

Small Firms and Technological Development in the Food Processing Machinery Industry: The Case of Pasta and Other Cereal Derivative Machines in Italy*

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ABSTRACT. This study about Italian producers of machines and plants for pasta, basic cereals, snacks and bread factories attempts to shed some light on the role played by small and medium-sized enterprises (SMEs) in the Italian industry. Even if the high diffusion of SMEs has positively affected the performance of Italian economy during the seventies and the eighties, the new trends of technological change and global competition are expected to be unfavourable to this category of enterprises in the nineties. The analyses of a significant sample of firms makes clear that the industry is in the middle of a positive restructuring process. The structure of this sector shows a division of labour based on deverticalization of production, and a process of internationalization focused on exports and not on direct investments or joint ventures abroad. Leading firms are following growth strategies by new investments and acquisitions. Finally, as far as technological change is concerned, there is a significant increase of process innovations, thanks to the use of electronic components.

I. Introduction

Small and medium sized firms have traditionally played a major role in the Italian industrial structure. This situation, already in existence at the beginning of the first industrial revolution, has increased in the 70s and has continued into the last decade, which was characterized by technological competition.

Various studies have described and interpreted the development model taken on by the Italian

industrial system, which can be briefly summarized as follows:

- intercompany relations based on the decentralization of production permitting more flexibility in the use of productive factors, reduction in the need of fixed capital, and increased saturation of productive capacity (Piore and Sabel, 1984);
- flexible specialization model: the production process is divided into various steps with specialized firms dedicated to each single step; flexibility is one of the basic attributes of these firms as they supply customized services and products to a variety of clients (Brusco and Sabel, 1981);
- industrial districts: the physical proximity of suppliers and customers creates a dense network of relations, which models the surrounding territory according to the specific needs of production; in this model, the transaction costs are substantially reduced (Brusco, 1986).

Unfortunately, in the studies carried out on this growth model, what is lacking is an organic vision of the role of small and medium sized firms in Italy, which gathers the analyses of numerous sectors and industrial districts considered individually.

It must be affirmed, at any rate, that such fragmentation and incompleteness of analyses are mainly caused by segmentation of the demand and technology to which small and medium sized firms refer. Such factors have modelled in their image a highly differentiated supply: in this way, every

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industrial section can be studied more easily, if confronted as an entity in itself.

In this context, the CERIS-CNR research has for years been focussing on the study of the mechanical engineering sector, an industry in which Italy has for some time achieved a competitive advantage.

In fact, the industry of mechanical engineering is a positive component of the Italian trade balance and is a sector which absorbs employment with medium-high specialization. Moreover, on an international level, Italian industry takes second place after Germany, both in production and exports.

As Table I shows, this sector proves to be extremely variegated (and partially unexplored by sectorial studies). After having analysed the sector of metalworking machine tools and that of wood-working machine tools, CERIS decided to take on the study of machinery for the food industry, starting with the sector of machines for pasta and cereal derivatives.

This choice was determined mainly by the following factors:

- the filière of bread, pasta and pizza production is very much present in the Italian economy, where the large food enterprises have become vertically integrated upstream (cereal processing) and downstream (control of the distribution network); in this case, the role assumed by the industrial districts in concentrating the productive phases of said filière according to territory is particularly evident.

- the production of pasta has a cultural value linked to Italian food traditions; the exportation of the "Mediterranean diet" has brought about a towing effect for the exportation of machinery that make such a diet possible, rather than for the finished product itself;
- in this sector the pervasiveness of information technologies, which join mechanics, electronics and informatics within a product, is self-evident;
- in this sector the so-called "Smithian enterprise," whose small size does not hinder its competitiveness, is widespread (Dosi, 1988).

All in all, the sector of machinery for pasta and the processing of cereals is a clear case of an Italian-style development model, in which the relationships of productive decentralization, deverticalization of the production phases and the continuous introduction of product and process innovations have allowed for growth throughout the entire decade of the 80s.

The object of this research is to study the determinants of such growth and to single out the possible actions to take in order to continue to win the competition of the 90s and to meet the challenges of the unified European market.

II. Our sample

As far as supply is concerned, the cereal derivative machine sector produces machinery used in all phases of cereal processing filière, from farm

TABLE I
Mechanical engineering industry in Italy (1989)

	Sales Billions of Lira	Exports/Sales	Imports/Sales	Employees
Metal working machine tools	4123	49.0	26.4	32100
Textile machines	4400	59.1	27.3	26200
Food processing machines	1755	64.6	N.A.	11060
Packaging machines	2020	64.8	12.3	11890
Plastic machines	2990	52.3	13.7	13000
Woodworking machine tools	1700	75.9	7.5	10750
Printing machines	1440	69.1	65.8	7750
Shoes machines	920	65.2	2.6	7070

Source: Confindustria

production of cereals to sales of finished consumer products (Figure 1).

On the other hand, regarding demand there is quite a wide range of users of such machinery, including industrial enterprises (producers of bread, pasta, etc.), craftsmen and small shops (bakeries, confectioneries, pizzerias, etc.), agricultural companies or co-operatives organized with integrated cycles of production (from cereals to flour and/or animal feeds).

This complex situation has led us to classify the sector both according to the type of end user and the technological cycle carried out by the machinery:

- (a) plant and machinery for the preservation, transportation and processing of cereals destined for milling and animal feeds;
- (b) plant and machinery for the production of dried pasta (spaghetti, macaroni, etc.) and fresh pasta (ravioli, tortellini, etc.);
- (c) plant and machinery destined for the production of bread, pizza and oven-baked sweetmeats (leavened or unleavened);
- (d) here a fourth group has recently been added: that of plant and machinery destined for the production of extruded cereals such as snack foods, cornflakes, popcorn, etc.

As to its size, the sector does not have any official statistics, nor can the census or the industrial statistics of the National Central Institute of Statistics give information about the sector as a whole. However, thanks to the entrepreneur association (ANIMA) it is possible to estimate the amount of entrepreneurs of the sector: a composite of about 100 small and medium sized firms which were the subject of three types of survey.

First, all the firms were sent a questionnaire

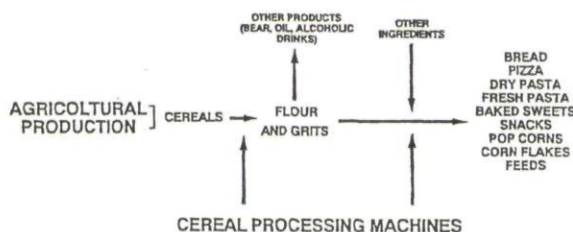


Fig. 1. The cereal processing filiere; Source: Ceris-CNR.

that focused on external growth, the internationalization process, technological change and organizational structures. Just less than half the companies targeted replied to the questionnaire.

Second, a control was effected through interviews with several leading companies in the four segments.

Finally, balance sheets for the years 1985–1986–1987 were processed for joint-stock companies present in the data-base of the Centrale dei Bilanci s.p.a.¹

III. Evolution of main economic and financial variables

Our research comprehensively examined 52 companies with a total sales for 1988 about 520 million ECUs, equivalent to approximately 95% of all sales in the sector (according to the data of the entrepreneur association ANIMA).

Considering the distribution of personnel and total sales, the companies are mainly of small and medium size: taking an average of the three years 1986–88, only 7 companies employ more than 150 people and only 6 produce total sales of over 20 million ECUs (see Table II).

Even though, in absolute value, large companies are not present, the degree of economic concentration appears relevant: the top 6 companies of the sample employ, on the average for the three years, 49% of total employees and account for 52% of total sales.

In recent years the combined results of the sector have shown a positive performance, as examination of the principal economic variables shows.

As far as investments are concerned, there has been notable growth over the three year period (25% of annual increase). Some of the determinants which explain the phenomenon are good profits for recent years, positive expectations for the future and the intense effort towards the restructuring of production presently underway.

It is worthwhile to underline the elevated level of rationalization investments which exceeds investments in property by four to one: the former is 2.7% of total sales, the latter only 0.7%. Dynamics of both are positive, especially regarding investments in property: in the three year period they tripled their initial value.

TABLE II
Cereal processing machine sector: firms by size

Range of employees	Number of firms	%
< 10	5	7.7
11–50	23	44.2
51–100	10	19.2
101–250	11	21.2
> 250	4	7.7
Total	52	100.0

Source: Ceris-CNR

As far as the evolution of sales is concerned, one can observe a good dynamic in the period (15% of growth) that has not been accompanied by an increase in employment (only +0.6% of growth). This is due to the fact that the rationalization process conducted by investments in new machinery and plants is labour-saving (and consequently labour productivity shows almost the same good performance as sales).

However, in comparison with Italian industry as a whole, the dynamics of the workforce of our sector shows a positive result: the former performs negatively, especially in large companies, and the latter has maintained its employment level. Finally we can consider the high dynamics of exports (14% of growth). Since the most important export markets are in LDCs (in Africa, Asia and Latin America), Italian producers have been making an intense effort to organize a worldwide commercial network, especially as far as after-sales services are concerned (Figure 2). However, despite all these difficulties, Italian producers are winners: on average, exports correspond to 45% of entire sales, even if in individual terms there is a heterogeneous distribution.

As with the investments, sales and labour productivity previously examined, the opening up of foreign trade is also closely related to the particular supply links existing among companies: the specialization of some companies allows them to supply assembler-customers, whether in Italy or elsewhere, with customized products perfectly tailored to required specifications; on the other hand, certain other companies are tied down by almost exclusive supply relationships with Italian customers who become the final exporters of

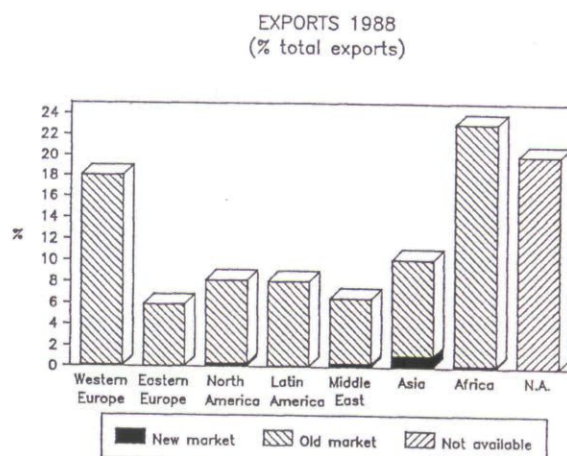


Fig. 2. Exports 1988 (% total exports); Source: Ceris-CNR.

entire turnkey plants. The high rate of development outlined above has been achieved, however, at the expense of company profits, as can be seen from the significant drop in ratios for the period 1985–87, if compared with the trends in the mechanical engineering industry (see Table III).

A significant reduction in the rate of remuneration of risk capital (ROE) can be matched to an analogous trend of the indicator relative to the yield of financial flows negotiated on the market of capitals (ROI).

The brief period taken into account, does not allow us to define a trend; however, the Table III depicts a negative situation that is further proven in the comparison of 1986 with the indexes relative to the broader sector of the plant and machinery industry. This situation can also be observed by the evolution of the profitability of net assets index (ROA) whose decline seems strongly connected to that of return on sales (ROS).

Evolution of economic variables allows an initial qualification of the structural dynamic of the sector: the growth model of the sector in the eighties reflects the evolution of the entire Italian industry in which a pattern of intensive development prevails, characterised by investments of rationalization. However, unlike the Italian industrial system taken as a whole, the cereal processing machine sector appears to be typified by numerous cases of increase in production capacity and

TABLE III
Cereal processing machine sector: sample group of 33 companies

	ROE	ROI	ROS	Turnover	ROA	Leverage
1985	8.06	14.83	13.84	0.88	12.28	3.37
1986	-0.21	10.01	7.75	0.84	6.58	3.68
1987	-1.84	7.23	8.68	0.85	7.41	3.82

"Plant and machinery industry": 1265 companies surveyed

1985	6.73	10.43	12.0	0.90	6.30	4.45
1986	6.60	9.61	10.2	0.80	5.74	4.40
1987	7.21	9.85	9.0	0.90	6.18	4.25

Source: Ceris-CNR, Centrale dei Bilanci spa

by the even more significant fact that the notable increase in total productivity occurs without eliminating jobs.

As far as examination of financial structure is concerned, it is essential to underline how the characteristic of company size (small and medium-sized firms and the family business) reflects its origin in the financial indicators shown on the balance sheets in Table IV.

The financial structure index points towards several negative tendencies:

- a worsening of the equity/debts ratio;
- the constant increase in short-term bank loans compared with those of medium- and long-term;
- a substantial increase in the debts/net sales ratio, particularly as regards the short term loans/net sales ratio;
- an ever greater incidence of financial burden on the contribution margin.

Despite these evident symptoms of a worsening of financial conditions it would be erroneous to consider this a structurally compromised situation — the most important financial structure index confirms that equity and long-term loans compete in good measure for the financing of current assets.

Probably the difficulty of access to the stock market on the part of small and medium-sized companies has made it difficult to achieve the greater level of financial capacity which seems

TABLE IV
Cereal processing machine sector: survey of 33 companies

Financial structure (%)	1985	1986	1987
Capital owned/long term debts + short-term debts	152.4	101.3	90.9
Short-term bank debts/net sales	13.1	21.9	21
Long-term debts + short-term debts/net sales	20	29.3	29.5
Short term debts/debts	67.5	75.7	73.9
Net financial charges/contribution margin	82.9	114.2	129.5
Capital owned/fixed assets	196.3	197.2	177.3
Capital owned + long term debts/fixed assets	208.3	217.4	204

Source: Ceris-CNR

appropriate for Italian companies in the period considered.

IV. Technological innovation

Technological progress in cereal processing is characterised by incremental innovation in which both experience deriving from a specific knowledge of processing technology and the results of technological progress in other sectors are incorporated.

As regards the former, ever since the beginning of the 18th century the transition from hand-made to industrial products has been centred on a technological model of fractionation/recombination: an ever more refined cracking process of the basic agricultural product coupled with recombination techniques and the addition of other ingredients. Throughout time, traditional techniques have been refined and other, less conventional techniques, have been developed, essentially for the first phase of filière, i.e., the production of flour. In particular, in recent years the so-called "mild technologies" have been re-evaluated, because these techniques respect the biological qualities of food, reducing heat and mechanical damage or the harmful effects of chemical and biological contamination.

With regard to the latter aspect, a fundamental

development has taken place in the field of micro-electronics which has not only improved machine performance, but has made possible the control of integrated plants composed of multiple machines specialized in various phases. This evolution, on the one hand, has accentuated the characteristics of the continuous cyclical process undertaken in certain areas; on the other, it has opened up the technological development of machinery according to the end user's needs. In fact, small scale customers such as small bakeries, confectioneries and pizzerias express a more traditional need for single, and not overly sophisticated, machines. Conversely, industrial bakeries and confectioneries, mills and producers of animal feed are now, because of the large volumes involved, oriented towards specialized and heavily automated integrated lines. Their needs in terms of productivity, in fact, demand rigid monoprodukt plants for which the amount of time required to change products is still generally substantial.

Thus the function and importance of electronics differs according to the end user. Requirements are still minimal and go no further than the drive systems and a few microprocessor controls, whereas there are already plants totally controlled by computers which integrate the functions performed by machinery and various sensors. At the present, however, it is precisely the sensors themselves which represent perhaps the final obstacle to complete automation (Clark, 1984).

Companies geared more towards the production of automated plants — generally sold as a turnkey formula — make ample use of actuators and electronic sensors run by programmable line controllers (PLCs) and, more rarely, by various types of computers (typically with production management functions). Obviously the degree of automation, to a greater or lesser extent, is determined by the customer's requirements and consequently the amount of acquisition of electronic equipment fluctuates widely. Large Western food companies have heavily for automation, whereas Third World companies, with an abundance of cheap but unskilled manpower, have serious problems managing automated plants and are therefore geared towards traditional production.

These brief considerations thus serve to explain the variety of situations revealed in the course of research in relation to the acquisition of electronic

hardware to be incorporated in plants and machines. There is, in fact, a solid nucleus of companies (12 out of 41) who did not indicate any value relative to such acquisitions — they, in large part, consist of small companies specialized in the production of traditional machines (e.g., kneading machines), but there were also several bigger companies who, indicated the automotive products they had acquired, but were unable to assess their value. This clarification is indispensable because there were companies identified who spent almost 10% of their sales from 1988 on the acquisition of various automation components. On average, however, expenditure — intended as the acquisition of electronic hardware from specialized suppliers — accounts for 5% of sales values. It is not a particularly large amount and is in any case similar to that of other areas of the mechanical engineering industry, as CERIS research has pointed out.

Regarding the importance of R&D in each company — and therefore the degree of effort towards the domination of technological change — slightly over 4% of employees across the entire sample are involved with this aspect of company policy, with some exceptions of over 10% and numerous cases in which this function is non-existent.

For the future, the companies' technological expectations are still oriented towards electronics. Almost all the companies interviewed, in fact, indicated that major innovations will confront the increasingly extensive use of information technology in the food industry, this with regard to increasing the level of plant and machinery automation, introducing new electronic components (sensors) and assuring the computerised management of production now required by many Western operators. Parallel to this general view of development, however, are other potential technological trajectories which are noteworthy: the THT process (*Très Haute Température*) already used successfully for dried pasta, the cold technologies for the bread and biscuit, and the pre-cooking techniques for pasta. In the last two cases, new production processes are introduced in order to adhere new requirements of both machine users and consumers. In fact, the diffusion of new consumer trends and new attitudes towards the preparation of foodstuffs create the need to offer

prepared foods (pre-cooked or frozen) in order to reduce cooking time, but at the same time make it necessary to rethink cuisine in terms of natural ingredients or partially prepared items. These apparently contradictory tendencies are well noted by the food industry which, obviously, refers these requests for new products to its machine suppliers.

V. A new pattern of growth: the process of deverticalization and decentralization

The model of growth followed by the sector in the 80s depended on technological and organisational innovations.

First of all, we must consider the new relationship existing between production and service within the industrial system. It is well known that Italian industry is witnessing an increase in time of the tertiary production quotient,² caused both by the fact that the process of reducing manpower in the early eighties mainly affected production functions and by the fact that the final product of more recent years requires an ever greater service content (identifiable as commercial services, after-sales service, sales finance, promotion, marketing, etc).

As regards the sample examined, the tertiary production quotient was 44% on average, with some companies reaching as much as 90% of personnel employed in activities which were not directly productive.

The distribution of companies in terms of the importance assumed by the area of production confirms that there is a clear division of labour within the sector. In companies where the function of production is predominant an elevated level of internal productive integration was chosen: only 13% of total production in such companies derives from work undertaken outside the company. In the companies where non-production functions prevail, development strategy encompasses the decentralization of production and the company's commercial role: fully 59% of total production in such companies was performed outside the company itself.

In the face of the increase in service functions and support for production units, the complex company organization of the sector also demands greater recourse to external suppliers, in order to

obtain product parts and/or complete manufacturing phases.

The percentage of production undertaken by third parties is high and reaches almost 40% for the sample as a whole: in 5 companies more than 50% of sales revenue originates from outside the companies' own premises, whereas, the production cycle is completed internally without any form of decentralization in only 9 companies.

The analysis of this quota's evolution in recent years is interesting: it diminished in only one case, while in half the cases where such work was done the tendency is towards an increase.

In examining the sample under consideration, a close link between the supply ratio and product typology (single machines or whole plants) was identified. In general, the companies producing single machines are (with a few exceptions) small and the decentralized part of production is hardly significant; on the other hand, companies whose production consists of more than 90% of complete plants are (with a single exception) among the biggest companies in the sector and are at the centre of vast networks of sub-contracting.

This evidence may indicate the existence of inter-company relationships based on the model of deverticalization for production phases and the model of decentralization for a part of production.

Intercompany relationships based on decentralization justify themselves in that they search for greater flexibility in the use of production factors. In the early 70s, the model of decentralization in Italian industry was realized, above all, to overcome the rigidity of the labour factor; consequently, such organization succeeded in achieving greater flexibility through use of the capital factor as well, transforming itself into a real structural modification of the production cycle. Besides reducing investment requirements, rendering production more flexible and saturating production capacity, the decentralization of production allows the potential offered by flexible production systems to be fully exploited.

With the model of deverticalization, the large company becomes a final assembler of components and semi-finished products acquired by small companies. The latter are specialized in manufacturing phases. In this way the large company places its attention further away from production activity towards that (upstream) of R&D/

planning and (downstream) of marketing/after sales services. The small unit specializes in manufacturing phases and, thanks to the use of flexible machinery, can supply different markets. As already indicated, such typologies can be identified in the sample under consideration and, in fact, one sees several large companies who favour planning and final product assembly functions, while the production of single machines or, more often, a part of it, is entrusted to small companies.

The evolution of the division of labour within the sector is delineating the profile of new operators: (a) producers of single machine parts who work on orders from domestic and, if necessary, foreign producers; (b) companies who undertake the planning and realization of single machines, that is, technologically autonomous companies with a large number of local suppliers and an ample international market; (c) front-end companies, or rather, system co-ordinating companies who take on the assembly/marketing of entire integrated plants as well as the task of accelerating information flow within the sector (harmonizing the technological evolution of suppliers) and stabilizing the rapport between operators (utilizing medium-long term contracts with the main suppliers of single machines or parts of them).

It is the relationship between the front-end company and its sub-contractors which solves the problem of "make or buy": the components where economies of scale are not achieved these are acquired from external specialist suppliers, provided that the component is not very complex and/or of strategic importance.

VI. External growth and concentration

Substantially, the results of our survey have brought us to consider the sector as scarcely involved in operations of external growth, with the exception of a group of larger and/or leading companies in their respective market segments. A similar situation had already emerged in a specific survey of external growth processes in the mechanical engineering industry in Italy (Gros-Pietro and Rolfo, 1988).

Dealing as it does with a sector of small and medium sized firms, mergers and acquisitions only surface with difficulty in the economic press. The direct survey, on the other hand, makes it possible

to expand figures and details in the cases recorded and to view them correctly in relation to sector behaviour.

A primary consideration concerns the presence in the sector of no more than 12 groups seen as an aggregate of industrial and commercial companies having financial and commercial links amongst themselves (see Table V). They almost totally represent groups which were constituted in this way around large companies in the 80s. Sixty percent are still under family control, but the recent entry into the sector of external financial groups participating in contiguous business is noticeable.

The interest of these external groups in the sector would seem to indicate the possibility of an intra-sectorial integration strategy in the vast field of machinery for the food industry. As in other areas of the Italian mechanical engineering industry (Gros-Pietro and Rolfo, 1988), it would appear to be a perfect example of horizontal concentration (Dutz, 1989): integration is sought for only with companies operating in the same end-market with complementary products, such as packaging machines or shop furnishings. The case of packaging machinery is typical of the producers of machines for dried pasta, who address themselves essentially to the acquisition of existing companies. On the other hand, the supply of furnishings pertains to companies specialized in machinery for bakeries, pizzerias, etc. and seems to have been initiated as a diversification of the main activity and, thus as a branching out of activity from the parent company (growth along internal lines) in what is still a primary phase of the growth process (Irer, 1988).

TABLE V
Industrial groups in 1990

<i>Number of groups</i>	12
of which: Italian ownership	10
foreign ownership	2
of which: source within the industry	9
source outside the industry	3
number of firms within the groups	19
% of total sales controlled by groups	63%

Source: Ceris-CNR

Currently only two groups have an extensive range of machines covering more than one segment, but this situation could change in the middle period. There is the need for a range of machines capable of providing the most frequently requested turnkey set-ups, even in the industrialized countries, but at the same time, the evolution of the food industry towards the establishment of large, vertically integrated groups (from mills to biscuit works and pasta) tends to restrict the number of potential customers who are interested in the entire range of machinery. Finally, there is the possibility of exploiting economies of scope and scale, both in production and in marketing.³

The process of concentration outlined here has hardly ever taken recourse to mergers. Just five cases of mergers have been recorded, apparently dictated more by fiscal rather than strategic-organizational reasons. This would therefore appear to demonstrate an attitude held by companies, which is still extremely cautious — whether it involves moving in on the companies' market or activating organizational rationalization. For the rest, it is noteworthy that even the largest groups have frequently operated with the acquisition of minority interests of companies who they have supplied or collaborated with for some time.

It is worth underlining that during 1990 the process of economic concentration indicated the merger of two large family groups with nine other small and medium-sized firms, in a production pole characterized by a wide range of products. The pole is controlled by a financial holding in which these entrepreneurs become shareholders. In Italy this is a new sort of organizational innovation (in which entrepreneurs become managers) that allows the small and medium-sized firm to exploit all the economies of large dimensions.

The analysis of non-equity operations confirms the indications of networks among firms. In particular, the approximately 40 agreements presently in force have been stipulated by just 10 companies for the 70% belonging to groups. Not only that, but 3/4 of the agreements cover the marketing of Italian machines in European and American countries and confirm the difficulty, even for large companies, of organizing direct representation abroad and the need to co-operate with local trading operators. Although fewer, the agreements for the granting of licenses and exper-

tise (8 cases) are more interesting — they pertain only to Third World countries (in Africa and Latin America) and, obviously, are concentrated in the more appropriate segments for these countries, i.e., mills and bakeries. This may indicate that Italian technology is not only placed at a good level internationally, but is also prepared to be exploited in the less developed countries. The lack of agreements with the industrialized countries (represented by two joint-ventures only) may, however, indicate some difficulties in competition against companies endowed with technology which is as advanced or at least comparable to that available in Italy.

An initial conclusion of the analysis of external growth processes indicates that the sector is shifting from a phase of internal concentration on traditional segments towards a conglomeration on different segments. This process takes place essentially by means of a broadening of the original mission of the company into two directions. The first is aimed at the complementary activities of business such as packaging, while the second, observable so far only in few large groups, is aimed at other segments within the sector. In actual fact, from the point of view of the theory of group, these strategies may still be included in the horizontal concentration if we consider the cereal processing machine sector as a whole. The argument is different for the groups of external origin who entered the sector with diversification strategies which tend to classify their activity as conglomerate concentration (Scott, 1989).

In fact, even if these strategies happen to be already well-defined by the groups of external origin, for those emanating from within them it is probably still too soon to be able to precisely outline the routes taken. Our impression is that, apart from some almost forced choices to broaden the range of machines on offer within the segments (correlated diversification), many groups are still relatively undecided not so much as to what strategy to adopt, but as to the conditions and operating methods. The need to operate in global markets is generally acknowledged by executives although they are aware that small size is a hindrance to the implementation of such strategies. Therefore, only a few leader companies will be able to operate successfully along these lines.

As far as the process of internationalization is

concerned, the propensity manifested up to now to favour new forms of internationalization (between direct investment and exports) is seemingly a result of two elements. The already reduced size of these groups is probably unable to sustain a strong, direct, foreign presence. In this light, a transaction cost analysis (*à la* Williamson, 1985) ought not to be very favourable to these companies. However, Italian companies are more and more involved in developing countries or, more recently, in planned economy, through the formation of joint-ventures. These intermediate forms between market and hierarchy could render Williamson's hostage model valid, in the sense that joint-ventures in many cases depend on the political and economic environment of these countries (sometimes according to a logic very different from that of the Western capitalist markets).

In summary, the companies and groups examined here seem to be moving towards a kind of pragmatic internationalization in which strategies and different forms co-exist according to products, partners and countries.

This should permit a reading more similar to the eclectic approach proposed by Dunning (1981) in the sense that the choice of companies is conditioned by advantages accountable in turn: by property (the possession of know-how), internalization (favourable transaction costs), and localization (conditions of the partner country).

VII. Conclusions

The picture that emerges from our research is not homogeneous because it evidences strong differences between companies and areas; it is possible, however, to identify some of the explanatory elements of this complexity.

As the sector is characterized by small and medium sized companies, this signals a delay in the rationalization process which big firms have put into motion in the last ten years.

However, among the difficulties of small firms one begins to catch a glimpse of an enterprising response typical of the Italian industrial structure: the creation of enterprise networks founded on the financial co-ordination of sleek and efficient structures, targeted at the conquest of a competitive advantage.

In order to follow this course there is no need to be overwhelmingly large, but it is important to exploit the application of new technology, in particular microelectronics, and the synergy of contiguous business. In this context, the use of the decentralization and deverticalization model allows the advantages of small size flexibility to be bundled together with the economies of scale and scope of the large companies.

The instrument of agreement is utilized broadly in order to implement such a growth strategy along various lines:

- (1) agreements and joint-ventures for marketing in foreign markets;
- (2) agreements and acquisitions in Italy to complete the range of products;
- (3) the creation of enterprise networks checked for technological components and common tertiary functions.

As competition in the European market becomes stronger and stronger these strategies seem indispensable for reinforcing the winning structure of the sector, especially as far as the exploitation of economies of scope is concerned. Such behaviour is the only valid way for limiting the effects of a merger and acquisition campaign on the part of big foreign industrial groups that can decide the future of this "traditional" and excellent Italian sector.

Only an improvement in structure of the sector as a whole will make it possible to continue exploiting economies of location in our country — industrial districts, system areas, etc. — in the face of disquieting symptoms of weakness in Italian industry, as was underlined in the last OECD report (1991).

Notes

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¹ Centrale dei Bilanci is a company, owned by Banca d'Italia and the most important Italian banks, that collects and analyzes a great number of balance sheets (about 30,000) of Italian limited companies.

² The tertiary production quotient — the non-productive personnel to total employee ratio — may be considered an

indicative proxy of the amount of services effected within the industrial company.

³ It should be noted that company dimensions and the characteristics of demand have slowed down the direct presence abroad of these companies who, instead, have favoured exports by means of agents and representatives. Our research has revealed that only five companies (three of which are producers of bakery machinery) have formed their own commercial branches abroad, while merely two have become involved in joint-ventures with foreign partners.

References

- Alzona, G., 1988, 'Acquisizioni e Cessioni Nella Dinamica Dei Grandi Gruppi Industriali Italiani', in Bianchi, P. (ed.), *Antitrust e Gruppi Industriali*, Bologna: Il Mulino.
- Brusco, S., 1982, 'The Emilian Model: Productive Decentralisation and Social Integration', *Cambridge Journal of Economics* 6(2), 167–184.
- Brusco, S., 1986, 'Small Firms and Industrial Districts: the Experience of Italy', in D. Keebe and E. Wever, (eds.), *New firms and Regional Development in Europe*, London: Croom Helm.
- Brusco, S. and C. Sabel, 1981, 'Artisan Production and Economic Growth', in Wilkinson, F. (ed.), *The Dynamic of Labour Market Segmentation*, London: Academic Press.
- Clark, J., 1984, 'Food, Drink and Tobacco', in Guy, K. (ed.), *Technological Trends and Employment* 1, *Basic Consumer Goods*, Aldershot: Gower.
- Corrieu, G. and D. Picque, 1988, 'Capteurs Pour les Industries Alimentaires et des Fermentations: Situation Actuelle et Développements Futures', in Renard, M. and J. J. Bimbenet, (eds.), *Automatic Control and Optimisation of Food Processes*, London: Elsevier.
- Dosi, G., 1988, 'Innovazione e Dinamica Industriale', in Zanetti, G. (ed.), *Alle Radici Della Struttura Produttiva Italiana*, Roma: SIPI.
- Dunning, J. H., 1981, *International Production and the Multi-national Enterprise*, London: Allen & Unwin.
- Dutz, M. A., 1989, 'Horizontal Mergers in Declining Industries: Theory and Evidence', *International Journal of Industrial Organization* 7(1), 11–33.
- Giedion, S., 1983, *La Mécanisation au Pouvoir*, Paris: Denoel and Gonthier.
- Gros-Pietro, G. M. and S. Rolfo, 1988, 'Dalla Meccanica Strumentale all'Automazione Attraverso la Crescita Esterna', in J. Nomisma, *Laboratorio di Politica Industriale, Acquisizioni, Fusioni, Concorrenza* 1, 33–44.
- Irer, F., 1988, *L'Innovazione Organizzativa Nell' Industria Minore. Lo Sviluppo del Gruppo Industriale*, Milano: F. Angeli.
- Jacquemin, A., 1989, 'La Dynamique du Groupe d'Entreprises: une Perspective de Droit Économique', *Revue d'Économie Industrielle* 47, 6–13.
- De Montmorillon, B., 1989, 'Vers une Reformulation de la Théorie du Groupe', *Revue d'Économie Industrielle* 47, 14–26.
- Mueller, D. C., 1989, 'Mergers: Causes, Effects and Policies', *International Journal of Industrial Organization* 7(1), 1–10.
- OECD, 1991, *Italy*, Paris.
- Piore, M. J. and C. Sabel, 1984, *The Second Industrial Divide: Possibilities for Prosperity*, New York: Basic books.
- Rolfo, S. and P. Vaglio, 1988, 'Macchine per l'Industria alimentare', in *L'Industria Italiana nella Competizione Internazionale*, Roma: I.C.E.
- Rolfo, S., P. Vaglio, and G. Vitali, 1989, 'Struttura e Competitività di un'Industria Specializzata: le Macchine per la Trasformazione dei Cereali', *Quaderni CERIS* 1, 3–158.
- Scott, J. T., 1989, 'Purposive Diversification as a Motive for Merger', *International Journal of Industrial Organization* 7(1), 35–48.
- Williamson, O. E., 1985, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, New York: Free Press.

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