

Social media and innovation ecosystems: An Analysis of Twitter Microblogs about Graphene

Sanjay Arora and Jan Youtie

Georgia Institute of Technology, Atlanta, GA

Email: sanjayk.arora@gatech.edu

Abstract

Although ideas, information, and resources play a critical role in innovation and high-technology entrepreneurship, they are not always available at the right time and to the right people. In dynamic science-based domains, new channels of online communication offer a compelling platform to ameliorate problems associated with information asymmetries, resource deficiencies, and uncertainty. Yet, in public forums such as Twitter, users must actively calculate the rewards, risks, and costs of sharing information. This research investigates how social media may transform the behaviors of actors in innovation ecosystems. By adopting the lens of structuration theory, we are able to distinguish external structural rules, which posit certain modes of participant interaction, from internal structural rules, which dynamically enable and constrain user behavior. Both types of rules contribute to network structure, or patterns of communication. This research proposes to test several associational mechanisms by which information and shared understandings diffuse throughout the communication network. The multi-methodological research design employs data from Twitter, the microblogging service. This work focuses on Twitter text concerning the two-dimensional nanomaterial graphene, which attracted the Nobel Prize in 2010. This research models the sharing of new terms related to graphene (as proxied by number of "hash tags") in twitter text as a function of the characteristics of the actor/"tweeter" (geographic location, sector) and the frequency and nature (directed versus undirected) of the tweet. The models are estimated using fixed effects and negative binomial regression for panel and cross-sectional data. Qualitative evidence is employed to confirm the use of Twitter and the nature of relationships. Early results indicate that new terms associated with graphene are on the rise in tweets, that most actors are engaged in solo tweets rather than large volumes, and that undirected communications are most prevalent. These findings suggest that one-way distribution rather than network models work best in understanding how new scientific terms are diffused.