



Angela Hullmann, programme officer for nanosciences and nanotechnologies, DG Research, European Commission, published in November 2006 a commentary in *NATURE NANOTECHNOLOGY* with the title: “Who is winning the global nanorace?” The way to determine who is winning the nanorace seems to be familiar from the tasks that observatories have to perform as a part of ‘soft’ regulation: “Analysis of scientific papers, patent applications and funding, by geography and area of nanotechnology, reveals the different strengths and weaknesses of Europe with respect to the US, Japan and the rest of the world.”

In February 2008, Mike Treder from the Center for Responsible Nanotechnology takes up the metaphor of the race and asks “Who will win the nano race?” and explicitly refers to Hullmann’s article.



There are several aspects to this debate. One is that it shows how difficult it is to get the ‘right’ (kind of) data, interpreted and arranged in the ‘right’ way. As mentioned above, there are different categories that can be measured somehow.

Firstly, Hullmann mentions the “knowledge base”, which means scientific publications as “the most appropriate indicator for measuring scientific activity or output”. There, when you compare all publications per country, the US have more publications than anybody else, followed by Japan, China and Germany. But, on the other hand, if you break nanoscience into different subfields, then the US maintain first place but the following ranks change considerably, depending on the subfield – now, what is more important?

Then Hullmann has a look at the “technology” base: how many patents by whom – as an indicator for the ability of nations and companies to transfer scientific results into technological applications and econo-

mic development. Here, too, the picture depends on total numbers for all nanotechnology, or on subfields, or on other factors. Also, for Hullmann, this is an occasion to hint at the ‘European dilemma’, that there is top science but not enough skill to bring it to market.

Finally there is the “funding base: public and private sources”. Again, the scenario is rather confusing, depending on how you are looking at what arrangement of data. There is more funding in the US than in the EU if you compare the budget of the EC and the federal government in the US, but there is more funding in Europe if you add the EC and member state budgets (compared to US federal plus states). Finally, the US takes the lead again if you add private funding on top.

One can learn from this article a) that it is not really clear how good such indicators are, and b) that you can extract different lessons, depending on how you look at the data, on what you want to see, and what rhetorical stance you want to take up.



Treder presents his own – of course somewhat different – interpretations. Arguing from a US perspective his concern seems to be rather to prevent the market leader USA from becoming lazy in her top position.

Thus, to stick to the metaphor, Treder adds a rule to the “who has more x” race. This rule states: Whoever first reaches the goal of molecular manufacturing will have a giant advantage. And this goal is not the sum of all patents, publications, etc. – it could be achieved via a ‘shortcut’ even by nations that are until now far behind. So – stay alert, watch out, and keep going.

Additionally, one of Treder’s comments on Hullmann’s paper is very illuminating. It concerns the symbolic value of such comparisons. Hullmann presents a chart that shows number of publications in nanotech-

📖 nologies per nation where the USA is in the lead. Treder discovers, that in this chart the scale of the vertical axis is abridged and he cannot keep himself from presenting his own version of the chart – unabridged – where the now very long bar indicating the number of US-publications looms with due impressiveness.

Another point of dissent is the fact that in the EU public funding outweighs private funding, whereas it is the other way round in the US. Hullmann states that this means that in the EU the public is therefore given more power to influence priorities, which Treder does not seem to like.



Q: So do you want to say that we do not need statistics concerning economic or scientific development? **A:** No, we need them, and they may be very useful. The

task of the ethicist is just to bring to mind that these require interpretations, and that their power as indicators is not naturally given. Additionally, it is also interesting to watch metaphors like “nano race” and their rhetorical implications.



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Hullmann, A.: Who is winning the global nanorace? In: nature nanotechnology, vol. 1, November 2006, pp. 81-83.

Treder, M.: Who will win the nano race? In: Nanotechnology Now, February 21st 2008, <http://www.nanotech-now.com/columns/?article=173>