

Project Overview

Project: use the value chain approach developed in previous years to examine California's footprint in nanotechnology across multiple indicators.

Objectives:

- 1) Identify and develop a database of firms working in each stage of the supply chain from nanomaterials through end-markets
- 2) Analyze the impact of value chain dynamics in each stage such as policies, risk, perception, and competitiveness factors
- 3) Evaluate how these are linked together in California and how California compares to competing geographies.
- 4) Create interactive visual tools to analyze and depict results.

Outcome: Results will be available on a *California in the Nanotechnology Economy* website. The website will highlight California's position in the national and global value chain and showcase how visual analytic tools can be used to do this.

Background

Value chain analysis is widely used by economists, social scientists, and business managers to analyze how the actions and relationships among and between public and private stakeholders affect the development and competitiveness of a firm, industry, or location's value chain. Developing and applying value chain research methods is the focus of project collaborators at the Center on Globalization, Governance, & Competitiveness at Duke University.

http://www.soc.duke.edu/NC_GlobalEconomy/index.shtml



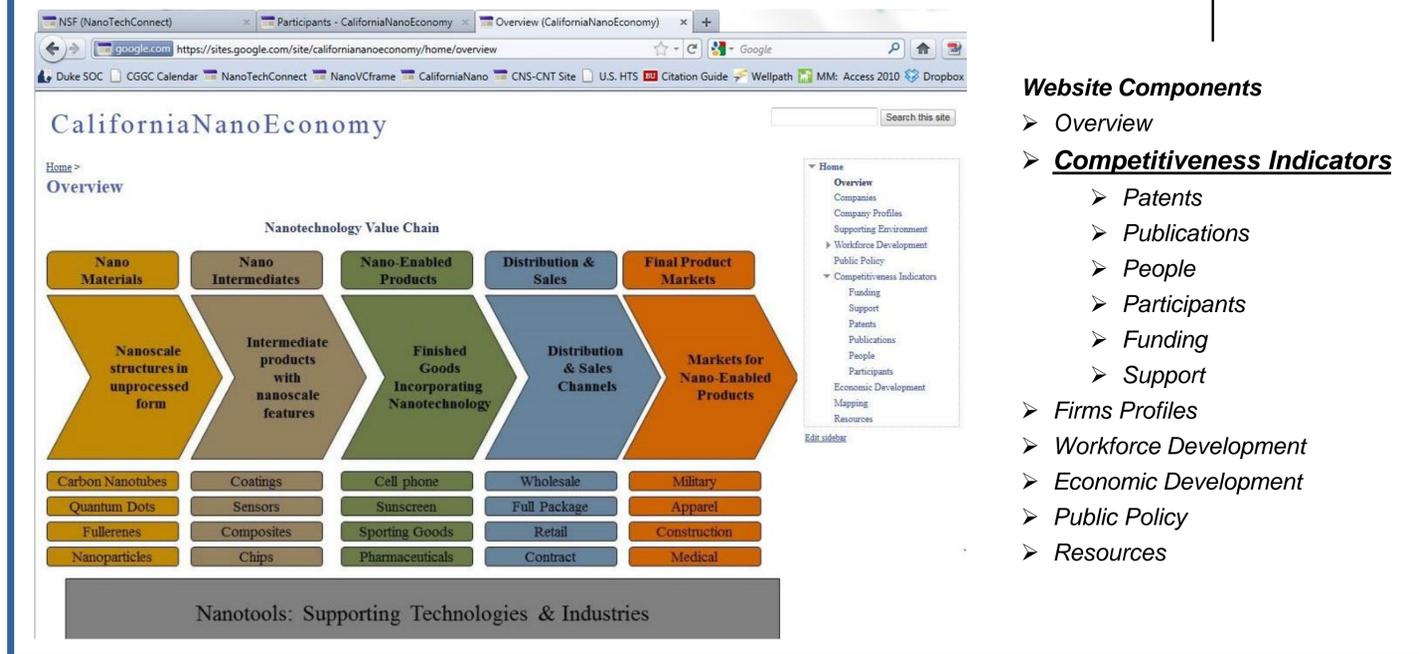
Method & Previous Results: A Value Chain Approach for Nanotechnology Research

The value chain approach for nanotechnology research used to carry out the current project was created in the initial five years of the project (2006-2010). Prior to development, a systematic approach to tie together diverse aspects of the innovation to commercialization life cycle specific to nanotechnology did not exist. In addition to the approach, a process others can follow to carry out research has been created.

Value Chain Research Approach for Nanotechnology Components:

- **Structure:** a visual of the input-output process and geography of actors in the global economy including the supply chain (physical transformation) plus value-adding, non-production activities.
- **Framework: (1) Mapping:** identify activities and stakeholders in the structure (who & what) and **(2) Analysis:** determine relationship between dynamics and stakeholders (how & why)

Results: <http://www.CaliforniaNanoEconomy.com>



Website Components

- Overview
- **Competitiveness Indicators**
 - Patents
 - Publications
 - People
 - Participants
 - Funding
 - Support
- Firms Profiles
- Workforce Development
- Economic Development
- Public Policy
- Resources

Collaboration & CNS Impacts

CNS Impacts and Collaboration

The website provides a means to bring together the work of multiple CNS researchers analyzing different competitiveness factors.

- **Patents & Publications:** working with Herron to extract variables in the globonano database of scientific literature and patents to conduct spatial analysis and create maps of variables for the website.
- **People:** using Walsh's ProQuest database of PhD dissertations on nano-related topics to map California's footprint in education.
- **Participants:** Frederick and Herron have both compiled firm and product-specific databases that will be combined with the above datasets to map value chain collaborations along the innovation to commercialization life cycle.
- **Education/Outreach:** the approach has been used to guide the CNS summer internship project and can be used in the future to teach or research topics related to societal dimensions. These templates will be available on the California site.

Synergies with Existing Value Chain Economic Development Projects

The concept for the California in the Nano Economy website draws heavily from two existing projects that both use the value chain framework to display information on key industries in North Carolina each catering to a different audience. Components of these sites are being combined and expanded to create a more comprehensive resource for the California site.

NC in the Global Economy: developed as part of a class project at Duke University, the site provides the results of value chain analyses for seven major NC industries. The site is widely used by government to understand NC's position in these industries.

NC Textile Connect: caters to industry; brings together diverse information on the NC textile industry in one place and organizes the information by value chain sector. This project is funded by the NC Department of Commerce and was the focus of Frederick's dissertation research.

www.nctextileconnect.com



Significance & Future Work

Significance:

- The website will provide a more holistic picture of the nanotechnology landscape by presenting data based on a value chain rather than by one industry or sector.
- Links firms and competitiveness indicators (patents, publications) rather than presenting just one variable.
- Provides a new, original concept to disseminate and organize industry information and academic research by combining an established research methodology with visualization and information management technology.
- Enables researchers to educate and disseminate results on a variety of topics using a comparable methodology.

Future Directions:

- Expand the project to other U.S. states
- Expand the concept to compare the U.S. to other countries
- Create educational templates based on the research approach

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