

10 Reasons to Buy into Big Science

Philip E. Gibbs *

Abstract

When people hear the price tag for big science experiments like the Large Hadron Collider or the Hubble Space Telescope they wonder what the benefits are that justify the cost. I am not talking about projects with obvious potential benefits such as a fusion reactor. This is about pure science, why is it worth doing? In fact there are lots of reasons so here is my list of the top 10, starting with the least important. This article is based on viXra Log at <http://blog.vixra.org>.

Key Words: ESA, EUCLID, Dark Energy, NASA, WFIRST.

November 5, 2011: [10 reasons to buy into big science](#)

When people hear the price tag for big science experiments like the Large Hadron Collider or the Hubble Space Telescope they wonder what the benefits are that justify the cost. I am not talking about projects with obvious potential benefits such as a fusion reactor. This is about pure science, why is it worth doing? In fact there are lots of reasons so here is my list of the top 10, starting with the least important.

10 – **spin-off innovations:** When scientists are asked to justify why the LHC was worth building they often roll out the list of technical innovations that have been invented at CERN; MRI scanners, touch sensitive displays and of course the world wide web. NASA has an even longer list from non-stick pans to velcro. This only makes number ten on my list because I think most of them would have been invented by industry anyway. The advantage of inventing them at CERN or NASA is that they are not owned by private companies. What would the web be like if it has been invented by a computer or telecoms company?

9 – **National Prestige:** New scientific discoveries can make big news stories and for many countries there is a lot of pride in being able to call in their own experts who have worked on the project to give their summary of what it means. Politicians love it.

8 – **Entertainment:** TV documentaries, science magazines, blogs etc, they are there because many people find big science entertaining.

7 – **Employment:** Big science projects employ lots of people, another secret favorite of politicians.

6 – **International Cooperation:** This is rarely brought up but it is very important. Science is a very international business that brings together people from different countries. They tend to put aside national differences because what matters to them is the science. The relationships last and carry over into industry and even politics.

* Correspondence: Philip E. Gibbs, Ph.D., Independent Researcher, UK. E-Mail: phil@royalgenes.com

5 – **The development of hi-tech industries:** Building an experiment like the Large Hadron Collider requires new technologies such as superconductors, cryogenics and large-scale computing facilities. These are subcontracted to private companies that develop new methods with applications elsewhere. It is very hard to quantify the benefit that this brings but in economic terms it could be worth a lot more than the money spent on experiments that push the limits of technology.

4- **Education:** Places like CERN are packed with young people and the directors like to brag about it to the point of being openly arrogant as employers. This is good news because it means that these people are learning new skills and going on to use them elsewhere in industry or other educational centres. Students and graduates at CERN or NASA have to learn how to do research in physics, engineering and IT. In a world where science underpins the economies of developed countries it is an educational resource that no self-respecting nation can afford to miss out on if they want a prosperous future. Again this is rarely quantified but we hope that politicians who allocate the funds appreciate it. In my opinion it is the top practical reason for funding big science.

3 – **Inspiration:** Big science inspires young minds

2 – **Value for Money:** When people quote the cost of something like the Large Hadron Collider in billions of dollars it certainly seems like a lot of money, but you have to remember that it is spread out over many years and many countries. The UK pays about £70 million per year for CERN. It is still a lot but it is a small part of the UK research budget and it brings all the above benefits. I have never seen a cost benefit analysis done on this basis but I bet it comes out as good value.

1 – **For the Knowledge:** It has to be the number one reason for doing pure science, because we want to know and should know the answers to big questions. It is just part of what makes us human.