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THE MODEL OF ITALIAN SMALL- AND MEDIUM-SIZED INDUSTRIES*

Prepared by

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CHAPTER I

SMALL AND MEDIUM-SIZED INDUSTRIES IN ITALY

1. FRAME OF REFERENCE

In terms of economic development and the creation of employment in the 1970s, all industrialized countries showed, to some extent, more activity in small and medium-sized industries than in big ones.

This had not been the case in the 1960s, but it certainly became true in Italy during 1970s until 1985, when small industries made the greatest contribution to the Italian economy in terms of growth rates in employment, investment and GNP.

This tendency cooled after the middle of the 1980s, and certain phenomena showed the disadvantages of small size compared with big, and this was reflected in the data on the SMIs economic/productive performance. Such a line of development, which seems unlikely to change in the near future, has a close correlation to the accelerating increase in technological progress and its primary importance to development -- and in some cases to survival -- of industries.

Other related factors are the progressive globalization of markets, government policies, the strategies of big industries, and the perception of imperfections in factors of production market and in commodity market. In fact, in the 1980s small industries have been confronted with an economic scenario characterized by increased technological uncertainty, by the greater importance of new methods, by the movement of the frontier of innovation away from single machines toward mass production, by the increasing importance of such immaterial

capital as software, know-how, professional training, and organizational/managerial innovations. The disadvantage to small industries in this context has been greater since they had less access to highly skilled labor, either from within or from outside their ranks, and because of their lesser financial resources. Along with new opportunities, the increasing globalization of markets brings new challenges. On the one hand, how does internal production measure up against foreign competition? On the other, an industry must intensify its presence on foreign markets, not only in its commercial aspects but also by creating a stable presence requiring large "investments" in the market and an outstanding capacity for agreement and integration with other companies.

The single European market to be created by 1992 constitutes a source of new opportunities, but also of new risks.

There will of course be possibilities of acquiring technologically advanced inputs in order to achieve economies of scale and greater skills, to exploit the new kinds of stimuli afforded by a sophisticated industrial demand. But, on the other hand, factors of production will be more keenly judged for imperfections against those of other Community countries.

These lines of thought suggest the systemic difficulties confronting small and medium-sized industries, and the implied risk of less development than in the previous decade.

2. PRODUCTIVE ECONOMIC PERFORMANCE

In recent years the financial/economic situation of Italian industry has on the whole been positive, both because of the development of small industries and of the financial and productive restructuring of the big ones which started in the mid-1970s and began to accelerate in 1980-81.

The development process of the SMIs, begun in the 1970s through the decentralization of production by the bigger companies and continued in an autonomous and innovative way, has so far persisted in a regular, autonomous, and permanent fashion, providing to the economy a relevant contribution in terms of employment and of broadening the production potential.

A. INVESTMENTS

Since the end of the 1970s SMIs have registered a continual expansion of investments, whereas formerly, since they were not closely involved in the processes of restructurization, the accumulation rate was rather low. It went from -3.8% in 1974-77 to 8.2% in 1978-80 and to 3.1% in 1981-85 (Table 1).

Thus from 1977 to 1985 the accumulation rate was positive and growing with a strong peak in 1978-80, and a fall in the recession years 1981-82, while in 1983-85 the growth rate of investments rose to 9.9% a year, to settle at 8.5% from 1986 to 1988. It is interesting to compare these data with those of Medium and Big Industries (MBIs) whose accumulation rate was constantly negative or at zero-growth rate for the same period. Only in 1986-88 was there a growth of 10.9%, according to data from the Banca d'Italia's "Inquiry on Investments".

The acceleration of accumulation had positive effects on production growth, which for the SMIs was very high (an annual

average of 4.7% in 1973-85 compared with 1% for the MBIs). This intensive growth of the accumulation rate and the resultant growth in production which characterized the development of the SMIs led, in the 1970s, to the growth of a fairly permanent and soundly established system of small industries.

TABLE 1

SMI (20-99 employees)
AVERAGE ANNUAL PERCENTAGE VARIATIONS

YEARS	1974-77	1978-80	1981-85	1983-85
INVESTMENTS (1980 prices)	-3,8	8,2	3,1	9,9
VALUE ADDED (1980 prices)	3,4	5,9	4,9	7,8

MBI (200 or more employees)
AVERAGE ANNUAL PERCENTAGE VARIATIONS

YEARS	1974-77	1978-80	1981-85	1983-85
INVESTMENTS (1980 prices)	-5,4	-3,1	-0,4	0,0
VALUE ADDED (1980 prices)	1,2	1,8	0,4	1,4

SOURCE: Banca d'Italia elaborations on ISTAT inquiry on GNP

B. EXPORTS

For a considerable number of SMIs, growth took place on foreign markets. During the first half of the 1980s the exported proportion of their turnover grew from 20.0% in 1982 to 21.5% in 1985, reducing their discrepancy with the MBIs, which were steady at 26.5%. In 1985, with an average proportion of 24.8% of turnover exported by the manufacturing industry, medium-sized industries registered about 25%, while small ones had about 21.5% and big ones about 27%.

The propensity for export by small industries varies from country to country. Compared with those of other European countries, Italy's SMIs perform well in exporting, a particularly relevant fact considering that they receive less direct and indirect assistance for exports than do big industries.

If, on one hand, geographic mobility may be favored by the greater managerial and commercial flexibility often connected to small size, on the other hand there is the problem for SMIs of sustaining their presence on foreign markets, and the problems of other barriers to their entry to distant markets whose distribution and information systems are difficult to reach, and of the difficulty of making direct investments in foreign countries and the reduced possibilities of access to the financial market.

C. MARKET QUOTA

The distribution of market quotas was greatly modified between the 1970 and the early part of the 1980s. Of the total internal and external demand in 1973, the SMIs absorbed 22.6%. In 1985 this increased to 30%, while the MBIs' quota dropped from 65.7%

to 56.7% in the same period. The transfer of market quotas from the MBIs to the SMIs is particularly marked for the so-called traditional products (textiles, clothing, shoes, leather, furniture), and for the sectors of rubber and plastic, machines for production, metal-working, and foodstuff.

D. PRODUCTIVITY OF WORK

During the 1970s work productivity increased more for the SMIs than for the MBIs, attaining an average of 5.3% as against 3.1%. In any case, the difference in productivity between SMIs and MBIs steadily decreased throughout the 1970s. The swifter growth of productivity associated with the progressive decrease in the difference evidences a better performance by the SMIs than by MBIs, indicating stability and autonomy in the economic development of small industry.

The growth of SMIs productivity slowed in the 1980s and fell below that of the MBIs: 4.1% a year as against 7.6% (Table 2) and the gap in productivity began to reopen. This tendency was linked to the productivity of the individual sectors. The increase in productivity was greater in chemicals, automobiles, electricals and electronics (particularly computers) (Table 3). For these sectors, 1985 production was 14.2% for the SMIs and 44.6% for the MBIs. Thus, in the 1980s the tendency of the SMIs toward improved productivity efficiency has slowed down.

TABLE 2

WORK PRODUCTIVITY (pro-capite)				
YEARS	1974-77	1978-80	1981-85	1983-85
SMI	3,1	5,3	4,1	5,8
MBI	1,6	3,1	7,6	8,0

TABLE 3

Size by kind of activity: value added pro-capite
(1980 prices: percentage variations)

KIND OF ACTIVITY	SIZE (EMPLOYEES)								
	SMI (20-99)			MI (100-199)			MBI (200 e oltre)		
	74-77	78-80	81-85	74-77	78-80	81-85	74-77	78-80	81-85
Metallurgy	6.7	4.6	7.0	2.2	6.2	7.3	-1.7	1.2	3.4
Chemicals and fibres	7.0	10.8	9.4	1.5	9.5	6.0	2.2	7.5	9.5
Mechanical	1.6	5.5	1.6	2.4	4.1	1.7	3.1	3.4	6.8
Production machines	.6	4.2	1.0	1.5	1.7	.9	2.5	-.2	.3
Computers, precis.	5.3	16.6	11.3	6.7	15.9	8.2	3.6	19.9	21.2
Electric/onic prod.	3.5	9.6	7.1	3.0	9.3	6.9	4.1	4.5	7.0
Metal-working	1.3	4.3	-1.4	2.5	3.0	-2.1	1.2	-1.9	-1.2
Automobiles ^{1,7}	7.9	3.0	.1	7.0	4.0	-.1	.2	7.0	
Other vehicles	3.7	5.9	4.9	11.2	3.4	-2.6	1.9	3.4	6.9
Food and tobacco	5.6	.4	3.8	1.7	.8	.9	1.6	-1.4	4.8
Textiles	5.2	4.0	6.0	5.5	3.9	4.0	2.7	1.6	4.9
Cl., sh., L., fum. (2)	5.6	4.1	2.2	6.3	3.4	2.4	3.0	5.3	2.6
Cl., shoes, leather	5.7	4.1	2.9	6.2	2.4	3.6	3.4	5.5	3.2
Furniture, wood	5.9	4.7	1.4	6.7	5.3	.5	1.0	4.0	.6
Other (3)	.4	7.7	4.1	.8	5.7	4.0	.5	4.1	4.0
Non-metallic minerals	.3	8.5	3.7	1.7	7.1	2.5	1.5	5.2	1.8
Rubber and plastic	2.6	4.4	3.5	2.6	1.6	5.0	1.8	1.3	.7
TOTAL	3.1	5.3	3.5	3.0	4.6	3.2	1.6	3.1	6.2

SOURCE: Elaborations on ISTAT Inquiry on GNP

(1) Figures before CIG

(2) Clothing, shoes, leather and hides, furniture and wood

(3) Rubber and plastic, non metallic minerals, paper, other

E. EMPLOYMENT

A notable effect of the development of SMIs is the constant increase in employment. From 1973 to 1978 the average annual increase, net of CIG (redundancy fund), was 0.6%, with a trend toward growth which underwent only mild deviations. This was particularly accentuated from 1981 to 1985, years in which the increase in employment in SMIs was an annual 0.8% as opposed to the decrease of 6.7% in MBIs (Table 4). In 1986 the differential in increase began to grow smaller again.

TABLE 4

EMPLOYMENT (*)

YEARS	1974-77	1978-80	1981-85	1983-85
SMI	0,3	0,6	0,8	1,8
MBI	-0,4	-1,2	-6,7	-6,1

(*) figures net of CIG

SOURCE: Banca d'Italia elaborations on ISTAT Inquiry on GNP

F. WORK INCOME AND INCOME DISTRIBUTION

The development of the SMIs was accompanied by a big increase in real income from work, steadily superior to the increase achieved by the MBIs in the 1970s, and equal to it in the 1980s. This was reflected in the price of products which rose more dynamically for the SMIs than for the bigger companies. It turned out that industrial sectors with bigger concentrations of SMIs systematically had bigger increases in product prices than did sectors with bigger concentrations of MBIs, reflecting a probable oligopoly for the SMIs.

Profits were variable and linked to the cost of labor which, in

the 1970s, was higher in SMIs than in big industries. The restrictive cycles (1973-77; 1981-82) slowed the growth of profits, whereas positive cycles (1977-80; 1982-85), with prices pushed higher by the demand and by high productivity, caused profits to rise. In the first half of the 1980s, growth rate of profits of SMIs increased from 35.3% in 1980 to 38.0% in 1985. This increase was smaller than that for the same years of the MBIs, but this does not signify a deterioration of the SMIs' economic efficiency. In fact, considered year by year in 1973-85, the SMIs had a greater increase in profits than had the MBIs (Table 5).

TABLE 5

GROWTH RATE OF PROFITS

YEARS	MBI	SMI
1973	24,7	34,1
1977	24,5	30,1
1980	26,9	35,2
1982	28,6	33,6
1985	34,7	38,0

SOURCE: Banca d'Italia elaborations on ISTAT Inquiry on GNP

3. CONCLUSIONS

The activity of variables such as the accumulation rate, value added, exports, the market quota, productivity of labor, the employment rate and the growth rate of profits, favored the SMIs, and they demonstrate that in the 1970s Italian SMIs registered a substantial overall growth, both in absolute terms and by comparison with the medium-big industries.

This development was not temporary, but permanent and systematic, as evidenced by the increasing economic opportunity to carry on small-scale production. The growth of SMIs was thus independent of the decentralization process of the big companies, and it pervaded both the traditional sectors and others like machinery. To move from the empirical to the theoretical, a comparison can be made between the SMIs' interpretive model of reality called flexible specialization, and the model of dualism and those of the neo-Schumpeterian school.

The progress and permanence of the SMIs seem to indicate a development born of the capacity for responding autonomously to changes in external conditions with a flexible and dynamic organization of production. This theory is opposed by those who see SMI development as a byproduct of the activities of the medium-big industries, almost as if their good performance were an illusion brought about by a temporary halt in the growth of the medium-big industries.

According to the model of dualism, small industry is dependent on big industry for production outlets; therefore it is neither autonomous nor truly efficient. The strength of small industry is considered to be based on institutional protection provided by phenomena like greater fiscal evasion, greater flexibility in fulfilling insurance obligations, less power of union

organizations. According to the neo-Schumpeterian school's model, small industry can show high rates of development during phases of affirmation of a new technological paradigm, but only temporarily.

It is probably true that every size has its advantages and its darker sides, according to the results and the variables to be optimized. In any case, the empirical evidence shows a very good performance by the SMIs in the 1970s with a cooling of this tendency in recent years. Future challenges like competition from the single European market, the problem of financing for SMIs and technological innovation will test the permanent efficiency of small size following the model of flexible specialization.

CHAPTER II

FINANCING SMALL AND MEDIUM-SIZED INDUSTRIES

1. FINANCIAL RESTRUCTURIZATION

In addition to the process of real adjustment, Italian industries set in motion an extensive financial restructurization in the 1980s. This could be observed in the evident progress in income statements and in patrimonial systems of the industries with the decreasing need for financing and the resultant decrease in indebtedness and related costs. The "financialization of industry" affected only Big Industries, however, so that the literature increasingly mentioned the phenomenon of a dichotomy or polarization of the credit market.

For this reason the financial market appears to be split in two: one branch is modern and dynamic and available to Big Industry operations; the other, traditional and static for the use of the SMIs.

The Big Industries "financialized" for the following reasons:

- the desire to break the bonds of monetary policy which, in the early 1980s, had become increasingly restrictive with the increase in interest rates;
- the desire to become independent of the oligopoly of traditional credit institutions, and to acquire more freedom on the financial market with the creation of new type of holding companies;
- the need to reduce indebtedness and the related interest payments;
- the chance to improve companies' profitability by increasing

financial proceeds through arbitrage operations. The demand for credit was increasingly motivated by the portfolio.

The phenomenon of financial innovation involves the creation of new markets and new methods of collection and investment of funds, which the BIs managed either directly or through companies connected to or controlled by them. Because of the need to bring together technological competence, research efforts and presence on the markets, aggregations of companies were constituted and developed to provide financing by supplying risk capital and/or by broadening credits among connected companies. Development of these relationships provided a tangible expression of the synergies made possible by the interrelationships between the real and the financial aspects of management.

2. THE DICHOTOMY OF THE CREDIT MARKET

As previously pointed out, bank clients tend to gather around one of two poles: on one hand, the Big Industries which are progressively more independent of bank financing and which can even offer some banking services themselves; on the other, the smaller industries which have been traditionally dependent on credit institutions. This dichotomy is a result of the differences in economic behavior between the BIs and the SMIs. Their investment policies and therefore their policies of industrial development show particularly marked differences. While the BIs have been occupied with restructurization, which brought improved means of production and increased productivity without changing productive capacity, the SMIs were broadening their scale of production by an increase in the rate of investment, especially in circulating capital.

In addition to showing two different strategies, this difference in investment policy had different impacts on financial management. If the BIs really succeeded in lessening their financial need and in substantially increasing their profitability thanks to a better financial policy, the SMIs on the contrary were forced to increase their indebtedness while also succeeding in obtaining good levels of profitability (Tables 1-4).

TABLE 1

INDUSTRIAL TRANSFORMATION INDUSTRY
(classified by number of employees, closed sample)
Size up to 99 employees

INDEX	'82	'83	'84	'85	'86
No. companies	8.016	8.071	8.114	8.143	8.139
Employees	318.303	320.702	326.296	328.980	327.184
V.A. (thou.mil.)	10823.2	12577.8	13478.3	15067.1	16494.2
ROI %	12.75	13.4	15.2	14.05	13.1
ROE %	-0.3	3.3	6.9	4.6	5.45
Debt./VA %	99.7	83.4	95.45	104.15	107.2
* S-t w.C.I.%	51.35	49.7	57.5	64.7	63.3
M&I-t w.C.I. %	23.4	17.75	19.35	19.85	21.5
Chgs. net/VA%	21.7	17.6	19.3	21.15	19

TABLE 2

INDUSTRIAL TRANSFORMATION INDUSTRY
(classified by number of employees, closed sample)
Size 100-199 employees

INDEX	'82	'83	'84	'85	'86
No. companies	1744	1711	1677	1647	1664
Employees	241866	235696	230939	269760	230130
V.A. (thou.mil.)	7009.2	7766.8	8678.1	9824.2	11315
ROI %	14.4	12.8	13.4	13.8	13.6
ROE %	3.3	3.2	5.3	7.3	9.4
Debts/VA %	63.8	68.5	74.6	73.6	73.1
S-t w. C.I. %	33.8	37.6	42.8	41.9	40.6
M&I-t w. C.I. %	15.1	14.8	15.5	16.2	17.4
Chgs. net/VA%	14.3	13.1	12.3	10.9	9.1

* S-t w. C. I = Short term with Credit Institution - M&i-t = Medium and long term

TABLE 3

INDUSTRIAL TRANSFORMATION INDUSTRY
(classified by number of employees, closed sample)
Size 200-299 employees

INDEX	'82	'83	'84	'85	'86
No. companies	1.400	1378	1.369	1370	1357
Employees	1.241.930	1.185.240	1.147.745	1.110.309	1.076.017
V.A. (mld)	38.112	41653.4	47941.8	53094.1	57459.2
ROI %	9.1	10.4	12.1	12.6	12.6
ROE %	-8.0	-3.1	3.2	6.9	9.1
Debts/VA %	99.2	98.6	94.6	85.3	77.9
S-t w. C.I. %	35.2	34.1	38.1	32.8	29.6
M&l -t w. C.I. %	35.0	37.4	34.1	30.8	28.0
Chgs. net/VA %	14.4	12.5	9.4	7.0	4.7

TABLE 4

INDUSTRIAL TRANSFORMATION INDUSTRY
(classified by number of employees, closed sample)
Size 1,000 employees and up

INDEX	'82	'83	'84	'85	'86
No. companies	205	201	204	196	185
Employees	770.310	723.115	692.381	655.168	619.806
V.A. (mld)	23738.4	25505.2	29765.9	32577.8	34256.7
ROI %	7.0	9.4	11.8	12.7	12.7
ROE %	-14.5	-7.1	1.6	7.2	9.4
Debts/VA %	118.3	115.2	104.3	89.9	83.1
S-t w. C.I. %	36.8	33.4	37.2	29.6	27.3
M&l-t w. C.I. %	44.8	48.5	41.6	36.0	32.8
Chgs. net/VA %	15.3	13.2	9.2	5.7	9.5

SOURCE: Budget Bureau

An explanation for the SMIs' lower profitability might be the theory of the transfer of commercial financial charges (confirmed by the available data). The fact is that the BIS

have reduced the granting of commercial credit to SMIs to the limits of their rationalization of resources, transferring on to them part of the burden of financing circulating capital. By improving the product cycle and client relationships and by adopting the "just in time" procedure of warehouse management, the BIs transferred onto suppliers the burden of stocks of raw materials, and onto the clients the burden of finished products.

The financial debts which grew most were short-term loans from credit institutions (Tables 1-4). In this context, the dichotomy of the credit market is evident. Given a greater negative financial balance for SMIs than for BIs (a lower level of self-financing), their recourse to outside financing gave the former a greater short-term bank debt, and the latter a greater use of risk capital and medium and long-term financing. Naturally, the greater short-term debt of the SMIs carried higher charges, aggravated by the broadening of the dispersion of interest rates. Furthermore, BIs have traditionally been considered more deserving of loans than have SMIs. Evaluation of an industry's trustworthiness for credit is still anchored to its past history of assets rather than to its economic prospects.

The dichotomy is also shown in the assets of the balance sheet. With financial restructurization the BIs were enabled to employ part of their capital on the credit market, drawing consistent income from it, thus helping to increase their profitability. The financial structure of the SMIs on the contrary, did not change and continued to show the lower degree of financial investments imposed by management necessity.

3. RELATIONS BETWEEN SMIs AND CREDIT INSTITUTIONS

As their indebtedness increased, the SMIs had increasing recourse to credit institutions to take out more loans, particularly short-term ones. The extreme dependence of SMIs on credit institutions is emphasized by the relationship between use of borrowed funds and granting of loans. While the BIs' actual recourse to bank loans has diminished to less than 40% and their lines of credit have increased, the SMIs have maintained a rather high use of loans -- over 60% (Source: Bureau of Risks).

But the wider granting of loans to the SMIs was accompanied by another troubling phenomenon: the increase in non-repayment of loans. Non-repayment of investments is exacerbated if: companies have relatively small production; industries operate in older branches of production; companies are located in the Mezzogiorno; SMIs have left the BIs' financial circuit. These correlations can be explained: by the traditionally higher mortality rate of SMIs; by the crises which occur more frequently in the older branches of production; by the fact that both these characteristics are more prevalent in the South.

An interesting aspect of SMI indebtedness is its relationship to the smaller credit institutions, particularly working-class and rural banks and savings banks. Aside from the obvious credit limits of the smaller banks because of small assets, there are two other reasons for a relationship of size. First, small banks located in the same area as the SMIs can make a specialty of gathering more information and knowledge about actual productivity and how profitable it may be. Second the relationship may also depend on market conditions which, given the limited entry and the segmentation of the loan market, make

small banks more of a monopoly.

To summarize, the SMIs suffer from the following weaknesses and delayed dependency on the credit institutions:

a) Since SMIs have no access to alternative financing, they are limited to a narrow range of traditional banking operations; small banks are limited and SMIs' credit demands are rigid: almost exclusively for circulating capital and bank deposits.

b) The SMIs' lesser contractual power, even though banks have become more competitive, forces them to pay higher interest rates.

c) The higher cost of credit is also the result of the greater recourse of the SMIs to short-term loans, which represent a high financial risk assumed to cover investments in fixed assets.

d) Granting of loans to SMIs still seems to be based on traditional criteria of evaluation of credit-worthiness, established on the basis of the results of former operations and of the ability to offer non-company security. This rigid attitude is attached to a diffuse perception of the greater financial risk SMIs represent.

Finally, the bank still seems to be statistically and passively tied to the role of a simple tenderer of banking services. In an integrated and growing economy, on the contrary, the credit institution should function as an active promoter of new and dynamic financial relationships and as an instigator of development to be sustained by intense and lively interdependence between the real and the monetary economy.

4. CONCLUSIONS

The interpretation of past events unfortunately leads to pessimism about the financial prospects of SMIs. For the typical SMI, finance seems to be only a "byproduct", handled in most cases by the administration. The growth of SMIs is largely conditional upon risk capital. As a result, the Italian SMI's model of flexible specialization is in financial crisis. The advantage gained by the SMIs which flexibly innovated and adapted their productive systems to the new market conditions has been reduced to the vanishing point by the recovery of the BIs whose restructurization took effect not only in production but also in commerce and finance.

Size was also a determining factor in the development of financialization. SMIs, in fact, are not capable of: creating efficient control over their stocks and commercial relations; forming a group and asking an appropriate firm to manage a profitable treasury and efficient coverage of exchange and rate risks; entertaining more financial relationships with the capital market in order to diversify sources of supply.

What the SMIs have not succeeded in doing has been done by the BIs. Naturally, this has had no small effects on the former, as is normal in an interdependent economy. Let us remember the transfer of financial charges on circulating capital from the BIs to the SMIs, and the higher cost of money charged to the SMIs in order to recover those profit points lost by the banks when they were confronted with the BIs' increased contractual power.

We cannot finish this chapter, however, without outlining what might, under other circumstances, be optimistic prospects. Even for the SMIs, the road of financial innovation may exist.

The first step would be the union of several SMIs in

syndicates, by locality or by production sector, to develop financial operations. In the framework of groups of associated companies, an autonomous payments service could be set up, making use of telematic systems for central management of the treasury and for possible connections to factoring agencies. A syndicate would have the advantage of a greater contractual power with the banks and could also supervise the SMIs in their relationships with the Special Credit Institutions to obtain the easier credits that bureaucratic red-tape would otherwise make prohibitive.

Second, development and dissemination are to be desired of a system of financial services appropriate to the realities of SMIs and capable of competing with the credit institutions. To this end, help must be sought from external economies, their advantages, are useful to SMIs until they cannot internalize any functions and services.

CHAPTER III
TECHNOLOGICAL INNOVATION

1. SMIs AND INNOVATION

An analysis of the complicated relationship between SMIs and innovation must first consider the basic concept expressed by the EEC in 1983 -- "The European Year of SMIs and Artisans" -- that small and medium-sized industry is indispensable to economic development and to the dissemination of innovation. This statement does not merely recognize the role played by SMI in certain particularly dynamic economic activities; it is also a presupposition which "obliges" society in general and mobilizing real and financial resources to eliminate barriers to development of the SMIs' innovations. The fundamental connections linking innovation to technical progress and economic growth are well known. It is important, nevertheless, Schumpeter's famous classification saying that innovations concern:

- 1) introduction of new goods or new qualities;
- 2) creation of new methods of production;
- 3) entrance to or creation of new markets;
- 4) discovery of new sources of raw materials or replacement with others, and use of new partly finished goods;
- 5) creation of new labor organisations.

This is a broad concept of innovation which includes not only the Technological (innovation of the production process) but also the product-market and managerial organisation. In this framework, SMI is the economic unit which best espouses Schumpeter's philosophy of innovation, because it is itself the fruit of the industrialist's creative capacity and his risk. Innovation as a concrete realization of industrialists's animal

spirits should be a quality typical of SMIs. This interpretation which identifies the innovative spirit of the industrialist as a determining factor of innovation is corroborated by an OECD study ("Innovation in Small and Medium Firms" , Paris 1982). According to this study, a company is innovative if it has an aggressive technical and commercial attitude. Other variables beyond animal spirit determine the drive toward innovation. We will focus our attention on two variables: the size of firms and the shape of technological change. On the basis of the specialisation principle, the innovation development process must therefore be carried on by many interdependent entities: from SMIs to BIs, to national and international government institutions. The process is thus both internal and external to the industries.

2. SIZE AND TECHNOLOGICAL CHANGES

In this context we shall seek to define the role of SMIs in the innovation development process as it relates to two interconnected variables: size, and the shape taken by the technological change.

To consider innovation's relationship to size, we must first list the typical disadvantages of SMIs:

- they are unable to bear the cost of R&D or to make more than minimal investments in research;
- they have few opportunities or possibilities of obtaining informations;
- they cannot control demand, and are therefore unable to create outlets for their new products or speedily to recover invested capital;
- qualified technical personnel are rarely available to them;
- they have little contractual power;
- apart from self-financing, few financial resources are available;
- they run a greater risk for single innovative projects.

As was true for animal spirits, size is not the only explanation for the relationship between SMIs and innovation. There are cases of SMIs, some of which we shall see below, which have achieved impressive production in spite of the above disadvantages.

In considering the second variable, the shape of technological change, we shall analyse the ways in which the so-called III technological revolution is changing the dimensions of economic units. Technological change is in fact responsible for changing the size of industry and, as a consequence, for changing the relationship between individual companies and the industrial system.

New forms of division of labor are developing among industries. The technological change, begun in the 1970s, was interpreted according to two conflicting theories:

- Centrifugal theory: the new electronic technologies will permit greater decentralization of production.
- Centripetal theory: the development of automation and industrial robotics will bring about centralization.

Of course one theory does not preclude the other, and in fact both have been confirmed in different sectors. However, two basic tendencies have been perceived: the recent technological changes have reduced the capital labor ratio and increased the flexibility of capital. The "microprocessor revolution" has especially encouraged decentralization and thereby favored the SMIs. The engineering of instruments, office machines and telecommunications apparatus have benefitted the service industries and production activities requiring low-intensity capital and high intensity labor, inspection and communication. It could be said that the technological innovation makes for "more production with less capital". As a result, more qualitative and innovative investments are being made in human capital, with an increase in the use of fixed capital.

3. THREE SAMPLE SECTORS

Now, these theories have been partly confirmed to different degrees in different sectors. Here the three most interesting cases will be discussed.

1) Although, as has been observed, the boundaries between sectors are changing with technological change, let us begin with a consideration of the classical "mature" sectors of Automation Instruments and Systems, and finally to the sector defined as "science-based" which has a high level of R&D. In the mature sectors (shoes, clothing, household goods, bathroom fittings, guns, ect.) the production cycle has undergone progressive division, with a development of specialized production units for different phases of work and/or parts of the product. Moreover, a new polarization has come about in the sector's structure, with:

- development of a group of small production units (artisanal units, piecework at home, small specialized units);
- a reduction in medium-big production units and an increase in the medium-sized group.

The two poles are interconnected: the restructurization of the Medium and Big Industries with the introduction of new technologies provoked the reorganization and development of the smaller units. The SIs are, however, largely dependent on the M-BIs since the latter control and determine the processes of restructurization and have power over the placing of finished products on the market. In the mature sectors the model of flexible specialization of the specific phases of work given back to them the MBIs. The SMIs are relatively autonomous and specialized, and are capable of producing, in an elastic and flexible way, more goods within a range of production.

2) The technology of the Automation Instruments and Systems

(ASS) sector typically applies finished Hardware and Software systems to specific problems. This sector evolved at a steady pace. Its families of products are being progressively integrated into a single automation system. For example, automation in the factory is changing from the combination of planning/engineering automation (CAD-CAE) with production automation (CAM) to a single integrated automation system such as FMS (Flexible Manufacturing System). Inquiries about the ASS sector reveal extreme polarization with:

- growth of microindustries and reduction of medium-sized ones;
- steady development of BIs.

A barrier is thus shown to exist to growth in size rather than to entry. Small Industry has a specific role here in the subsectors of the components as well as in those of the system. The SIs are efficient both at making specialized components and at the production of systems to offer to particular segments of the market. The SIs complement the BIs, since the latter develop standard components and large systems which do not permit them to be flexible or to guarantee production adequate to meet particular demands.

3) Finally, the last sector to be considered, the "science-based" (HRD) sector, is made up of divisions: pharmaceuticals, new materials, information systems, semiconductors, instrumental electronics, telecommunications, photokinematographics. In a sense, it is the "container" from which will arise the high-technology products to be realized both by the applicative sectors like ASS (with which it has many aspects in common) and by the traditionally mature sectors. The HRD industries represent the technological bases and the sources of technological innovations for the entire industrial apparatus. Characteristics common to all the divisions of this sector are:

- high level of investment in R&D;
- high degree of internationalization;
- oligopolistic structure, strong concentration in a few groups, strong presence of foreign multinationals;
- extreme specialization and development of integration and of complementary activities between company units;
- highly specialized SIs subordinated of the HRD sector is linked to international developments. In this context, the backwardness of Italy can be seen: as compared with other more industrialized countries, its industrial system is still too fragmented and still tied to the internal market and to mature production sectors and products. The scarcity of BIs is deplored as an insufficiency which penalizes the international competitiveness of the sector. As for the SMIs, they are more active and can play an important role in:
 - pharmaceuticals: in the first phases of the production cycle of biotechnologies (research and preliminary development of the product)
 - instrumental electronics: production of more "mature" electromedical equipment;
 - photocinematographics: production of laboratory equipment.

In this sector SIs are almost always artisanal and can guarantee a very high-quality product at excellent price; their development is uncertain, however, because management's attitude is not inclined to risk-taking or to growth in size. These three sample sectors illustrate some of the effects of technological change on the dimensions of the sectors. Neither the centrifugal nor the centripetal theory can be held to be true for industry as a whole, but the model of specialization by phases is still important for the SMIs.

4. CONCLUSIONS

Having seen the situation of the SMIs in these three sectors, let us look at the main obstacles to innovation development for SMIs: the information barrier; the size barrier; the financial barrier.

These three barriers sum up the whole spectrum of obstacles identified several years ago in the literature.

An inquiry published in 1986 (ISTAT bulletin, June 1986) points out that as size decreases obstacles to innovation increase because of problems of financing, cost and risk; insufficient knowledge of the markets; lack of qualified personnel and know-how.

Above all, it is essential to break through the technological isolation of the SMIs. Because of the few resources at their disposal, they were unable actively to seek information and knowledge. Transfer and diffusion of technologies slowed down both because of the difficulties of identifying what is on offer, and because of the inability of the SMIs to explain their technological needs and to make a rational request for information. In second place is the traditionally recognized financial barrier, as we have seen in chapter II. SMIs cannot finance possible unforeseen costs of innovation or high-risk R&D activities which have medium or long-term prospects of return.

In response to these barriers, a complex and diversified system of real services has been created to overcome the disadvantages of small size in all operations of support for innovation. The system creates a series of external economies which, in different ways, can benefit both the highly specialized "science-based" SMIs and the industries of the "mature" sectors.

Although some activities may occur spontaneously thanks to the development of an advanced tertiary, some other initiatives require a coherent industrial policy: a policy which links the system to universities and research centres, creating structures for assistance and consultation during the phases of application of the innovations.

However, an industrial policy oriented solely to the supply-side approach is to be deplored when in other countries the incentive to innovation comes chiefly from the demand-side approach through the creation of large projects with obvious repercussions on the SMIs.

Finally, the Government can promote innovation in the SMIs by improving coordination between Government Boards and administrations. The SMIs need to have a clear point of reference in order to use their own resources and time, both of which are notoriously scarce, for innovative projects.

CHAPTER IV

SMALL AND MEDIUM-SIZED INDUSTRIES AND EXPORTS

1. THE PERFORMANCE OF ITALIAN SMIs IN EXPORTS

The brilliant economic/production performance given by the small and medium-sized industries in Italy and many other industrialized countries during the course of 1970s was matched in foreign trade. Small industries made in fact an important contribution to national exports and thus to rebalancing accounts with foreign countries.

Several advantages seem to be linked to the characteristics of modern small industries which are capable of becoming competitive even on an international scale. In particular, such factors have been identified as relatively low investments in fixed capital, low use of energy per employee and per unit of value added, vertical disintegration, and discreet use of highly qualified manpower. Small and Medium-sized industries are therefore extremely flexible and can readily respond to fluctuations in international markets in a timely fashion, with rapid reconversions and continual restructurizations.

An analysis made in 1979 by the Istituto San Paolo di Torino in collaboration with Ceris shows the small and medium industries to be particularly competitive when compared with the bigger ones. Studies made by ICE and ISTAT and elaborations by the Study Service of the Banca d'Italia on customs data from the Italian Exchange Union, although they confirm the great contribution of a few big industries to total exports, show a clear tendency toward a decrease in concentration: about 50% of national exports are made by SMIs.

According to the 1980 ISTAT inquiry, the percentage of export turnover by companies with 20 to 500 employees increased from 43.2% in 1975 to 47.3% in 1980 (Table 1), and these data agree with those of the Mediocredito Centrale. From 1973 to 1978, the SMIs' contribution to national exports grew considerably, going from 42.2% to 50% (Table 2). During the 1970s, on the other hand, the importance of industries with over 1,000 employees was reduced (-9.9%), and in 1978 they contributed only to 38.3% of exports against 48.2% in 1973.

As regards the sectorial composition of export turnover (ISTAT 1980 inquiry), the small industries' contribution was especially significant in shoes (51.6%), hides and leather (48.5%) and wood (48.3%) (Table 3).

Medium-sized industries (100-500 employees) had high levels of exports especially in plastics (48.8%), clothing (43.3%) and the food and tobacco industry (42.5%).

Big industries contributed largely to the export of vehicles, rubber, chemicals, paper and specialized paper products, and the polygraphic, publishing and related industries.

Together, these data confirm a growth in the 1970s of the contribution of the SMIs to Italian exports and better sales in the sectors of traditional Italian consumer goods. This is probably the result of restraints in technological innovation and of the economies of scale typical of basic sectors and the technological activities of the more advanced sectors.

During the 1980s, the SMIs contribution to Italian exports seems distinctly to have slowed down compared with the bigger industries. A recent ICE inquiry (April 1989), based on Italian Exchange Office data, shows this variation in tendency compared with the 1970s. There has in fact been a reduction in the number of small exporting industries which have been excluded from many international markets. The export activity of the

SMEs seem to be increasingly characterized by a lack of planning and programming, by restricted geographic diversification, and by an orientation toward easier markets or toward those which are free of competition from big industries. At the sectorial level, big and medium-sized companies are more dynamic in both the advanced and the traditional sectors, while the importance of small industries has grown only in the sector of farm and industrial machinery.

This slowdown recorded by the ICE-UIC data is generally attributed on the one hand to the effects of the intense process of restructurization by the big industries in the previous decade, increasing their competitiveness and flexibility through new forms of organization and by the introduction of technological innovations. On the other hand, it is said to be because of limitations related to small size.

TABLE 1

EXPORT SALES OF MANUFACTURING INDUSTRIES WITH 20 OR MORE EMPLOYEES, 1980 (by number of employees)

ABSOLUTE VALUES

	Number of employees					
	1975	1976	1977	1978	1979	1980
20-99	22.960	22.464	21.883	21.393	21.160	20.854
100-499	5.052	4.990	5.026	4.949	4.952	4.926
Over 500	867	861	846	819	830	820
TOTAL	28.879	28.315	27.755	27.161	26.942	26.000

PERCENTAGES

	Number of employees					
	1975	1976	1977	1978	1979	1980
	79,7	79,4	78,9	78,8	78,5	78,3
	17,5	17,6	18,1	18,2	18,4	18,5
	2,8	3,0	3,0	3,0	3,1	3,0
	100,0	100,0	100,0	100,0	100,0	100,0

	Export sales					
	1975	1976	1977	1978	1979	1980
20-99	2.987	4.060	5.348	6.311	7.644	8.494
100-499	4.493	6.247	8.270	9.777	12.011	13.594
Over 500	9.815	13.092	15.643	18.617	22.272	24.547
TOTAL	17.295	23.399	29.261	34.705	41.927	46.635

	Export sales					
	1975	1976	1977	1978	1979	1980
	17,2	17,4	18,3	18,2	18,2	18,2
	26,0	26,6	28,3	28,2	28,6	29,1
	56,8	56,0	53,1	53,6	53,2	52,7
	100,0	100,0	100,0	100,0	100,0	100,0

SOURCE: Elaboration of ISTAT data

TABLE 2

DISTRIBUTION OF EXPORTING INDUSTRIES AND RELATIVE EXPORTS BY NUMBER OF EMPLOYEES
COMPARISON 1973/78

Number of employees	1973				1978				1978-1973
	Companies	%	Export sales (000,000,000 lire)	%	Companies	%	Export sales (000,000,000 lire)	%	Var. % export sales
10-20	1,374	13.3	117,917	1.6	2,393	16.4	561,011	2.1	+0.5
21-50	3,723	36.1	539,399	7.3	5,447	37.4	2,306,620	8.6	+1.3
51-100	2,417	23.4	651,060	8.9	3,181	21.8	3,000,737	11.2	+2.3
101-200	1,422	13.8	787,900	10.6	1,950	13.4	3,372,405	12.6	+2.0
201-300	534	5.2	565,195	7.6	606	4.2	2,046,972	7.6	.
301-500	382	3.7	481,045	6.4	471	3.2	2,137,085	8.0	+1.6
501-1000	259	2.5	701,459	9.4	306	2.1	3,125,055	11.6	+2.2
Over 1000	210	2.0	3,583,078	48.2	221	1.5	10,289,351	38.3	-9.9
TOTAL	10,321	100.0	7,427,053	100.0	14,575	100.0	26,839,236	100.0	

TABLE 3

Percentage distribution of export sales of manufacturing industries with more than 20 employees, by sector of activity, 1979

Sectors	NUMBER OF EMPLOYEES										
	20-49	50-99	100-199	200-499	500-999	1.000-1.999	2.000-4.999	5.000-9.999	10.000-19.999	20.000 and up	Total
Food and tobacco	15,8	13,6	24,6	17,9	11,3	3,1	13,5				
Textiles	17,8	16,9	23,8	21,1	8,7	6,7	4,7				
Clothing	14,1	15,2	17,1	26,2	9,1	2,5	15,5				
Shoes	24,6	27,0	23,9	14,0	10,2						
Hides and leather	28,4	20,1	25,3	26,1							
Wood	20,3	28,0	21,7	20,3	9,4						
Furniture	24,3	24,8	21,3	20,9	8,4						
Metallurgy	5,0	5,5	7,4	14,9	9,3	8,1	8,7	42,7			
Mechanical	6,6	9,0	12,8	18,0	11,7	10,4	11,6	10,6	8,3		
Vehicle construction	1,6	1,7	2,6	5,2	4,3	4,3	9,4	6,3	4,4	59,7	
Non-metallic minerals	13,4	18,5	20,8	14,5	9,4	11,8	11,3				
Chemicals	2,0	2,8	8,5	17,8	12,6	5,6	50,3				
Rubber	2,0	2,7	7,5	11,3	72,3						
Cellulose		1,0	22,0	22,0		76,8					
Paper & rel. prod.	4,5	5,8	8,3	19,6	26,7	18,5	16,3				
Polygraphics/publ.	9,5	9,5	11,8	16,0	7,3	18,3	27,0				
Photo/phonographic	12,2	15,5	21,2	51,5							
Plastics	16,1	20,9	27,2	21,6	9,7	4,2					
Various	25,3	16,2	19,9	23,6	22,3						

Note: Numbers of employees are not identical in all sectors when activities contain fewer than three units.
SOURCE: elaboration of ISTAT data

2. SUPPORT FOR SMI EXPORT ACTIVITIES

For SMIs industries it is extremely important that central and local government be functional and that qualified services and infrastructure be available. Furthermore, an active policy specifically designed to favor exports is required. In Italy, as in other industrialized countries, this has operated in the fields of fiscal affairs, credit, and insurance, with arrangements for information systems and networks of organizations to assist exporters as well as for the provision of infrastructure and services. In addition, it is indispensable to have a series of foreign policies and interrelationships which will directly or indirectly create foreign outlets for the national production system.

Excellent opportunities exist for reciprocal development, for example, in the aid policies which the developed countries operate to assist developing countries. Development of small and medium-sized industry is now being increasingly mentioned as one of the objectives of the bilateral development cooperation agreements between Italy and developing countries. It is a dynamic factor for economic development and, as there are many openings for cooperation between governments, so there are opportunities for cooperation between Italian SMIs and those of countries in Asia, Africa and Latin America.

In Italy the subject of exchanges with foreign countries is regulated by the Ossola law (227/1977), which provides for an organization to coordinate various government activities.

In addition to official policy, important steps have been taken toward cooperation among SMIs through CONFIDI and export consortiums. Invented by industrialists and encouraged by specific legal provisions (Law No. 240 of 1981), this kind of organization seeks to create synergy among the industries to

overcome the competition and other difficulties related to the small size of the company.

These organizations offer exporting SMIs qualified services in marketing, financing, technical and commercial assistance, and training. There are more than 300 export consortium in Italy today, with a membership of almost 8,000 companies having a total of more than 300,000 employees.

Beyond continuing to furnish assistance through provision of services, the export consortium should increasingly direct their attention to the problems of marketing, to organizing their own foreign sales networks, and to the more modern techniques of international trade.

There are still some deficiencies in the overall system designed by the government to support exports, and these are particularly felt by the small and medium-sized industries. But everywhere in Italy growing attention is being given to the problems of the SMIs. The most recent reform by the National Institute for Foreign Trade, the enactment of the law on export consortium, the numerous bills proposed about the SMIs, all show that the government has become aware of the importance of Italian SMIs to exports and of the problems and challenges they face.

3. CONCLUSIONS

The brilliant performance given in exports in the 1970s by the small and medium-sized industries compared with that of the big ones, and the decisive slowdown they registered in the 1980s, reveal the high potential of the Italian SMIs but also show that they are not yet capable of achieving permanent and stable results. This indicates that limitations related to small size still exist and have an influence on exports. There are limits to access to financing, information about foreign markets, technological progress, and such essentials to competitiveness as training, know-how, and refresher courses for personnel.

There are also deficiencies in government support for exports. Because of the difficulties they encounter in their attempts to expand abroad and these government deficiencies, small and medium-sized industries have widely sought synergy through the kinds of association which constitute a basic characteristic of the makeup of Italian small and medium-sized industries.

Growing attention is being paid, however, to the SMIs and this must result in an intensification of government intervention both in the fields of financing, insurance and services and in a reinforcement of the SMI associations. Such government support is particularly necessary in view of the 1992 unification of the European market, which will destroy barriers but will also remove mechanisms for the protection of the smaller industries.