

PART 1

Innovative Entrepreneurship and Economic Dynamics

COPYRIGHTED MATERIAL

Entrepreneurship and Competitiveness in Literature

1.1. Introduction

Although competitiveness is a ubiquitous term in economic research, it remains a complex concept with regards to the specific scope and the scale it addresses, whether for a company, a country or a region. Indeed, at country level, policy-makers who analyze the pillars of the economic competitiveness focus on the specificities of their own industries, while business managers focus on the ability of their respective firms to compete in specific markets (Ferreira *et al.* 2017). But the importance of competitiveness remains historically linked to events that have emerged particularly in the 1970s, in the context of the trade battle between the United States and Japan (Wziatek-Kubiak and Magda 2005), when each country sought to develop new sources of comparative advantage in order to ensure their long-term economic growth.

Several macroeconomic research studies have focused on growth in a dynamic perspective by using the traditional factors that sustain the production function such as labor and capital, particularly by analyzing the localized determinants of attractiveness that favor investment in activities that are sources of comparative advantage.

This has revealed a pattern in some countries to develop specializations in competitive industries requiring greater involvement of the factors of production traditionally available in the country and thus ensuring competitive advantages at the international level (Alexandros and Metaxas 2016). Other

approaches have taken sectoral analysis angles, notably through innovative ecosystems or at the firm level, to analyze market structures, competitive positions, internal processes that promote innovation and the efforts made by players to remain competitive.

The Schumpeterian approach to competitiveness is both original and instructive, in that it integrates competitiveness within the framework of innovation-based entrepreneurial theory. The ability of the business owner to create innovations will affect his economic added value and this results in his competitive advantage. From a dynamic perspective, Schumpeter (1934) links entrepreneurship and growth through the process of “creative destruction”. The entrepreneur will seek the innovative opportunities that make a sector competitive (Kirzner 1973). The entrepreneur becomes price competitive by exploiting new production activities, as opportunities for profit.

Further works have explored the relationship between competitiveness and innovation, including the contributions of Porter (1990) on the competitive advantage of nations, in which he suggests that a nation’s competitiveness depends on its ability to innovate and to keep up with technological advances. His work laid the foundation of regional economy and development by analyzing the determinants of competitiveness. Porter (1990) suggests that competitiveness is not a national heritage, but rather is created by economic actors. Through his “diamond” model, he explains how firms in a given sector are more competitive than others in national and international markets. To be competitive, companies must constantly improve the productivity of their products, through price and quality, but should at the same time seek out strategic positions through innovation.

In addition, Porter links the determinants of competitiveness to the stage of development of a country, the latter measured by the degree of sophistication of production patterns and by targeting transition towards an economy based on new knowledge creation. He identifies first a *factors-driven stage* of development where countries compete with each other through low-cost and low value-added products. Second, an *efficiency-driven stage*, where countries target efficient production practices in large markets that allow firms to exploit economies of scale. Finally, an *innovation-driven stage*, in which countries invest in innovation in order to reach the technological frontier and knowledge-based position. At this ultimate stage, the economy is a producer of innovation and a source of new knowledge creation and new technologies production (see Figure 1.1).

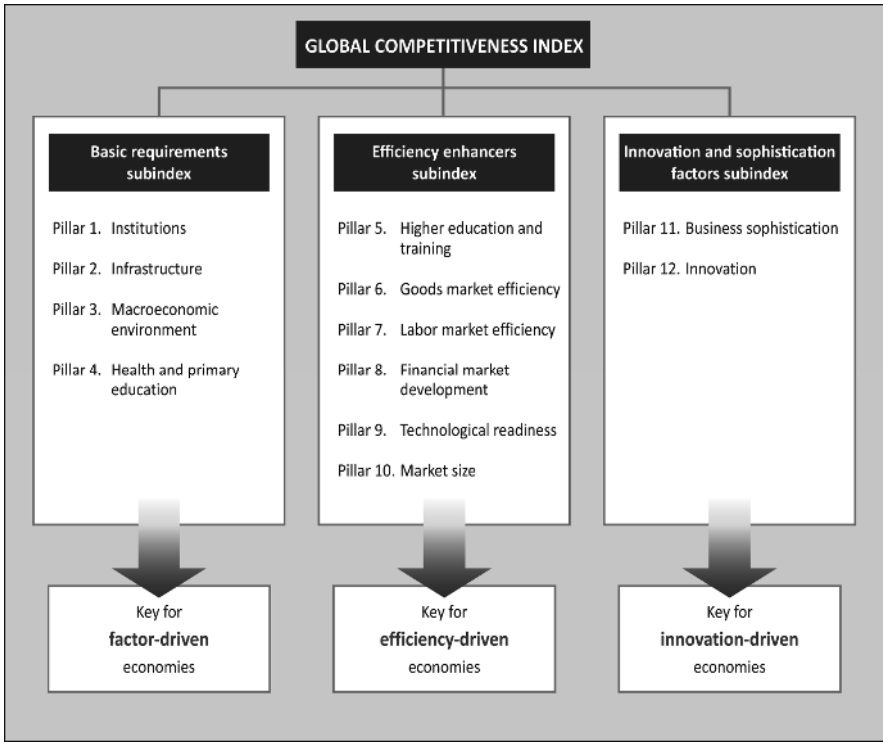


Figure 1.1. Pillars of competitiveness according to the stage of development of the countries (source: adapted from the “Global competitiveness report 2012–2013”)

Innovation becomes a continuous challenge for the creation and commercialization of new ideas, new knowledge. The interaction between the market conditions and the returns on investment in innovation can contribute to economic development (Ferreira *et al.* 2017).

Entrepreneurship and innovation do not happen by chance, nor are they equitably distributed among industries or even countries. The explanation lies in the “national attributes” (Porter 1998) that might play a crucial role in fostering the entrepreneurial activities allowing marketable innovations to emerge. This means that the structure of the local environment and the existence of local factors and circumstances foster investment and favor the development of new opportunities for innovation. They are therefore the “drivers” of competitiveness. Porter (1998) illustrates this situation by analyzing the example of the wave of foreign entrepreneurs who immigrated

to the United States and who contributed greatly to the country's economic development, relying on the existence of a hospitable and welcoming environment that is ripe for entrepreneurship and innovation.

Nevertheless, Porter's contributions have two main limitations. First, there is a lack of clarification about the place of entrepreneurship and innovation in the competitive system. The second limitation concerns the ambiguity of evident links (direct or indirect) between entrepreneurship, innovation and competitiveness. In a recent contribution, Porter and Stern (2001) have provided new insights on the cross-cutting factors that foster innovation, in particular investment in human capital, the financing of scientific progress, and the level of technological sophistication, as well as the incentive and protection mechanisms for innovation. However, the link between entrepreneurship, innovation and competitiveness remains unclear.

Porter's view of competitiveness is akin nowadays to being incomplete to explain the business environment and thus economic development (Siudek and Zawojcka 2014), and has attracted much criticism, notably from Paul Krugman (1994), who stresses the need to distinguish firm-level competitiveness from national competitiveness and to avoid confusing the determinants of performance in the analysis. In this perspective, he emphasizes that the concept of competitiveness is a "dangerous and confusing obsession" if we assess competitiveness of a given country as a firm competing with other firms-countries in a global market.

When a company is no longer competitive in a market, when it cannot improve its performance and therefore cannot pay its employees, suppliers and creditors, it will disappear. This cannot naively be transposed to the case of a country. The latter cannot disappear because it is not performing or solvent. Moreover, countries do not compete with each other as companies do. The companies' customers are not usually their own workers, whereas in the case of a country, goods and services are mostly produced for the local market and the export share represents only a small part of its usage.

Krugman (1994) suggests a more humanistic approach to competitiveness, according to which national competitiveness is based on the economy's ability to transform the results of productive activities to improve income levels, to create employment and to enhance welfare. But, once again, the role of the entrepreneur remains unclear in his approach, particularly in terms of the links

between entrepreneurship and competitiveness of an economy, compared to the emphasis on innovation and its determinants.

The international economic change and technological evolution that have characterized the last 20 years, particularly the rapid and continuous pace of progress and the renewal of technology, result in a new shift of firms' activities and a new mode of development, with an increasing prevalence towards small businesses that contribute the most to economic growth. Since the 1990s, we have witnessed the development of new technology sectors, particularly information technology and telecommunications, that have turned entire industries upside down, redefined some sectors and contributed to the emergence of new sectors. This economic and structural shift has even affected the international positioning of some countries with regard to technological innovation.

This disruptive shift has captured the researchers' interests towards exploring the role of the entrepreneur in economic growth (Wennekers and Thurik 1999) and thus breaking with the established view that has prevailed for a long time, both in innovation and development theories as well as at the country level and the market level. For a long time, large firms have dominated economic theories in the sense that they are the main source of innovation, given their size, their financial strength and experience in coping with risk. The recent changes in economic and business landscapes have fostered academic interests towards exploring the new determinants of growth and innovation and thus the extent to which small innovative structures contribute to economic development.

Nowadays, it is no longer appropriate to differentiate the macroeconomic level from the microeconomic perspective when it comes to analyzing motivations, or even individual behaviors and actions, leading to innovation, in an economic system. The accelerating pace of communication technologies and digitalization lead us to rethink the systemic innovation process including a framework that integrates entrepreneurial behaviors and actions and its interaction with the environment in which entrepreneurial actions evolve.

Several institutional studies have explored the new potential pillars of economic development and growth by combining both microeconomic and macroeconomic factors of development and growth performance. The Global Entrepreneurship Monitor (GEM) follows this perspective and has

the merit of providing an integrative framework which links entrepreneurial behavior and attitudes to macro-economic dimensions.

This framework has fostered further multi-dimensional studies and complementary approaches. Various recent studies have been conducted under this framework including the analysis of the influence of level of development on dynamic entrepreneurship (Wennekers *et al.* 2005), the relationship between entrepreneurial activities and economic change (Gries and Naudé 2010; Acs and Naudé 2013), the analysis of entrepreneurship under a systemic framework at the country level (Acs *et al.* 2014; Autio *et al.* 2014), the links between intrinsic and extrinsic knowledge aspects of entrepreneurship and innovation and competitiveness (Ferreira *et al.* 2017), the regional and local economic level of development and their effects on the type of entrepreneurship (Korez-Vide and Tominc 2017), as well as more systemic approaches of entrepreneurship such as those that have allowed the development of the concept of entrepreneurial ecosystems (Acs *et al.* 2008; Acs *et al.* 2014; Lafuente *et al.* 2016; Neumeyer and Corbett 2017) and studies in management (Autio *et al.* 2014; Autio and Levie 2017) that are targeted at innovation and entrepreneurship as subjects of exploration.

This chapter will discuss the contributions of the various and complementary macroeconomic, economic development and management theories in the way they have approached the links between entrepreneurship, innovation and development. This historical and multidisciplinary review is of critical importance and even instructive to understand the complexity of these links.

1.2. Entrepreneurship, innovation and development: key points of reference

In order to understand the relevant role of entrepreneurship in economic development, it is needful to undertake a complementary approach using, on the one hand, the discipline of management to explore the individual dimension, which refers to the personal aspirations and behaviors of the entrepreneur, his/her objectives and his/her actions in an environment that can be a source of opportunities and, on the other hand, the global perspective, using macroeconomic and economic development analyses, that

entails broader sophisticated and multifold interactions, and includes social, institutional, political and industrial actors.

From an innovation perspective, understanding the entrepreneur's behavior, motivation and actions in the environment in which he/she evolves requires exploring the historical evolvement of the links between the three key concepts of this book: entrepreneurship, innovation and development, under an integrative and complementary approach which uses different angles of analysis, particularly the economic and development theories, which focus on entrepreneurship as well as developments in innovation theory.

We will see that the various approaches have a historical foundation, closely linked to macroeconomic changes, and have sometimes been nurtured by one another and sometimes confronted or completed with a final objective of exploring the potential or evident links between the concepts of entrepreneurship, innovation and economic development. Additional approaches have narrowed the analysis to innovation and its driving forces at the level of the firm, particularly the internal knowledge and learning processes enabling innovation to take place. Finally, recent approaches have focused on entrepreneurial capabilities and have thus provided insights on the relationships between the quality of entrepreneurship and economic development.

1.2.1. *Economic development and entrepreneurship*

Schumpeter, whose works have often been considered as the foundation of the theory of entrepreneurship and innovation, has been inspired by Jean Baptiste Say's works (1846, 1852), who can be considered the "father" of the concept of entrepreneurship in a capitalist world. The outstanding contribution of Jean Baptiste Say is his consideration of the entrepreneur not only through the individual perspective but also with regards to his systemic role and "function", through ensuring links with the socio-economic structures of the economic system, particularly in terms of profit, social recognition and innovation (Boutilier and Tiran 2016).

Jean Baptiste Say, the classical but liberal economist, was an entrepreneur in the cotton sector, and had for his time provided an innovative vision through linking the macroeconomic vision, that of economic development, and a microeconomic vision at the level of the entrepreneur and his motivations. Jean Baptiste Say suggested that the entrepreneur is not

an individual disconnected from the dynamics of economic progress, but rather the driving force of these dynamics (Say 1846) through his contribution to the production function, by giving utility and marketable value to the final products. This key value has been explored and continuously updated, particularly to address innovative entrepreneurship, as a source of added value at both the individual and collective levels.

Later on, in a post-war context, the development theories with various academic streams and visions emerged. The neoclassical stream of literature which considers the entrepreneur in a capitalist economic system has been progressively dropped in favor of an economic growth stream of literature according to which the use of the classical production drivers (work and capital) ensures the general equilibrium. In this perspective, entrepreneurship becomes a peripheral phenomenon in economic growth (Baumol 1990).

Schumpeter (1934) was the founder of economic evolutionism and the dynamics of economic change by placing entrepreneurship and innovation at the heart of his theory. He broke out the economic conformism of general equilibrium by considering growth as a continuous process of technological progress. This progress is fostered by the entrepreneur, who has the ability to combine resources and factors to create business opportunities, source of added value.

Schumpeter also established a symbiotic relationship between innovation and entrepreneurship, where the main and probably unique function of the entrepreneur is innovation. The entrepreneur usually creates new combinations: new products, new markets, new materials and new forms of organizations, through the famous creative destruction process (Schumpeter 1934). Schumpeter therefore started emphasizing the role of small structures in supporting innovation in an economic evolution perspective. However, this link will be nuanced later in his work (Schumpeter 1943) when he associated innovation activity almost exclusively with R&D activities within large companies, distancing it therefore from the entrepreneurial activity.

Schumpeter's work has contributed to understanding the articulation between the concepts of entrepreneurship and innovation and the drivers of innovative entrepreneurial capacity, even though his main contributions on innovation were conducted and illustrated on large firms. It should be noted that, from a contextual point of view, Schumpeter was a witness of the expansion and success of large firms and was a good observer of their ability

to create economic value through the production of goods and thus the way they defend and preserve their market position. He particularly acknowledged their capacity to bear the risks and uncertainties associated with the innovation process (Naudé 2010a) and therefore suggested that, due to the high costs of R&D activity, associated with innovative activity, a threshold of a company size is necessary and even crucial, in order to be able to achieve economies of scale, cost-cutting and thus to obtain a market position and to have the ability to sustain and empower it.

In the same vein, Galbraith (1967) and Williamson (1968) approved these prerequisites and argued that the contribution of large firms to innovation is closely related to their size, the existence of a capitalistic capacity basis and a substantial R&D activity dedicated to innovation, which jointly help in moderating the risk inherent in innovative activity and thus ensure a contribution to economic development.

The neoclassical Baumol (1968) investigated the drivers of economic growth. He first proposed a conceptual model to adjust marginal cost to the price of the product and suggested impersonal relationships between economic stakeholders. In this perspective, he emphasized the role of the imitator in economic advance at the expense of the entrepreneur. Later on, Baumol (1990) took up Schumpeter's work and recognized the relevant role of the entrepreneur in innovation activity and economic development, thanks to his ingenuity and creativity, combined with his ability to seek and accumulate wealth and power. The author also distinguished three categories of entrepreneurs: productive, destructive and unproductive, in order to explain the type and the categories of impacts that could occur on development in a broader perspective.

The particular added value of Baumol's contribution lies above all in considering entrepreneurial innovation as the main source of competitive advantage and that entrepreneurs are essential for developing new businesses, while bringing about new business models and ideas that break with existing skills. In this perspective, he particularly underlined the role of investing in the education system toward developing entrepreneurial capabilities. He also suggested that institutional policies, incentive systems, property rights and access to information, should greatly impact the supply of innovative entrepreneurial ideas, and thus would explain the difference in development levels between countries.

Simultaneously, socio-behavioral approaches have been drawn on Schumpeter's approach to innovation to analyze the innovative role of the entrepreneur. According to Weber (1930), the pioneer of the societal approach of entrepreneurship, the social and cultural circumstances affect entrepreneurial action in specific environmental contexts, specifically where social norms and trust are decisive parts of social capital and can therefore foster entrepreneurial action.

This approach is also supported by Highfield and Smily (1987) who explain that when the economic environment is characterized by high unemployment and low growth rates, social and cultural conditions can foster creativity and entrepreneurship. But considering this aspect cannot solely explain the added value of entrepreneurship for innovation and economic development.

In parallel, new insights have been provided by the economic behavioral view of entrepreneurs mainly carried by Kirzner (1973), who belongs to the neo-Austrian economic school, and who has placed the personality and behavioral dimensions of the entrepreneur, synonymous with what he calls "human action," at the heart of his developments. According to the author, the entrepreneur is a passionate and opportunistic adventurer and a hero of dynamic capitalism. Even if his actions are motivated by irrational and opportunistic grounds, made possible with the lack of perfect knowledge among the market participants, his entire role arises from alertness to unnoticed opportunities and his risk-taking and contributes not only achieving personal profit, but also an overall value. The competitive-entrepreneurial adjustments in the type of products placed on the unbalanced market contribute to improving market failures and ensuring economic welfare. Regarding Schumpeter's work on the dynamic conception of markets, Kirzner criticized him particularly on the role of entrepreneurship as a disrupter of economic equilibrium. The author promotes the entrepreneur's perception of profitable opportunity. He sees the entrepreneur as a creator of information. His alertness to unnoticed knowledge about the market fosters his ability to detect profitable opportunities, and is sustained by a learning process, which in turn is nurtured by the entrepreneur's experience in identifying the needs and profit sources.

Additional studies have explored the drivers of entrepreneurial capability, particularly training and education aspects. According to Schultz (1980), who advocated investing in human capital, experiential learning is important, though the level of education can be crucial for entrepreneurship particularly in understanding the technical dimension of a product as an input of the entrepreneurial capability. Therefore, the entrepreneur is no longer a genius, but rather trained to develop entrepreneurial capability. Leibenstein (1968, 1987) supports this approach and suggests that training, learning and education, considered in a complementary perspective, contribute to the entrepreneurial *input* necessary for growth.

1.2.2. *New theory of economic growth, innovation and entrepreneurship*

For a long time, economic growth was closely associated with the allocation of the factors of production “labor and capital” (Solow 1957). Technological innovation, as an important component of the production system, was not yet considered as central for economic growth. The new theory of endogenous growth has been developed in the context of the 1980s, characterized by stagflation and rising unemployment in the United States, particularly in large firms. This historical event has raised concerns about exploring potential new drivers of economic growth, and academic developments have been undertaken, notably those which explore the role of small firms in economic development, through job creation and the diffusion of innovations.

The theory of endogenous growth establishes a central link between innovation and economic development, by considering innovation as an endogenous driver of growth and human capital as a source of innovation. From a dynamic perspective, knowledge and innovation are not merely intermediate variables but also crucial for growth (Lucas 1988; Romer 1990). The residual factor of technology function, which refers to human capital investment, the skilled employees and R&D activity, is a source of new opportunities for innovation, and thus for long-term growth (Lucas 1988).

Economic growth depends increasingly on possessing technical knowledge rather than on production cost-cutting while using a widely available technology. The appropriate use of knowledge will lead to improving machines, offering new products, reducing costs and increasing

productivity (Romer 1993). In extension to this, investment in knowledge and new skills development enables capitalizing on greater advantages, mainly in a context of openness for developed countries compared to developing countries (Szirmai *et al.* 2011).

The theory of endogenous growth has focused on exploring technological catch-up to explain the difference in growth between countries. It has greatly contributed to our understanding that catch-up processes can be enhanced through openness as a source of broader R&D diffusion, and that foreign direct investment (FDI) is an important channel for the technological catch-up, particularly for the least developed countries (Grossman and Helpman 1991). However, the catch-up process cannot be achieved consistently, since it depends on the availability of local circumstances and mechanisms that enhance the absorption of external knowledge and thus the specific characteristics of each country that enhance or slow down technological catch up.

The theory of endogenous growth has also highlighted the role of human capital as a source of knowledge acquisition which allows taking advantage of externalities (Lucas 1988). Technology as a public good is accessible to everyone, in opposition to human capital which accumulates knowledge and is not free. Human capital is a factor of production, specific to each country, and can thus explain the differences in growth between nations (Lucas 1993). Consequently, the more internal knowledge a firm has, the greater its ability to capture externalities and the more it accumulates new knowledge and contributes to growth. Moreover, endogenous growth theory shows the role of human capital in transforming resources and exploiting technological advances toward a country's prosperity (Romer 1990). The interaction between individual and collective skills contributes to the accumulation of human capital, a source of endogenous growth. Human capital is thus a crucial intermediate variable in the innovation process.

In this context, small structures and SMEs play an important role as agents of change through their innovative activities, which stimulate sectoral dynamics and contribute to creating new jobs (Acs 1992). With regards to entrepreneurship, the theory of endogenous growth did not tackle its potential contribution to growth. Instead, this theory emphasizes the role of political and socio-cultural dimensions in the growth process (Amable and Guellec 1992), in the sense that the firms' innovative capacity depends on the quality of institutional and social dimensions as well as the quality of

government involvement, in particular, through public investment in infrastructure as well as specific resources supporting innovation.

1.2.3. Complementary insights from industrial economy lenses

The neoclassical theory of development was challenged with the emergence of industrial economics, particularly Michael Porter's contribution, namely his paper "Competitive advantage of nations" (1990). Porter suggests that comparative advantage closely results from innovation. He distinguishes between invention and innovation in order to show that a firm that invents is not necessarily competitive if it does not know how to commercialize and adapt its inventions to the needs of the market. Innovation can thus arise both from R&D activity in large companies and from a newly created company. Porter places innovation at the heart of competitive advantage. Moreover, he noted that an innovation can result from a new company whose owner has a non-standard background and skills, which even characterize an entrepreneur, but Porter remained unclear regarding the relationship between innovation and entrepreneurship, since he talked about new companies' creations rather than clearly pointing out entrepreneurs.

In his early developments on competitiveness, Porter (1990, 1998) emphasized *national attributes* as drivers of competitiveness, including the investment in resources and infrastructure and the level of skilled labor and knowledge. The cultural dimension, highly associated with a country's socio-political history and shared values, also plays a role in shaping the environment in which a firm operates. All factors, such as the quality of governance, social capacity, technological capacity, modes of competition and evolving organizational structures, nurture and foster each other.

Economic competitiveness is to a large extent based on institutional supply which can explain the differences in development between countries. Governments particularly play a crucial role in setting up the foundations of an economic development, especially in structuring and configuring an environment that triggers innovation activity, including the investment in infrastructure and education to develop entrepreneurial capacity. Economic development becomes a sequential process which differentiates countries and their global position according to the ability of local factors to contribute to a country's innovation and competitiveness, which refer to the drivers of the stages of development (Porter *et al.* 2002).

Porter has in this perspective underlined the relationship between investment in knowledge and economic development. Indeed, the author characterizes three stages of economic development. First, a stage based on the use of traditional factors of production, which characterizes almost the poorest countries. Second, a stage in which an economy invests in the development of a capacity to absorb the externally developed technologies in order to increase its stock of knowledge and develop its innovation capacity. This situation refers to the efficiency factors stage of development. He finally defines an economy based on the creation of knowledge and the development of innovation at the technological frontiers, which refers to the innovation driven stage of development characterizing the most developed countries.

Drawing on these new insights on the stages of development linked to innovation, Fagerberg *et al.* (2010) studied the national innovation capabilities in developing countries, and have demonstrated correlations between the existence of an effective institutional environment and the development of innovation capabilities. The correlation between these two factors does not imply causal relationships. However, innovative capacity can be affected by the historical and geographical factors in each country. Moreover, the innovative capacity, depends not only on local enterprises, but is also fostered by FDI, which is often considered as a source of transfer, namely through alliances, joint ventures and strategic alliances. This is the case, for example, in Singapore, where *reverse* engineering and FDI have been an important source of technology transfer alongside local public policy consisting of huge investments in human capital through education. Finally, a country's stage of development affects the type of innovative activity in developing countries, where imitation, for example, can be considered as innovation, as long as the product is adapted to the local context.

Afterwards, Porter *et al.* (2008) took the analysis of the competitiveness of nations further by analyzing and presenting two levels of competitiveness: macroeconomic and microeconomic. Macroeconomic competitiveness is defined according to two groups of factors: the structural factors consisting of infrastructure, political institutions and human capital and the public policy factors, including monetary and fiscal policies that indirectly affect the productivity of firms (see Figure 1.2).

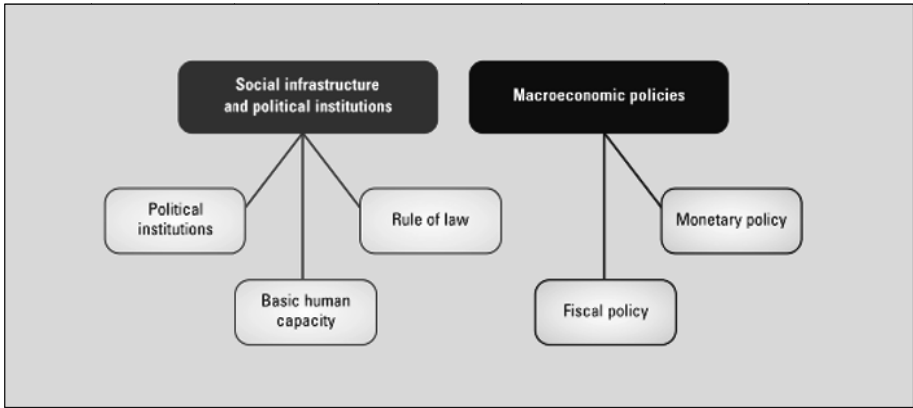


Figure 1.2. *Determinants of macroeconomic competitiveness (source: Porter et al. 2008)*

Microeconomic competitiveness, on the other hand, is based on the degree of sophistication of the company and its strategy, which is affected by the quality of its environment. It also depends on the economic context through which the government is represented by the agencies that facilitate the implementation of the national public policy strategy. Additionally, clusters that reflect the cooperation between the various economic players, including businesses, universities and professional associations, are also part of the microeconomic environment that operates in support of business dynamics (see Figure 1.3).

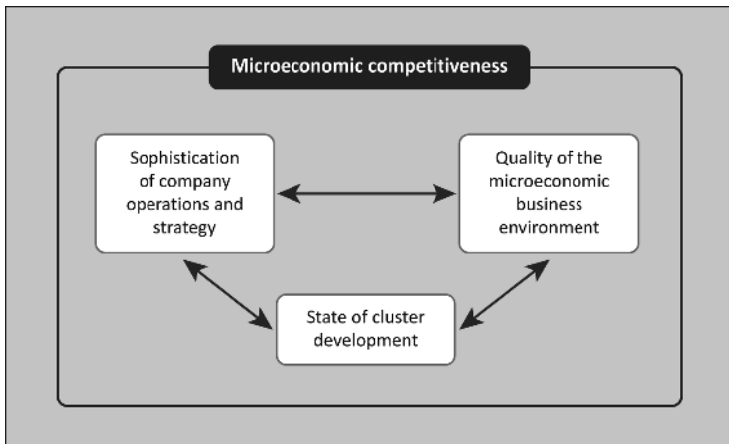


Figure 1.3. *Determinants of microeconomic competitiveness (source: Porter et al. 2008)*

By identifying the components of microeconomic competitiveness, Figure 1.3 reveals the complexity of the forms of collaboration affecting the development of a firm or sector and shows the effects of public policies on microeconomic competitiveness. It also reflects the fragility of microeconomic competitiveness depending on cyclical policy orientations. Moreover, the factors structuring macroeconomic competitiveness are certainly necessary, but not sufficient enough when the country aspires to higher productivity. The role of the government thus remains important particularly in adapting its strategy and tools to change and in supporting innovation, notably through public investment in R&D, education, improvement and modernization of infrastructure, regulatory policies, the development of the capital market and support for the development of technologically-based start-ups.

1.2.4. Theories of the firm, innovation systems and entrepreneurship

The context of the 1980s has been characterized by a technological leap combined with a rapid pace and disturbing technological machinery renewal, notably embodied in the ICT revolution, technological modernization, the production of new generations of machinery and equipment, and the shift to higher value-added activities in global value chains. This context has also been accompanied by a growing wave of vertical technological specialization in large technology sectors such as IT, and operated by small firms (Szirmai *et al.* 2011). This radical technological paradigm shift has threatened the survival of existing firms (Nelson and Winter 1982), especially since this paradigm shift is hence based on the knowledge economy and driven by small structures (Acs 1992; Audretsch and Thurik 2001).

The evolutionary theory has been developed in this new disrupting context to explore the survival factors of existing firms and thus to provide new insights on the new drivers of firm's growth in context of innovation being based on the analysis of the drivers of an innovative firm. This develops dynamic capabilities, sources of new knowledge acquisition and new capacity building. The analysis of firms' capabilities therefore implies studying the conception of the firm and its frontiers through analyzing how firms operate and exploring their ability to accumulate new knowledge in a perspective of growth.

This approach, which is centered on the firm and its internal dynamics, reflects the articulation and interactions between knowledge creation, capabilities

and competencies toward developing an innovation capacity. Therefore, knowledge capital accumulation requires substantially investing in R&D, which is not systematic given its cost, one that not all firms would be willing to bear. Moreover, the development of new products requires developing new capabilities or optimizing the combination of knowledge, competences (Ferreira *et al.* 2017). These competences result from a sequential process of acquisition, assimilation and dissemination of new knowledge (Cohen and Levinthal 1989, 1990). They evolve and depend on the context in which they are constructed. These competences are therefore specific to each firm.

Innovative capacity stems from both technological and organizational competences and their combination. The technological dimension refers to partly tacit knowledge, anchored in routines and therefore not easily transferable. The organizational dimension refers to the role of interaction between individuals, the share of knowledge and the learning dynamics that accompany the strengthening of these competences. However, firms do not all have similar competences and do not share similar core knowledge; the latter is crucial in the sense that it affects the future of knowledge acquisition and the nature of new capacity development (Cohen and Levinthal 1990).

Despite the new insights that have been provided by innovative capacity literature, the role of small firms as structural agents of change and their importance in industry in an increasingly evolving environment, requiring flexibility and adaptability (Acs 1992; Ferreira *et al.* 2017), has unfortunately not been clearly tackled. Recently, Acs (1992), who had conducted an analysis on 23 OECD countries over the period 1984–1994, shows that new smart SMEs belonging to innovative sectors affect industrial structure and dynamics, and have contributed to reducing unemployment through to entrepreneurial activity. Unfortunately, the innovation literature has not emphasized the role of the entrepreneur's capabilities, including creativity, experience, motivation and networks to innovation (Lynskey 2004).

Another limitation of the innovation theory to be noticed refers to the context of application. Indeed, most of the studies have been conducted on developed countries and on firms highly involved in R&D activities that are at the frontiers of global knowledge (Szirmai *et al.* 2011). For the case of developing countries, innovation capacity results rather from the absorption of an innovative technology widely disseminated in developed countries, which can be

considered as a full innovation when an adaptation effort is carried out by local firms to the specific need of the country.

However we note the relevant studies that have been conducted on innovation capacities under the technological catch-up perspective, particularly those on innovation capacities in the context of emerging countries, notably Venezuela (Pirela *et al.* 1993), Mexico (Arvanitis and Villaviciencio 1998) and China (Katz 1987; Arvanitis *et al.* 2006; Zhao and Arvanitis 2010). These studies have highlighted the role of technological learning in the development of innovative capacity for the case of emerging countries. In this vein, Katz's (1987) work on Latin America has highly contributed to fostering the exploration of learning as an economic catch-up mechanism, and also for the case of the "Asian dragons", where he emphasized the role of the government in industrial dynamics. More recently, Arvanitis *et al.* (2014) have suggested that the role of firm-based technological learning in economic catch-up perspective needs to be considered from a macroeconomic perspective that goes beyond the firm's boundaries. Indeed, they have raised the question of the role of learning in the innovation processes for emerging countries and have explored the firm's internal and external knowledge interactions applied to the case of Chinese industry. They have narrowed the analysis to exploring cognitive activities and practices inherent to the technological learning process. These activities include, among others, searching for suitable technological alternatives, negotiating technology, adaptation of external technologies, product or process improvement, or the development of new products adapted to the local needs and demands. They also underlined the role of human capital, particularly at the level of upstream steps of the production process, notably in consolidating information research, engineering and R&D services. They suggest that these activities lead firms to establish strong relationships with their environment and thus promote learning by interaction.

The premises of the development of a systemic approach to innovation rely on the contributions of Lundvall (1985) and Freeman (1987). We can find as backgrounds the approaches based on the theory of the firm and the evolutionary theory, including analyses of knowledge accumulation and development and learning. Therefore, the systemic approach of innovation has explored the sources of economic performance under the technological innovation angle by considering technological innovation as an interactive process aiming at adjusting technological supply to market demand (Lundvall 1985). Innovation is not analyzed at a purely individual level but becomes a

process depending on the economic stakeholders and the context that may affect its performance (Amable 2001). In this context, governance and institutional coordination supporting research and innovation are also crucial for innovation performance (Freeman 1987).

At the innovation process level of analysis, the contribution of Lundvall (1992) and Nelson (1993) on national innovation systems (NIS) is particularly relevant. Using the heritage of the evolutionary theory of the firm, they have explored the innovation process from the knowledge accumulation perspective, with regards to its cumulative and interactive characteristics (Fagerberg *et al.* 2010; Acs *et al.* 2016). Applied to the case of some examples of emerging countries, notably the Chinese firms, Zhao and Arvanitis (2010) suggest that the knowledge produced is cumulative, interactive, collective and specific to each firm. These authors have also emphasized the role of human abilities. These competences could become efficient and contribute to innovation as a result of the collective development of new knowledge (Villavicencio and Arvanitis 1994; Arvanitis *et al.* 2014).

The contribution of the regional studies in the framework of the systemic approach to innovation has contributed to highlighting the capacity of innovation in economic dynamics and firm performance (Lundvall 1992; Nelson 1993). The various contributions in the stream of innovation systems converge on the fact that a country's technological performance is a complex, cumulative and uncertain process, in which innovation performance at the microeconomic level depends on the interactions between the actors of the system and the regulatory role of institutions. The difference between countries would be mainly explained by the existence of "key" industrial sectors, the quality of institutions (Edquist and Lundvall 1993), as well as the existence of an education system and universities that support new knowledge creation (Nelson 1988).

However, systemic approaches to innovation have some limitations particularly related to the fuzzy weight of each component of the system and how the system ensures its own development and success. These limits question the universal characteristic of national innovation systems, namely with regards to their components and the mutual reinforced interplay between stakeholders' actions. In support of this, we can notice the inefficiency and lack of performance of national innovation systems in developing countries (Fagerberg *et al.* 2010), which have different development trajectories and an uneven way in terms of global functioning

including the lack of involvement of some components in the system (Cimoli 2000; Arvanitis *et al.* 2009; Arvanitis and M'henni 2010).

Amable (2001) has explored the social systems of innovation, intuitively infused by networks and proximity approaches and naturally integrating the cultural dimension. In order to ensure efficiency in innovation context, he advocated that national institutions have a crucial role in shaping the economy toward innovation and thereby setting up appropriate initiatives and supporting technical change at a national level, even if the interactions are rather localized in a sector or a region. The author therefore suggests delimiting the boundaries of each study system, which even evolves in a more globalized environment.

Regarding entrepreneurship, the national system of innovation theory has been unfortunately criticized for the fact that its level of analysis remains macroeconomic and that has thus implied exploring coordination and communication mechanisms between stakeholders (Autio *et al.* 2014), neglecting the role of the entrepreneur in the innovation dynamic. In this sense, innovation performance implies increasing not only the quantity of economic production but also the nature and quality of what is produced (Szirmai *et al.* 2011). Therefore, the entrepreneur is a central actor in the way he selects opportunities that can be sources of the development of new or better quality products on the market. Unfortunately, the importance of stakeholders' interactions and institutional coordination in the systemic approach to innovation does not leave room for exploring individuals' behaviors and firms' activities in the diffusion of innovation on the market (Zahra and Wright 2011; Acs *et al.* 2016).

This is even more relevant for developing countries, where the benefits of innovation for entrepreneurs depend on the characteristics of the innovation system in which they operate. The better the performance of the innovation system, the more a developing country will be able to exploit global technology, and the faster knowledge flows into the national economy and the faster the economy will undertake the technological upgrading process (Szirmai *et al.* 2011). Conversely, the lower the performance of the innovation system, the weaker it is, and the less the efforts of individual entrepreneurs to contribute to economic development and foster technological catch-up (Goedhuys and Sleuwaegen 2010).

In the specific context of emerging countries, some studies have focused on the analysis of the links between development policies and innovation capacities and have highlighted the role of entrepreneurship in development, particularly the contribution of Pirela (2007) on the case of Venezuela and Arvanitis and Zhao (2010) on China.

The findings of Arvanitis and Zhao's (2010) study on the automotive and electronics sectors in China are relevant on a twofold perspective and contribute to understanding the role of the historical and political dimensions in innovation-based economic development. The authors show first that the innovation system set up and promoted by the Chinese government has influenced the innovation capacity of firms and has thus supported some sectors over others, according to their proximity and relationships with the existing institutional system. They also have showed that rural entrepreneurs who were not at first glance supported by government had seized the opportunity of the availability of growing and unmet demand to mobilize the necessary funds and create market-driven enterprises to progressively position themselves as technology providers, while integrating interactive learning, diversifying sources of technology and maintaining interactive relationships with their clients and suppliers in their business model.

However, this case cannot be duplicated or even generalized to all emerging countries; nevertheless, this example provides information on the necessity to consider two crucial dimensions: first, the historical and cultural dimension are different from one innovation system to another and might explain the innovation process and how the local circumstances can influence the differences in economic development between countries; second, the role of entrepreneurship in supporting this innovative dynamic, in addition to the companies already in place. Entrepreneurship might shape the type and the pace of innovation and sectoral specializations.

This review of the literature has used complementary and even a variety of theoretical approaches from different analytical angles. These complementary enrichments have showed the influence of macroeconomic environment and circumstances in shaping economic development with an innovative component.

Table 1.1 summarizes the main contributions and approaches to development with a specific focus on their views of and level of understanding of the concepts of innovation and entrepreneurship.

Approaches	Entrepreneurship	Innovation	Main contribution
<i>German School</i> (Schumpeter 1934)	x	xxx	The entrepreneur brings innovation to market and contributes to economic development through creative destruction.
<i>Institutional Approach</i> (Baumol 1968, 1990, 1993; Baumol and Storm 2008)	xxx	x	The entrepreneurial offer depends on the institutional offer. The entrepreneur is creative, ingenious and opportunistic. He is motivated by wealth, power and prestige. The entrepreneur exploits unnoticed ideas and plays a role in the functioning of the market. The entrepreneur gives meaning to innovation by bringing innovation to market, by commercializing it. He increases productivity and contributes to consumer welfare.
<i>Human Capital Approach</i> (Leibenstein 1968, 1987; Schultz 1980)	xxx	0	The entrepreneur is a superhero, a rare resource and important for economic development. The function of the entrepreneur is to offer a creative response to X-inefficiency. The level of education contributes to the development of entrepreneurial competences.
<i>Behavioral Approach</i> (Kirzner 1973, 1985)	x	0	The entrepreneur's ability to perceive profitable opportunities. The entrepreneur combines resources to address unmet needs and improve market failures.

Approaches	Entrepreneurship	Innovation	Main contribution
<i>Neoclassical Growth Model</i> (Solow 1970)	0	x	Growth results from the factors of production labor and capital, with the exogenous residue attributed to technological change.
<i>New Endogenous Growth Theory</i> (Lucas 1988; Romer 1990; Aghion and Howitt 1992)	x	xxx	Entrepreneurship and innovation are integrated into growth models. The entrepreneur is part of human capital.
<i>The Industrial Economy</i> (Porter 1990, 1998; Porter <i>et al.</i> 2002)	x	xxx	Innovation is at the heart of the national advantage. Innovation can result in new businesses creation. A favorable context (national attributes) fosters innovation and entrepreneurship. A country's development is measured according to position to innovation.
<i>The Evolutionary Approach</i> (Nelson and Winter 1982)	0	xx	The innovative firm (ICT sector) characterizes the technological paradigm shift.
<i>Managerial Approach</i> (Drucker 1985)	xx	xx	Innovation contributes to wealth creation. The entrepreneur is an agent of change. He creates new opportunities.
<i>Systemic Approach to Innovation (SNI)</i> (Freeman 1987; Dosi <i>et al.</i> 1988; Lundvall 1992)	0	xx	Innovation is approached from a technological perspective. Role of institutional structures (<i>top-down</i> approach).

Approaches	Entrepreneurship	Innovation	Main contribution
<i>New Development Economics</i> (Acs and Audretsch 1990, 1993; Acs 1992; Audretsch and Thurick 2001; Arvanitis <i>et al.</i> 2006, 2014; Pirela 2007; Acs <i>et al.</i> 2008)	xxx	xx	Economic development refers to the knowledge-based economy supported by small innovative enterprises. Two types of entrepreneurship: necessity entrepreneurship and opportunity entrepreneurship. Entrepreneurial dynamics depend on the institutional context and the level of development of a country.
<i>Development Economics and Entrepreneurship with a Systems Approach</i> (Wennekers <i>et al.</i> 2005; Naudé 2013; Acs and Naudé 2013; Acs <i>et al.</i> 2014; Autio <i>et al.</i> 2014)	xxx	xx	The entrepreneur is a catalyst for change. The entrepreneur assimilates the technology spread. Adoption of new working methods. Role of the government in setting up the appropriate context for innovation and entrepreneurship. The macroeconomic context and individual and behavioral dimensions are linked. The local context affects the micro-process of entrepreneurial innovation.
0 = not mentioned x = indirectly addressed xx = clearly addressed xxx = at the heart of the analysis			

Table 1.1. *Synthesis of theoretical contributions to development on innovation and entrepreneurship*

As shown in Table 1.1, there is agreement on the role of innovation in development. But it is at the sources of innovation that these different approaches diverge or complement each other, particularly with regard to the place of the entrepreneur, whether he is a hero or an opportunist and whether he has an explicit or hidden role in this dynamic.

The different levels of analysis suggest that innovative behavior, be it individual, diffuse within a company or even within an ecosystem, is not independent of the structure and dynamics of the relationships between the different players. From this perspective, the government, through its institutional policies and actions, can regulate the innovation process. The government can also foster innovation in key sectors through investment in infrastructure and human capital, and thus can greatly contribute to economic development.

