California in the Nano Economy

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August 29, 2012
Last updated August 30, 2012

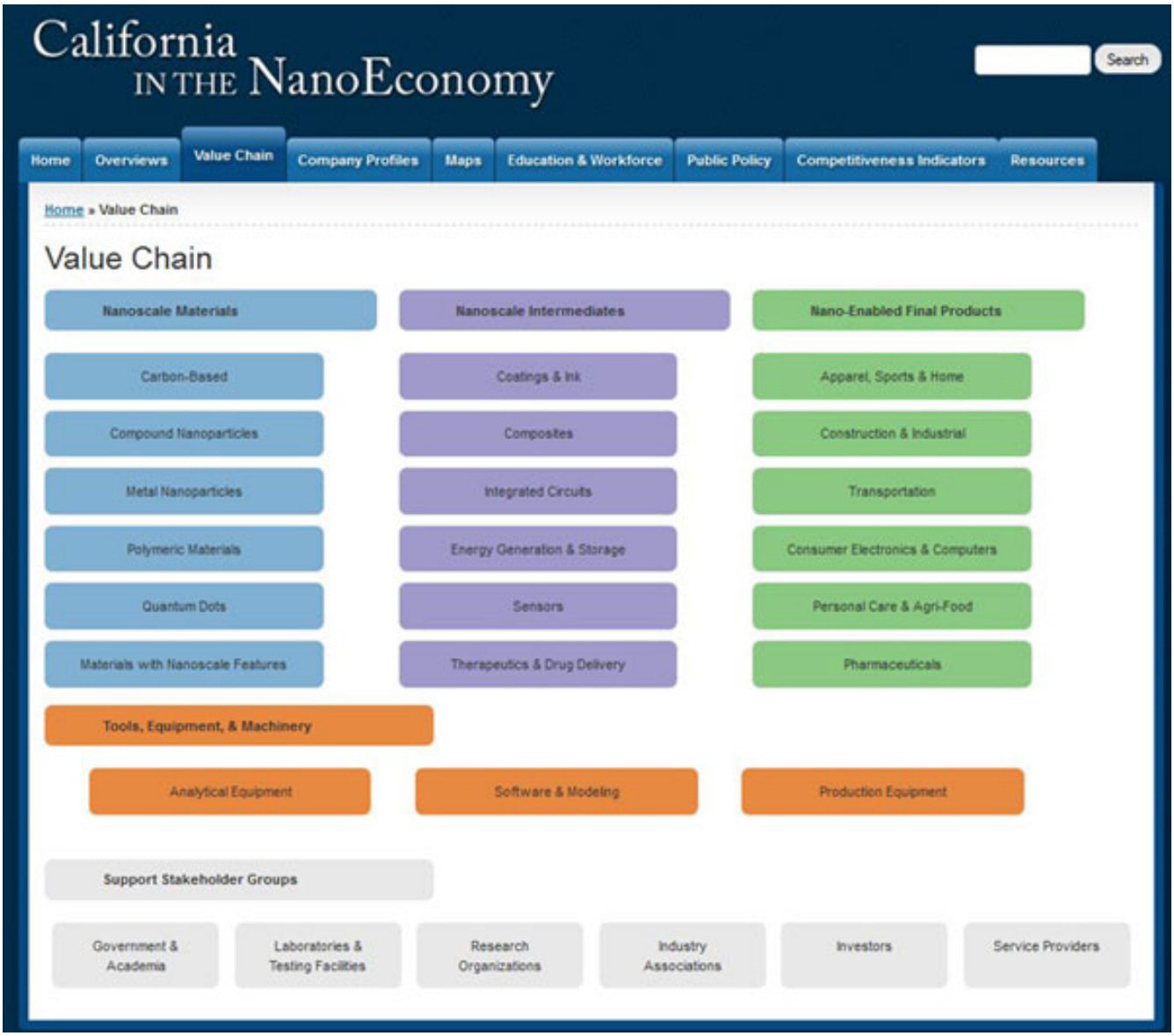
California in the Nano Economy is a new website being launched this September as a resource for the nanotechnology community. The site uses a value chain approach to present California's footprint in nanotechnology including its existing and potential capabilities and resources along the entire chain from nanoscale materials through final products. The site was developed by the Center on Globalization, Governance, & Competitiveness (CGGC) at Duke University with support from the NSF Center for Nanotechnology in Society (CNS) at the University of California, Santa Barbara.1

The purpose of the site is two-fold. The primary focus is to provide a new type of educational resource to enable understanding of the 'nano economy' by using the perspective of the value chain. The approach is illustrated using data for California, and as a result, the site also provides a secondary benefit as a valuable resource for industry in California.

The Value Chain Approach

The value chain research approach uses the value chain structure to analyze how past and present activities and relationships among stakeholders affect the development and competitiveness of a firm, industry, and/or geographic location.

- A value chain is a structure that can be used to categorize, organize, and visualize the activities, places and firms involved in making a product (or service). It includes the full range of activities involved in the process of taking an idea from innovation through commercialization. This includes activities related to production and transportation (supply chain), as well as other value-adding activities such as research, design, marketing, and support services.
- Value chain analysis is based on a framework that involves mapping the current activities of the stakeholders within the structure, and identifying the dynamic factors and relationships that impact the development of these activities. One of the main focus areas of this project is to help users comprehend the multiple industries and concepts involved in value chain research and nanotechnology through visualization. The outcomes of the theoretical process of value chain mapping are presented visually using both the structure of the chain and geographic maps.



Information included on the California in the Nano Economy Website
The California in the Nano Economy website represents an interactive, web-based version of applying this approach to a specific location (California) and the parts of a variety of industries that are impacted by a particular technology (nanotechnology). The information on the site primarily falls into the following categories that each represents one of the main steps in the research process.

The value chain section presents a visual depiction of the broad structure of the nanotechnology value chain. From the value chain image, users can click on any stage or sector to see basic information that describes the activities within that area and a list of companies in California that fall under the category. Each company name is a hyperlink to a new page that provides details on the activities of that location.

Each location page covers information related to the physical location, business descriptors (i.e., year established and employment), and products or services. This information was generated by integrating data from a variety of secondary sources to create a database of firms and organizations engaged in activities related to nanotechnology. This is part of a larger effort to begin mapping the U.S. and global nano economy of which a significant subset of companies are located in California. Each page also includes information on the location's position in the value chain, including value chain sectors and subsectors, industry-focus areas, value-adding activities, and the

degree the company appears to be focused on nanotechnology. Each location was placed into these positions by analyzing the location-specific information.

The maps section includes interactive geographic maps of all the locations in California included on the website. Multiple views are available that present different variables related to each location and are set apart by varying the color, size, and shape of the map marker. When the cursor is placed on a location, the information associated with that location appears. Users can select the variables they want to view to analyze different aspects of the firms and organizations in California. An additional section features company profiles that provide more in-depth overviews of the firms most cited by the secondary sources collected as being involved with nanotechnology in California.

Other sections of the website focus on important dynamics that impact the development of the nanotechnology activities in California including workforce development and education resources and public policies. The final section of the site is a work in progress that focuses on competitiveness indicators used to evaluate the level of development of countries, states, and regions working in nanotechnology. Existing benchmarking strategies that use these indicators are listed along with California's rankings in select studies.

The website will be available in September at www.CaliforniaNanoEconomy.org. For further information regarding the site, please contact Stacey Frederick at stacey.frederick@duke.edu.

Stacey Frederick is a Research Scientist at CGGC and extramural collaborator with CNS-UCSB. California in the Nano Economy was developed under her direction.

1CGGC is a research center that develops and applies the value chain research approach to any research areas with topics ranging from agriculture to clean energy to offshore services. CNS-UCSB is an NSF research center focused on understanding societal issues surrounding nanotechnology.

DOI: 10.4053/hi712-120829