBT, not all firm's capabilities can become sources of sustained competitive advantage. In her seminal study, Edith Penrose (1959) underlined that the firms' success in the long term largely depends on the availability of a well-established set of resources. Since then, the RBT scholars have produced conceptual spillovers, such as the 'Knowledge-Based View' – KBV (Grant 1996), and 'dynamic capabilities' (Teece et al. 1997), built respectively on the importance of specific knowledge, and of human resources. For the purpose of this article, Machlup's (1980) definition has been adopted. He individuated the following three groups of elements constituting knowledge: i) being able to explain, demonstrate, talk about, perform; ii) being acquainted with, aware of, familiar with; iii) distinguishing, interpreting, remembering, recollecting, recognizing, and understanding. From this conceptual basis, asymmetry in the economics of knowledge represents one of the main factors explaining the existence of firms (Demsetz 2000), and also one of the main resources needed to create value (Kaplan et al. 2004).

Knowledge within the RBT has been described in terms of its four attributes: 'transferability' (manageability), 'capacity for aggregation' (knowledge added), 'appropriability' (the ability of the knowledge owner to obtain a return equal or superior to the value created by that knowledge), and 'specialization in knowledge acquisition and storage' (Grant 1996, 111-112). This study does not analyze specific extra-core capabilities, but quantifies their key-features in terms of heterogeneity and low-mobility.

Heterogeneity and low-mobility are features of primary importance for the RBT (Barney and Hoskisson 1989). It suggests that both competitive advantage and sustained competitive advantage cannot exist when firm's resources are perfectly homogeneous and/or mobile (Barney 1991, Peteraf 1993). In relation to this, the first research hypothesis of this study is:

> *H1: It would be reasonable to expect some level of heterogeneity and immobility of resources.*

In general, position barriers represent the mechanism that enables a firm to maintain such a form of equilibrium. The first mover advantage may represent the first mechanism to be activated in order to exploit opportunities and create heterogeneity (Lieberman and Montgomery 1988). For example, the first firm which enters into an industrial extra-core business, implementing a strategy ahead of any other competing firm, can gain added capabilities in the sector where it enters that are not yet possessed by other firms. The first mover advantage may be captured because the firm possesses a unique knowledge or foresight (Lieberman and Montgomery 1988). However, if current competitors and potential entrants also possess the same knowledge it is unlikely that they would gain a competitive advantage. The RBT suggests that to remain in the condition of first mover, firms must control access to the added knowledge. Whenever different firms control identical knowledge, none of them may be able to achieve a sustained competitive advantage through the exploitation of this resource.

The second mechanism to enact to be able to achieve a sustained competitive advantage is that of 'entry barriers' (Bain 1956), or, more generally speaking, 'mobility barriers' (Caves and Porter, 1977). To manage the competition, firms need to determine the height of the entry barriers in the destination markets, in order to protect their added knowledge. On the one hand, mobility barriers may help firms in creating and defending the heterogeneity required to achieve competitive advantage, and to generate above-normal economic performance. On the other hand, the existence of mobility barriers becomes possible only if current or potential entrant competitors are heterogeneous in terms of the resources they possess, and/or if these resources are imperfectly mobile (Barney et al. 1989). Consequently, the second research hypothesis is the following:

> *H2: Entry barriers to the acquisition of extra-core capabilities for food firms are lower than those existing for firms active in other industries.*

In short, entry barriers and high mobility barriers may activate heterogeneous capabilities, and may allow a firm to defend its competitive advantage against competitors who do not have the required extra-core capabilities. By verifying these two hypotheses, it will be possible to portray the competition that is created among companies regarding the acquisition of new capabilities (Wernerfelt 2011).

Materials and Methods

This study utilizes the EU-27 Supply matrixes that reflect the primary characterizing (primary output) and secondary non-characterizing (secondary output) production activities of industries. In order to distinguish between the primary and secondary output of an industry, the relationship between industries and products must be defined, based on the criteria of industrial origin. Each product is assigned to one individual industry that, by definition, is the primary producer of that product, thus each industry can be defined by the list of primary products that are attributed to that industry (Eurostat 2008, 18). The share of secondary outputs varies across industries. "Secondary outputs are usually smaller than primary outputs, as units are classified according to their main activity. However, the size of secondary outputs also depends on the level of aggregation, and on the statistical unit used. In the case of enterprises, the secondary output will be much more frequent and higher in its output share than when the information is directly collected from local kind-of-activity units" (Eurostat 2008, 19). Generally, survey results mainly concern enterprises with numerous secondary activities, and it is the principal activity of an enterprise that determines its allocation to a specific industry classification.

The columns of the Supply Matrix present the production program of each industry, including the output of its primary and secondary productions. For each bundle of products listed in the rows (following CPA classifications), it is possible to find the industries that produce those goods as their primary or secondary production listed in the columns. The principal activity or production of an industry is reported on the diagonal of the Supply matrix, while secondary activities are listed off the diagonal (Eurostat 2008, 71).

For the years 2000-2007, the European tables published up to 2012 used the NACE Rev. 1.1 statistical classification of economic activities. Until 2004 the geographical reference was the EU-15 block, and the EU-25 or EU-27 thereafter. Since 2013, the EU national accounts domain as a whole has implemented the NACE Rev. 2 classification (that is harmonized with the United Nations ISIC Rev. 4 classification). The new series of input-output tables (featuring 65 groups of products in the rows, and 65 Industries in the columns) begins with the 2008 and 2009 years for the EU-27 and EA-17 countries. Although now five years old, these tables are the only available source that is freely accessible, reliable, and comparable with the tables of all the EU countries. The construction of the tables for the whole EU-27 economy necessarily requires the availability of the individual tables for all the countries involved. At the present time, the 2010 table for the EU-27 countries has not yet been published, as the tables of four countries are still missing.

The first part of the study relates to the activities (included in the new NACE Rev. 2 classification under Section C) denoted as "Manufacturing", which is split into 24 divisions, among which there are the "Manufacture of food products, beverages, and tobacco products" (divisions 10, 11, and 12). These activities together encompass a total of 18 classes of products. Division 10 - "Manufacture of food products" has nine groups, articulated as: 10.01 Processing and preserving of meat and production of meat products; 10.02 Processing and preserving of fish, crustaceans, and mollusks; 10.03 Processing and preserving of fruit and vegetables; 10.04 Manufacture of vegetable and animal oils and fats, and dairy products; 10.05 Manufacture of dairy products; 10.06 Manufacture of grain mill products, starches, and starch products; 10.07 Manufacture of bakery and farinaceous products; 10.08 Manufacture of other food products; and

10.09 Manufacture of prepared animal feeds. Division 11 - "Manufacture of beverages" constitutes seven groups: 11.00 Manufacture of beverages; 11.01 Distilling, rectifying, and blending of spirits; 11.02 Manufacture of wine from grape; 11.03 Manufacture of cider and other fruit wines; 11.04 Manufacture of other non-distilled fermented beverages; 11.05 Manufacture of beer; 11.06 Manufacture of malt; and 11.07 Manufacture of soft drinks, production of mineral waters, and other bottled waters. Finally, Division 12 - "Manufacture of tobacco products" encompasses the group 12.00 Manufacture of tobacco products (Eurostat 2008).

The inter-temporal comparison (2000-2009) has been used as a reference for the NACE Rev 1.1. database Division 15 - "Manufacture of food products and beverages", not including tobacco products, which are classified under Division 16. The data for 2008-2009 have then been harmonized for food with these classifications. For the purposes of this study, therefore, secondary activities/productions are all those activities which are not included in the above definitions, and which are appropriately classified under other industries/groups of products, according to the same NACE Rev. 2/CPA classification.

In the second part of the study, after having calculated the economic importance of the food industries' primary and secondary production for EU-27 (2009), articulated by the core competences of industries, the methodology of BCG has been applied. This step entails the construction of the Growth-Share Matrix (GSM) for EU-27 in the years 2000-2009, appropriately modified for the purposes of this study. Following this globally applied matrix, industries have been subdivided in four groups with reference to B2B market environments, as follows: a) "stars", bigger and growing environments; b) "question marks", smaller but growing; c) "cows" bigger, but growing slowly; and d) "dogs" smaller and decreasing environments. These typologies, however, only represent the result of past investment trends by food firms in specific extra-core activities, and do not provide indications about firm's capability to successfully develop new strategic paths for further downstream diversification in its portfolio of secondary products.

To overcome difficulties, there is a need for the height of the entry barriers in the destination markets to be determined through specific indexes that are described below. In the literature there are other barrier indexes, but these are not suitable for the purposes of this study (Orr 1974, 39, Mann 1966). The originality of Chang's indices (Chang and Iseppi 2012, 112) is essentially that: (i) each industry/country is compared using a reference system of economic or geographical average behavior; (ii) the symmetry is fundamental: it considers, on the one hand, the insulation ability of each industry to build-up entry barriers against the entry of the reference industry and, on the other, the invasion ability of other industries to enter the core business area of the reference industry; and (iii) it also highlights the balance between the performance of entry barriers and the invasion ability. These indices have been applied in order to determine whether the markets of industries into which the food industry is entering and hoping to expand its market share have high or low entry barriers that prevent or allow penetration. The indices allow for both an ordering among individual sectors and individual countries, and for a measurement of the investigated phenomena. For each country (and for the complex of countries as a whole), the Supply matrix is taken by product and by industry. For a given industry i (n is their number), P_i denotes the proper production (namely the production in the industries' primary field of competence), S_i represents the industries' secondary production in all the other groups of

products, and A_i is the total secondary production of all the other industries involved in the core business of the given industry i. It is necessary to normalize the indexes, specifically:

(1) $p_i = P_i$ normalized by $\sum_{j=1}^{n} Aj$

(2) $a_i = A_i$ normalized by $\sum_{j=1}^{n} Pj$

(3) $s_i = S_i$ normalized by $\sum_{j=1}^{n} Sj = \sum_{j=1}^{n} Aj$

The first index is Chang's Entry Barrier Index:

(4) $$\Phi_i = \frac{\lg \dfrac{a_i}{p_i}}{1 + \left| \lg \dfrac{a_i}{p_i} \right|}$$

The value ranges from -1 to +1. If $a_i = 0$, no penetration happens, hence the index attains the maximum +1. The minimum -1 represents a theoretical limit case in which the entire production of an industrial sector is actually the secondary production of other industries.

The second index is Chang's $\sum_{j=1}^{n} Pj$ Invasion Index. This compares the differences between external secondary activities and internal (incoming) secondary activities, and normalizes them with the whole of the balance of secondary activities for all the sectors.
The Chang Invasion Index is:

(5) $$I_i = \frac{(n+1)(S_i - A_i)}{\left(\sum_{i=1}^{n} |Sj - Aj| \right) + n|S_i + A_i|}$$
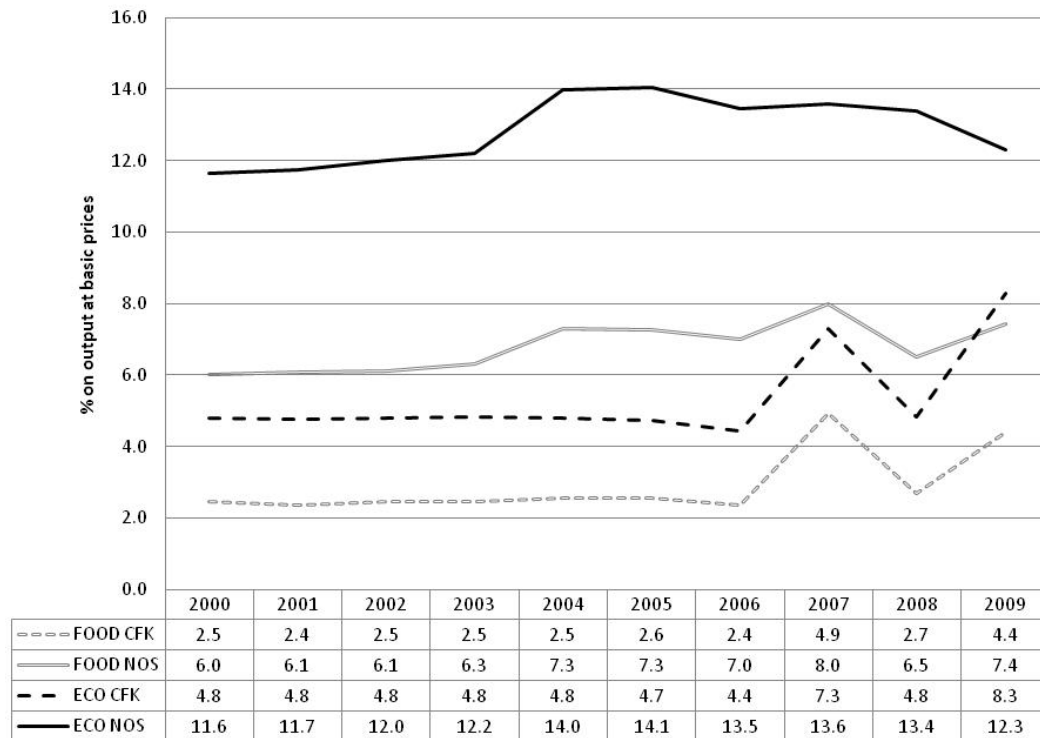
(Refer to index 13 in Chang and Iseppi 2011). The index ranges from -1 to 1. "Of course negative values mean that the invasion undergone by the industry is greater than the penetration it performs, 0 (zero) means balance, positive values mean that it expands more than it is invaded. Thus the index is not only connected to entry barriers, but is also tied to the capability or interest to overcome the entry barriers of other sectors" (Chang and Iseppi 2012, 113).

The Heterogeneity of Food Industry Diversification in Secondary Activities

Total domestic production at basic prices for the EU-27 whole economy in 2009 amounted to €22,028.66 billion. Adding imports of €1,465.66 billion and direct purchases made abroad by residents, and subtracting the Cif/fob adjustments on imports, produces a total figure for EU supply of goods and services of €23,649.94 billion, including exports. In terms of percentage share, primary production, being the sum of the core business activity of every industry, accounted for 92.6% of this total production (with a total value of €20,398.84 billion), while secondary production accounted for only 7.4% (a total of €1,629.82 billion).

Using this foundation, the industry named by NACE Rev. 2 as "Manufacture of food products, beverages and tobacco products" (hereafter food industry) had a total production of €882.15 billion, of which €844.76 billion pertained to primary production (95.76%), and €37.39 billion (4.24%) to secondary production. As can be seen, the incidence of primary production of the food industry is above the EU average (95.76% vs. 92.6% respectively), whilst the contrary is the case for secondary production (4.24% vs. 7.4% respectively). This implies that the food industry is less able and capable to undertake activities outside of its core business than the mean for the economy as a whole. The compound annual growth rate of food industry secondary products in the period 2000-2009 was 4.18% compared to 5.14% for the EU-27 manufacturing system as a whole. This suggests that food industry firms operating outside of their core business may have a first mover advantage. In the same period, the group of products (CPA), named food products, beverages, and tobacco products (hereafter food products), derived its total production of €878.7 billion from the activities of both the food industry and all other industries (rest of the economy). The value at basic prices of food products produced by other industries amounted to €33.9 billion, being only 3.86% of total Food Products, whilst the food industry produced the overriding part (96.14% compared to the primary production figure of 92.6% for the EU economy as a whole). These findings are a clear sign that the food industry has a medium difficulty in undertaking extra-core production, but that exogenous and endogenous barriers to entry into the market of food industry core business are of medium height in comparison to the rest of the economy (Table 2). In synthesis, the EU Food Industry has the potential to enter into the core activities of other industries, even though it has to date not managed to achieve even the average share of diversification of the economy as a whole. Meanwhile, the above figures demonstrate that entering the markets of food industry core business is, in theory at least, not easy for most firms from other industries.

From a functional point of view, Food Products can be classified as Final Manufacture (Chenery and Watanabe, 1958) since they mainly go directly to the final consumer, and firms buy intermediate inputs on output, which is above the mean of the economic system as a whole (74.4% vs. 52%). As a result of its investment policy, food industry performance is suboptimal since it gains a Net Operating Surplus (NOS) on production of 7.4% that is well below the average 12.3% for the EU economy as a whole. In reality its Consumption of Fixed Capital (CFK) on output is only 4.4% whilst that of the economy as a whole is 8.3%. Respectively, the CFK and NOS of the whole EU economy are consistently above those of the food industry (Graph 1). These figures indicate food industry's substantial inability in the medium term to adapt its production structures to the levels of the wider economy in order to increase the share of its operating surplus on output.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
= = = FOOD CFK	2.5	2.4	2.5	2.5	2.5	2.6	2.4	4.9	2.7	4.4
—— FOOD NOS	6.0	6.1	6.1	6.3	7.3	7.3	7.0	8.0	6.5	7.4
– – ECO CFK	4.8	4.8	4.8	4.8	4.8	4.7	4.4	7.3	4.8	8.3
—— ECO NOS	11.6	11.7	12.0	12.2	14.0	14.1	13.5	13.6	13.4	12.3

Graph 1. % Share of consumption of fixed capital and net operating surplus on output (2000-2009).
Source. Authors' elaboration from Eurostat data

During the initial phase of the economic crises, the percentage share of the CFK on output had a fluctuating trend, both in the economy as a whole and in the food industry in particular. At the same time, the share of the NOS was dropping in the EU economy, while that of the food industry showed a marked recovery. Only by continuing this positive performance can the food industry hope to at least partially fill the gap.

In regard to the diversification of the food industry secondary production, 18 groups of products together encompass the main part of its efforts, considering those that furnish at least or near 1% of its secondary production (Table 1). These groups account for 95.9% of food industry secondary production, whilst the remaining 46 groups of products together represent only 4.1%. These data indicate that the degree of heterogeneity of the food industry secondary activity portfolio is too high and not strongly concentrated, since the first five groups of products constitute only 75.48% of food industry secondary production (in Agriculture the equivalent figure is 87%). The first research hypothesis (H1) is thus verified.

The food industry performs downward vertical integration with some service activities in the fields in which it has some sort of experience, either in conservative frame or in up-to-date evolution. The ten most important activities, in decreasing order of importance, are: wholesale trade services; chemicals and chemical products; retail trade services; real estate services; other professional, scientific and technical services; architectural and engineering services; technical testing and analysis services; accommodation and food services (previously named - until 2007 - hotel and restaurant services in NACE Rev. 1.1.); legal and accounting services; products of

agriculture, hunting and related services; and basic pharmaceutical products and pharmaceutical preparations. The principal field of secondary activity of the EU-27 food industry is wholesale trade services, with a value of €18.23 billion, being about 48.7% of the total secondary production (downstream in the Value Chain - VC). Thus the food industry delivers part of its production directly, bypassing wholesalers.

The next most important secondary activity is constituted by chemicals and chemical products (upstream in VC). In the food production process, chemicals are complementary products necessary for quality control and food safety. In this technological context, the food industry has acquired a bundle of extra-core competences that it properly exploits. The third most important food industry secondary activity is yet more downward in the value chain, specifically in the retail trade environment. This is one of the most profitable activities, in accordance with the mainstream-manufacturing model of diversification, since it can be split into a higher tier concentrating on rich consumers.

Table 1. Food industry secondary and primary production in the supply chain (EU-27, 2009).

No	Code	Secondary Products (CPA) of Food industry	Millions of Euro	% Share
29	CPA_G46	Wholesale trade services, except motor vehicles and motorcycles	18,225	48.73
11	CPA_C20	Chemicals and chemical products	3,505	9.37
30	CPA_G47	Retail trade services, except motor vehicles and motorcycles	2,545	6.80
44	CPA_L68B	Real estate services (excl. imputed rents)	2,301	6.15
50	CPA_M74_M75	Other professional, scientific, and technical services; veterinary services	1,657	4.43
47	CPA_M71	Architectural and engineering services; technical testing and analysis services	956	2.56
36	CPA_I	Accommodation and food services	863	2.31
46	CPA_M69_M70	Legal and accounting services; services of head offices; management consulting services	696	1.86
1	CPA_A01	Products of agriculture, hunting, and related services	637	1.70
12	CPA_C21	Basic pharmaceutical products and pharmaceutical preparations	629	1.68
48	CPA_M72	Scientific research and development services	597	1.60
34	CPA_H52	Warehousing, and support services for transportation	578	1.55
28	CPA_G45	Wholesale and retail trade and repair services of motor vehicles and motorcycles	578	1.55
31	CPA_H 49	Land transport services, and transport services via pipelines	496	1.33
51	CPA_N77	Rental and leasing services	431	1.15
24	CPA_D35	Electricity, gas, steam, and air-conditioning	414	1.11
27	CPA_F	Construction and construction works	391	1.05
40	CPA_J62_J63	Computer programming, consultancy, and related services; information services	368	0.98
		Food industry main fields of activities	**35,867**	95.92
		Other industries < 1% on the Total	1,525	4.08
		Total Secondary Production	**37,392**	100.0
		Principal Production	**844,756**	
		Total production of food industry	882,148	

Source. Authors' elaboration from Eurostat data.

This is the state-of-the-art of the food industry portfolio. The has a rather higher than average potential to also diversify its secondary production upstream by vertical integration into the Agricultural field of competence, and thus secure important sources of raw materials for itself. (Chang and Iseppi 2011). However, the exploitation of this product diversification does not seem to be among the priorities of the EU Food and Beverage Industry, considering that Agriculture is its second largest client and its main supplier (Chang and Iseppi 2011, 32). In fact, in 2007 it produced €1.07 billion of agricultural goods, corresponding to only 3.01% of its total secondary production, but in 2009 the agricultural production of the food industry further decreased, both in value and in share, falling to €0.637 billion and 1.7% respectively.

Instead the food industry's strategy of diversification prefers to expand its key complementary activities through related or concentric downward vertical integration, towards the Wholesale and Retail trade, and pure or conglomerate diversification activities mainly into the field of competence in Chemicals, for the reasons outlined above (Chang and Iseppi 2012). Meanwhile, the food industry focuses its attention only partially, and with a negligible and decreasing percentage share, on accommodation and food (hotel and restaurant) services (€0.86 billion being 2.32% of its total secondary activity in 2009, compared to €1.33 billion and 3.74% share respectively in 2007), considering that this sector is traditionally its main client (Chang and Iseppi 2011, 32).

As is well understood, smart manufacturers should aim to create new business models to capture profits at the end of the value chain, and to provide steady service-revenue from marketing and auxiliary services. This may allow them to capture a larger share of income in subsequent phases of the production-distribution process (Holland and Bruch 2010). However, during the recent economic crises the growth rate of those food industry secondary activities dropped below the average of the whole food industry.

There are therefore signs that the European Food Industry, focusing its interests on wholesale, is only partially pursuing a downstream vertical integration model, and in fact identifies the most lucrative activities even more downstream, specifically in the provision of services such as retail. This is the "profit imperative"! (Holland and Bruch 2010). Nevertheless there was, in 2009, an imbalance between the sale value achieved by the food industry in the wholesale trade market, which corresponds to €18.22 billion of €1,100.16 billion, and that in the retail trade market, which is only €2.55 billion of €770.12 billion. The share of the food industry market is respectively 1.66% and 0.33% of total domestic sales of those markets. On the contrary, smart manufacturers are creating new business models to capture profits at the end of the value chain, and to provide steady service-revenue. Moreover, in the manufacturing context, the revenues from downstream (high margins) may represent 10 to 30 times the annual volume of the underlying product sales! (Wise and Baumgartner 1999, 134). According to mainstream thought, in order to grab value downstream, smart food manufacturers should focus their attention on: i) the expansion of the food value chain definition until it includes both intermediate and final services; ii) customer loyalty rather than operational excellence; iii) rethinking their vertical integration (Wise and Baumgartner, 1999, 134). The best way to go downstream envisages the sale of products as a means to provide future services associated with commodities, on the basis of the following four business models: a) embedded services; b) comprehensive services; c) integrated solutions; and d) distribution control.

Trends in the Food Industry Secondary Activity Portfolio

For the purposes of positioning each industry within its competitive environment, this study has applied the BCG methodology, and in particular the *Growth-Share Matrix* developed by Bruce Henderson (1970), which has been appropriately modified. The model is useful in brand marketing, strategic planning, and production management. Despite some criticisms of this method, due mainly to the controversial relationship between market share and profits, and the difficulties of defining its strategic role in rapidly evolving markets (Collis & Montgomery 1995), it allows a first-general classification of B2B structured markets as competitive environments.

For comparison in the period from 2000-2009, the data of old and new series have been linked. Therefore, the captions and the statistics may not coincide with previous ones in the following analysis. The compound annual growth rate of each food industry extra-core production (y-axis of the GSM graph, Figure 1), as well as the logarithm of its percentage share (for 2009) of total secondary production (x-axis of the graph), have been calculated for the EU-27 countries. This is an alternative application of GSM, since the intention is to establish the position of secondary activities within the food industry portfolio, rather than their competitive position in the destination market. In the graph, the vertical axis crosses the horizontal axis as usual at 50% of the share of the biggest competitor (for the secondary activity of its portfolio), namely the Wholesale trade (22.19%; log=1.35). The Horizontal axis crosses the vertical one at the level of the average compound growth rate of the food industry secondary activities as a whole (4.18% in 2000-2009).

The obtained results enabled the classification of food industry secondary production under the 4 classical typologies shown from left to right in Figure 1.

Stars are fast-growing investments by the food industry outside its core business, which have a high impact on its secondary activities. A *Star* might only be cash-neutral, despite its strong position. Large amounts of investment may be required to defend their position against competitors.

Question Marks are fast-growing investments with low share of food industry secondary production. Substantial net cash input is required to maintain or increase their production share.

Cash Cows have a high secondary production share, but are slow growing. These should generate substantial cash inflows ready for using in other investments.

Dogs are secondary productions with low production share and slow-growing investments, and generally regard mature product in the final phase of their life-cycle. These investments tend to have a negative cash flow, which is likely to continue.
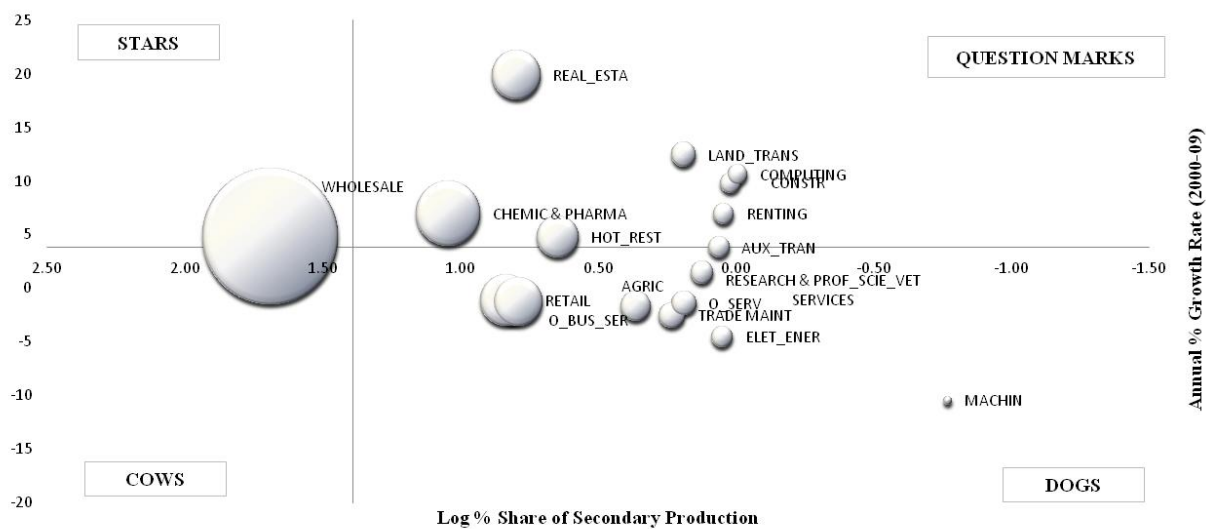
Figure 1. Growth-Share Matrix of secondary production of the EU-27 food industry (2000-2009).
Note. [1]First sixteen industries >1% in the share. [2]The dimension of the bubbles is related to the respective share of secondary production.
Source. Authors' elaboration from Eurostat data.

From the classification of the Growth-Share Matrix (2000-2009) for EU-27 above (Figure 1), the composition of the food industry secondary production portfolio can be seen below in Graph 2.

The *Wholesale* trade is at the same time positioned both in the *Cows* and the *Stars*, and is thus the main source of both cash and cost burden for the food industry, whilst it has great potential to become entirely a *Star*. It engenders safe investments, although it is growing at a slightly higher rate than most food industry secondary activities. This cash flow can provide funds for other investments, such as in the area of Research and development services that are growing fast (120.24%), particularly in the current period of economic crises (Graph 2, right side).

Moreover, from the Migration Graph (Graph 2), which represents the stability or the upward or downward trend (stable, up and down arrows respectively) of activities in the ranking of food industry secondary production share, it results that research has scaled as many as six positions in the portfolio (2000-2009), rising from 14th to 9th place. This may be the effect of aggregation with advertising and market research services, and especially with other professional, scientific, and technical services, and with veterinary services, which was not previously explicated by the statistics (Chang et al. 2013). However, this escalation demonstrates the clear interest of the food industry in direct investments in this field.

Ranking 2000		Migration trend	Ranking 2009		Compound annual growth rate		GSM Classifica-tion
Food Secondary production	Initial Position		Final Position	Ranking 2009	2000-09	2007-09	
WHOLESALE	1		1	WHOLESALE	4.82	7.54	Cow-Star
RETAIL	2		2	CHEMIC & PHARMA	6.97	1.69	?
REAL_ESTA	3		3	RETAIL	-1.16	-7.07	Dog
CHEMIC	4		4	RESEARCH & PROF_SCIE_VET S.	19.87	120.24	?
O_BUS_SER	5		5	REAL_ESTA	-1.29	-8.42	Dog
HOT-REST	6		6	O_BUS_SER	4.80	-17.62	?-Dog
AGRIC	7		7	HOT-REST	-1.64	-19.41	Dog
TRADE_MAINT	8		8	AGRIC	-2.55	-22.82	Dog
O_SERV	9		9	AUX_TRAN	12.45	22.63	?
RESEARCH	10		10	TRADE_MAINT	-1.42	-11.42	Dog
LAND_TRAN	11		11	LAND_TRAN	1.49	-14.30	Dog
RENTING	12		12	RENTING	3.79	13.48	Dog-?
ELET_ENER	13		13	O_SERV	-4.56	-15.30	Dog
AUX_TRAN	14		14	ELET_ENER	6.94	6.45	?
MACHIN	15		15	CONSTRUC	9.81	25.89	?
CONSTRUC	16		16	COMPUT	10.58	15.01	?
COMPUT	17		17	MACHIN	-10.47	-53.26	Dog

Graph. 2. Industry migration in the rankings of the main food industry secondary productions and growth rate (2000-09).
Source. Authors' elaboration from Eurostat data

Dogs are numerous (8), among which are: *Retail*, *Real Estate*, *Hotels and Restaurants*, *Agriculture*, etc. It is clear that the food industry is currently reducing the weight of dogs in its investment plan. They are resource dependent, and regard mature products only in the final phase of their life cycle. Nearly all *Dogs*, except *Agriculture*, have markets with low barriers to entry (Table 2), belonging to the III and IV quartile in terms of entry barriers, and so are subject to be invaded or heavily invaded by new entrants (III or IV quartile in terms of invasion index), with the exception of *Retail* and *Agriculture*, which are both predominantly invaders. The latter is also defended by very high entry barriers (Figure 1; Table 2 – I quartile).

There are no activities in the *Stars* that the food industry can hope will become *Cows* or able to be milked for further investments.

Question Marks are also numerous (8). These are the investments made by the food industry to diversify its portfolio assets, which are growing at a higher than average rate (except *Renting*, although this too is growing faster in the last period – Graph 2), and represent a real opportunity, albeit at different levels of development and portfolio share. Only the *Chemical* industry remains on the borderline of *Stars*, although it is not the most dynamic in terms of growth. In the Migration Graph, *Chemical* scaled 2 positions in the share, but this may be the effect of the aggregation with *Basic Pharmaceutical Products* and *Pharmaceutical Preparations*. Notwithstanding, it is important to note the commitment of the food industry in this field. The industry has high entrance barriers (II Quartile) and a high propensity to invade (III Quartile), but the food industry should have no problems to maintain this type of activity, owing to its specific

knowledge acquisition (capabilities) and development, as the food industry possesses infrastructures and technological competences in this field (Chang et al. 2013, 303).

Among the *Question Marks* in 2007, there were *Hotels and Restaurants*, and *Agriculture*, but these have not withstood the economic crisis, and have slipped down into the *Dogs*' domain (with a compound annual de-growth rate of around 20%; Graph 2). The "real estate bubble" has negatively affected some secondary activities of the food industry because they do not have enough marketshare to face the challenge of the ongoing crisis through economies of scale. From 2007 to 2009 this crisis has frozen or even reversed food industry expectations for at least 9 out of 17 extra-core activities, as can be seen from Graph 2 (last part).

From Figure 1 and Table 2, it appears that the food industry has the tendency to diversify its secondary production into the fields in which it has competence, and which have low barriers to entry (in 10 out of 14 cases), such as *Wholesale, Research*, *Auxiliary Transport*, *Computing, Renting,* etc.

Finally, notwithstanding its medium height barriers to entry, the food industry is itself invaded by other industries. The reason could be that, owing to its heterogeneity, niches arise in its market, especially in the field of experience goods. This is the case with the invasion by *Agriculture* into the fields of quality wine and olive oil.

Table 2. Classification of barriers to entry and invasion capability of the markets in which EU food industry undertakes secondary production (2007).

Industries/Groups of products	Chang's Entry Barriers Index ×100	Position in the EU Economy Ranking (Quartile)	Chang's Invasion Index ×100	Position in the EU Economy Ranking (Quartile)	Classification	
					Barriers	Capability to Invade/ Being invaded
Food products and beverages	15	II	-4	III	Medium	Balanced
Wholesale trade and commission trade	-27	IV	-3	III	Very Low	Balanced
Chemicals, chemical products, and man-made fibers	5	II	24	III	High	Invader
Retail trade services, except motor vehicles	-10	III	21	III	Low	Invader
Real estate services	0	II	-65	IV	Low	Heavily invaded
Other business services	-18	IV	-52	IV	Low	Heavily invaded
Hotel and restaurant services	-3	III	-28	IV	Low	Heavily invaded
Products of agriculture, hunting	45	I	47	I	Very High	Strong Invader
Research and development services	-43	IV	-56	IV	Very Low	Heavily invaded
Trade, maintenance, and repair services	-34	IV	-40	IV	Very Low	Heavily invaded
Land transport, transport via pipeline	-7	III	-4	III	Low	Balanced
Renting of machinery services	-40	IV	-65	IV	Very Low	Heavily invaded
Electrical energy, gas, steam, and hot water	39	I	52	I	Very High	Strong Invader
Construction work	22	II	-12	IV	High	Heavily invaded
Computer and related services	-27	IV	-32	IV	Very Low	Heavily invaded
Supporting and auxiliary transport services	-5	III	6	III	Low	Invader
Machinery and equipment n.e.c.	-14	III	1	III	Low	Invader
Other services	-33	IV	-43	IV	Very Low	Heavily invaded

Source. Authors' elaboration from Eurostat data.

This data suggests the plausibility of this study's second hypothesis (H2), according to which entry barriers to the acquisition of extra-core capabilities for food industry firms (in the destination markets of the main fields of their investment portfolio) are lower than those existing for firms active in other industries. This issue deserves further research in order to verify whether the same hypothesis holds true in every food industry destination market environment. At this stage, the impression following the RBT, is that market permeability also depends on the firm's internal capabilities, and not only on the height of the entry barriers.

Discussion and Final Remarks

This study has several implications for management. Firstly, it confirms the idea that entering the food industry core business market might not be very hard for newcomers, but it is not easy especially in a stagnant market. In that case, entry barriers and inertia may influence firms, leading them to adopt a long-term viewpoint. This is the strategic element required to optimize rents deriving from firms' market share (Rumelt and Wensley 1981, 2-16, Wernerfelt 1982, 11-19). Consequently, these core business capabilities could be managed in order to keep the level of imitation of products low, creating "isolating mechanisms" (Rumelt 1984), and barriers to competitive duplication of firms' strategic assets (Peteraf 1993, Barney 1986).

Secondly, it emerges that the EU Food Industry has capabilities to undertake activities outside its core business *below* the average, having a share of secondary production lower than the EU average. Consequently, specific capabilities aimed at empowering ancillary revenue streams need to be acquired or improved. This might be done, for example, with the implementation of internal operations pre and post-sales in related services, in order to familiarize and raise awareness among new clients, and deepen their knowledge of food experience goods. According to the Nelson classification scheme, food goods are "experience items", even though much relevant information about them is available prior to purchase (Nelson 1970, Laband 1991).

Further implications concern processes of knowledge integration on B2B markets. Food industry firms, exploring extra-core activities ahead of their competitors, could control the expected discounted future above-average returns obtainable from the newly acquired capabilities which are going to become competences. Strategically, firms could manage the price and/or the value of an extra-core capability even more precisely, if the market of factors for *that specific resource* comes close to perfect competition (Barney 1986, Dierickx and Cool 1989). Regarding upward trends, the rapidly emerging position of Research, Professional, Scientific and Veterinary Services, and Auxiliary transport demonstrates the growing attention of the food industry to innovation and logistics. This indicates the growing need for food industry firms to acquire, share, and transfer knowledge, as well as to develop capabilities for managing distribution networks. This study highlights the importance of well-structured databases for understanding B2B market acquisition and development, and firm's decision-making processes.

From a theoretical viewpoint, the escalation of the value creation process is of great importance for defending competitive advantage. As one of the most prominent RBT scholars underlined, current resources reduce the costs of resource acquisition (Wernerfelt 2011). In this respect, the above analysis suggests that food industry secondary production is too heterogeneous and distributed over too wide a range of activities, and thus of capabilities. Heterogeneity is an

attribute that may be both a strength, and a weakness. It is a strength when the degree is deliberately decided by a firm to compensate for the major costs deriving from the absence of scale economies, otherwise it can become a point of weakness. In this regard, experience teaches that the greater the scale of production, the lower the costs per product unit. It follows that if the degree of heterogeneity is too high, resulting in small-scale productions, the unit costs rise. The gap between the unit costs of primary (core business) and secondary production may widen further in relation to extra-core production, although this rise may be hidden by joint and connected costs. If the company's resources are distributed among a plurality of subtasks, the value of each secondary production does not reach the critical mass capable of filling the gap in average costs within a reasonable range of tolerance. The gap is tolerable when it is covered by the reduction of the transaction costs that the company might otherwise incur without such extra-core productions. To be coherent, the food industry should be much more selective in choosing the composition of its portfolio of secondary productions, reducing their number in order to increase production scale, and thus reduce unit costs. The first mover food industry firms need to plan the escalation of their extra-core business value creation processes (Fraser and Ginter 1988), leveraging the extra-core business capabilities they already acquired.

On the other hand, it should be noted that plurality of technical and economical knowledge favors creative innovation, whilst strict specialization encourages only incremental innovation. The growing integration of food and wholesale businesses with the Research Triangle highlights the capabilities that food industry is trying to build. Obviously costs are increasing, but in the case of successful strategies, the gains of innovation can be extremely higher, in much the same way as buying a winning lottery ticket would be.

Downward vertical integration processes in the secondary production of the food industry is primarily concerned with the wholesale trade. An intermediate channel is perhaps the most suitable first step to connecting with customers who are present in more distant markets. Food industry firms have the possibility both to expand their activity in the wholesale environment, and to optimize the balancing of sales in wholesale compared to retail markets, for example by innovating the retail proximity distribution networks. Finally, the extra-core potential capabilities of food industry firms are mainly related to functions of marketing, sales, transportation, and logistics.

This study seeks to describe the situation regarding extra-core production, productive trends, and capability flows, in connection with profitability. It does not intend to push the analysis beyond the important aspect of cash flows and related capabilities. It proposes a unified intelligence system platform at the European Union level, in an attempt to facilitate the definition of a common strategy for the development of extra-core capabilities for food industry and other food-based sectors such as tourism (Droli et al. 2014a; Droli et al. 2014b). Finally, the study lays the foundation for further studies in the field of integrating knowledge acquisition, knowledge development, and business management systems.

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