

Executive summary

The global space sector is a high-technology niche with a complex ecosystem, which employed at least 900 000 persons around the world in 2013, including public administrations (space agencies, space departments in civil and defence-related organisations), the space manufacturing industry (building rockets, satellites, ground systems); direct suppliers to this industry (components), and the wider space services sector (mainly commercial satellite telecommunications). But these estimates do not take into account universities and research institutions, which also play a key role in R&D, as receivers of public contracts and initiators of much of the space sector's innovation.

The acquisition and development of space capabilities remains a highly attractive strategic goal, and the number of countries and companies investing in space systems and their downstream applications continues to grow. Despite the economic crisis, institutional funding remained stable in 2013 on a global scale, with increased budgets in several OECD countries and emerging economies. Space often has a reputation for being expensive, but national investments represent only a very small percentage relative to GDP in all G20 countries. In the United States, the largest programme in the world, space represents only 0.3% of GDP and in France, less than 0.1% of GDP.

Although OECD countries accounted for the largest space budgets globally in 2013 (USD 50.8 billion, using purchasing power parities or PPPs), an increasing part of global space activities takes place outside of the OECD, particularly in Brazil, the Russian Federation, India and China (around USD 24 billion PPPs).

The space economy represented some USD 256.2 billion in revenues in 2013, divided between the space manufacturing supply chain (33%), satellite operators (8.4%) and consumer services (58%), including actors who rely on some satellite capacity for part of their revenues, such as direct-to-home satellite television services providers.

Globalisation of the space sector is accelerating

Globalisation is affecting the space economy at different levels. In the 1980s, only a handful of countries had the capacity to build and launch a satellite. Many more countries and corporate players across a wide range of industrial sectors are now engaged in space-related activities, a trend that is expected to strengthen in the coming years. Supply chains for the development and operation of space systems are also increasingly evolving at the international level, even if the space sector remains heavily influenced and shaped by strategic and security considerations. Many space technologies are dual use, i.e. employed for both civilian and military programmes, which tends to constrain international trade in space products. Nonetheless, as evidenced by recent OECD research on global value chains, product and service supply chains for space systems are internationalising at a rapid pace. While the mode of interaction between space actors may vary (e.g. in-kind co-operation

among space agencies, contracting out to foreign suppliers, industrial offset programmes), the trend towards globalisation is having an impact right across the space economy – from R&D and design, to manufacturing and services.

As more actors seek to enter global value chains, competition on the relatively small commercial open markets for spacecraft, launchers and parts is getting stronger for incumbents. In parallel, the expansion of aerospace and electronics groups to address new national markets, where fresh public investments in space programmes are being made, is affecting human resources. As new opportunities arise, in the form of scientific co-operation, technological innovations, new applications, emerging markets etc., so too do new risks – the growing vulnerability of widely stretched supply chains to various kinds of disruption is just one example. Balancing these new risks and opportunities over the next few years will prove challenging for policy makers and industry players alike.

The “democratisation” of space is gaining ground

New dynamic forces are being unleashed in the space sector, with some technological innovations coming increasingly into use (e.g. electric propulsion systems on-board large telecommunications satellites, 3-D printing used by industry and tested in orbit on the International Space Station) and others just around the corner (e.g. advances in miniaturisation making small satellites even more affordable). Scientific and technological innovations are making space applications more accessible to more people. It still takes years of R&D, with sustained funding, to develop leading-edge sensors and new spacecraft. However, it is now possible for universities to buy off-the-shelf technologies and equipment to build micro-satellites with ever-growing functionality. Innovative industrial processes are also promising to potentially revolutionise space manufacturing, for example the adaptation of the automobile industry’s mass production techniques to selected space systems. These new dynamics, coupled with globalisation, could increasingly impact the way space activities are conducted around the world, particularly for incumbent industrial actors.

Many of the socio-economic impacts from space investments are becoming more visible

Socio-economic impacts derived from space investments are diverse. Impacts of using space applications can often be qualitative (e.g. improved decision-making based on satellite imagery) but also monetarily quantifiable in documented cases, such as cost-efficiencies derived from using satellite navigation tools. However, the flow of evidence-based information to decision makers and citizens needs to be improved. When assessing the net benefits of space investments, more effort is needed internationally in building the knowledge base and devising the mechanisms for transferring know-how and experience to practitioners worldwide. This can improve the provision of evidence-based information on the benefits and limitations of space applications, while at the same time reducing the risk of “reinventing the wheel”.



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