The role of the state and national 'systems' of innovation

To support our understanding of the process of innovation within the capitalist enterprise, we must also grasp a basic understanding of the way the economy interrelates with global and regional economies on local and national levels. Not only do national economies tend to be dominated by a form of economic organisation (e.g. the *Chaebol* in South Korea or *Keiretsu* in Japan), it is also the case that the relationship between state and business differs radically from one national space to the other. Such interrelationships in society generate a business environment with a unique business value system, attitude and ethic. Historically, this difference created advantages and disadvantages for business organisation across a range of activities, the most important of which may be perceived as the process of innovation. This would seem to be the case, given the crucial role played by innovation in the history of capitalism.

Why firms depend on the state for so much

Mariana Mazzucato (2011) argues that the state has played a central role in producing game-changing breakthroughs, and that its contribution to the success of technology-based businesses should not be underestimated. According to Mazzucato, Apple's success would have been impossible without the active role of the state, the unacknowledged enabler of today's consumer-electronics revolution. Consider the technologies that put the smart into Apple's smartphones. The armed forces pioneered the internet, GPS positioning and voice-activated virtual assistants. They also provided much of the early funding for Silicon Valley. Academic scientists in publicly funded universities and labs developed the touchscreen and the HTML language. An obscure government body even lent Apple $500,000 before it went public. Mazzucato considers it a travesty of justice that a company that owes so much to public investment devotes so much energy to reducing its tax burden by shifting its money offshore and assigning its intellectual property to low-tax jurisdictions such as Ireland.

Similarly, the research that produced Google's search algorithm, the fount of its wealth, was financed by a grant from the National Science Foundation. Pharmaceutical companies are even bigger beneficiaries of state research than internet and electronics firms. America's National Institutes of Health, with an annual budget of more than $30 billion, finances studies that lead to many of the most revolutionary new drugs.

The issue of whether there is a role for the state in the process of innovation has been addressed in different contexts (e.g. Afuah, 2003; Porter, 1990). The literature on the subject has attracted attention to the following points, where state action may be necessary:

1 *The 'public' nature of knowledge that underpins innovation.* This refers to the role that can be played by the government in the process of idea generation and its subsidisation and distribution. This way, economic actors may be stimulated to work on new ideas, alongside state organisations, and may endeavour to convert such ideas into marketable goods or services. For instance, by granting intellectual property rights to producers of knowledge and by establishing the

necessary legal infrastructure to support those rights, the state may promote knowledge generation.

2 *The uncertainty that often hinders the process of innovation.* Macroeconomic, technological or market uncertainties may hinder innovation. When the companies are risk-averse in investing funds in innovation projects, then the state may promote such activities through subsidising, providing tax advantages and supporting firms to join R&D projects. Forming a stable economic environment, where funds could be extended by the banking system to productive firms, also creates a favourable long-term perspective, for one of the first preconditions of strategy making is economic stability. Thus, expectations of low inflation, low interest rates and stable growth will encourage firms to invest in entrepreneurial activity (particularly given that other areas, e.g. portfolio investments, are less profitable to invest in).
3 *The need for certain kinds of complementary assets.* Provision of electricity, roads and water has historically assisted industrial development; recently, the establishment of communication systems (e.g. communication superhighways), legal infrastructure and the formation of industrial districts have been issues where state action has led to favourable outcomes with tangible and intangible conditions created for enterprises.
4 *The need for cooperation and governance, resulting from the nature of certain technologies.* For the development of possible networks, which will enhance and promote the diffusion of new technologies and innovations, the state may set the vision and enhance the possibilities for better communication and joint decision making. In the UK, the Government provided funds (through education and promotion) to encourage households to switch from analogue television signal to a digital television signal. Such action helps countries/society to upgrade from one old established technology to a newer improved technology.
5 *Politics.* Lastly, in terms of politics, national states still have a key role in foreseeing and contributing to international and regional standards of business making within the system of 'national states' and in creating consent and cohesion in the national arena amongst domestic forces. Such standards increasingly are becoming environmental, safety and human rights standards in industrial or business activities. The German Government has an impressive record of being at the forefront of introducing legislation in automobile safety and environmental recycling, which has contributed to Germany becoming a world leader in these two industries.

How national states can facilitate innovation

Figure 2.1 highlights the possible roles that can be played by national states. It takes Porter's industry attractiveness framework and develops the role the state can play in relation to innovation. It underlines a firm's relationship with the buyers, factor conditions (e.g. labour, capital, raw materials), related and supporting industries (e.g. technology providers, input providers, etc.) and other institutions that help facilitate strategic orientation and innovative capabilities. These will determine, to a great extent, the firm's opportunities – notwithstanding the fact that its inner strengths, i.e. its strategy-making capabilities and structural features, will clearly affect this potential.

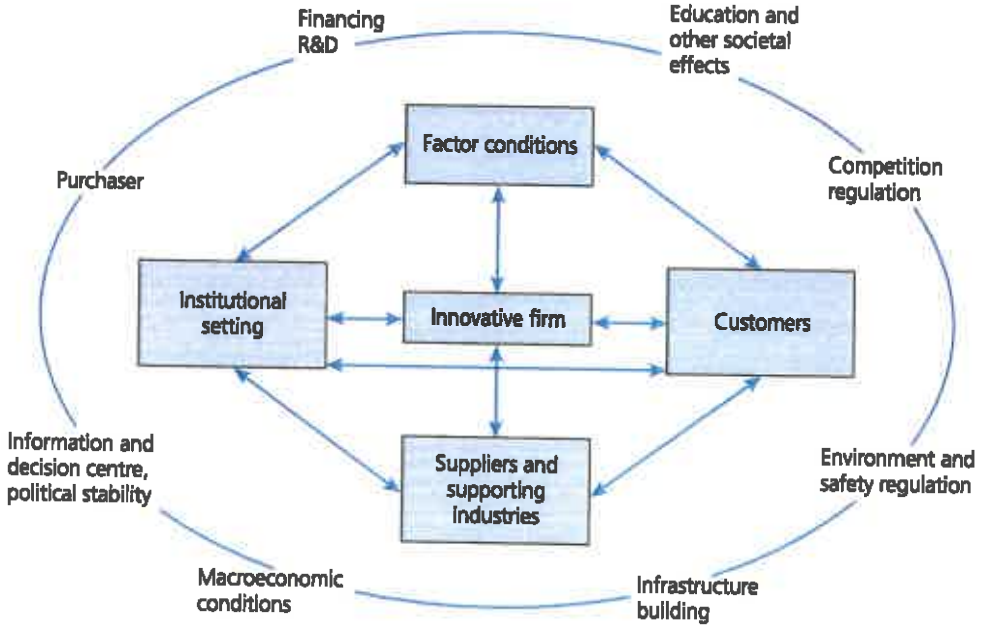

Figure 2.1 The role of the state in innovation