

Nanotechnology and the Balance between Innovation and Disruption

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ABSTRACT

Nanotechnology as a programmatic force in the US came into being with the speech by President William Clinton at Caltech in January 2000, where he announced that the upcoming Federal budget would include \$500 million dollars for a “major new national nanotechnology initiative”. The NNI was born and has grown steadily over the past decade; its annual funding is now almost \$2 billion dollars per year. It has been a brilliantly successful program and several other countries, including Korea, have established their own nanotechnology programs.

One of the earliest and most successful cases of applied nanotechnology is in the semiconductor industry, where “Moore’s Law” scaling had driven the industry to routinely manufacture integrated circuits with well defined and controlled physical features on the order of 10’s of nanometers that have unique functionality by the year 2000. These smaller integrated circuits can not only be manufactured at lower cost, they can also be operated at higher speeds. This synergy between “cheaper and better” justifies making massive investments in research, development and manufacturing that creates an ongoing cycle of technology innovation.

Nanotechnology today is found in far more than just the electronics industry. The Woodrow Wilson Institute web site lists over a 1000 self-reported nanotechnology based products, and the range of application spans many areas of materials. We will discuss some of the characteristics of nanotechnology innovation and the conditions that lead to the transition from truly innovative technology to disruptive technology.