

## The state of the nano industry

Although the nano industry in general, and particularly nanomaterials, is considered to be game-changing, at present its impact is still tiny. This is despite two decades of lavish public funding and tens of thousands of academic publications. Hence, there is no shortage of knowledge of nanomaterials and how in principle to exploit them. Furthermore, many university departments engaged in nanotechnology research have spun out companies to exploit particular materials and manufacturing technologies.

Nevertheless, all these companies seem to be struggling commercially. They are not geared to industrial requirements. They typically offer bespoke materials lacking standard specifications, batch-to-batch repeatability and price transparency. Most of these manufacturers are, in fact, geared to making small research quantities of their materials. In other words, most, if not all, specialist nano companies are focused on technology rather than market opportunities and their competitive positioning. Typically they do not give sufficient thought to competing technologies with widely different cost base positions and their own ability to compete, the complications of scaling up, and the imperative to bring in income. Also typically, investors allow such technically driven enterprises to chase the next big technical leap rather than focusing on gradually exploiting the technology so that the business can recover costs as early as possible.