Is science slowing?

In theory, the progress of science can not be measured objectively. There is no natural importance or hierarchy between scientific discoveries. When we want to measure the development of science, we need to design a scale artificially, a criterion to measure the degree of scientific development. That is to say, the standard of our measurement of science is determined by ourselves, depending on the purpose of the measurement. If we want to measure the impact of scientific progress on the productive activities of human society, then we should start from the gross social product; if we want to measure the strength that we have invested in scientific research, we should start from the research funds, the number of scientists and the number of papers published. Two scientists measured the development of science from the perspective of input-output ratio, and wrote two papers: *Is Science Hitting a Wall?*[i], and *Science Is Getting Less Bang for Its Buck*[ii].

In is science hitching a wall?, the author cited the examples of Moore's law and medical research, holding that the productivity of scientific research is declining rapidly, and based on this, the author puts forward the white on the moon problem, opposing pure scientific research.

In science is getting less bang for its buck, according to a survey of the importance of the results nominated for the Nobel Prize in physics, the author draws a conclusion that the development of science is slowing down significantly. In addition, based on the average age of Nobel laureates and the size of the research team, the author draws a conclusion: scientific exploration is like discovering a new continent. The more territory we know, the more difficult it is to explore. Finally, the author concludes with a decline in growth rate of productivity in the United States.

I don't think the progress of science has slowed down. The reason why the two authors came to the wrong conclusion is that they used the wrong algorithm.

In the first article, the author wrote: "number of researchers required today to achieve the fame double every two years of the density of computer chips is more than 18 times larger than the number required in the early "You know, today's density of computer chips is one million times that of the 1970s, and it takes only 18 times as many people to double the density of a million times. Isn't that suggesting science is progressing? The author also mentioned that more and more research on cancer has saved fewer and fewer lives. It should be noted that the progress from saving 80% of cancer patients to 90% of cancer patients is not an improvement of 12.5%, but a saving of 50% of the world's patients who would otherwise die of cancer.

In the second article, the graph presented by the author's Nobel nomination survey actually shows a trend of fluctuation over time, rather than a downward trend. This shows that the breakthroughs in physics are roughly the same in each decade, so are chemistry and medicine, rather than declining as the author says. The argument on the decline of productivity growth in the United States has made the same mistake as the first author. The GDP of the United States today is 80 times that of 1950, [iii]while the growth rate is one sixth of that in 1950, indicating that the growth value is 13 times that of 1950. This is an example of the progress of science.

Generally speaking, it is feasible to measure scientific progress with the method of input-output ratio, but we should pay attention to the algorithm of measurement.

Word count: 602

Reference:

---

i Horgan, John. “Is Science Hitting a Wall?, Part 1.” Scientific American, Scientific American Blog, Network, 7 Apr. 2018, blogs.scientificamerican.com/cross-check/is-science-hitting-a-wall-part-1/.

ii Patrick Collison, Michael Nielsen. “Science Is Getting Less Bang for Its Buck.” The Atlantic, Atlantic Media Company, 28 Nov. 2018, www.theatlantic.com/science/archive/2018/11/diminishing-returnsscience/575665/.

iii https://www.kylc.com/stats