

CHAPTER 4

OTHER BENEFITS OF SCIENCE & ENGINEERING

As well as the measurable economic and policy benefits that science and engineering can deliver, there is a wider set of advantages that are less easily defined, but which nevertheless impact on people's lives.

Obvious examples include health treatments that may be costly (and hence not viewed as economically positive) but which are appreciated as beneficial. Other examples include forensic science, which helps to solve crimes, or defence research, which has the potential to make the world a safer place. Ecological and environmental science may improve the environment, and science may assist in the preservation of museum artefacts or historical documents, all of which interest people and enrich their lives. All of these things cost money and their benefits are often difficult to quantify with the same simplicity that we can measure economic gain. But few people would question their importance in bringing indirect improvements to our quality of life.

It is no doubt for some of these reasons that two thirds of people in the UK agree that science makes our lives healthier, easier and more comfortable¹.

Most of the policy implications of this category of benefits are similar to those of the economic, policy or cultural benefits of science and engineering. For example, the ability to deliver environmental science depends on a healthy science base (see Chapter 5) and a strong capability in forensic science relies on a positive scientific culture in the relevant government ministry (see Chapter 3).

Box 4.1 uses the example of the British Library to demonstrate the inter-dependent nature of these related aspects of science policy.

4.1 Government departments and agencies

This dimension of science policy was recognised in the Government's identification of 15 headline indicators of quality of life in the UK, ranging from the total output of the economy to the level of crime and the populations of wild birds². These indicators are monitored scientifically, and a report is produced each year to give a snapshot of trends in overall quality of life. Data and analysis are provided by the Office of National Statistics, individual Government departments, businesses such as Netcen, and voluntary organisations such as the British Trust for Ornithology³.

Figure 4.1 shows some examples of the trends that these indicators reveal.

In many ways, this is a positive example of the way in which government departments can call on the

Box 4.1

The British Library

The British Library, as the nation's repository of knowledge, is an important scientific institution for economic reasons, for policy reasons, as an educational institution, as a resource for the science base, as a centre of cultural activity. All of these aspects impinge on the quality of life of the British population.

The economic importance of the Library's work is most evident in its supply of information to the business and industrial sectors. Its overall value has been calculated at about £363 million per year, more than four times the cost to the taxpayer of running it.

The British Library's value as an education institution is obvious, with just one example being the provision of over 2,000 web pages of material for teachers. As a research resource, it houses a copy of every book published in the UK, and is the largest supplier of documents in the world. Given that about 13% of the science that researchers routinely cite is more than 20 years old, the Library is also an invaluable resource because it preserved research results in the various formats that appear as technology develops.

As a cultural centre, its unique and irreplaceable artefacts include not only material related to history, such as the original copies of Magna Carta, but also scientific material including manuscripts and letters of Robert Hooke, Charles Darwin and Albert Einstein.

Astonishingly, the British Library's Grant-in-Aid has not seen even an inflationary rise in recent years. Indeed, in the financial year 2002-03, its grant of £85 million was almost 4% lower than it had been the previous year.

The budgets of important scientific institutions like the British Library should be maintained and enhanced, both because of the economic value they create, but also because their activities improve the quality of people's lives in a variety of ways.

widest range of scientific expertise to monitor and assess their needs in terms of implementing policies, as set out in the *Guidelines* on scientific advice in policy making⁴.

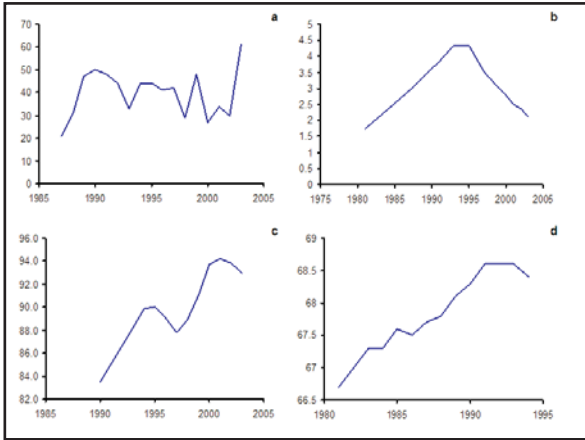


Figure 4.1. Examples of trends identified by the government's scientific monitoring of indicators of quality of life. a) Number of days per year when average air pollution in rural areas across the UK was judged moderate or higher; b) Number of vehicle-related thefts each year (in millions) in England and Wales; c) Percentage of river length in England classed as being of good or fair chemical quality; d) Healthy life expectancy at birth (in years) for women. [Source: data published as <http://www.sustainable-development.gov.uk/indicators/headline/data/hli-20041021.xls>].

Among the research carried out by government agencies or by private analogues funded by government, there is a great deal that is performed at least partly with the intention of improving citizen's lives. Obvious examples include the forensic science and meteorological forecasting.

The overall responsibility of government departments to commission research is considered in Chapter 3, which present evidence both that the current budget is inadequate to the job, and that, in general, the culture within ministries fails to take proper account of the potential benefits of scientific research.