The structural role of nanotech-opposition in online environmental networks

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26th Sunbelt Conference, Vancouver

April 24-30 2006

premise and question

Activist environmental groups (actors/websites) engage in competition for scarce resource (hyperlink capital).

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.

definitions

Nanotechnology - cornocupia or dystopia?

Activist networks on the internet.

Frames render events meaningful, serve to organise experience and guide collective action; activists seek to create “frame alignment” processes (Benford and Snow 2000).

Fields are sites of competition; they comprise institutional logics (Friedland and Alford 1991) and dominants and challengers.

3 activist frames: bio, global, toxics

Our 162 organisations are diverse (grassroots, transnational, advocacy) yet equally retrievable online; they promote an international public good, frame nature in terms of purity, morality, fragility.

We parse homepage content for co-locations. We identify environmental dialects and allocate them into diagnostic and prognostic frames.

environmental-bio frame (47 groups)

identity: traditional/knowledge (11) farming/families (3) small/farmers (3) peasants/farmers (3) farming/activists (3) help/farms (3) farmers/feel (3).

problem: trade/dispute(s) (5), trade/war(s) (5) multinational/corporations (4) corporate/power (3) global/system (3) patent(s)/law(s) (4) misleading/ claims (3) field/trials (6) engineered/crops (6) modified/organisms (5) animal/feed (4) engineered/food (3) food/security (5) food/safety (4)

solution: fair/trade (7) agrarian/reform (7) genuine/reform (6) safety/bans (5) national/bans (5) keep/bans (3).

environmental-global frame (92 groups)

problem: climate/change (22) public/health (5) natural/resources (4) ancient/forests (4) air/quality (3) extinction/hotspots (3) oil/addiction (5) greenhouse/emissions (4) fossil/fuels (3) human/activities (4) major/companies (4).

solution: take/action (10) local/communities (6) civil/society (5) protected/areas (5) indigenous/peoples (4) public/lands (3) energy/independence (3) renewable/energy (3) wildlife/conservation (3) reduce/emissions (3) air/quality (3) soliciting/donations (3) finance/programs (3) find/solutions (3).

environmental-toxics frame (23 groups)

problem: toxic/chemicals (6) environmental/health (4) chemical/burden (4) waste/sent (3) being/dumped (3) community/groups (4)

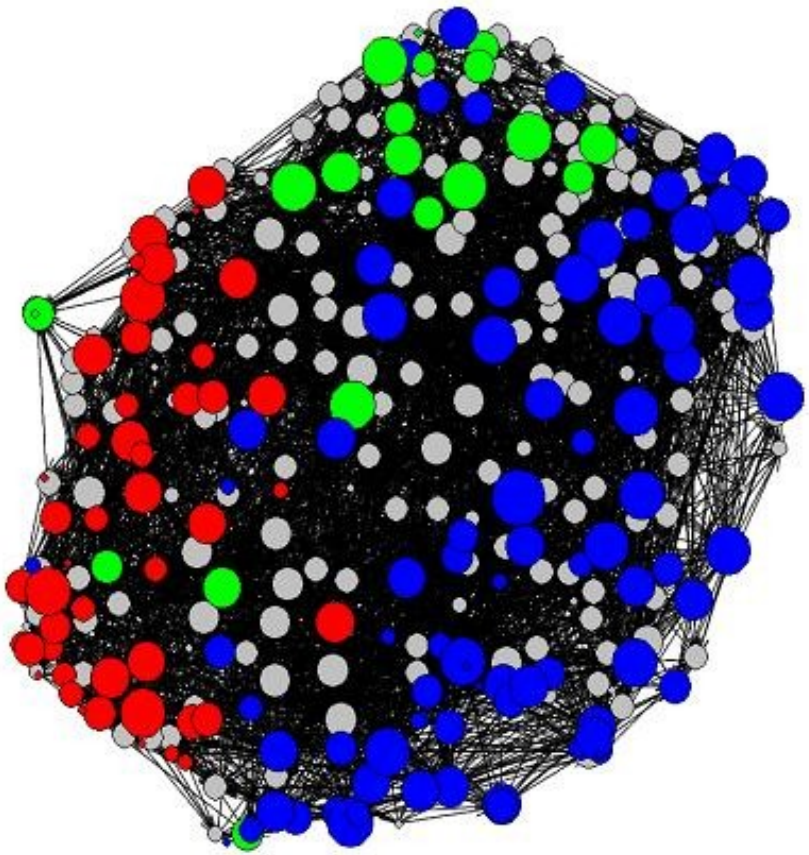
solution: waste/management (8) waste/practices (5) management/practices (5) press/coverage (3).

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.

We examine clustering, centrality and evolution.



LinLogLayout FDG of 355 nodes

(node repulsion version, minimum degree: 10)

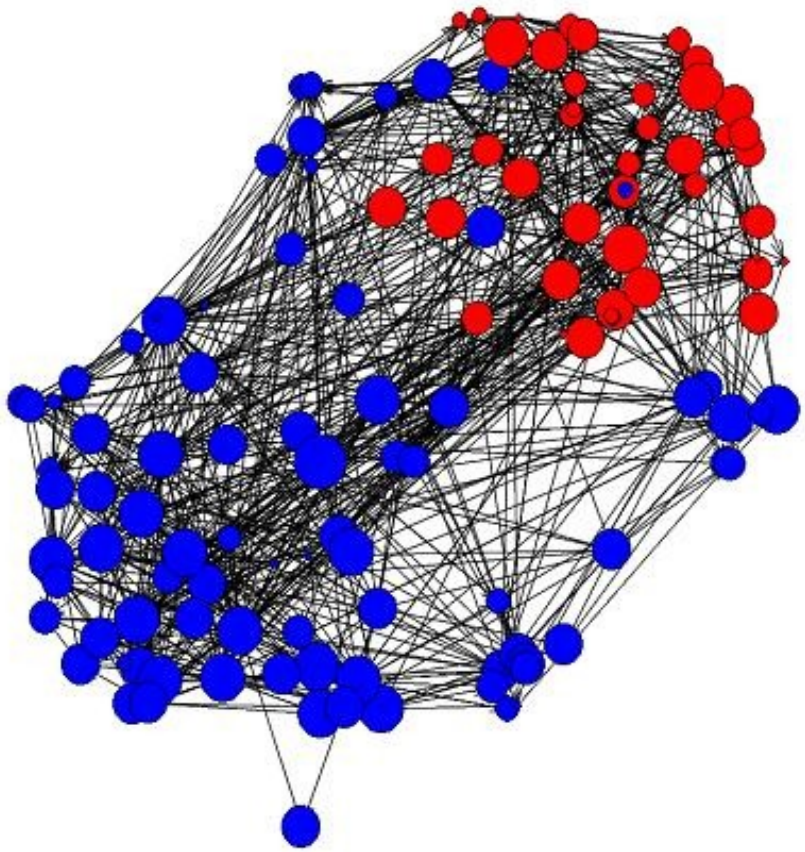
red: bio

blue: global

green: toxics

	Environmental Bio	Environmental Global	Environmental Toxics	All
Environmental Bio	60.2	33.0	6.9	100.0
Environmental Global	12.3	81.0	6.7	100.0
Environmental Toxics	14.4	54.1	31.5	100.0
All	26.3	63.0	10.7	100.0

Composition (activist classification) of links to other seed sites

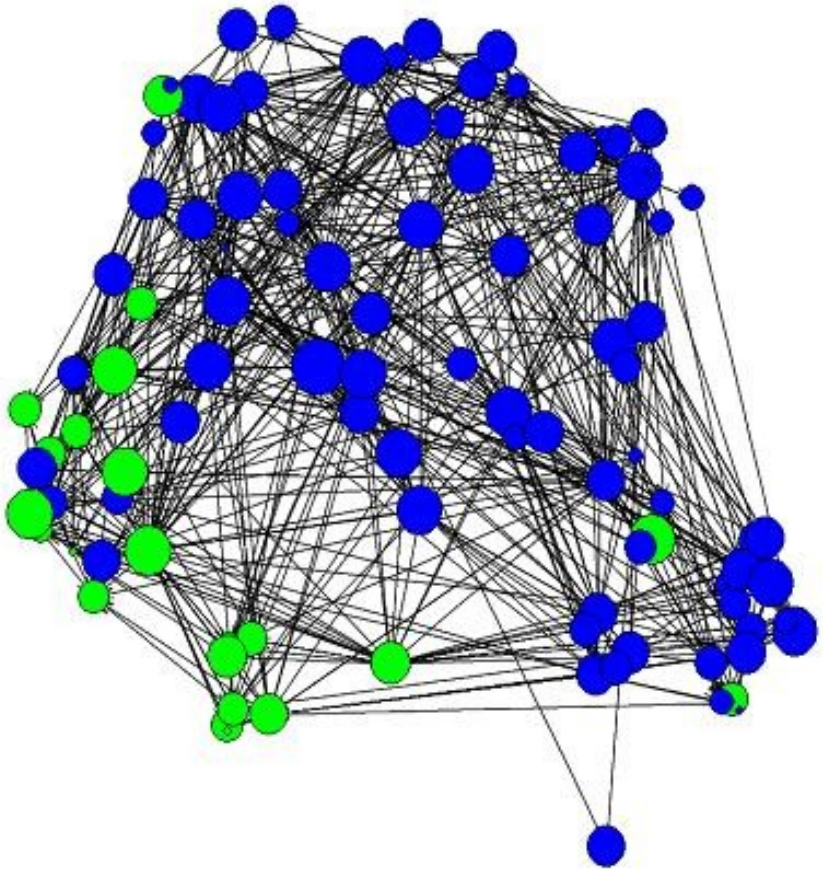


LinLogLayout FDG of 135 nodes

(node repulsion version)

red: bio

blue: global

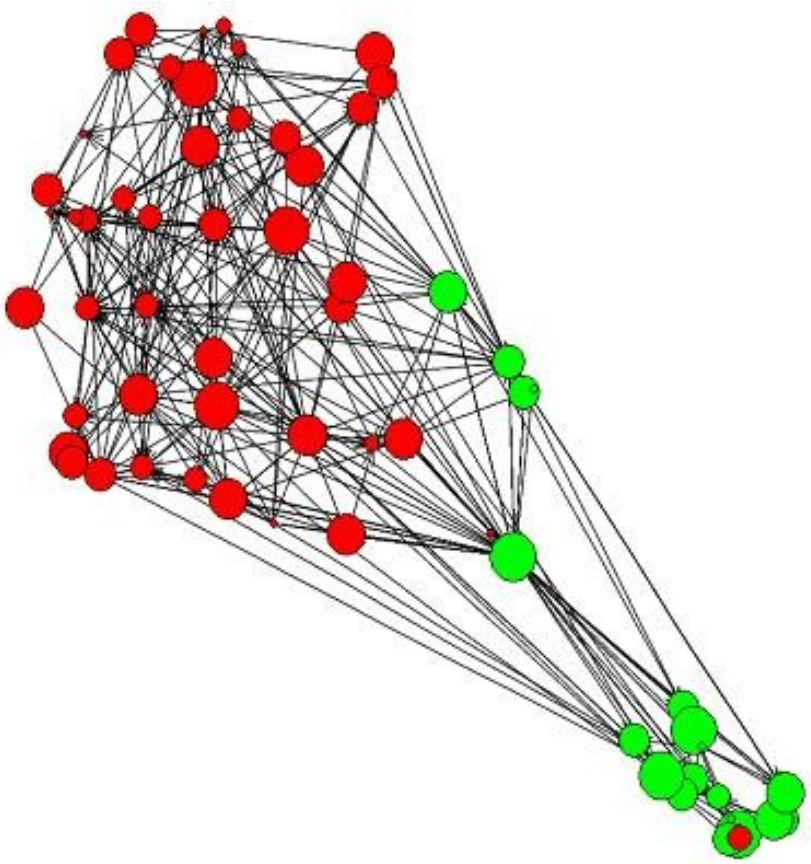


LinLogLayout FDG of 111 nodes

(node repulsion version)

blue: global

green: toxics



LinLogLayout FDG of 66 nodes

(node repulsion version)

red: bio

green: toxics

	Q1	Q2	Q3	Q4	Q5	All
Environmental Bio	36.4	45.5	25.0	28.1	12.5	29.6
Environmental Global	54.5	39.4	50.0	65.6	71.9	56.2
Environmental Toxics	9.1	15.2	25.0	6.3	15.6	14.2
	100	100	100	100	100	100

Quintile distribution of hyperlink indegree

by activist group type

	Q1	Q2	Q3	Q4	Q5	All
1-2 years	15.2	12.1	9.4	3.1	0.0	8.0
3-6 years	51.5	60.6	65.6	56.3	21.9	51.2
7+ years	12.1	21.2	18.8	37.5	78.1	33.3
Unknown	21.2	6.1	6.3	3.1	0.0	7.4
	100.0	100.0	100.0	100.0	100.0	100.0

Quintile distribution of hyperlink indegree by time in the network

	1-2 years	3-6 years	7+ years	Unknown	total
Environmental Bio	8.5	66.0	17.0	8.5	100.0
Environmental Global	8.7	41.3	43.5	6.5	100.0
Environmental Toxics	4.3	56.5	30.4	8.7	100.0
All	7.2	54.6	30.3	6.1	100.0

Time in the network by activist classification

network structure

clustering: clear grouping of bios and globals. Toxics more fragmented.

centrality: in terms of indegree (attracting hyperlinks means attracting eyeballs) the most successful group is the global.

evolution: apparent confirmation of the preferential attachment model; bios lack “stickyness”.

	Number of sites	Number of outbound links per site	Number of inbound links per site	Ratio of inbound to outbound
Environmental Bio	47	147.6	48.1	0.33
Environmental Global	92	182.1	85.7	0.47
Environmental Toxics	23	138.7	69.6	0.50
All	162	165.9	72.5	0.44

Hyperlink counts

field dynamics

Suggestion: The institutional logics of this activist field is a competition for the definition of the “legitimate principles of division of the field” (Bourdieu 1985): actors seek to impose their diagnostic frame as the most legitimate.

1. Diffusion of anti-nanotechnology dialect?

2. What are responses of different subgroups to a new stake such as the contestation of nanotechnology?

dialect diffusion

Leadership role taken by two globals: Environmental Defense (US): “green nano”; Greenpeace UK.

Most influential on activist field has been ETC Group (sixth highest indegree / advocacy group). Framing of risk / danger: “atomtech”, “nanotoxicity”.

No occurrence on sample homepages of these terms. For internal complex contagions to spread many sources are needed (Centola and Macy 2006). No critical mass.

	None	Some	Substantial	Unknown	total
Environmental Bio	63.8	21.3	12.8	2.1	100.0
Environmental Global	82.6	10.9	5.4	1.1	100.0
Environmental Toxics	87.0	8.7	4.3	0.0	100.0
All	77.8	13.6	7.4	1.2	100.0

Nanotech content by activist classification

	None	Some	Substantial	Unknown	total
1-2 years	84.6	15.4	0.0	0.0	100.0
3-6 years	79.3	11.0	8.5	1.2	100.0
7+ years	76.4	16.4	7.3	0.0	100.0
Unknown	66.7	16.7	8.3	8.3	100.0
All	77.8	13.6	7.4	1.2	100.0

Nanotech content by time in the network

nano -response: global subgroup

Add to repertoire of issues.

Cooption.

Join major campaigns.

nano-response: bio subgroup

Most closely associated with uptake of new stake on the field: challenge incumbents; parallels biotech / nanotech.

Nanotechnology: resists framing.

Hypothesis: increased network diffusion through adoption of “nano-food” master frame [broad interpretative scope, inclusivity, flexibility and cultural resonance - and by the fact that they are adopted by two or more distinctive movements (Benford and Snow 2000)].

a prediction that did not eventuate

"Environmental Justice, as an all-encompassing notion that affirms the use value of life, of all forms of life, against the interests of wealth, power, and technology, is gradually capturing minds and policies, as the environmental movement enters a new phase of development".

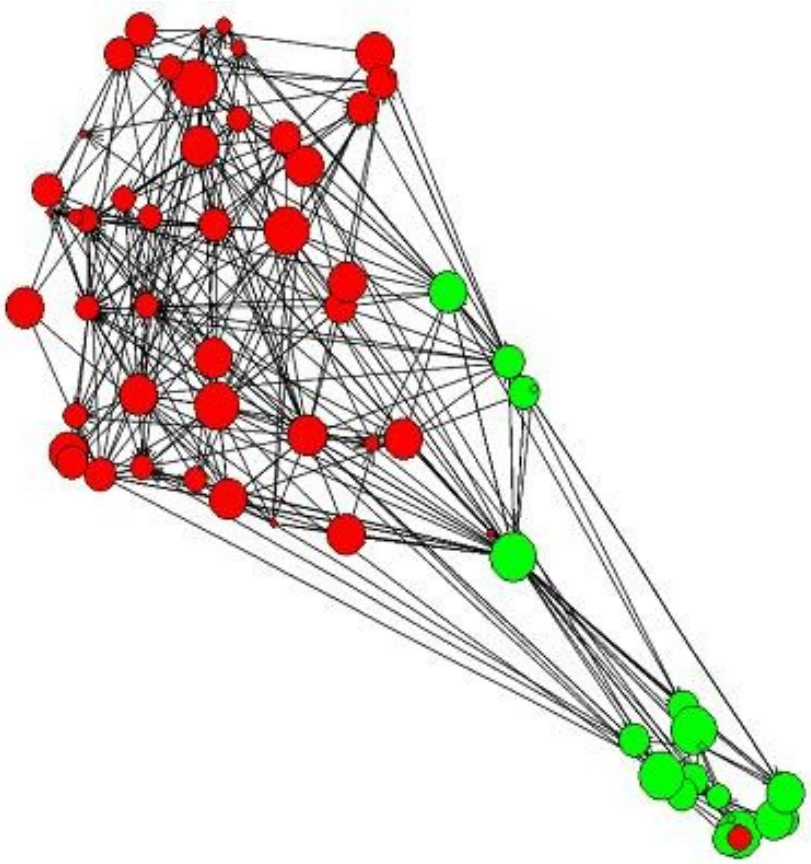
Castells, *The Power of Identity*. (2004 [1997]: 190)

nano-response : toxics subgroup

Least interested in this issue

Structurally, toxics overtaken by bios as leading challengers to global group: disinclined to link to successful competitors.

Ideologically, genetics too focused on individual, not on effects of polluters on community.



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the structural role of nano-opposition

Key position occupied by broker (Pesticide Action Network).

Frames seek to link the everyday to broader issues of equality, solidarity and injustice: what is the everyday?

Field divisions have a class basis. Yet it is precisely the environmental movement's diversity which has allowed it to survive.

Structural role of new stakes is to (re)generate divisions, thereby contributing to network robustness.

references

Benford, R.D., and Snow, D.A. (2000) Framing processes and social movements: An overview and assessment. *Annual Review of Sociology* 26: 611-39.

Bourdieu, P. (1985) The social space and the genesis of groups, *Theory and Society* 14: 723-44.

Castells, M. (2004 [1997]) *The Power of Identity. The Information Age: Economy, Society and Culture Vol. II*. Oxford: Blackwell.

Centola, D. and Macy, M.W. (2006) Complex contagion and the weakness of long ties. Under review, *American Journal of Sociology*.

Friedland, R. and Alford R.A. (1991) Bringing Society Back In: Symbols, Practices and Institutional Contradictions. In P. Di Maggio and W. W. Powell (eds) *The New Institutionalism in Organisational Analysis*. Chicago: University of Chicago Press. pp. 232-262.