12. Defining socio-economic impacts from space programmes

The investments in space programmes are often justified by the scientific, technological, industrial and security capabilities they bring (Figure 12.1). The wish to develop a specialisation may allow a country to participate later on in large space programmes because of its expertise (*e.g.* Canada's expertise in robotics and radar imagery; Norway's expertise in developing satellite telecommunications in difficult environments, such as platforms at sea). Space investments can also provide socio-economic returns such as increased industrial activity, and bring cost efficiencies and productivity gains in other fields (*e.g.* weather forecasting, tele-medicine, environmental monitoring and agriculture previsions). Several space applications have reached technical maturity and have become the sources of new commercial downstream activities, sometimes far removed from the initial space research and development. For example, the growth of positioning, navigation and timing applications, which rely on satellite signals, has spurred new commercial markets (*e.g.* GPS chipsets in smartphones). But as Einstein wrote: "Not everything that counts, can be counted". This is also true for the diversity of socio-economic impacts derived from space activities. As shown in Figure 12.2, impacts can be categorised in different segments: new commercial products and services (including "indirect industrial effects" from space industry contracts, meaning new exports or new activities outside the space sector), productivity/efficiency gains in diverse economic sectors (*e.g.* fisheries, airlines), economic growth regionally and nationally, and cost avoidances (*e.g.* floods).The following sections review some of the impacts that have been detected so far.

Methodological notes

The most common economic measurement for any technology's value is the calculation of benefits to costs. In theory, to calculate the ratio, it is necessary to divide the benefits (*e.g.* improved productivity, decreased cost of operations, increased revenue and better customer satisfaction rates when applicable) by the costs of deploying the system (*e.g.* hardware, software, maintenance, training and so forth). However space systems are by nature multifaceted and rely often on lengthy research and development. The challenge of putting a monetary value on the technologies and services they deliver remains a complex and often subjective exercise. As discussed in OECD (2008), monetary or financial valuation methods fall into three basic types, each with its own repertoire of associated measurement issues and none of them entirely satisfactory on its own. They include: direct market valuation (*e.g.* market pricing), indirect market valuation (*e.g.* replacement cost) and survey-based valuation techniques (*i.e.* contingent valuation and group valuation). One option is to use several of these methods in parallel to test assumptions and the resulting impacts of a given space application. Ongoing work in OECD is devoted to conducting case studies on selected space applications, in order to provide a source of comparative national experiences and lessons learned when trying to apply the different methodologies to the study of impacts.

Source

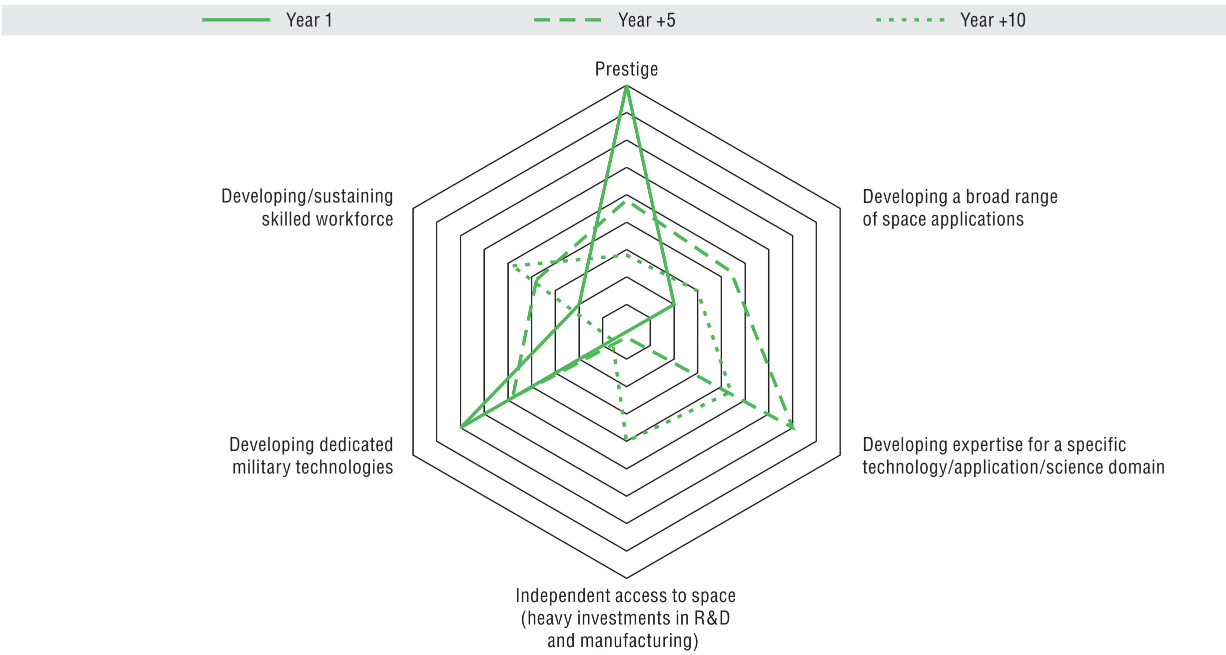
OECD (2008), *Space Technologies and Climate Change*, OECD Publishing, Paris.

Further reading

OECD work on the space sector, *www.oecd.org/futures/space*.

OECD (2011), *Space Technologies and Food Security*, OECD Publishing, Paris (forthcoming).

12.1 Examples of motivations for developing space programmes and possible developments over time



12.2 Review of possible impacts derived from investments in space programme