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Introduction and summary

I.1 Purpose and scope

This book addresses the properties, behaviour and growth of the firm. A 'firm' is defined here as a social organisation and an autonomous legal entity that produces and sells goods or services by means of a set of human, physical and financial resources that are coordinated, combined and monitored under an administrative structure. Although the focus of this book is on business organisations, its main conclusions largely concern the 'economic reasons' for all social organisations. Organisations undeniably represent a ubiquitous and dominant presence in what is usually called the 'market economy'. The efficiency of the 'market economy' depends to a very considerable extent on how social organisations operate.[1]

Since the 1980s, the literature on the theory of the firm has expanded, following numerous lines of research and offering differing interpretations of the nature of the firm. I do not propose here to provide a survey of this fast-growing literature.[2] Rather, this book examines how the relations between basic conditions, decision-making mechanisms and organisational coordination within firms influence their relative performance. The present study pursues the avenue of research started with my *Production Process and Technical Change* (Morroni, 1992), moving from analysis of the temporal, organisational and qualitative dimension of production toward a

[1] On the ubiquity of organisations, see Simon (1991, p. 27); on the efficiency of markets and organisations, see Coase (1991, p. 13).

[2] Useful collections of readings which offer an overview through a wide selection of the vast literature on the nature of the firm are, for instance: Barney and Ouchi (1986); Williamson and Winter (1991); Buckley and Michie (1996); Casson (1996); Putterman and Kroszner (1996b); Foss (2000); Langlois, Yu and Robertson (2002); Kay (2003); Ménard (2004a: part II, 2004g).

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new analytical framework based on a cognitive perspective that also encompasses transaction and scale considerations. This makes it possible to overcome the traditional disjunction between the capabilities, transaction costs and scale–scope analyses which so far have generally been treated within separate theoretical approaches. Although scrutiny of the interaction between the foregoing three aspects highlights the fact that *some* explanations provided by the different lines of research will appear complementary rather than rival accounts, I do not set myself the task here of either outlining a synthesis of some features of the existing approaches on capabilities, transactions and scale of processes, or suggesting a joint application of these approaches.[3] I wish to stress that the primary objective of this book is, instead, to provide a theoretical perspective that seeks to improve our understanding of *organisational functioning* and *boundaries* through investigation of the basic conditions under which capability, transaction and scale–scope considerations are significant and interact in shaping the boundaries and growth of the firm. I do not dispute that further empirical work is needed, but I judge it to be essential first to make constructive efforts toward a more integrated theory of the firm on which to build additional evidence. Consequently, an application of the conceptual framework presented here is left as a possible future direction for empirical research, though in the following pages illustrative examples will be drawn from historical investigations, case studies, evidence from experimental results or surveys of applied literature. Business history and applied research on cognitive mechanisms, learning processes and innovative activity provide a vast number of case reports, giving empirical results that are consistent with the arguments developed in the present book.

I shall argue that the interplay between capability, transaction and scale–scope aspects in moulding the individual firm's performance

[3] A synthesis or joint application of the different existing approaches on the theory of the firm is extremely problematical because of the great heterogeneity of analytical aims, conceptions of the nature of the firm and explicit or implicit assumptions. Holmström and Tirole (1989, pp. 64–5) put it clearly in their now classic survey: 'The theory of the firm addresses a wide range of questions . . . Obviously, no single model or theory will capture all elements of the puzzle . . . Trying to organise these fragments of a theory into a coherent economic framework is difficult.' On this, see the discussion and formal framework in Gibbons (2004, pp. 1ff., 37).

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and growth occurs whenever *learning processes*, *complementarities* and *uncertainty* matter. In particular, this interaction is intense if technical and transactional knowledge are costly, some inputs and processes are indivisible and complementary and some relevant knowledge is tacit, non-transmittable and characterised by set-up processes with high fixed costs. I would like to emphasise that these conditions, which are increasingly important with the spread of the knowledge-based economy, cause interplay among the three aspects of the organisational coordination of the firm even in the presence of perfect rational agents who make decisions under costly information and weak uncertainty.

On the other hand, *the impact* of the foregoing basic conditions on both the relevance of the three aspects of organisational coordination, and also on the interaction among them, is *strongly amplified* in all circumstances where the assumption of perfect rationality has to be abandoned because of the presence of radical uncertainty, which prevents individuals from estimating the probability distribution of future contingencies and pay-offs. Chapters 4, 5 and 6 will show that business organisations provide efficacious instruments to cope with this kind of uncertainty.

This book traces its roots backs to several pioneering works. In particular, it rests on the seminal contributions by Frank Knight and John Maynard Keynes on uncertainty; Ronald Coase on transaction costs and flexibility of the employment relationship within firms; Joseph Schumpeter, Nathan Rosenberg, Richard Nelson and Sidney Winter on the innovation activity and evolution of business organisations; Edith Penrose and Robin Marris on managerial resources and the growth of the firm; Nicholas Georgescu-Roegen and Alfred Chandler on the time profile of production and on the relationship between organisation and efficiency; and, finally, Friedrich von Hayek, Herbert Simon, George Shackle, Kenneth Arrow, Richard Cyert, James March, Brian Loasby, Daniel Kahneman and Amos Tversky on knowledge and decision-making.[4]

My attempt to develop an analytical framework involves a considerable broadening of the focus, with the unavoidable risk of sacrificing

[4] See Knight (1921a); Keynes (1936, 1937); Coase (1937); Schumpeter (1912); Rosenberg (1969); Nelson and Winter (1982); Penrose (1959); Marris (1964); Georgescu-Roegen (1969); Chandler (1962, 1977, 1990); Hayek (1937, 1945);

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depth and omitting mention of significant works regarding some specific issues. Whenever the analysis appears too concise in relation to the complexity of the subject, I shall suggest surveys and collections of writings that provide the reader with further and more detailed discussion and exhaustive bibliographical references. Sadly, for numerous key concepts utilised in the present conceptual framework there is not yet a common vocabulary. This may cause ambiguities and misunderstandings. In the following pages, an effort is made to relate different taxonomies and clarify the definitions used in this study. At the end of the book, a Glossary gathers together the main definitions adopted.

I.2 The multifarious nature of the firm

In industrial countries, firms exhibit a very wide range of possible property and financial structures, hierarchical set-ups, incentive and control structures, size and market power, arrangement of production processes, degree of vertical integration and organisational features. Alfred Chandler showed in his historical investigation on industrial enterprises that firms have evolved by implementing new management ideas and by inventing new organisational and incentive systems, as well as by introducing new strategies and new business initiatives in the attempt to pursue economies of scale and scope.[5] The organisational structure of the firm is an evolutionary outcome of a combination of several elements, whose specific traits may take very dissimilar forms in different types of firms. In market economies, distinct organisational structures can live side by side. Suffice it to reflect on the dimensional and organisational structure of American high-tech sectors, such as microelectronics, computers, medical technologies and biotechnologies. As Nathan Rosenberg demonstrates, the American high-tech scene is complex because it is characterised by a mixture that includes a great number of start-up and small firms and, at the same time, very large business organisations such as AT&T, INM, Merck, General Electric, Johnson & Johnson, etc. The presence of different technical and organisational structures and the coexistence

Simon (1951, 1972); March and Simon (1958); Shackle (1954, 1955, 1979, 1990); Arrow (1962, 1973, 1994a); Cyert and March (1963); Cyert (1988); Loasby (1976); Tversky and Kahneman (1974); Kahneman and Tversky (1979).

[5] Chandler (1977, 1990). The multiplicity of possible organisational configurations is stressed and analysed in depth by Grandori (1995).

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of firms of noticeably different size and function are common features of many industries even in mature sectors of activity.[6]

By the same token, in industrialised countries a considerable variety of ownership structures can be found. Family firms, managerial corporations, public companies, state-owned firms, partnerships, non-profit firms, social enterprises, workers' cooperatives and consumers' cooperatives all represent instances of a rich tapestry of ownership characterising the typology of the firm.

The firm's size may differ greatly even within the same sector of activity. Size ranges from a very small business to very large companies with hundreds of thousands of employees that give rise to a turnover constituting a significant percentage of their country's gross national product (GNP). The huge distinctions in the size of firms yield remarkable disparities in market power among them.

Production processes may be organised in series, in parallel and in line according to the sector of activity, the technology and the different types of equipment used. These various arrangements result in a dissimilar distribution of idle times among inputs and different forms of division of knowledge and labour.

The 1990s saw the emergence of contrasting tendencies with regard to integration and concentration processes. High levels of merger and acquisition (M&A) activity coexist with a trend in the opposite direction towards contracting out. The growth of giant firms has been based on horizontal expansion and diversification, and increasing concentration has been balanced by a tendency toward outsourcing and by new entries.[7]

The firm's organisational form may consist of just one production unit, or several production units.[8] Moreover, there are centralised enterprises (U-form), multidivisional enterprises (M-form) and holdings controlling other firms spread across various countries (H-form structure). A centralised enterprise is composed of a functionally

[6] Rosenberg (2002, p. 37). For a historical account of such diversity, see also Rosenberg and Birdzell (1986, pp. 189ff., 269ff.).

[7] Holmström and Roberts (1998, pp. 73, 80, 83–9); Marris (2002, pp. 74, 78).

[8] A production unit, or a business unit, consists of one or more plants situated in one or more departments, within a single establishment or in neighbouring establishments. The production unit is responsible for organising the production of a single commodity (or a range of commodities) and the corresponding production methods.

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departmentalised unitary structure. The multidivisional firm is characterised by corporate headquarters whose function is to oversee a number of divisions functioning as independent profit centres organised along product, brand or geographic lines.[9] Many holdings take the form of conglomerates that control a group of subsidiary companies engaged in a variety of dissimilar and unrelated activities.

In the literature on the theory of the firm, many contributions tend to focus on one particular kind of firm – such as a particular ownership form, governance structure, size, production model or organisational form. Alternatively, and more restrictively, they may address only one distinctive aspect or single function of its activity. This has brought about a proliferation of special-purpose models with analytical results built on ad hoc hypotheses.[10] The analysis set out here does not provide a study of a particular kind of firm, nor does it attempt to build formal models that capture certain specific features of the internal behaviour of firms. Rather, this book is offered as a theoretical framework designed to study the *multifarious and changing nature* of the firm as a result of the complex links between basic conditions, organisational structure, efficiency and efficacy of business organisations.

I.3 Basic conditions, decision-making and organisational coordination

Efficiency (in terms of input requirements) and *efficacy* (in terms of matching current or potential market needs) jointly determine the

[9] Since the period between the two world wars, in many US corporations a centralised structure (U-form) has been progressively replaced by a multidivisional structure (M-form). On this, see Chandler (1962, 1977, 1990). The continuous evolution of the M-form over time in the paradigmatic case of General Motors has been analysed by Freeland (1996, 2001), who shows that control has been achieved through significant variations on the original organisational and administrative structure.

[10] Holmström and Roberts (1998, p. 75) cast strong doubts on partial models. Their paper points out, and we cannot but agree, that approaches based on ‘a single instrument’ result in a ‘potentially misleading’ explanation of the behaviour and growth of the firm. A similar position is expressed in Milgrom and Roberts (1988, p. 450). Partial models have recently attracted various criticisms from other lines of research as well; see, for instance, Simon (1991, p. 27); Dosi (1994, p. 231); Foss (1996a, pp. 470ff., 1996b, pp. 519ff.); Arena and Longhi (1998a, p. 6); Hodgson (1998b, p. 32); Krafft and Ravix (1998, p. 237).

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firm's competitiveness. Both efficiency and efficacy depend on the organisational setting which, in turn, is influenced by basic conditions and internal decision-making. Naturally, the causal chain also runs in the opposite direction: the competitiveness of a firm contributes to creating the basic conditions that shape internal decision-making processes (see figure I.1).[11] This causal chain can be regarded as an adaptive toolbox useful in developing an analysis of the strengths and weaknesses of the firm, so that strategies and policies aiming to increase competitiveness can be devised.

The causal chain

Basic conditions result from the interplay between the environmental conditions that business organisations face and the internal conditions created by business organisations themselves as a result of external constraints and opportunities. The left-hand rectangular block in figure I.1 gives an overview of the basic conditions that will be discussed in depth in chapter 1.

A firm's decision-making is a consequence of the interaction between individuals and organisations created by individuals to achieve their aims. Equally, however, decision-making mechanisms also significantly affect individual aims, which can vary according to each individual's specific role in the firm. Furthermore, basic conditions such as institutional forms and market conditions shape both individual aims and the firm's organisational structure. Since individual motivations, aims and abilities are affected by the basic conditions and the firm's decision-making mechanisms, the individual cannot be treated as an isolated entity. Among important elements that influence decision-making mechanisms within the firm, property structures, control rights, the aims of the firm, incentive structures and the level of rationality occupy a salient position (central square block of figure I.1).

In order to produce and sell goods or services, a firm must:

[11] The tables and figures included in this book summarise the main arguments elaborated in the text. They are intended to provide a visual support that may constitute useful material for presentations and lectures. These illustrations are downloadable from the author's personal web page.

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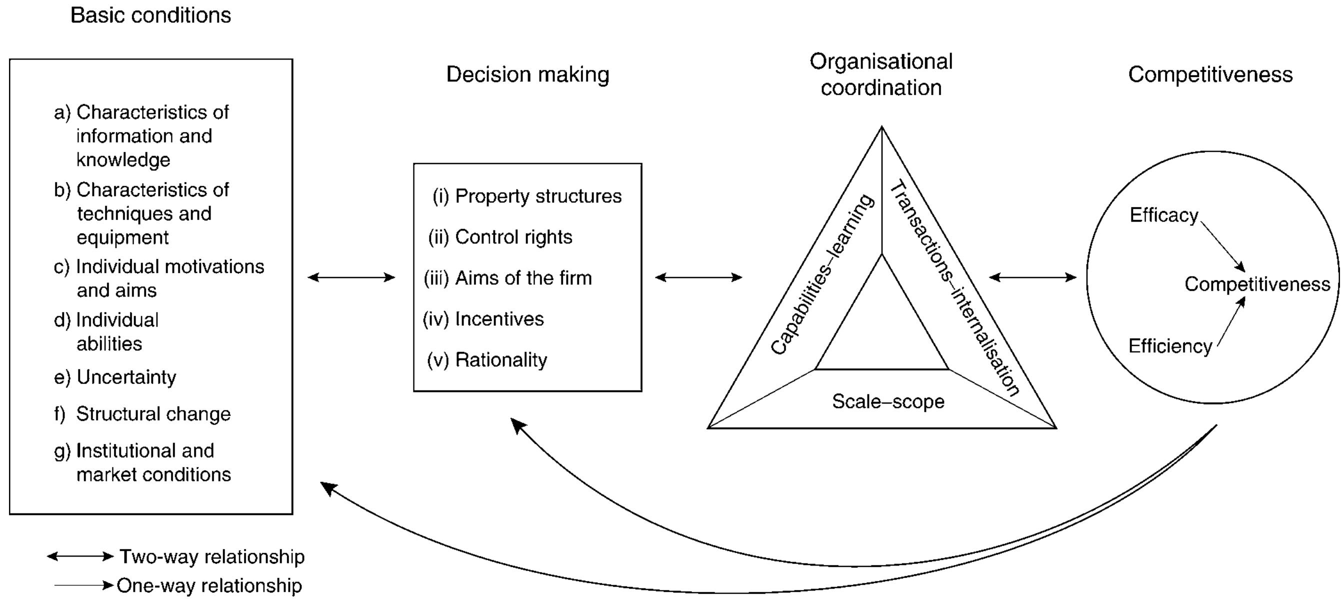

Figure I.1. Basic conditions, decision-making, coordination and competitiveness.

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- develop specific *capabilities* by coordinating and motivating learning processes
- arrange *transactions* with suppliers and customers by establishing the degree of internalisation of processes
- design the operational *scale* by balancing the different productive capacities of *indivisible* and *complementary* inputs and processes.[12]

These three aspects of the organisational coordination of the firm are listed in the central triangle in figure I.1 and extensively examined in chapter 3.

First, developing capabilities means finding, interpreting and using knowledge on both how to plan, organise and perform production processes, and how to arrange transactions with suppliers and customers in order to create and maintain a competitive advantage. Differential capabilities can help to explain the performance of firms, and therefore their boundaries.

Secondly, firms establish the level of internalisation of separable processes and organise transactions with suppliers. The internalisation of external processes eliminates the transaction costs stemming from the costliness of economic exchange. Transaction costs are usually relevant in the presence of measurement and informational problems. In particular, they can could result from insufficient knowledge concerning the characteristics of what is being exchanged and the opposing party's behaviour, and from lack of enforcement. Transaction costs affect the level of vertical integration and the extension of organisational coordination among firms. Cooperative agreements with suppliers aim to reduce transaction costs, favour specialisation and enhance learning processes. Overall, organisational coordination within or among firms encourages the transmission of information and knowledge, the strengthening of enforcement power as well as flexibility in facing unexpected contingencies.

Thirdly, in designing the operational scale of each process the firm has to balance the productive capacities of different indivisible and complementary inputs and intermediate stages. Usually, this balancing is obtained by increasing the scale dimension of individual firms or

[12] The financial dimension might be fruitfully added as a fourth aspect of the organisational coordination of the firm. However, the analysis of the financial dimension goes beyond the aims of this book. The integration of this aspect into the present framework could be a subject of future research.

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organisations of firms, which makes it possible to reduce idle times or underutilisation of productive capacities of various inputs. Moreover, processes based on information and knowledge have a cost that is completely independent of the scale of the process in which such information and knowledge is used. This involves super-fixed costs and therefore favours remarkable economies of scale and economies of scope. Finally, in facing unpredictable contingencies, an expansion of the boundaries of organisational coordination allows economies of diversification of activities and of holding reserves that are linked to statistical factors.

The growth of the firm: strengths and weaknesses

Basically, growth is a consequence of managerial ability to build on the firm's strengths and to limit the negative consequences of various counteracting forces. A firm's strengths derive mainly from its ability to exploit potential, mutually reinforcing advantages provided by the organisational coordination of competencies, transactions and operational scale of different processes. These advantages help to explain the existence and the growth of the firm. Each of the three aspects of organisational coordination is endowed with a different degree of importance in the growth of all social organisations. In figure I.1, these three aspects are indicated within the central equilateral triangle, but in the organisational coordination of real-world firms the three aspects usually have uneven weight according to the sector of activity and the type of business organisation considered. Nonetheless, it must be stressed that it is quite rare, even though conceivable in some circumstances, for the growth of the firm to be based on advantages deriving exclusively from one aspect.

A firm can expand by hiring new resources and by allocating managerial and administrative tasks to specialist employees. The magnitude of the firm's growth rate may be affected by the need to adapt its organisational capacity, and this requires time. However, while possibly limiting the rate of growth at any moment, this need *does not* represent a limit on the expansion of its size beyond a certain point (Penrose, 1959, p. 55). Even so, there are numerous weaknesses that may result in organisational costs, to the point of hampering the growth of the firm and even precipitating its failure. The weaknesses and internal inefficiencies of firms derive from an

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