

## 18. Evaluation of national space investments

As institutional funding still supports the bulk of the space R&D taking place in space agencies, industry, academia and research institutes, there is a growing demand worldwide for impact assessments to evaluate any derived economic and social benefits, despite the relatively large up-front and sustained investments needed to engage durably in space activities.

While these will depend on stakeholder policy objectives (autonomous surveillance/intelligence capabilities; improving R&D and scientific capacities; new markets for a national industry, etc.), impact assessments can be conducted as part of a national administration evaluation portfolio to justify public and private spending. This is especially important in light of the fact that the internationalisation of funding mechanisms of selected space programmes and expected spill-overs in national industries tend not to be well traced. Indeed, methodological constraints and the lack of verified up-to-date data will tend to limit such assessments today.

Few countries have developed regular assessment schemes to follow up on investments in space programmes, and often only ad-hoc studies are launched to track potential returns as one-off exercises. Examining its industry every year since the 1990s, Norway has detected a positive spin-off factor derived from its space investments: for each million Norwegian kroner (NOK) of funding through the national or ESA programmes, the Norwegian space sector companies have on average attained additional turnover via new market developments worth NOK 4.7 million in 2013. Denmark found the same type of effect in its industry, with a positive 3.7 spin-off factor, whereas each million euros of Danish contributions to ESA have generated a turnover of EUR 3.7 million. Table 18.3 provides some illustrations for selected countries.

#### Methodological notes

Economic impact assessments need to be considered with caution, as one-off results may vary over time, scope and type of industry, and levels of institutional support. When looking at the many impacts studies conducted over the years on the use of space applications by governmental agencies, consultancies and academia, five broad lessons have been learned: 1) ad-hoc studies provide snapshots at a given date, but are often quite too limited for policy making; 2) “earlier is better” when launching a new evaluation exercise, helping to create a “history” of time series and case studies when examining specific investments; 3) an open tender process for assessments increases efficiency and potential access to other methodological angles (competition usually pays off); 4) studies are of higher quality when the technology and scientific impacts are examined in light of both economic and social impacts; 5) survey methods or peer reviews are often prerequisites to evaluations (e.g. conducting a detailed industry survey to assess the sector before trying to measure its impacts), to avoid too many assumptions from the start.

#### Sources

OECD (2012), *OECD Handbook on Measuring the Space Economy*, OECD Publishing. [dx.doi.org/10.1787/9789264169166-en](https://doi.org/10.1787/9789264169166-en).

#### Note

18.3: The selected findings are only provided for illustration and not for direct comparison purposes, as very diverse methods have been used for each study.

##### 18.1. Different levels of evaluation

Assessment levels	Usual types of evaluation
Mission/Project	<ul style="list-style-type: none"> <li>● Peer review (scientific)</li> <li>● Cost benefit analysis</li> <li>● Assessment of outcomes, outputs and impacts</li> </ul>
Selected programme	<ul style="list-style-type: none"> <li>● Assessment of outcomes, outputs and impacts</li> </ul>
Administration/Agency	<ul style="list-style-type: none"> <li>● Assessment of outcomes, outputs and impacts</li> </ul>
Entire space programme	<ul style="list-style-type: none"> <li>● Assessment of outcomes, outputs and impacts</li> </ul>

##### 18.2. Typology of socio-economic impacts derived from institutional space investments

Possible impacts	Description
Commercial activities: new products and services	<ul style="list-style-type: none"> <li>● Space industry: new line of commercial activities, new exports contracts (e.g. small satellites, equipment, components)§- Space economy: new mass market products and services using satellite capacities (e.g. actors using satellite positioning signals in car navigation products)§- Other economic sectors: new products based on transferred technologies (e.g. medical imagery)</li> </ul>
Productivity/efficiency gains in diverse economic sectors	<ul style="list-style-type: none"> <li>● Applicative sectors with documented cases: precision farming, fisheries, land transport...</li> </ul>
Costs avoidances	<ul style="list-style-type: none"> <li>● Public-good nature of many applications: e.g. costs avoided and lived saved thanks to flood forecasts</li> </ul>

##### 18.3. Selected national assessments of economic returns from space programmes

Country	Selected Findings*	Study Periodicity
Belgium	1 Euro : 1.4 Euros (2010)	Ad-hoc
Denmark	1 Euro : 3.7 up to 4.5 Euros (2008)	Ad-hoc
Ireland	1 Euro : 3.63 (2012)	Ad-hoc
Norway	1 Krone: 4.75 Kroner (2013)	Annual
Portugal	1 Euro : 2 Euros (2011)	Ad-hoc
United Kingdom	1 Pound : 1.91 Pound (2010)	Every two years



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