

Social Movements in Response to Nanotechnologies

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Activist environmental groups engage in competition in online networks, vying for scarce resources in the form of hyperlinks (“hyperlink capital”) and control over the terms of the debate via framing strategies. We use hyperlink and content analysis to examine the symbolic and organisational dimensions of online contestation. We show how actors’ acceptance or rejection of emerging issues such as the contestation of nanotechnology highlights network divisions.

Activist connectivity database

We identified 162 online environmental organisations using a combination of methods including search engines, media stories, etc. These organisations are diverse (grassroots, transnational, advocacy) yet equally retrievable online; they all promote an international public good, framing nature in terms of purity, morality, fragility. These “seed” organisations were classified according to their predominant theme or “collective action frame”: “environmental- global” groups deal primarily with issues such as climate change, forest and wildlife preservation, nuclear weapons, and sustainable trade (92 sites); “environmental- bio” groups deal primarily with genetic engineering, organic farming, biopiracy and patenting issues (47 sites); “environmental- toxic” groups deal primarily with pollutants and with issues of environmental justice (23 sites). We also classified the seed organisations according to country of origin; generic TLD (i.e. org, com, etc.); length of presence in the network (proxied by date of first archival by the Internet Archive); and amount of nano- related content.

We used webmining methods to identify outbound hyperlinks *from* and inbound hyperlinks *to* the 162 seed, thus constructing an “activist connectivity database”. We also parsed homepage content to obtain frequency counts of co-located words (e.g. “traditional/knowledge”). Our content analysis allows us to identify environmental “dialects” and allocate them into diagnostic and prognostic frames: these dialects confirmed our *a priori* classification of the seed organisations into the three themes.

Network structure

By creating outgoing hyperlinks actors define who is part of the network; by receiving incoming hyperlinks actors are legitimated as part of the network. Hyperlink capital is a form of endorsement sought out by actors, even when they appear to be disinterested.

Clustering. The force- directed graphing algorithm provided a clear clustering of environmental- bios (red nodes) and environmental- globals (blue) - see Figure 1. Environmental- toxics (green) are more fragmented. When nodes are coloured according to country- of- origin, the predominance of US-based sites (turquoise) is apparent, as is the separate clusterings of UK sites (green) and Australian sites (red) - see Figure 2.²

Centrality. The number of hyperlinks pointing to a site is one measure of online “success” (the mechanics of search engines is such that inbound hyperlinks generally translates to “eyeballs”). On this measure, the environmental- global group is most successful.

1 These notes are based on two papers presented to the 26th International Sunbelt Social Network Conference, 24- 30 April, Vancouver: Ackland, R., O’Neil M., Bimber B., Gibson, R. and S. Ward (2006), “New Methods for Studying Online Environmental- Activist Networks”; O’Neil M. and R. Ackland (2006), “The Structural Role of Nanotechnology- Opposition in Online Environmental- Activist Networks”. These papers can be downloaded from the Virtual Observatory for the Study of Online Networks (VOSON) website: <http://voson.anu.edu.au/papers.html>.

2 The colour coding in Figure 2 is: Australia (red), Canada (pink), Germany (olive), Netherlands (brown), UK (green), US (turquoise), France (yellow), India (blue).

Environmental- global sites have collectively been present in the network longer than the other two subgroups and so the finding that the globals are the most successful in terms of hyperlink indegree is apparent confirmation of the "preferential attachment" model proposed by physical scientists: newer entrants are inclined to link to already well-connected actors, thereby increasing these incumbents' advantage.

Diffusion of nano- opposition theme

The environmental- global subgroup is the incumbent dominant cluster (bios and toxics predominantly link to this subgroup and most of the environmental- global links are to other global sites). With regards to the issue of nanotechnology, the leadership role within the global group appears to have been taken by Environmental Defense (US) and Greenpeace UK.

The toxics appear to have been overtaken by the bios as leading challengers to the environmental- global group, especially with respect to the emergence of an anti- nanotech theme. Structurally, anti- biotech activists are relatively new entrants on the field and are more likely to focus on new issues such as nanotechnology than the established players. While there are obvious parallels with concerns raised about biotech products causing irreversible and unpredictable damage, we posit that the bios' uptake of this new issue also reflects a deliberate strategy to challenge the incumbents' ability to define the "stakes" of the field. This challenge is best exemplified by the ETC Group which has the sixth highest indegree amongst all the seed sites and has been most active in framing the potential risks of nanotechnology, for example by coining terms such as "atomtech" and "nanotoxicity".

It is of note that we did not find examples of these negative frames on the homepages of the seed organisations: for internal complex contagions to spread, many sources are needed and this perhaps indicates a present lack of "critical mass" for these frames in online environmental activist networks. We surmise that if the opposition to nanotechnology is to diffuse widely in the environmental- bio group it will occur through the connection to a master frame which has served this group well in the past - that of food.

Our mapping indicated a lack of linkage between the environmental- bios and environmental- toxics. This can partly be explained by the toxics being disinclined to link to successful competitors, but it also points to ideological and sociological differences between these groups: the toxics view genetics as being too focused on the individual, as their overarching concern is with the effects of pollutants on communities. We found that the Pesticide Action Network sites act as a bridge between toxics and bios, as P.A.N. spans the individual and community spheres.

Activists use frames in order to link the everyday to broader issues of equality, solidarity and injustice. But differences exist as to what the "everyday" is. Field divisions have a structural, ideological and class basis: Environmental Justice represents the attempts of urbanised poor people, often members of ethnic minorities, to resist being made the target of environmental discrimination. In contrast, the contestation of biotechnology allowed educated middle class activists to reconnect to their ancestral roots by forming an unusual alliance with farmers, and by focusing on individualised and pleasurable practices – the consumption of distinctive products, such as organic food, comes to mind. Yet it is precisely the environmental movement's diversity which has allowed it to survive, by enabling it to reach a wide variety of audiences, maximising adaptive variation through diversity of purposes, and encouraging innovation and problem solving. The structural role of new stakes such as the contestation of nanotechnology is to (re)generate divisions, thereby contributing to network robustness.

Figure 1: FDG (clustering) map by “environmental theme” (see text for legend)

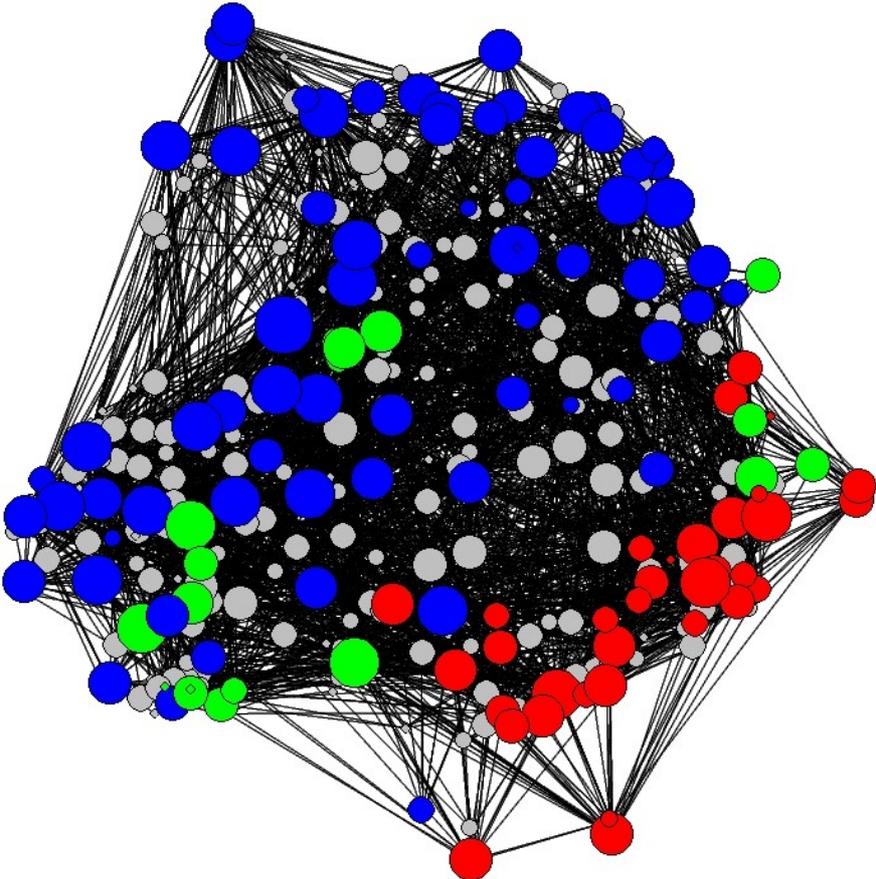


Figure 2: FDG (clustering) map by country- of- origin (see text for legend)

