

The innovation in the evolution of the ‘Italian industrial model’: lights and shadows

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Published online: 27 June 2015
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Abstract A long-standing stance argues the Italian industrial system does not comply with the “correct development process” because of its innovativeness shortage due to the skewed firm size distribution of its SMEs (Small and Medium-sized Enterprises). Such an approach, backed by innovation statistics, stems from the idea that ‘a firm’s growth equals innovation, which in turn equals competitiveness’. Yet these arguments both rely on a narrow concept of innovation and fail to match with historical facts. By putting the Italian industrial history into a Langlois’s (2003) perspective, this article suggests that “the Italian exception” actually represents one among several possible outcomes of the co-evolution among knowledge, technological progress, institutional development and aggregate demand dynamics. We further provide an analysis with very recent descriptive statistics showing that, even during the current crisis, “not so big” has not meant “not so competitive”. Therefore, innovativeness must be channeled in the right direction, because it concerns all those strategies allowing firms to “buffer risks”. What the Italian industrial system really lacks is consistent institutional and structural policies facilitating firms’ efforts toward new technologies.

Keywords Innovation · Italian industrialisation · Firm evolution · SMEs

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1 Introduction

The Italian industrial system is very often regarded as performing poorly when it comes to the innovation activities debate. In line with this widespread opinion, the Italian 2012 R&D expenditure accounted for only the 1.27 % of the GDP, far from the values shown by its European competitors (1.73 % for the UK; 2.29 % for France; 2.98 % for Germany) and other world industrial powers (2.79 % for the US; 3.38 % for Japan; 1.98 % for China) (OECD 2014). Further statistical evidence suggests these findings are not bound to any specificity of the current historical period, because Italy has steadily placed in the last positions in the international innovation ranking for over 40 years, endeavouring without success to bridge the gap with other countries: in fact, its gross domestic expenditure on R&D although reducing the gap with other economies was always lower than that of other competitors, shifting in the period 1970–2012 from 34 % to 73 % of that of the UK, from 42 % to 55 % of that of France, from 38 % to 42 % of that of Germany, from 30 % to 45 % of that of the USA and from 47 % to 37 % of that of Japan (Airi 2014). Such a structural condition represents a deep-seated hindrance to a sustainable industrial development and structural transformation, preventing improvements in firm's productivity as well as competition levels, thus ultimately hampering economic growth. According to the traditional structure-conduct-performance paradigm, in fact, the growth of an industrial system is triggered mainly by innovations, because they implement two interconnected processes: the growth of the firm on the one hand and competition in the markets on the other. A rewarding path starts when the process and/or product innovations push the firm towards its production possibility frontier, where the productive efficiency makes achieving higher productivity and reduced costs possible. This pattern leads to low prices for the goods and to efficient resource allocation, boosting firm size growth by means of increasing competitiveness on the domestic and international markets (Cohen 2010).

The debate on the Italian industrial development carried out over the last 40 years, although conducted inside this theoretical framework, mixed up the role of innovation in triggering the industrial transformation. Indeed, it referred to productivity, firm size and price competitiveness as the main causes of an innovation process, instead of the reverse. This distortion, which emerged in the 1970s just when a generalised firm crisis revealed the structural weakness of industrial sectors, caused an enduring misunderstanding about some important dynamics that have characterised the Italian industrial evolution. In fact, the inability to explain some contradictory trends such as the success of small-medium firms and the decline of large ones, or the development of exports even in the presence of insufficient innovation, can be attributed to it. A short historical excursion shows how the 'Italian exception' can be explained by the innovation gap and the emergence of a new innovation environment.

To this end, the industrial transformation of the 1970s is emblematic. In that period, Italy's 'economic miracle' (that is, the extensive phase of development lasting from 1953 up to 1963) was a long way off, and the country's industry was suffering from a

productive and dimensional restructuring that bequeathed a dualistic manufacturing structure (Traù 2001; Nardozzi 2003; Ciocca 2008; Amatori 2008; Colli 2010): a section of SMEs wider than elsewhere within the group of industrialised countries and a branch of large state-owned and private firms. Small and medium firms were spreading all over the Italian territory at the expense of private and state-owned enterprises (with large firms proceeding to their inescapable decline): in fact enterprises with 49 workers or less, being in tune with the medium-size counterparts (50–249 workers), increased their share of total manufacturing employees between 1971 and 1991 from 42.0 to 57.8 % (Amatori and Colli 2012: 204). In addition, dynamic industrial districts (producing textiles, furniture and machines) emerged as networks of SMEs characterised by innovation and intensive technological linkages—Paba 2012: 38–40 and Mediobanca 2011: section 2) and progressed during the 1980s as they supported not only the Italian industry, but also the export of manufacturing goods. The performance of Italian exports, placing the country steadily in the sixth position among the G-7 (Fortis 2011: 70–7), was certainly due to the evolution of the European common market and the exchange rate policies, but it was mainly pushed by the ability of the Italian SMEs to be innovative in the quality of their products and to tackle the international trade environment.

In the 1990s, the international economic context changed because of three processes following and overlapping one another during the subsequent 2 decades: the reinforcement of the European monetary system (implemented in 1979) resulting in the European Monetary Union (EMU) in 2002, the fulfillment of the European common market (coming into force in 1993), and the achievement of World Trade Organisation agreements (which opened a new phase of globalisation in 1995) and the Euro convergence (the meeting of the Maastricht criteria required to join the Economic and Monetary Union and adopt the Euro currency) held up between 1992 and 2001. The new scenario brought new challenges to the Italian economy, already out of breath because of a general decrease in investments and delay in adopting new technologies. Representative of the state of affairs was the GDP rate of growth trend, which, after showing a yearly average of around 5.17 % during the 1950–1980 period, was halved in the 1980s up to 1991 and then further declined to 1.3 % during the following 15 years (Guarino 2011: 144). Despite these trends, the performance of manufacturing exports at the beginning of the new century pushed Italy to third place as a net exporter, right behind Japan and Germany (Fortis 2011: 71). Once more the ability to innovate in specific sectors was at the base of this performance.

The unexpected combination of firm size reversal and export improvement in the Italian manufacturing sector has supported the thesis of small-medium size firm districts as a model of good industrial development (Baldwin et al. 2007; Amatori 2008; Paba 2012). The argument has long been disputed concerning the intensification of the industrial district's ability to innovate to efficiently tackle the challenges of the repeatedly changing international environment (Colacurcio et al. 2010), but in the long-term perspective it seems interesting to analyse it in terms of the evolution of firms and industrial (or market) relations models. In fact, the different phases through which capitalism has evolved have arranged the organisation of the firm, the structure of the industry, and the intermediate and final market connections as much

as systemic architectures. Some scholars pointed out that each stage within this path proposed a representative firm and the corresponding industrial relations. According to Chandler, if the ‘small owner-operated business’, putting into practice the factory system and market principle, represented the first form of the firm (fulfilling the invisible hand coordination), the large-scale vertical-integrated managerial corporation was the second one (working thanks to the visible hand, that is, an institutional environment provided by public policies—Chandler 1990). By the 1980s, the ICT revolution weakened the image of the corporation as an always successful competitor by enabling a reduction of transportation and information costs and, consequently, by increasing the number of competing firms on broader international markets. Thus, according to Langlois, a third kind of firm and industrial relations appeared, characterised by medium-sized, innovative, specialised and self-connected corporations operating under the ‘vanishing hand’ (Langlois 2003, 2007). In this framework the technological changes stress the link between innovation and economic performance, showing the set of available skills and knowledge enabling firms to apply either updated or completely new forms of techniques to the production process, that is, the existence of firm endogenous sources of innovation. Thus, the innovative firm, continuously updating its technology in order to take part in the globalisation process, reveals a per se broader concept of innovation, expanding over and above the boundaries established by the conduct-performance paradigm. Italian districts’ SMEs can be referred to as accounting for this new firm model stemming from environmental variables. In this way, Italy does not represent an exception to the economic development path, but rather a precursor.

The 2008 world crisis greatly affected the international trade environment, forcing each national economy to restructure its own industry in order to tackle the difficulties. In the case of the Italian economy, this challenge is more demanding because of the domestic situation, which has presented an 8 % reduction of the GDP during last 6 years due to a drop in domestic consumption, a downfall in investments equal to 24 % owing to the worsening of financing conditions and the significant technological gap (Busetti and Cova 2013: 5). This framework represents a puzzling environment for small and medium firms, especially because public policies are not able to sustain them by improving the national sources of innovation (education, research, ICT infrastructure, etc.) necessary to tackle globalisation (Becattini et al. 2011). Therefore, the aim of this article is to present the evolution of the Italian industrial model from the ‘visible hand’ to the ‘vanishing hand’ and to discuss its sustainability in the current world economic context by using an historical as well as path-dependent perspective and an applied analysis of SME performance during the crisis.

2 Innovation and evolution of industrial systems and firm models: from the ‘invisible hand’ to ‘vanishing hand’

The sharp contrast between Italian economic performance and its innovativeness level in the last 40 years might lie in the interconnection between the way innovation is conventionally measured and Italian firms’ specific innovation pattern.

The former relies on indices made up of either balance sheet data on R&D expenditure or the number of implemented process and product innovations, or, alternatively, of licensed patents (Bugamelli et al. 2012). On the contrary, the latter has been driven in some phases of its historical path by learning by doing and non-codified operations, tailoring the expression ‘innovation without R&D’ for Italian firms’ innovative activity. This perspective on the one hand looks to a concept of innovation going beyond the firm-based documentations contemplated by the structure-conduct-performance paradigm by drawing attention to an innovative environment; on the other it reveals that these innovative activities could affect the evolution of industrial systems and firm models in the different stages of capitalist evolution. In order to use these suggestions as explanatory instruments for the analysis of the Italian industrial model, a further investigation on both topics is necessary.

Concerning the concept of innovation OECD codified a multifaceted definition where ‘innovation activities include all scientific, technological, organisational, financial and commercial steps which actually lead, or are intended to lead, to the implementation of innovations. (Thus) innovation comprises a number of activities that are not included in R&D, such as later phases of development for preproduction, production and distribution, development activities with a lesser degree of novelty, support activities such as training and market preparation, and development and implementation activities for innovations such as new marketing methods or new organisational methods that are not product and process innovations. Innovation activities may also include acquisition of external knowledge or capital goods that is not part of R&D’ (OECD 2005: 18). Along these lines the literature on the topic (see Malerba 2006) highlights the relation between the multifaceted and differentiated innovation process and the evolution of industrial systems, pointing out that the first element affects the second one through the structure of the demand,¹ the types of knowledge,² the networks interplaying in firms’ capabilities and technological/social and institutional factors,³ and the ways by which all these elements co-evolve.⁴ According to this perspective innovation depends on both firm strategies and the environmental (both innovative and of other nature) variables, but also on their coordinated evolution.

¹ ‘In particular, advertising, bandwagon and networks have been shown to be important factors in influencing the magnitude and orientation of inventive effort and the degree of industry concentration’ (Malerba 2006: 8).

² ‘... sectors and technologies differ greatly in terms of the knowledge base and learning processes related to innovation. In some sectors, science is the force driving knowledge growth, while in others, learning by doing and cumulativity of advancements are the major forces. We also know that knowledge differs across sectors in terms of sources (firms, universities, and so on), domains (i.e., the specific scientific and technological fields at the base of innovative activities in a sector) and applications’ (Malerba 2006: 12).

³ ‘...innovation and industry evolution are highly affected by the interaction of heterogeneous actors with different knowledge, competences and specialization, with relationships that may range from competitive to cooperative, from formal to informal, from market to non-market’ (Malerba 2006: 15).

⁴ In a broad sense, coevolutionary processes involve knowledge, technology, actors, demand and institutions, and are often path-dependent’ (Malerba 2006: 17).

Thanks to this definition of innovation and to the systemic-evolutionary process methodology introduced to analyse it, also the ways by which innovation affects industrial systems and firm models have been highlighted. Some scholars such as Simon (1962), Chandler (1977, 1990, 1992) and Langlois (2003, 2007) have evaluated the evolution of the organisations in general and of the firms in particular accordingly. They have provided important sparks and careful considerations that can provide a useful theoretical framework to frame the link between technological innovations and firms' evolution. According to this approach the models of industrial structure and firm management are the organisational result of an evolutionary design problem (solved thanks to the specialisation and differentiation of functions) tackled by the technology of production and by the business organisation to buffer a changing, variable and uncertain environment. Each model develops specific shock absorbers (whose function is to mediate between a variable environment and a predictable production process) that are (or contain) 'information-processing systems' (Langlois 2003: 354) of a different nature: one of the most important among them is human skill, particularly the business competences of the management. The shock absorbers have changed as industrial organisation and firm models changed along the capitalist path, because technology, market and environmental conditions are evolving systems. However, at the same time, as every national environment affects the way by which technology and market conditions design the industrial structure and firm management, also shock absorbers can be shaped differently during the same capitalist phase in different places. In fact, the models of industrial structure and firm management that emerged from the connection of technological activities with market activities inside the environmental conditions are the result of the relative speed of the co-evolution of these systems as well (Aoki 2007). These reflections enable saying that all national industrial structures and firm organisations are in some way an interpretation of the general industrial model coupled with each phase of capitalism in accordance with the national level of the innovative environment. The relations between the level of innovation and the morphological features of the industrial structures and firm models throughout the development of capitalism can be briefly summarised by three different scenarios.

Before the factory system the industrial structure was generally represented by fragmented and decentralised systems of small-scale craft productions that supplied many isolated local markets. The engine of the economy was commerce, carried out by independent generalist merchants trading a variety of generic (or non-specialised) products by managerial competences learned as much as necessary to obtain profit from different goods (as 'in the low-fixed-costs economy of the period, profitability depended not on the ownership of tangible assets but on specialised knowledge and the ability to adapt' Langlois 2003: 354). Thus the coordination of this industrial model relied upon the 'invisible hand', that is, on the ability of the merchants (pushed by their interest) to implement the trade between the consumers of the local and neighbouring markets and the firms that, in this way, could activate the division of labour using new technologies. The environment did not present particular shocks except from the slow and burdensome costs of transportation and from the perishability of certain goods. To buffer these elements the system

entrusted merchant expertise to managing trade and their inventories (when products could be stored), while some particular customer needs in the final markets or modification of a product component in intermediate markets were satisfied by the abilities of the artisans: thus both shocks were absorbed by human skills. Indeed ‘the value chain in the US in the early years of the nineteenth century was one dominated by merchant middlemen, who lowered transaction and agency costs by aggregating outputs and demands from widely dispersed producers and consumers as well as providing capitals for the growth of manufacturing’ (Langlois 2003: 358).

As the systems of transportation evolved reducing transportation costs, both the distribution system and the production structure changed. Larger markets for old products and new ones supplying new intermediate and final goods (steel, chemical, means of transportation, etc.) on the one hand increased the amount and specialisation of the commerce; on the other they pushed the technological progress in industrial sectors, that is, the division of labour, specialisation of functions, scale of production and variety of products. Both the coordination of the productive filière and of production with the market (which were previously in charge of the merchants) became increasingly a task of entrepreneurial cartels first and of multidivisional firm internal purchasing and marketing functions later. Thus the reduction of the number of producers and distribution stages shrunk the value chain and made merchant managerial competences obsolete. The higher fixed costs due to plant investments and to firm organisational coordination became economically sustainable because they were associated with high levels of output enabling lowering unit costs. The vertical/centralised firm (corporation) mediated the environmental shocks directly by the management, a professional category with expertise to manage (in a predictable way) all the relations of the productive apparatus scientifically. They tried to simplify and stabilise the environment in order to facilitate high-throughput production. Management was a shock absorber endowed with the ability to work professionally and, to a large extent, independently thanks to specific relevant legislation: this condition proves the existence of the state’s ‘visible hand’. Such an industrial configuration and firm model could buffer all the market risks associated with the technological features of the firm, but could not tackle new consumption styles. In addition ‘Chandlerian managers are generalist for the same reason that craft artisans and merchant are generalists: because their function is to buffer uncertainty’ (Langlois 2003: 365).

When the consumption model became more complex and jointed, only a more modular model of the industrial structure and firm could match it. The ICT revolution came to upgrade the production system together with important institutional changes in the structure as well as in the markets’ extent. If the increased complexity in production was tackled by the modular technology enabling specialisation, flexibility and high-throughput production coupled with reduced plant dimensions, the greater complexity of the market coped with the increasingly reduced costs of information and communication and with the creation of standards, which are quality benchmarks for components or goods. This institutional activity cuts the transaction costs in both intermediate and final markets, charging the firms with the coordination through the market. ‘In many respects, the structure of this model looks more like that of [the craft-production] era than like that of the era of

managerial capitalism. Production takes place in numerous districts' firms, whose outputs are coordinated through market exchange, broadly understood. This is in the sense that the visible hand of management is disappearing. Unlike [the craft-production] structure, however, the new economy is a high-throughput system, with flows of work even more closely coordinated than in a classic Chandlerian hierarchy' (Langlois 2003: 373).

This theoretical framework, coupling both the activities that can be defined as innovation and their impact on the firm evolution and industrial transformation, is a useful tool to review the historical path of the 'Italian industrial model', in search of an explanation for its 'exceptions' (that is, its acquaintance with the innovation).

3 Managerial capitalism 'in the Italian fashion'

A recurring leitmotif among specialists depicts the Italian industrial demography as divergent compared to other world industrialised countries because of the importance of small-medium size firms (1–249 employees) in the manufacturing sector. Differently from other industrialised European economies, nearly four fifths of Italy's total employees were in small-medium size firms in 2007, while the proportions in Germany, France and the UK were between 47 % (the first country) and 57 % (the last one; Table 1). The prevalence of large firms in the industrial structures of the mentioned economies was also shown by their contribution to the value added of the manufacturing sectors, accounting for 56.6, 65.0 and 55.5 %, respectively. Even Spain, although structurally a lot like Italy, behaved similarly to the other European countries. In fact, although the share of employees in its large firms was nearly equivalent to that in Italy (23.9 % of the total compared to 22.1 %), the contribution to the total value added was much bigger (42.7 % compared to 31.7 %), which made Spanish large firms the more productive of the patterns within this size class. The Italian divergence was revealed particularly by the fact that its medium-size firms (50–249 employees) were the only ones whose share in terms of total value added was higher than that measured in terms of total employees (25.9 vs. 21.1 %).

Table 1 Shares of employees and value added by firm size in manufacturing in 2007 (in % of total)

Country	Small firms (1–49 employees)		Medium firms (50–249 employees)		Large firms (more than 250 employees)	
	Employees	Value added	Employees	Value added	Employees	Value added
France	31.4	24.0	21.7	19.4	46.9	56.6
Germany	22.3	13.7	24.8	21.3	52.9	65.0
Italy	56.8	42.4	21.1	25.9	22.1	31.7
Spain	49.3	33.1	26.8	24.2	23.9	42.7
UK	30.3	21.8	26.2	22.7	43.5	55.5

Source: Authors' elaboration of data from OECD (2010)

The deviation from the manufacturing morphology prevailing in European industrialised countries represents a recent turn in Italy's 120-year process of industrialisation, for it started in the early 1970s (Colli and Vasta 2010). Large firms have spread over almost 80 years, introducing new forms of technological progress and new productive sectors to the economy and implementing new organisational systems and decision-making methods. Thanks to this achievement, due to the technological regime of the second industrial revolution, the small-size handcrafted forms of production of the first industrial revolution, firmly established in the Italian economy, decreased within manufacturing in favour of large firms with a 'fast-paced' and 'high-throughput system' [that showed, in any case, a smaller average size in respect to their counterparts in the other European countries (Colli 2010: 50)]. However, in addition to the technological innovative waves, some other elements supported this long-lasting prevalence of large firms: the oligopolistic structure of the domestic market, concentrated ownership (Colli 2010: 48), state entrepreneurship, family holding system and state policies.

It was at the beginnings of the twentieth century that new industries based on an advanced technology ('such as chemical, steel, heavy mechanics, transportation equipment and oil refining'—Colli 2010: 48) drove the Italian economy towards the diffusion of large firms, side by side with the prominent productions developed during the previous technological wave (textiles, metals, foods, electricity and transportation). The advent of such a new technological regime, characterised by capital-intensive productions, energy consuming processes, product layout (assembly lines) and batch production, enables, by its nature, scale economies, unit cost reduction, a large volume of products and labour specialisation (Amatori and Colli 2012: 203), and thus mass production and consumption. However, some environmental conditions are required in order to take advantage of all these economic opportunities for a country's development: many investments, managerial innovation abilities, high demand for final goods and new institutions supporting this socio-economic change (Amatori 2008: 208). Unlike the USA and also some other European countries, these conditions were absent in Italy during the first half of the twentieth century, so that the Italian industrialisation presented specificities that have modulated the characteristics of the traditional model of managerial capitalism. In fact, a small capital market in the first 2 decades of the century and the bankruptcy of some universal banks fostered the entrepreneurial state as a promoter of the industrialisation later in the 1930s. The presence of a small market for consumer goods (due to the poverty of the country with respect to its European partners and to the exports shortage in 1920s and 1930s) endorsed strong oligopolies. The need to maintain cartels and rents pushed private capitalism towards a family-ownership structure and a state-compliant strategies, both well away from innovative managerial logic. All these features of Italian industrialisation were also sustained by an institutional framework preventing competition, bankruptcy and technological updates. Thus, 'if American capitalism can be defined as managerial, the British one as personal, the German as cooperative, one could well say that Italy features a political capitalism' (Amatori 2008: 212–213) in the first half of the twentieth century.

In spite of these deviations from the standard model of managerial capitalism, this phase of Italian industrialisation produced some positive effects. First of all, when the Second World War blew up, Italy was the only Mediterranean country that had developed a stable industrialisation, being formerly among the eight world industrial powers since the 1920s. In addition, both the family-owned and the state-managed firms constituted an environment where the managerial cohorts that governed the industrial expansion of the postwar period emerged. These managers really pushed large firms, in both private and public sectors, towards international markets, big investments in the chemical and steel industry, and new high-quality and low-cost productions, realising governmental policies directed towards investments and integration in international markets. It was thanks to the mix of entrepreneurial talent and ability to innovate, investments, custom reduction, institutional change, public policies oriented to supporting an industrial system exporting standardised goods, as well as increased domestic consumption, that emerged the ‘Italian boom’, a 20-year period between 1951 and 1971 characterised by a 6 % rate of GDP growth. During this period, after the dismantling of ‘political capitalism’, Italy became a managerial industrial power adjusting the traditional managerial firm to the environment of the Italian economy. In fact, Italian managerial capitalism was characterised by smaller size firms, a preference for ‘holding companies’ rather than ‘multi-divisional organisations’ and limited adoption of diversification and internationalisation strategies (Colli 2010: 50).

The success of large firms in manufacturing did not protect them from the structural deficiencies of the managerial organisational form. On the contrary, these weaknesses were emphasised by the factory production conditions. Worker’s dullness (due to the monotony of the technical division of labour) and absenteeism were increased by the shifting of this organisational form towards an intensive use of labour in assembly plants. This strategy, coupling a decreased number of workers with a higher work pace and piece rate system, was introduced to face the rising salaries caused by an excess demand in the labour market. The insufficient flexibility of the production line (emerging whenever a product differentiation was required by a change in international demand) became worse because of the fall in private investments in the 1960s (the purchase value for plants and machinery declined from about 10–6 % of the GDP between 1963 and 1968—Nardozi 2003: 152), which resulted in the risk of equipment breakdown and technological obsolescence. The strategy of increasing productivity by reducing the number of workers (rather than by increasing investments as Germany, France and the UK did in 1968 by 11, 10 and 9 % of the GDP, respectively) pushed exports, but triggered the decline of large manufacturing firms and broke the development process. While private industrial capital was used to try to make profits without investing, the entrepreneurial state made investments in the steel and petrochemical industries (overall to develop the southern regions) without considering either the demands of the market or location constraints (Amatori 2008: 218). Thus it failed to propel the economy just when the need for new institutions supporting managerial capitalism (the antitrust law, a new banking law, the protection of shareholders, the promotion of institutional investors) and for new social and redistributive policies to control social conflicts was at its highest.

The post-World War II trend toward large firms inside Italian manufacturing, after an increased share of private and public large firms during the ‘Italian boom’, showed a clear reversal starting from the 1970s. The thriving phase was characterised by the increase of the percentage of firm class sizes with more than 500 employees from 21.5 to 23.1 % in the 1960s and that related to class sizes of 100–499 employees from 20.4 to 22.4 % in the 1951–1971 period. The declining stage presented, on the contrary, a crash of the share of total employees working within firms with more than 500 employees from 23.1 % in 1971 to 9.6 % in 2001, while that referring to the class size of 100–499 employees shifted from 22.4 to 19.9 %, in the same period (Garofoli 2014: 82). The phase of dominance of managerial capitalism between 1951 and 1971 is also revealed by the gradual reduction of the share of very small firms (1–9 employees) in the total manufacturing employment between 1951 and 1971 (from 32.1 to 23.4 %); likewise a decreasing phase resulted from the increase of the total share of workers of the firms having less than 100 employees between 1971 and 2001 (from 54.6 to 70.4 %). However, inside these structural dynamics the doubling of small-medium firms’ share in terms of employees throughout the second half of the nineteenth century appears typical: firm size classes of 10–49 and 50–99 employees increased, respectively, from 14.1 to 33.3 % and from 8.1 to 11.3 % between 1951 and 2001 (Garofoli 2014: 82), with this process speeding up since the 1970s. This steady trend confirms that the SMEs’ intensive ‘Italian industrial model’ emerged from the ‘Italian boom’.

4 ‘Entrepreneurial capitalism’: the rise of Italian small-medium firm districts

The 1970s and 1980s represented 2 decades of important changes in the international demand for consumer goods and technological advances in production processes. Considering the first element, 30 years of development enlarged the middle class and promoted new models of consumption. Consumerism became a method of social exhibition and social climbing, and this shifted the consumption from the standardised goods of mass production towards both more differentiated goods and new products satisfying new desires. New perspectives also opened up for traditional industrial sectors, which could move towards high quality and fashion because these characteristics, entailing a smaller price elasticity, enabled bearing high overhead costs or implementing price differentiation up to the willingness to pay. The new structure of the demand drew, following the previously presented theoretical model, firm innovation. The differentiation and introduction of new goods pushed towards more flexible plants, where numerical control machines reduced their idleness by more versatility in the mode of operation and by more divisibility of the service, and managerial operating methods (such as ‘just in time’, ‘total quality management’ and ‘world class manufacturing’) optimised the arrangement of the logistical-productive cycle by maximising the performance of the organisation regarding each competitive priority: quality, delivery speed, flexibility, innovation and price (Nakajima 1988).

The environment just described stressed the crisis of managerial capitalism ‘in the Italian fashion’, which was already in a tight spot because of the lack of investments and the obsolescence of the plants. The inability to compete in the new markets affected large firms, which reduced their productive capacity, but offered new chances to small firms having flexibility, creativity and the ability to enter the new markets or to compete on equal terms with old large exporters. Thus, in the 1970s, the structure of Italian industry started to change in favour of small-medium sized firms, as shown by both the reversal of employment in the class size of firms presented above and by the increase of industrial employees between 1971 and 1981 (+14.4 %) and of firms and plants during the same period (+42.7 %) (Garofoli 2014: 81–82).

If the mentioned evolutionary transformations of the capitalist market conditions and technological advance pushed a section of the Italian manufacturing firms towards the innovation, the domestic conditions thwarted the creation of an innovative environment. In particular the financial system, ownership of industrial capital, institutional framework and role of the state were among the most important fields where innovation was missing. The financial system, centred on a group of public and private banks, was unsuitable for selecting and financing good investments: public banks supported the industrial policy of the southern region’s development (pursued by the state according to electoral aims since the 1970s); the private ones sponsored the families with large firms (which were in the doldrums because of the change to the control by corporations in those decades). Also the Italian stock exchange could not carry out the function of financing industry, as its capitalisation was poor with respect to the other European industrial countries. Thus, as a consequence of this structural situation, the share of investments over the GDP fluctuated around 25 % during the 1970s (in conjunction with high state investments) and declined around 22.5 % in the 1980s. The sidetracked entrepreneurship of family-owned large firms on the one hand excluded them from technological advances; on the other it brought them towards non-tradable productions or protected sectors, so that at the beginning of 1990s ‘the highest ranking Italian firms are those which exploit monopoly positions such as ENI and Telecom’ (Amatori 2008: 221). The last element of the domestic environment affecting the evolution of the Italian industrial structure is the role of the state as a promoter of industrial policies and institutions for a new design of the Italian industrial model. In this respect the necessary reforms of antitrust laws, the authority to control the stock exchange, corporate governance, the banking system and transparency came on stage only in the 1990s, but they did not move towards a well-aware design of industrial policy by either the state or the entrepreneurs: the weakening of subcontract law and false balance sheet law occurred in early 2000, revealing insufficient interest in the argument.

The fact that firm aptitude to innovate by adapting the productive structure to demand and technological changes provoked (together with domestic structural and innovative inefficiencies) both the decline of large manufacturing firms and the emergence of dynamic small-medium firms, validating the hypothesis of an endogenous development process in the case of a SME district. The ‘endogenous development refers to the capital accumulation process of specific localities and

territories. It deals with development processes based on local savings and investment (...); it pays attention to the territory's capacity for the diffusion of innovation throughout the local productive system and the role played by that system. It argues that the efficient use of the territory's development potential is conditioned by the functioning of institutions. Endogenous development, therefore, is a territorial approach to economic growth and structural change, based on the hypothesis that the territory can be understood as the territorial community's network of interests and, therefore, can be perceived as an actor for local development' (Vázquez-Barquero 2007: 26).

These elements can be documented in the Italian experience. In fact the territories where small firms developed represented an incubator of positive externalities for economic activities: the first among these advantages was a widespread entrepreneurship due to sharecropping, that is, to an agricultural system engaging peasants in the management of the farm (Colli 2010: 53); there was also a versatile and cheap labour force, sometimes skilled in clothes and leather productions because of the long experience of cottage industries; there were material assets that could be offered as a guarantee in case of credit borrowing, and small banks tended to support local investments; in the end there was the availability of natural resources for manufacturing traditional goods (wool, leather) and local markets for providing the mechanical products required by the agriculture. Also based on the social capital these territories were well endowed: a faraway local identity awareness (frequently coming from medieval municipalities) coupled with traditional social networks and associated norms that ensured cooperation in economic activities; transcendent social ties such as common economic purposes and lifestyles (the 'small entrepreneurship' associated with a work ethic) that made them responsible for the coordination; a social and political environment that could organise the social structure and enable norms to develop.

On this favourable ground clusters of small-medium firms (mainly characterised as districts) emerged prominently not only in the Italian manufacturing sectors, but also in the Italian economic outcome. Their main characteristics were (Becattini et al. 2011: 57–59; Garofoli 2014: 104–106):

- High plant or firm specialisation, enabling reaching scale economies in each kind of processing;
- Highly skilled labour and mechanisms of vocational training on the job;
- High division of labour and integration among the local firms;
- High product specialisation and differentiation in each cluster;
- Competition policies generally based on quality and differentiation of the product, innovation and new products, and customer service, not price.

Such clusters provided a high quantity of highly differentiated products through the coordination of a large number of specialised firms that were formally independent. Given the specialisation of the firms, the intermediate markets, which could include more than one cluster according to the scale of production, presented imperfect competition. In addition, with the final and intermediate output being oriented to the market, information and innovation spread among firms, thanks also

to the frequent face-to-face communication used for integrating working activities. All these elements highlight the role of the entrepreneur not only as a manager of his or her firm, but also as a member of an entrepreneurial consortium promoting local products.

The SME model of Italian industrialisation not only represented an alternation of dimensional firms in the structure of manufacturing sectors, but also a complete change of the pattern of industrialisation. The reduction of the firm sizes involved the decomposition of productive cycles and the introduction of flexible technologies able to work efficiently also at the small scale level. The concentration of industry at the urban poles of the ‘industrial triangle’ (Milan, Turin and Genoa), typical of managerial capitalism ‘in the Italian fashion’, was replaced by widespread countryside industrialisation. The ability to innovate the products in response to demand changes includes innovations in firm layout, in managing the value creation process by networks and in connecting the firm activities to knowledge sources (universities and research centres).

The success of this industrial model can be profiled in some ways. First of all, the so-called traditional manufacturing sectors (clothing, footwear, textile yarn and threads), mechanics and industrial machinery increased their output, number of employees and exports: the increase of mechanics products represented an upgrading of specialisation, while the substitution of textiles with clothes meant a new ability to compete in international markets thanks to the quality and creativity, that is, to the ability to satisfy the new demand. In addition the structure of Italian exports changed in respect to the period of the ‘Italian boom’ because of this industrial restructuring: on the one hand manufactured products increased their share of total exports from 65.3 to 83.4 % between the early 1950s and mid-1970s at the expense of primary goods (declined in the period from 34.7 to 16.6 %); on the other hand the top products of Italian manufacturing exports changed. In fact while from 1951–1955 the ranking was textile fabrics of standard style, petroleum products, textile yarn and thread, and industrial machinery, growing at a yearly rate of 8.2, 8.1, 6.5 and 5.2 %, respectively, 20 years later the top five products exported were motor vehicles, machinery, petroleum products, clothing and footwear, with a yearly increase of 8.5, 6.5, 6.4, 5.7 and 4.6 %, respectively (Vasta 2010: 140). Although the success of SME exports was recorded in markets where the demand increased slowly and their share of the GDP declined to less than 20 % after 1986, the structure of Italian exports showed high stability up to the end of the century with comparative advantages, in the order of footwear, leather products, furniture, non-metal products, wearing apparel, textiles, metal products, plastic products, pottery, beverages, non-electrical machinery, glass products, and iron and steel (Vasta 2010: 143). In short, the contribution of this industrial system and firm model to the economic growth in the 1970s and 1980s was important not only because it caused an increase of production, employment and productivity, but also because it carried the economy towards the new industrial environment, transforming the firms and their environmental relationships (Malerba et al. 1999; Dosi et al. 2005; Bottazzi et al. 2006; Amatori 2008; Malerba 2002, 2011; Dosi 2013). This outcome, obtained thanks to a high rate of investments in industrial machinery between 1983

and 1990, sustained the income: in the 1980s Italy presented the highest rate of economic growth relative to the European partners (Garofoli 2014: 101–102).

Starting from the 1990s the technological and market conditions, which had caused distress to the Fordist model 30 years before, evolved because of two consequent advances: the diffusion of information and communication technologies and the globalisation of the markets. Both elements affected firms not only with respect to the planning, organisation and management of the production process, but also to the coordination of the relationships maintained with all the subjects contributing to the realisation of the economic value of the technical productive process. In fact the ICT on the one hand improved and sped up the production processes, making them increasingly flexible and specialised, imposing a focus on the core businesses and dismissing all the service activities. On the other, it promoted the technological design (which has the strength of cooperation among the supplier, service provider and buyers in defining the product) by reducing communication times and costs. Indeed the enlarged dimensions of products and productive resource markets (due to reduced transportation costs and free market agreements) led to an increase of competition/cooperation networking promoting the managerial design (that is, the structure of authority relations enabling allocating decision rights, rights of alienation and residual claims in the firm process). Technological and managerial designs are part of the product design, that is, of the decomposition of the process of creating a product in a certain number of modules in order to ensure firms' competitive advantage in the dynamic business environments (Kusiak 2002).

Modularity, decreasing product complexity, accelerates product innovation costs efficiently and creates many advantages with regard to the production process, as it enables increased economies of scale, increased product variety, cost savings in inventory, shorter delivery time and a shorter product lifecycle. As to the market relations, modularity enables mass customisation and in this way it facilitates postponing product differentiation and final delivery until the customer requirements are known. In addition 'modularity influences supplier relations and integration positively in a number of ways: firstly, modularity improves delivery forecasts' reliability, and thus mutual trust in supplier-customer relationships; secondly, it enhances supplier integration by reducing the communication barrier by creating a common language; thirdly, it helps buyers and suppliers to manage the risks of losing competitive advantage through inadvertent release of intellectual property rights (IPR), and finally, it has a positive influence on supplier integration which in turn has a positive effect on firms' performance' (Lehtovaara et al. 2011: 563).

'Modularity in the design of products leads to—or at least ought to lead to—modularity in the design of the organisations that produce such products' (Langlois 2002: 19), thus shaping the structure of the relations among the firms participating in the technical and economic process of production. To this end some stylised facts emerged in the industrial structure in the last 20 years:

- Vertical disintegration and international fragmentation;
- Extension of the productive filière;

- Correspondence of the plant with the firm in some sectors;
- The go-it-alone strategy of the firm has changed into a strategy of alliance;
- The leading firm is frequently a primarily assembler;
- A production process amounts to sharing of capabilities and interaction among the key market players.

In this framework science-based knowledge, strategic alliances (including licensing, supplier relations, joint ventures, collaboration, R&D consortia, industry clusters and innovation networks) and competences are very important for firms to survive inside an industry. Investments, research and development, innovation, work capabilities and a wide network of relations are key variables to tackle the challenges of competitors. To implement such a systemic firm endowment the combination of public policies and private initiatives channeling investments in education as well as research, machinery and communication networks is necessary. In this respect the Italian industry has presented many shadows during the past 25 years. Investments fell around 18 % in the 1990s before reaching 21 % again at the beginning of the crisis, and the privatisation of the majority of state-owned large firms at the end of 1990s did not re-invigorate either the stock exchange or public investments, but led to dismantling plants, taking refuge in protected productions and possession of financial assets for private capitals, while reducing the public debt for the state. Given the good performance of the SME industrial model during 1970s and 1980s and that its lights and shadows appeared when the international economic environment changed, many questions arise: does this endogenous innovation process at the firm level match the new international trade environment (characterised by knowledge-based capital and high value added activities)? Are the technological updating and competition strategies of Italian SMEs suitable to tackle this challenge? What kind of policies can support this challenge?

5 What next? Some evidence concerning the Italian industrial model in the age of crisis and some implications for technology change

This analysis so far shows how the Italian industrial development process can be interpreted up to the early 2000s through the lenses of the Langlois's *capitalism hands* evolution (Langlois, 2003). In particular, it has been highlighted that the firms' shrinking size phenomenon that started during the 1970s does not per se represent the Achilles heel of Italian industry, but rather an outcome signaling the passage from the Italian *managerial capitalism* era to the Italian *vanishing hand capitalism* era. The following step of the analysis involves an inquiry inside the recent period dynamics in order to discuss the sustainability of the model after the crisis. As a matter of fact, the 2008 global economic downturn has affected the development process, for it has reshaped the forces underpinning it. The question to be answered now is: "In which way did the crisis affect the Italian industrial evolution?" The main purpose of this paragraph is to cast some light on the period between 2008 and 2013 in order to be able to both sketch the dynamics followed by

the manufacturing sectors during the recession years and draw some policy conclusions in line with the path followed by Italian firms.

Such analysis has been possible by exploiting the information within the *Monitoraggio Economia e Territorio* (henceforth *MET*) micro-data set on Italian industrial sector firms. This is a private database collected by the *MET* research centre through a survey specifically designed to study R&D and innovation, investment strategies, internationalisation processes as well as economic and financial performances at the firm level. Furthermore it is probably the largest and most accurate micro database on this subject currently available in Italy. It counts four waves (2008, 2009, 2011 and 2013) embracing both the run-up and wake of the downturn, because the 2008 wave refers to the ante-crisis period, while the 2009 one to its aftermath. Each wave includes a very large number of observations: about 25,000 firms ranging from the smallest (1–9 employees) to the largest ones with more than 250 employees. The sampling strategy follows a Bayesian technique maximising the likelihood of interviewing firms undertaking dynamic activities. Nevertheless, descriptive statistics' significance at the sectorial, regional and dimensional levels (as well as at the intersection of these dimensions taken in pairs) is guaranteed by a calibration technique based on a system of weights associated with each observation in each year, allowing inferences about the industrial firms.

As the primary interest of this paragraph lies in sketching the industrial development process from 2008 onward, the first stage of the analysis focuses on the structural evolution of manufacturing⁵ along with the separate study of some of its most important sectors.⁶ Furthermore, attention is mainly devoted to medium (50–249 employees) and large (250 employees and more) firms because the second main purpose is to check for the presence of a 'vanishing hand process' in accordance with Langlois' theories. By considering the previous sections, Table 2 shows the evolution of employment shares within the two firms' classes during the 2008–2013 period. According to these data, during the run up to the economic breakdown, large enterprises absorbed more employment than medium firms within both overall manufacturing and three out of four of the selected sectors. The extent of this gap, however, changes from one sector to another, depending on their specific features. As to mechanics, it represents an exception under this perspective: in fact, before the downturn occurred, medium-size firms used to employ a higher

⁵ The MET survey makes use of the most recent national classification criterion (Ateco 2007) at the second digit level in order to identify firms' sectors. In particular it encompasses enterprises belonging to the following sectors: foods and beverages, leather and clothes, furniture and wooden objects, publishing and related industries, plastic and chemical products, metals and metal products, means of transportation, mechanics, electronic devices, the remaining manufacturing industries, communication and transportation services, and other services to the firms. The common definition of "manufacturing" involves the first ten categories, except for the mining sector, which is included in the "remaining manufacturing industries". Therefore, in order to be as strict as possible, we decided to include only the first nine sectors within the "manufacturing" category, because it was not possible to disentangle manufacturing firms from non-manufacturing firms within the "remaining manufacturing industries" class.

⁶ Four of them will be taken as examples in the present work: one representing the so-called traditional "made in Italy" products (leather, clothes and fashion) and three related to the high-technology frontier (means of transportation production, mechanics and electronic device production).

Table 2 The evolution of medium and large firms' employment shares within the main manufacturing sectors

	Medium firms (50–249 employees)	Large firms (250 employees and more)
<i>Manufacturing</i>		
2008	23.5	25.1
2009	18.1	21.0
2011	20.8	19.6
2013	25.6	22.7
<i>Leather and clothes</i>		
2008	20.2	25.1
2009	18.2	21.0
2011	17.4	19.6
2013	20.7	22.1
<i>Means of transportation</i>		
2008	27.6	50.7
2009	15.7	64.7
2011	17.2	58.7
2013	21.3	64.1
<i>Mechanics</i>		
2008	31.3	25.7
2009	23.9	30.6
2011	27.2	18.2
2013	27.0	22.8
<i>Electronic devices</i>		
2008	20.4	39.7
2009	19.0	22.5
2011	20.7	25.1
2013	33.3	31.2

The table shows the shares of employment absorbed by medium (50–249 employees) and large firms (250 employees and more) in the overall manufacturing and in some selected sectors. Small firms' (1–49 employees) share is not reported, although it is possible to compute them by subtracting the sum of medium and large firms percentages from 100. *Source:* MET database (waves 2008, 2009, 2011 and 2013)

share of workers than large ones. This suggests that sector-specific characteristics play a key role in this matter.

In the aftermath of the crisis blow up, then, medium and large firms appear to have followed two different paths. On the one hand, it is possible to point out a common behaviour among the former, while, on the other, different dynamics emerge among the latter. Medium-size enterprises, indeed, lost some employment share percentage points in both manufacturing and all the selected sectors. Differently, large firms relative employment decreased in some sectors (overall manufacturing, the leather and clothes and electronic device production sectors) and increased in others (means of transportation production and mechanics). However,

these dynamics are probably driven by unemployment insurance strategies, very commonly used by large Italian firms, other than by sector-specific situations. As a matter of fact, workers under unemployment insurance are still considered employed, entering into the computation of the working population in this way. On the contrary, smaller size firms rather go into bankruptcy because of the technical impossibility of reducing as much the intensity of the production activity. This implies that it is more likely for them to experience a reduction in employment shares. In the end, then, it is reasonable to expect that both medium and large firms have been immediately hurt by the downturn advent. Nevertheless, after the first shock, medium firms have shown a slow but steady recovery, while the swinging data referring to large firms across the sectors (probably still due to the unemployment protection exploitation) do not allow singling out a common path. Furthermore, 2013 employment shares highlight a very important medium firm crossing phenomenon with respect to large firms. Such remarkable dynamics occurred in both the overall manufacturing and three out of four of the selected sectors. The exception is represented by the means of transportation production, where unemployment protection exploitation is very common among large enterprises.

Therefore, two important aspects emerge from the employment shares observation. First of all, sector-specific characteristics have deeply affected and shaped sectors' paths. The overall manufacturing analysis, at this stage, is less interesting than the singular sector one because it either does not allow perceiving some peculiarity or it simply shows common trends that are detectable even from the separate study of single sectors. The second important remark relates to the recovery trend (in terms of employment share) experienced by medium firms during the period under consideration. After the initial 2009 shock, this class showed a steady path leading to better performances than large firms. This evidence emerges in both manufacturing and three out of the four selected sectors. As for large firms, the data do not show a very clear trend although it is plausible to suppose that they have struggled more than medium enterprises, without finding their way to recovery.

However, this picture is incomplete both because it is strongly affected by firms' death rates (a phenomenon that is not equally distributed among classes and cannot be studied through the MET database) and because it is uninformative regarding the tendencies occurring inside each class. Thus, to enrich this framework, Fig. 1 compares the 2008 and 2013 firm employee distributions within medium and large enterprises. In line with previous data, these graphs suggest the presence of an ongoing convergence process among the four sectors. Almost every medium firm percentile, in fact, increased between 2008 and 2013, and almost none decreased. On the contrary, large firms percentiles, with very few exceptions, have always either decreased or remained stable. Even by interpreting this as the result of the crisis cleansing effect, the conclusion that must be drawn does not change. The dynamics underlying the recession period have pushed medium firms towards higher dimensions and large enterprises towards smaller ones, suggesting a path leading to an in-between "optimal size". The extent of this "optimal size" differs from sector to sector, as witnessed by the different intensities of the convergence processes in Fig. 1.

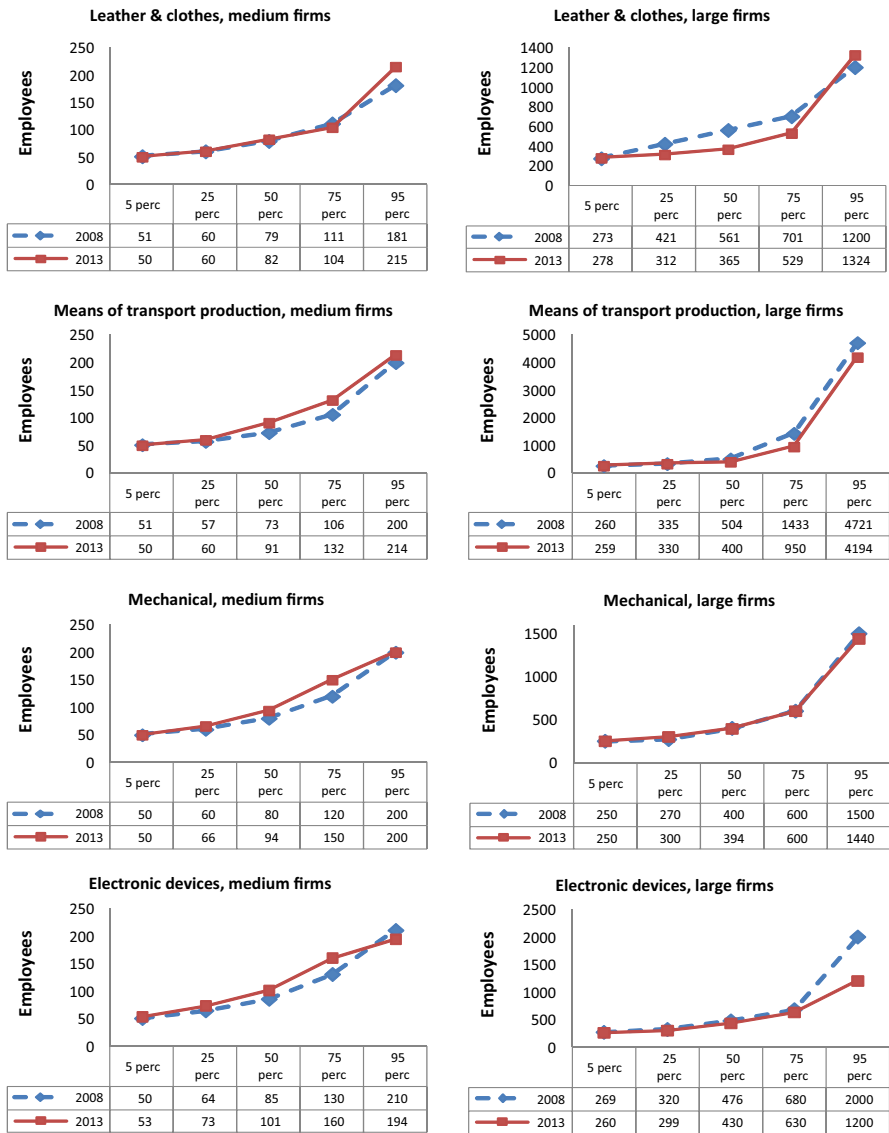


Fig. 1 The evolution of the distribution of firms’ size within the main manufacturing sectors’ medium and large firms

All these findings, therefore, are consistent with Langlois’ (2003) model. On one hand the sector-specific dynamics may indeed be the result of different *vanishing hand* determinants (for instance coordination technologies or market extents), while, on the other, the convergence pattern might be interpreted as a continuing modular process. In fact, in Langlois’ terms, an enterprise is an organisation devoted to ‘...perceive and interpret a variety of signals from the environment and adjusts its

conduct in light of those signals [...in order to...] survive and prosper' (Langlois 2003, p. 354). Probably, neither very large nor very small dimensions are fitted for surviving or prospering inside an ever-changing recession environment. The former because of their inability to quickly adapt and reorganise themselves, the latter because of their shortage of means to react properly to external shocks. Thus a transition towards medium-large dimensions is likely to give them the right endowment to buffer risks. The issue, then, shifts on which is the reasonable medium-large dimension: this is indeed the sector-specific matter.

Even performances on foreign markets seem to suggest similar conclusions. Figure 2 compares *ante-crisis* and nowadays levels of competitiveness on international markets between medium and large exporting firms. In this case, the level of competitiveness is conceived as the share of firm revenues deriving from the export activity.⁷ Evidence shows that medium firms either reduced the gap with or overcame large firms in three sectors out of four, thus becoming as appealing as large enterprises. The only exception is represented by the electronic device production sector, where there has been a widening gap in favour of larger entities. However, this result may be due to sector-specific dynamics leading to higher convergence dimensions. Both medium and large firms' 2013 median values are indeed greater than their counterparts in the other three sectors.

In the end, then, the crucial point in Langlois' (2003) theory of the firm does not lie in the size of the economic unit, which is time contingent and path dependent at the same time, but in its *sensitivity* to the surrounding environment. This implies that strategies aiming at enhancing competitiveness represent the key to assessing the potential development trajectories of an industrial system. Following this approach, Fig. 3 reports medium and large firms' investment choices since the beginning of the crisis. Strikingly enough, both classes show similar investment patterns. Firms are, to some extent, abandoning those types of investments that increase the dimensions rather than competitiveness of the organisation (plots and buildings) by preferring to devote resources towards those types of investments that might improve their performances (human capital, software and IT services along with machineries). Human capital investments, in particular, are becoming increasingly popular, especially among larger enterprises. Despite these similarities, sector-specific contingencies play a major role in investment decisions. For instance, within mechanics, medium firms invest more often than large firms in software and IT services as well as in patents' acquisition, in line with their dynamism highlighted before. On the contrary, electronic device sector medium

⁷ The export-revenue ratio is doubtless a rough measure of competitiveness because it is both biased in favour of small revenues and very sensitive to the economic cycle dynamics. As to the first aspect, small overall revenues show a higher export share than large revenues *ceteris paribus* the amount of exports; meanwhile, as to the second one, during economic downturns the export-revenue ratio might increase simply because of a shrinkage of the domestic market sales. Nevertheless this index is interesting for two reasons. First of all, Italian "not-large-enough" firms are often regarded as less competitive than large ones on foreign markets: the evidence of a stronger drift of their activities towards these environments shows that they can satisfy foreign demand even better than large enterprises do. Second, and more importantly, by assuming a decreasing domestic demand throughout the 2008–2013 period (as is the case for Italy), export revenue values might be another signal of the firm's ability to *buffer risks* by drifting its own activity abroad. Hence, higher values might be interpreted as higher managerial abilities.

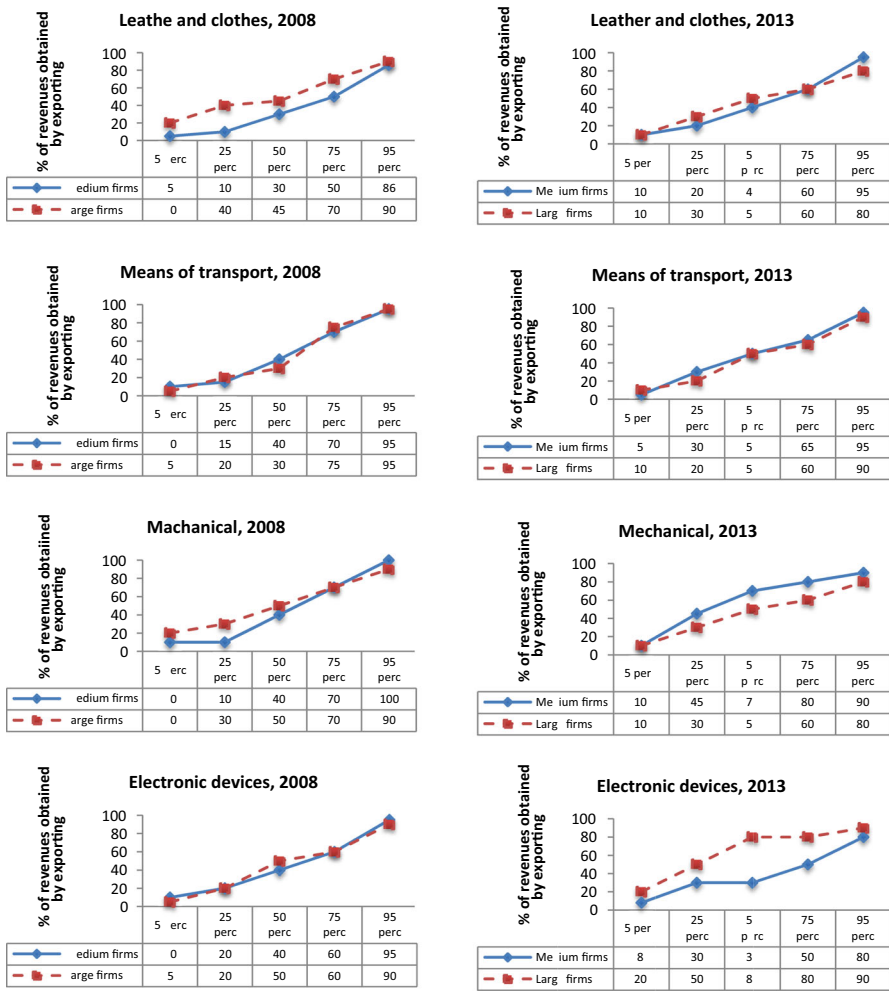


Fig. 2 The evolution of the distribution of firms’ competitiveness on foreign markets within the main manufacturing sectors’ medium and large firms. *Note* Each graph compares the medium and large firms’ share of revenues derived from exports during a certain year within the main manufacturing sectors. In particular, data refer to the 5th, 25th, 50th, 75th and 95th percentiles of the distributions. The source is the MET database (waves 2008 and 2013)

firms remain very far from their larger counterparts in terms both of software and IT services, patents and human capital. These data might explain the widening gap in terms of competitiveness as shown in Fig. 2.

Another fundamental set of strategies signaling the level of firms’ sensitivity is represented by *innovation strategies*. Table 3 reports the percentages of medium and large innovative firms, unbundling also information according to the type of innovation (product, process and organisational).

Under a general perspective, innovative firm shares were much lower in 2013 than in 2008. Furthermore, in 2013, large enterprises’ percentages dominate over

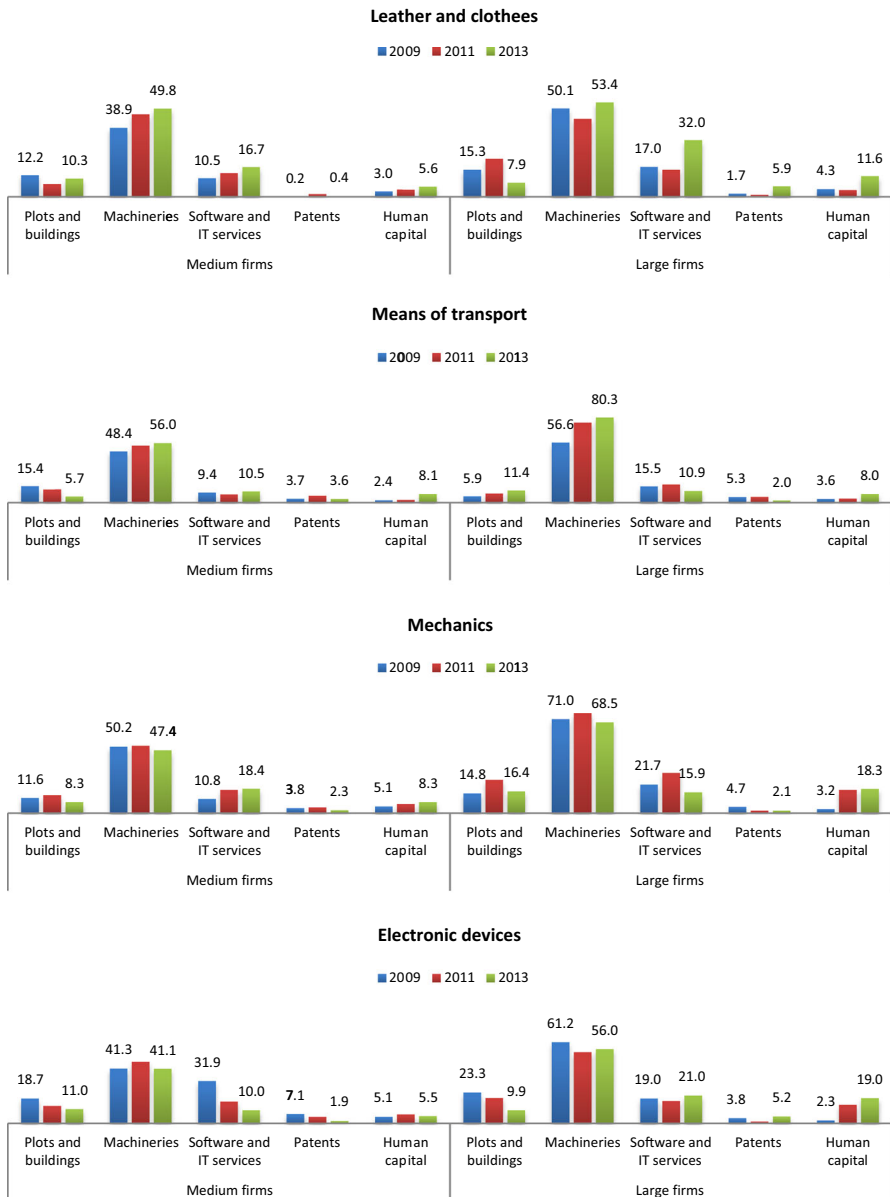


Fig. 3 Firms’ investment decisions within the main manufacturing sectors’ medium and large firms. *Note* Each graph reports the percentage of medium (50–249 employees) and large firms (250 employees and more) within the main manufacturing sectors, undertaking each one of the selected investments. These shares refer to the sectorial population of (either medium or large) firms claiming to have invested during either the year of the MET survey or the preceding one. *Source:* MET database (waves 2009, 2011, 2013)

Table 3 Innovation strategies during the crisis within the main manufacturing sectors

	Medium firms				Large firms			
	General innovation	Product innovation	Process innovation	Organisation innovation	General innovation	Product innovation	Process innovation	Organisation innovation
<i>Manufacturing</i>								
2008	67.4	36.8	29.2	43.0	81.8	48.3	40.9	52.7
2009	41.6	21.1	16.6	24.2	55.1	27.4	28.2	33.6
2011	44.1	21.8	15.5	23.7	61.3	33.4	27.3	42.0
2013	45.2	25.3	19.5	22.8	55.2	30.7	29.4	29.9
<i>Leather and clothes</i>								
2008	71.6	37.2	30.6	43.5	89.9	48.2	45.8	48.7
2009	38.8	20.3	20.0	22.4	51.5	22.2	29.4	34.6
2011	41.4	19.8	11.9	21.7	46.2	19.5	21.2	31.1
2013	39.1	19.2	12.3	17.5	59.4	26.0	20.0	33.8
<i>Means of transportation</i>								
2008	62.5	25.8	22.8	36.5	73.4	46.8	45.5	44.8
2009	44.9	19.1	20.3	31.2	55.5	22.0	33.2	39.4
2011	52.6	28.6	13.9	25.5	55.2	23.7	32.3	38.4
2013	54.8	35.1	25.1	28.2	64.4	37.6	30.1	46.8
<i>Mechanics</i>								
2008	66.7	42.9	27.7	45.2	85.4	49.9	38.1	60.2
2009	46.7	24.0	21.5	28.0	76.5	40.3	38.9	48.6
2011	51.3	31.0	21.3	29.2	67.2	41.6	32.4	44.2
2013	54.1	30.8	29.0	30.9	45.4	27.1	25.4	28.3
<i>Electronic devices</i>								
2008	70.1	43.3	30.0	49.6	77.8	43.1	27.7	53.1
2009	57.0	32.9	20.9	33.9	71.4	31.7	37.7	50.9

Table 3 continued

	Medium firms				Large firms			
	General innovation	Product innovation	Process innovation	Organisation innovation	General innovation	Product innovation	Process innovation	Organisation innovation
2011	49.7	23.0	15.3	26.2	70.5	40.3	32.6	56.4
2013	37.2	24.2	17.1	15.6	58.3	24.9	46.5	19.4

The table shows the percentages of medium and large firms introducing innovations within four selected manufacturing sectors. Four types of innovation are taken in consideration: *general innovation*, *product innovation*, *process innovation* and *organisational innovation*. *General innovation* refers to every innovative firm, no matter which type of innovation it has introduced. *Product innovation* refers to all those firms that have introduced a new or deeply changed product. *Process innovation* relates to those enterprises that have changed their production process in a substantial way, for example by replacing old machineries with new and different ones. *Organisational innovation* relates to those firms having changed the organisation of their production process, without necessarily having bought new machineries. *Source*: MET database (waves 2008, 2009, 2011 and 2013)

those of medium firms in three out of four sectors. Mechanics is indeed the only exception showing clear medium firms' superiority. These data, therefore, reveal a shrinking diffusion of dynamic strategies among firms throughout the crisis period. To a certain extent, this phenomenon is driven by strategic behaviours: who wants to introduce an innovation when expected returns are lowered by a prolonged economic breakdown?

Nevertheless, by analysing each type of innovation separately, this picture changes slightly. For instance, within the means of medium firms in the transportation production sector, the percentages referring to product and process innovations are higher in 2013 than those in 2008. A similar phenomenon occurs within the medium-size mechanics enterprises introducing a process innovation. Furthermore, means of transportation sector medium size firms have reduced their gap with their larger counterparts in terms of both product and process innovations. More strikingly, medium mechanics firms have overcome their larger counterparts concerning every type of innovation. On the other hand, in line with the previous findings, medium firms in electronic device production have lost out to large enterprises with reference to process innovation.

To sum up, a few conclusions can be made from the previous findings. First of all, Italian medium and large firms' behaviour during the crisis seems to be consistent with Langlois' *vanishing hand hypothesis*. As a matter of fact data point out a convergence path whose extent and speed are sector specific. Under this perspective medium dimensions seem to strictly dominate large ones in the mechanics sector, while in the electronic device sector the reverse occurs. Leather and clothes and means of transportation production results are less clear cut, even though the convergence is still there. More importantly, this structural transformation appears to be underpinned by dynamic strategies (investment and innovation strategies) likely to come from firms' sensitivity to the environment in which they act. Human capital, IT services and patents are slowly replacing buildings and plots in firms' investments decisions. As to innovation strategies, sector analysis highlights trajectories in line with the convergence paths. Nevertheless, *ex-ante* crisis levels are far from being fully recovered except for a few cases. This process is probably hampered by lacking a boost in aggregate demand and expansion opportunities, which is currently not only affecting the Italian economy.

6 Concluding remarks

This article has reviewed the Italian industrial history by framing its development path in the innovation activities and firm evolutionary perspective suggested by Langlois (2003). In particular the analysis highlights that the evolution of the 'Italian industrial system and firm model' can be represented as the result of three main forces: the implementation of the technological progress (that is, the different technical stages through which capitalist production and corresponding lifestyles and consumer conditions passed), firms' ability to innovate their structure, their behaviour as well as their networks in order to enter these technological waves,

and, finally, the domestic conditions concerning the economic and institutional environment (namely the structural features of the domestic economy and the economic role of the state in both managing economic activities and providing institutions able to create an innovative environment). As a matter of fact, although technological change represents the *condicio sine qua non* to trigger the “domino effect” giving birth to capitalist firm and industrial models, the innovative ability of entrepreneurs and the domestic conditions play a crucial role in determining the spectrum of possible industrial development patterns. In the Italian experience, economic and institutional conditions have mainly affected the industrial and firm models through either their support or their hindrance of firms’ innovative ability. In fact, the small and poor market and the ‘national interests’ produced at the beginning a long-lasting ‘political capitalism’ and, subsequently, a short managerial capitalism (both characterised by large and rather innovative firms). Starting in the 1970s, localised endowments of human, social and financial capital opened to the innovative ‘entrepreneurial capitalism’ model (characterised by SMEs), as such balancing the shortage of concentrated investments, unwise large firm strategies and absence of innovative policies for infrastructures and institutions. The blossoming of small-medium enterprises, driven from the bottom rather than from the top, did not represent an ‘exception’ in the world industrial development, but an innovative phase that pushed Italian manufacturing unexpectedly, quickly and before the other industrialised countries toward new technological and business environments.

The awareness of the advantages stemming from such a relative precociousness appeared too late and Italy has missed its chance to exploit comparative gains and firm rents. The environment (in particular private entrepreneurship and the state entitling of institution building) may indeed smother economic growth because of its changing speed together with technological and business systems preventing the co-evolution process. However the convergence towards medium-size firms (in accordance with the technological specificity of each industrial sector), the innovation and export performances show that both the industrial structure and firm model are trying to strengthen the ‘entrepreneurial model’, in spite of the environmental conditions. Thus, despite some isolated sparks (especially in terms of export performances), the Italian industrial model appears to be in crisis, once again because of the lack of an innovative environment. (Accetturo et al. 2013).

The sustainability of this industrial model within ever-changing markets represents an issue to be tackled by focusing mainly on the firm, in so much it is the economic agent charged with all the burdens of coordination. Consistent policies must therefore support enterprises by providing ICT infrastructures, stimulating the implementation of their internal and external capabilities and favouring their liquidity and investments.

Acknowledgments We are very grateful to Raffaele Brancati for having kindly allowed us access to the M.E.T. data set in order to write the section regarding the Italian industrial system during the crisis period. The views expressed in this article represent the authors’ opinions.

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