> If capitalist evolution – 'progress' – either ceases or becomes completely automatic, the economic basis of the industrial bourgeoisie will be reduced eventually to wages such as are paid for current administrative work.… The perfectly bureaucratised giant industrialised unit not only ousts the small or medium-sized firm and 'expropriates' its owners, but in the end it also ousts the entrepreneur and expropriates the bourgeoisie as a class which in the process stands to lose not only its income but also, what is infinitely more important, its function.
>
> (Schumpeter 1942, 130)

Schumpeter's reflections on innovation are of great interest. In the first place, because they show an interdisciplinary approach to study, one in which the institutional-historical analysis of capitalist development is combined with a microfoundation based on the innovative behaviour of entrepreneurs. Second, because his works have had a profound impact on the contemporary economics of innovation. Schumpeter's contribution was long-ignored by the dominant economic theories, which tended to consider technological progress as an exogenous factor in relation to the economy (Freeman 1994, 732; Helpman 2004). In recent decades, however, there has been a strong revival of attention given to innovation, which has gradually been 'endogenised' within the new theories of economic growth (Helpman 2004, Chapter IV). A rediscovery of Schumpeter's ideas has thus taken place, especially due to so-called 'evolutionary economics', which sees innovation and technological competition between companies as the driving force of capitalist development.[18]

1.6 Models of capitalism

This brings us to contemporary economic sociology. In this context, we will deal exclusively with two analytical approaches: that of *comparative political economy* and that of *new economic sociology*, but, as already seen in the preceding pages, only with reference to the subject of innovation. The first approach, prevalently macro in nature, is to be covered in this section, while the second approach, to be discussed in the next section, is characterised by a micro perspective. Political economy represents a line of study that analyses the relationships of reciprocal influence between economic, social and political phenomena and their modes of regulation in different institutional contexts.[19] In relation to this line, we are interested in a specific topic that, starting from the end of the eighties, has mainly attracted the attention of sociologists and political scientists: the study of the various institutional forms of advanced economies – that is, the debate on *varieties of capitalism*.

Comparative analysis highlights the existence of different models of capitalism which differ from each other in the way they regulate a wide range of economically important activities: for example, the financing and management of firms, relationships with suppliers and customers, the training of human capital, and systems of industrial relations and social protection. These differences

depend on the institutional, political and social factors that have historically been formed in various countries and which influence economic performance at national, regional and sectoral levels: in terms of growth, employment, social inequality and innovation capacity (Dore 1987, 2000; Albert 1991; Hollingsworth *et al*. 1994; Hollingsworth and Boyer 1997; Soskice 1999; Hall and Soskice 2001).

This literature has produced two ideal-typical models of contemporary capitalism: on the one hand, the *Anglo-Saxon model of liberal market economies*; on the other, the *Rhine model of coordinated market economies*. The first type (which includes countries such as the United States and the UK) is characterised by the greater importance accorded to the market in regulating the economy.[20] In contrast, in coordinated economies (which in addition to Germany and Japan include many central and northern European countries), the joint action of political and economic institutions and interest organisations tends to limit market mechanisms and to produce more extensive and inclusive social protection systems.

Various studies have analysed the different economic performances offered by these two models. With reference to the eighties, emphasis was placed on the advantage of the Rhine model in terms of promoting employment stability and the dynamism of businesses. In the following decade, however, the strong revival of the Anglo-Saxon economies led to the re-evaluation of some of the strengths of the other model. In a context of rapid technological change and growth in international competition, the greater flexibility of liberal economies not only made for a better employment performance – especially in the service sector – but also a high level of specialisation in the most dynamic sectors of high technology.[21]

One specific point of this literature is of particular interest: *the nexus between the two models of capitalism and the relative innovation regimes*. Hall and Soskice (2001), for example, argue that the two models generate specific institutional advantages that steer the innovative initiatives of companies in different directions. The two authors put forward a relational view of companies, which are perceived as actors who need to develop their dynamic and innovative capabilities in order to compete effectively in the market (ibid., 6). This depends on the quality of the relationships that they establish internally with employees and externally with a number of other stakeholders: customers, suppliers, financial organisations and public institutions.

These relationships are used to solve 'problems of coordination' in five spheres of activity that are crucial for company competitiveness:

1 the industrial relations sphere, to handle matters related to wages and labour productivity;
2 the education and professional training sphere, to provide human capital equipped with the necessary professional skills;
3 the corporate governance and financing sphere, to support innovation;
4 the external relationships sphere, to deal with other firms, subcontractors and customers;

5 the internal relationships sphere, to ensure the cooperation of employees in the achievement of corporate objectives.

The thesis advanced by Hall and Soskice is that to solve these problems of coordination 'firms will gravitate towards the mode of coordination for which there is institutional support' (ibid., 9). The two models of capitalism have a high level of 'institutional complementarity', i.e. a congruence of logic in the various spheres of activity, which tends to reinforce the overall performance of the institutions and to promote a certain type of action.[22] In each of the five spheres mentioned above, therefore, companies in liberal economies will rely on internal hierarchy and market competition. Conversely, those in coordinated economies will rely more on 'non-market' relationships – in other words, on more collaborative forms of interaction with the other actors.

The incentives provided by the institutional framework steer companies to produce certain goods, to specialise in certain areas, and to innovate in a certain way. In particular, coordinated economies facilitate incremental innovations which lead to small improvements to existing products and production processes. This kind of innovation is typical of productive sectors where technological change is not too fast (slow-tech), such as mechanical engineering, transport and consumer durables (domestic appliances, etc.). In other words, Rhine capitalism sustains *a regime of incremental innovation* consistent with its institutional structure. Coordinated economies, in fact, have a funding system based on banks – on a 'patient capital' that knows how to evaluate company results over time; a form of industrial relations that encourages collaboration and wage moderation; a well-trained workforce provided with employment guarantees; and stable and cooperative relations with suppliers and customers. All these elements support a long-term management strategy as well as productive specialisation and gradual innovation requiring appropriate skills and medium-/long-term development.

The opposite is the case for liberal economies, which are characterised by an 'impatient capital' (based on the stock market and venture capital) and market relationships that do not ensure stability in either contractual (between companies) or occupational (for employees) terms. This model therefore shortens management time horizons, but also provides flexibility, agility and a willingness to take risks that may be useful for projects featuring a high level of uncertainty. This set of attitudes sustains, therefore, *a regime of radical innovation* and specialisation in areas characterised by rapid technological change (fast-tech), such as high technology (biotechnology, semiconductors, computers and telecommunications), or in areas which require ongoing innovation, such as entertainment and advertising. Analysing the productive specialisation of their most representative countries, Germany and the United States, Hall and Soskice found confirmation of these different vocations of the 'two capitalisms' (ibid., 41ff.).

More recently, this line of reasoning has been adapted to interpret some economic developments that represent anomalies with regard to the internal logic of the two models outlined above, such as the spread of innovative start-up

companies in high-tech sectors in European coordinated economies. The policies introduced to develop sectors of the new economy (from biotechnology to software to telecommunications) have highlighted some unexpected results: for example, successful experiences in Germany in the field of biotechnology and, along with Sweden, in the software industry for the internet; in Britain, however, experiences in biotechnology were more disappointing (Casper and Soskice 2004, 349).

These results are surprising in light of the debate on varieties of capitalism, given the coordinated economies of the first two countries and the liberal economy of the third. In theory, in fact, it should be the UK that has an institutional framework more favourable to the highly dynamic and innovative sector of advanced technology. The problem is solved by 'contaminating' the literature on institutional models of capitalism with that on sectoral systems of innovation (which will be discussed in detail in Chapter 5). This strand of literature highlights how innovative dynamics vary from sector to sector, because of the different opportunities for innovation and the cumulative effect of the knowledge present in their technological regimes. The puzzle dissolves when it is observed that the *new* policies implemented in coordinated economies have created incentives for the emergence of high-tech companies, but these are directed towards sub-sectors more compatible with the institutional framework of the Rhine model.

Technological companies have to face certain organisational and coordination dilemmas: for example, they must be equipped with adequate resources of knowledge through cooperation with universities; they need to recruit highly motivated scientists and technicians and hold on to them in an industry that, from the employment point of view, is very unstable; and they must obtain financial resources for their innovation projects, etc. (Casper 2006, 488ff.; 2010). A solution to these dilemmas varies depending on the institutional context in which the companies work, since this influences the mode of regulation of the research system, the labour market, the banking and financial system, and so on. The thesis developed is therefore as follows: (1) A mix of policies aimed at creating an institutional environment more conducive to the emergence of technological companies has been quite successful in some European coordinated economies, such as Germany.[23] (2) Analysis carried out on the sub-sectors of these companies' activity, however, shows that the institutional structure of the Rhine model played a role in their choice of specialisations.

In the case of biotechnology in Germany, the incentives and collective goods provided, along with other characteristics of the institutional system, directed businesses towards specialisation sub-sectors with technological systems featuring a high degree of cumulativity in terms of knowledge. These are, therefore, subject to incremental innovation: examples include platform technologies sold to research laboratories to perform certain routine tasks such as the purification of DNA and other molecules, or applications designed for the automation of certain discovery processes (the screening of therapeutic components, etc.). Sub-sectors, in other words, that are most compatible with the stability and long-term orientation typical of the German industrial system.

Institutional characteristics also help to explain the British case: the country has a strong presence in biotechnology, especially in specialisations involving a high level of uncertainty, but since the end of the nineties results there have been rather disappointing. In comparison with the similar case of the United States – which also specialises in highly advanced sub-sectors with a high level of risk – the UK presents two problems of scale: (1) the inadequate size of the scientific-educational system, not up to the task of providing the managerial and research staff necessary for the field to really take off, and (2) the shortcomings of the labour market, which does not provide adequate opportunities for star-scientists in the biotechnology sector: this meant they either opted for safer jobs in the big pharmaceutical companies or for exit strategies in the direction of the United States (Casper and Soskice 2004, 380). A check carried out on companies listed on the new technology stock markets confirms the thesis of compatibility between the two European countries' institutional arrangements and their specialisations in the new economy, with 88 per cent of German companies gravitating towards sub-sectors deploying incremental innovation and the same percentage of UK companies working in those featuring more radical innovation (Casper and Whitley 2004).

A comparative institutional approach has also been used to examine the role of the state in promoting innovation. It is a theme that is coming back to the centre of attention, including that of public opinion, thanks to the book by economist Mariana Mazzucato (2013) which advocates abandoning 'market-centered' conceptions of development and innovation and a reconsideration of the state's entrepreneurial role. To argue her thesis, the Italian-English scholar refers to the well-known distinction between risk and uncertainty introduced by American economist Frank Knight (1921). *Risk situations* are those in which the results of actions, although unknown, can still be predicted to a certain extent, based on a probability distribution familiar to the actors. The latter can therefore apply decision rules based on expected utility maximisation. With *uncertainty situations*, on the contrary, the unknown factors include not only the result of actions but also the probability of occurrence of one particular event or another.

Private entrepreneurs tend to shy away from situations of uncertainty such as those, for example, typical of projects at the frontiers of scientific research. These kinds of project – capital intensive and involving incommensurable risk – are, however, essential for long-term development and form the basis of almost all the new 'general purpose technologies' discovered in the second half of the twentieth century: from the internet, to biotechnology, to the nanotechnology and renewable energy of today.

And this, therefore, is where the entrepreneurial function of the state comes in: funding forward-looking and uncertain research projects from their inception up to the marketing of results. Mainstream economic theory justifies government intervention only in certain specific situations, to remedy so-called 'market failures'. According to Mazzucato, however, this position does not do full justice to the visionary and anticipatory role of the state in the context of technological change, where it performs two unique tasks: providing innovators with 'patient

capital', something that is in short supply in the market economy; and promoting innovative partnerships between researchers, universities, government laboratories and companies, guiding them in directions consistent with the public good. In other words, the *entrepreneurial state* explores the 'risk landscape', creating new markets, especially where high capital investment is required in situations of radical uncertainty, and playing a leading role as *risk taker* and *market-shaper*.

Mazzuccato's book didn't simply drop unheralded from the skies. We only have to consider the institutional turn that has taken place in recent decades in the field of development economics (Evans 2005); or the literature on the developmental state (Block and Evans 2005) and national innovation systems (see Chapter 5); or even the recent rediscovery of the 'invisible hand of government' in the technological progress of the United States (Block 2011). All these contributions underline the importance of the institutional context in explaining both innovation and the trajectories of development followed by countries (Rodrik 2007; Acemoglu and Robinson 2012).

In particular, I would like to draw your attention here to a line of studies – those regarding the *new developmental state* – which has analysed the development of emerging economies in technologically cutting-edge productive sectors. It is a line that originates in certain research in the field of comparative political economy carried out in the eighties on the processes of 'late industrialisation' followed by Japan and other Asian economies after World War Two. As one researcher has observed, 'all late industrializers have in common industrialization on the basis of learning …. These countries industrialized by borrowing foreign technology rather than by generating new products or processes, the hallmark of earlier industrializing nations' (Amsden 1989, v). In these early studies, the economic success of the Asian countries is attributed to the presence of a *developmental state* that on the one hand protects infant industries from foreign competition, and on the other stimulates the competitiveness and exports of strategic companies, 'setting stringent performance standards' for groups receiving public support (ibid., 145).

But what are the essential features of the developmental state? The first element regards *development strategy*. State action is aimed at promoting economic growth through a long-term, structural, industrial policy which, while recognising the role of the private sector, tends to guide and direct it towards international markets. It is, therefore, a strategy based on high levels of productive investment, the strategic allocation of capital resources, and selective exposure of domestic industry to international competition (Wade 1990).

The second element relates to *state structure*. Industrialisation is led by a political élite equipped with broad powers and relatively insulated from the pressures of social groups. Moreover, thanks to the legacy of the Confucian tradition, the government can take advantage of a robust and efficient bureaucracy – one that is selected on a meritocratic basis, endowed with high prestige, devoted to the national interest and, thanks in part to the informal links forged during the period of studies, internally cohesive. The classic description of such a bureaucracy and

its role in development is provided by Chalmers Johnson (1982) in relation to Japan's Ministry of International Trade and Industry (MITI). Although carrying on relationships with private companies, these political and bureaucratic élites are sufficiently insulated and competent to pursue policies that promote long-term economic growth (Johnson 1982; Onis 1991). In other words, East Asian developmental states were able not only to promote economic development but also to direct and coordinate industrialisation.

As has been noted, however, these early studies provide a reductive and simplified vision of relations between the public and private sectors, where 'the state prevails over civil society, and social groups are pacified agents of economic changes' (Moon and Prasad 1994, 363). This 'rigid binary demarcation of state-society relations through the "dominance/insulation" hypothesis' has therefore come under fire on two fronts (ibid., 370): on the one hand, for the overvaluation of the unitary and cohesive character of Asian states and the degree of success achieved in the various productive sectors; on the other, for the underestimation of the ties linking public agencies to their economic and social constituencies.

A new study approach therefore emerges from these criticisms – that of the *new developmental state* (Evans 1995; Ó Riain 2004; Breznitz 2007; Block 2011) – which places greater emphasis on the embeddedness of the state in society and focuses on the most dynamic and innovative high technology sectors. The first major contribution came from Peter Evans (1995) on the birth of the information technology sector in certain newly industrialising countries (Korea, Brazil and India). Evans develops two ideal-types of state: *predatory states* (e.g. Mobutu's patrimonial regime in Zaire), with corrupt and particularistic politico-bureaucratic élites that extract resources from society and undermine development capabilities; and *developmental states* (such as Korea), where the élites have a more universalistic orientation, focused on national interests.

This second type of state can play an active role in development thanks to: (1) its internal structure, and (2) its relations with society. Where the former is concerned, the organisation of the state approximates Weber's description of a modern and independent public bureaucracy: 'Highly selective meritocratic recruitment and long-term career rewards create commitment and a sense of corporate coherence' (ibid., 12). With regard to external relations, politico-bureaucratic élites are far from isolated: 'To the contrary, they are embedded in a concrete set of social ties that binds the state to society and provides institutionalized channels for the continual negotiation and renegotiation of goals and policies' (ibid.).[24]

The developmental state is based, therefore, on a subtle alchemy involving two seemingly contradictory characteristics. On the one hand, *autonomy* – its ability to preserve a certain independence from private élites – which allows it to formulate medium- to long-term development goals, passing over the immediate interests of the most powerful lobbies; on the other, *embeddedness* – its ability to build alliances with certain social groups (especially industrialists) 'with whom the state shares a joint project of transformation' (ibid., 59). Only when both of these aspects are combined, as in the case of Korea, are the conditions

created for what Evans calls an *embedded autonomy* that 'provides the underlying structural basis for successful state involvement in industrial transformation' (ibid.).

Following this approach, other emerging countries (Ireland, Israel and Taiwan) with a leading position in high-tech sectors have also recently been studied. These 'success stories' should be understood against the background of the birth of 'global production networks': an increasingly fragmented and geographically dispersed production process that allows emerging countries to specialise in a specific stage of production and compete on an international scale (Breznitz 2007).

The strategies followed by the first developmental states are ill-adapted to these new scenarios, particularly in market sectors subject to rapid technological change that require more flexibility on the part of both the state and companies. For this reason, Seán Ó Riain (2000, 2004, 2014), studying the development of the software industry in Ireland, contrasts the old model of the *bureaucratic developmental state* (typical, for example, of Japan) with a new model of the *developmental network state*. The latter 'is defined by its ability to nurture post-Fordist networks of production and innovation, to attract international investment, and to link these local and global technology and business networks together in ways that promote development' (2000, 158). Ó Riain shows that this new form of state assumes a more flexible and decentralised 'networked organizational structure', based on the 'multiple embeddedness of state agencies in professional-led networks of innovation and in international capital' (2004, Kindle digital edition, position 146).

While starting from assumptions very similar to those of Ó Riain, Dan Breznitz's study of Ireland, Israel and Taiwan tends to underline that these new development strategies are not, however, connected to a single form of state. Since the 1960s, all three of these countries have taken steps to create their own high-tech industry by following some common policies, such as strengthening education and communication infrastructure and supporting SMEs. But the similarities end there. The states involved, in fact, have very different bureaucratic structures, which followed different industrial and research policies – and as a result generated very different forms of technological skills and production specialisation. The methods of embeddedness are also dissimilar, with the relationship between the state and private enterprises established differently, both in the domestic and international market.

These three cases clearly show the usefulness of a *comparative political economy* perspective to explain how institutional contexts and differing political choices shape differentiated development trajectories. It should also be added that the emphasis placed on embeddedness tends to create a space for dialogue with the new economic sociology approach which will be looked at in the next section. That said, perhaps the most significant suggestion that arises from these neo-developmentalist studies is that of not exaggerating the 'demiurgic' potential of the state – its ability, in other words, to manage and plan economic and technological development.

To clarify this point I would like to refer to Peter Block's reconstruction of the evolution of the innovation system in the United States over the last few decades. Since technological innovation cannot be directed from above, the US federal government has promoted a 'coordinated decentralization' of innovation policy, based on public-private partnerships (Block 2011). In this system, public agencies do not appear able to define, ex-ante, a precise strategy of technological change. In addition to financial support they carry out an essential role in terms of socio-institutional brokerage, promoting the conditions for the cooperation of all those who can make a significant contribution. In this way they create 'collaborative public spaces' (Lester and Piore 2004) where stakeholders can discuss and exchange information useful for development and innovation (Block and Keller 2009; Block 2011). In other words, public agencies resolve situations of *network failure* that occur through the opportunism of the actors involved and/or the lack of adequate incentives, information and expertise (Schrank and Whitford 2011).

In this process of change, strategy is not defined, a priori. It is rather the emerging product – more or less intentional according to the various programmes – of organisational interactions and modalities involving a plurality of players. The role of the state is not, therefore, hypostatised. Block, analysing the influence of the US government, talks about an effect of 'social resonance', with specific reference to the catalytic role performed by a peripheral intervention programme: the Small Business Innovation Research Program (SBIR), which multiplied the creation of innovative SMEs. Two significant points emerge from Block's account: (1) The change in the US innovation system is not the result of a 'unified plan', as described by Chalmers Johnson (1982) with regard to Japanese industrialisation. In fact, behind the changes that have occurred over the past 30 years, there is no deliberate strategy visible that is aimed at augmenting the role of the public actor and reshaping the relationship between the state and the economy, given that all this happened in an era of 'market fundamentalism' (Block and Keller 2009, 475–7). (2) The SBIR programme triggered critical consequences only in resonance with other social, economic and political changes that were already in place, enhancing the overall effect (Keller and Block 2013, 21).

In conclusion, what can we learn from the comparative political economy studies examined in this section? Essentially, three lessons. First, the institutional analysis of capitalism is useful for the study of national innovation systems, both in advanced and emerging countries. The ideal-typical models mentioned earlier, however, require further elaboration: (1) to take account of innovation systems pertaining to other models of capitalism (e.g. the countries of Mediterranean Europe and emerging economies); (2) to analyse the territorial and sectoral variations of innovation systems (more about this in Chapters 5, 6 and 7).

The second lesson is that institutional arrangements should not be considered unmodifiable and therefore the dynamics of institutional change must also be taken into account.[25]

The third lesson is that the emphasis placed on the institutional structures of the economy and the systemic aspect of innovation should not over-restrict the space attributed to *agency factors* – in other words, the intentional action of public and private actors. As has recently been pointed out, a common error in various institutional and systemic approaches is to read the behaviour of the actors – the companies, for instance – only through the characteristics of the contexts in which they operate (Gertler 2010, 5).[26]

But companies have a certain strategic autonomy with regard to the institutional contexts to which they pertain: they are not exclusively *rule-takers* but also *rule-makers* (Crouch *et al*. 2009). They derive a substantial degree of freedom from the reflexive re-elaboration of the repertoire of skills and experience they have inherited from their own past. And this in a way that is partly independent of the industry and the country in which they operate. Susan Berger, together with a group of MIT researchers (2005), described this approach as the 'dynamic legacies model' and applied it to an empirical study of 500 North American, European and Asian companies, showing that their behaviour and strategy in the face of globalisation (e.g. with regard to choices of outsourcing and offshoring) could not be explained either by their productive sector or by their pertaining to one of the models of capitalism that we have looked at. More recently, the MIT research group on 'Production in Innovation Economy' also studied a wide variety of American companies in order to analyse the relationship between innovation and manufacturing production (Berger 2013; Locke and Wellhausen 2014). The conclusions reached are that innovation is not linked only to R&D activity and high-tech sectors, occurring not just in the initial phases of product development but 'throughout the value chain' (Locke and Wellhausen 2014, Kindle digital edition, position 94). This happens because 'much learning takes place as companies move their ideas beyond prototypes and demonstration and through the stages of commercialization' (Berger 2013, 5).[27] These scholars, therefore, emphasise the risk that the offshoring of production to emerging countries, implemented by many American companies, may in the long run weaken the basis of the US economy's innovative capacity and development. This is due to the fact that 'manufacturing firms have a critical role both as sites of innovation and as enablers of scaling up to commercialization the strong flow of innovations from America's research laboratories, universities, public laboratories, and industrial R&D facilities' (ibid., 26).

The study of innovation cannot, therefore, leave the choices made by companies, and their competitive and organisational strategies, out of consideration. With regard to the latter, for example, certain studies link the innovative capacity of companies to the specific organisational solutions that they adopted. Research carried out by Lester and Piore (2004) on case studies in the fields of mobile phones, medical appliances and clothing, shows that the most important innovations derive from an organisational and management approach of an 'interpretive' type. The authors contrast two different procedural approaches to problem-solving: analytical and interpretive. *Analytical processes* are those that can be applied when the problems to be solved and the

possible results are well-known. *Interpretive processes*, however, are more appropriate when neither the decision alternatives nor the possible outcomes are known in advance. Solutions, therefore, must be sought by exploring the frontier of innovation.

In the latter case, the activity of discovering new solutions proceeds through *interpretive conversations* between people that pertain to different organisational areas and workgroups. The outcome is neither predictable nor obvious, a priori. Managerial activity, therefore, is aimed at promoting the open exchange of communication and integrating a variety of resources in order to cross predetermined cognitive and organisational boundaries. The results of the study shed light on how the creation of these 'interpretive spaces' – open to the contribution of a plurality of subjects – produce the best results: 'The key innovations in each of the case studies grew out of an integration: in every case different domains of knowledge were brought together to form something new and original' (ibid., 10). The three case studies analysed by David Stark (2009) – through ethnographic research on the media and on finance in the United States, and on the machine tool sector in Hungary – also bring out this interpretive aspect in relation to innovation. This is especially true when organisations find themselves operating in competitive environments characterised by scenarios of radical uncertainty. In these contexts the best performance is obtained by *heterarchical organisations*, which are able to take advantage of the uncertainty, nurturing an ongoing capacity for innovation.[28] These organisations tend to systematically and intentionally generate problematic situations within themselves. They constantly question organisational routine and foster co-presence and dialogue between different evaluative criteria, deriving from different units and skills.

Heterarchy, therefore, represents a strategy that tends to 'organise dissonance', exploiting the intelligence dispersed within an organisation and coordinating it, without suppressing the presence of different principles of evaluation and valorisation. These, in fact, serve rather to create new productive combinations: in other words, to innovate. This implies: (1) the involvement of a plurality of units in the innovation process; (2) the strengthening of their operative interdependence through ongoing reciprocal monitoring; (3) the decentralisation of decision-making and the development of alternative forms of non-hierarchical coordination, based on 'collateral responsibility' between the working groups; and (4) greater simultaneity with respect to the design and implementation phases of innovation.

As Stark points out, with the assumption of this analytical perspective, the entrepreneurial role is not a matter of the attributes of an individual (as in Schumpeter) or his relationships, but is a property of the organisation itself. The entrepreneurial ability to generate innovation lies in the borderline and overlapping areas between networks and working groups, which possess distinct forms of knowledge and evaluatory criteria. The interactive coexistence of dissonant elements, not allowing the consolidation of predictable routine, generates 'creative frictions' and these foster the innovative recombination of resources.[29]

If, on the one hand, this perspective on business complicates the institutional analysis of capitalism, on the other it enriches our understanding of innovation processes. Reclaiming the analytical independence of 'agency factors' does not mean isolating the economic actors from the institutional context in which they operate. It is to see how they exploit the opportunities or compensate for obstacles through their strategies and interpersonal skills. And this is a theme that brings us to the next section, which deals with socio-economic networks and their influence on innovation.

1.7 Innovative networks

As we mentioned in the Introduction, over the last few decades there has been an increase in collaborative relationships between economic actors. The rapidity of technological change, the uncertainty of its evolutionary trajectories, growing international competition, and the pluralisation of knowledge sources have made companies more dependent on external resources. Inter-organisational partnerships (strategic alliances between companies, research consortia, collaboration with universities, etc.) have therefore multiplied, especially in the field of research and innovation. And this has focused the attention of scholars on the social and economic networks that support them. In the context of new economic sociology, this type of analysis has been developed through the so-called 'structural approach', which has applied the network analysis to the study of socio-economic phenomena. The starting assumption is that economic activity is *embedded* within the social relationships between individual or collective actors (Granovetter 1985). These relationships – and the social structures that they generate – influence economic activity, as they allow access to resources and information of various kinds, create trust and discourage opportunism in transactions.[30]

The networks are not, however, all the same. They are configured differently depending on the type of relationships that exist between the actors. These relationships can be: (1) informal (based on acquaintanceship of a personal kind, membership of the same professional community, etc.) or formal (based on contractual relationships such as alliances between companies, research consortia, etc.); (2) long- or short-term; (3) focused on individual (managers, researchers) or collective actors (companies, research organisations); (4) directed toward specific or more indefinite goals, etc.

Networks can also: (1) be purely *transactional* (such as in trade relations) or *relational* (personal and social relationships); (2) possess different modes of governance (more or less hierarchical, more or less regulated); (3) present a configuration that is more or less closed and dense.

Many studies have been devoted to analysing the impact of networks on innovation.[31] Research has mostly dealt with *innovative partnerships* (inter-organisational collaborations), showing that they foster the circulation of information, the sharing of project risks, access to resources that are different and complementary to those of the company, and also reciprocal learning