

The economic impact of nanotechnology

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In most countries, the economic value of nanotechnology is measured in terms of employment, education, research activity, and commercialization of products and processes. These metrics can vary widely. It is difficult to define the metrics of nanotechnology. We can count patents, but not all patents are commercialized. We can evaluate research by counting published articles and papers, but research varies widely in its importance and value. Nanotechnology degrees earned by university students provide a useful metric, along with research projects and outputs, to gauge the value of academic activity. However, economic metrics are more complex. Evaluating the return on investment from nanotechnology investments is much more difficult for government agencies and policymakers. Often, a government agency is asked to justify the value derived from millions or billions of dollars in nanotechnology investments. These investments can be evaluated in terms of job creation, reduction of manufacturing costs, new company formation, contribution to export industries, and creation of new products or services - but rarely is there a straightline metric that translates public funding of nanotechnology initiatives directly into commercial value.

Taking into account the above considerations, we will try to assess the business potential of nanotechnology applications, based on nanomaterials (nanoparticles, nanotubes, nanostructured materials and nanocomposites), nanotools (nanolithography tools and scanning probe microscopes) and nanodevices (nanosensors and nanoelectronics) that, according to a study issued by BCC Research in 2016, should reach \$90.5 billion by 2021 from \$39.2 billion in 2016 at a compound annual growth rate (CAGR) of 18.2%, from 2016 to 2021.