Social Capital Accumulation Strategies in Anti-Nanotech Online Networks

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[power on the internet]

- Power on the net: capacity to influence others

- In the case of online communities domination can be analysed in terms of:

  - central position (authority)

  - success in controlling terms of debate (diffusion)

  > > How can this be empirically measured? Convergence of social science (organisation and social movement theory, social network analysis) and information science approaches (web metrics).

[social capital]

- Influence: possession of resource [interdisciplinary term]
  - Social capital [SK]: resource available through network.
  - Hyperlink capital [HLK]: ties become a resource.
- Retrievability online is absolute; visibility is relative (Hindman et al 2003).
- Actors (websites) engage in competition for eyeballs -> supporters -> contributions and / or engagement.
- Mechanisms for generation HLK: how actors gain legitimacy / authority; how themes diffuse successfully?

[activist networks]

- Activist networks online: ideology and practice.
- Working hypothesis: the online environmental network is structured as a field where new entrants seek to assert the legitimacy of their prognostic frames over that of incumbents.

  See reform ecology 1970s, deep ecology 1980s, eco-feminism / eco-spirituality 1990s.
- Nanotechnology: cornocupia or dystopia?

[methodology (1)]

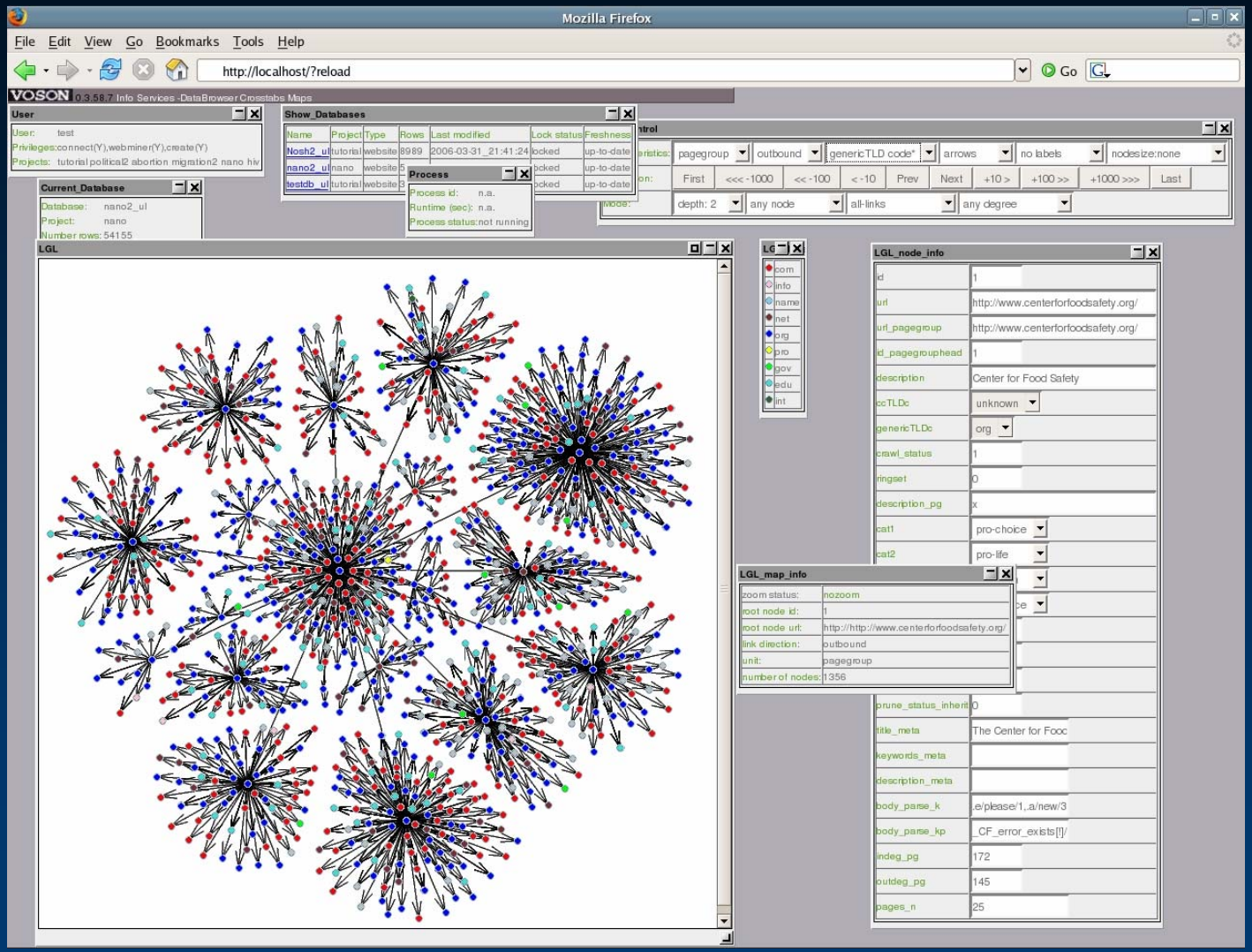
- Virtual Observatory for Study of Online Networks. http://voson.anu.edu.au
- Creation of seed set (search engines, media stories, directories). Content and hyperlink harvesting by web crawler.
- Creation of “Activist Connectivity Database”. Aggregation into page-groups (org-level analysis): 161 groups.
- LGL / FDG mapping of hyperlinks.
- Automatic classification of groups (ccTLD, generic TLD).

[methodology (2)]

- Manual classifications of 161 groups
  - Frame: globals (89), bios (46), toxics (26)
  - Years in network: 1-2 years (12), 3-6 years (82), 7+ years (55)
  - Organisational type: advocacy (71), coalition (70), grassroots (20)
  - Nanotech content: none (125), some (22), substantial (12)

- Analytical approaches
  - Text analysis of co-locations parsed from homepages.
  - Cross-tabulations of automatic / manual categories.
  - Social Network Analysis (SNA) - node and graph metrics.

[VOSON software]



[text analysis: prognostic frames]

- globals: 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).

- bios: 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)

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

[hyperlink counts]

	N	total-outbound	total-inbound	site / outbound	site / inbound	ratio in / out
bios	46	6458	2219	140.3	48.2	0.34
toxics	26	3812	1724	146.6	66.3	0.45
globals	89	16129	7755	181.2	87.1	0.48
all	161	26399	11698	163.9	72.6	0.44

[cross-tabulation: frame / age]

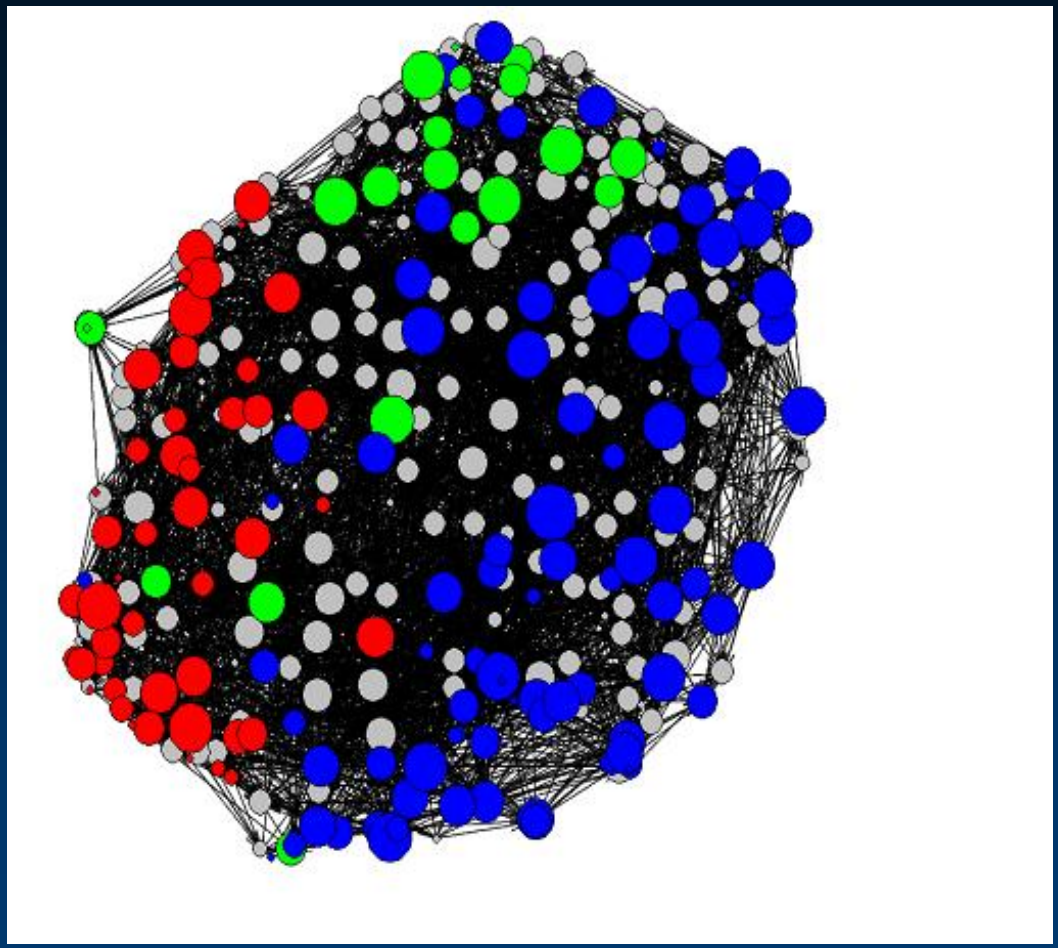
	1-2 years	3-6 years	7+ years	unknown	total
bios	6.5	67	17	8.5	100
toxics	2	57	30.5	7.5	100
globals	9	40.5	44	6.5	100
all	7.5	50	34	19.5	100

[cross-tabulation: frame / nano content]

	none	some	substantial	unknown	total
bios	63	21	13	2	100
toxics	84.5	11.5	4	0	100
globals	83.5	10	5.5	1	100
all	77.5	13.5	7.5	1	100

[cross-tabulation: results]

- In terms of indegree the most successful groups are the globals.
- Apparent confirmation of the preferential attachment model; bios lack “stickyness”.
- The contestation of nanotechnology (new stake) is primarily championed by bios (newest entrants); toxics least interested.



LinLogLayout FDG of 355 nodes

(node repulsion version, minimum degree: 10)

blue: globals

red: bios

green: toxics

[SNA: nanotech content]

	some / substantial nano content	no nano content
network size	34	125
network density	0.108734	0.0429032
dyadic reciprocity	0.344262	0.285714
centralisation (degree, normalised)	0.190341	0.202269

[SNA: frame]

	globals	bios	toxics
network size	89	46	26
network density	0.0764811	0.106763	0.146154
dyadic reciprocity	0.0250255	0.0289855	0.0369231
centralisation (degree, normalised)	0.218195	0.167122	0.34

[SNA: results]

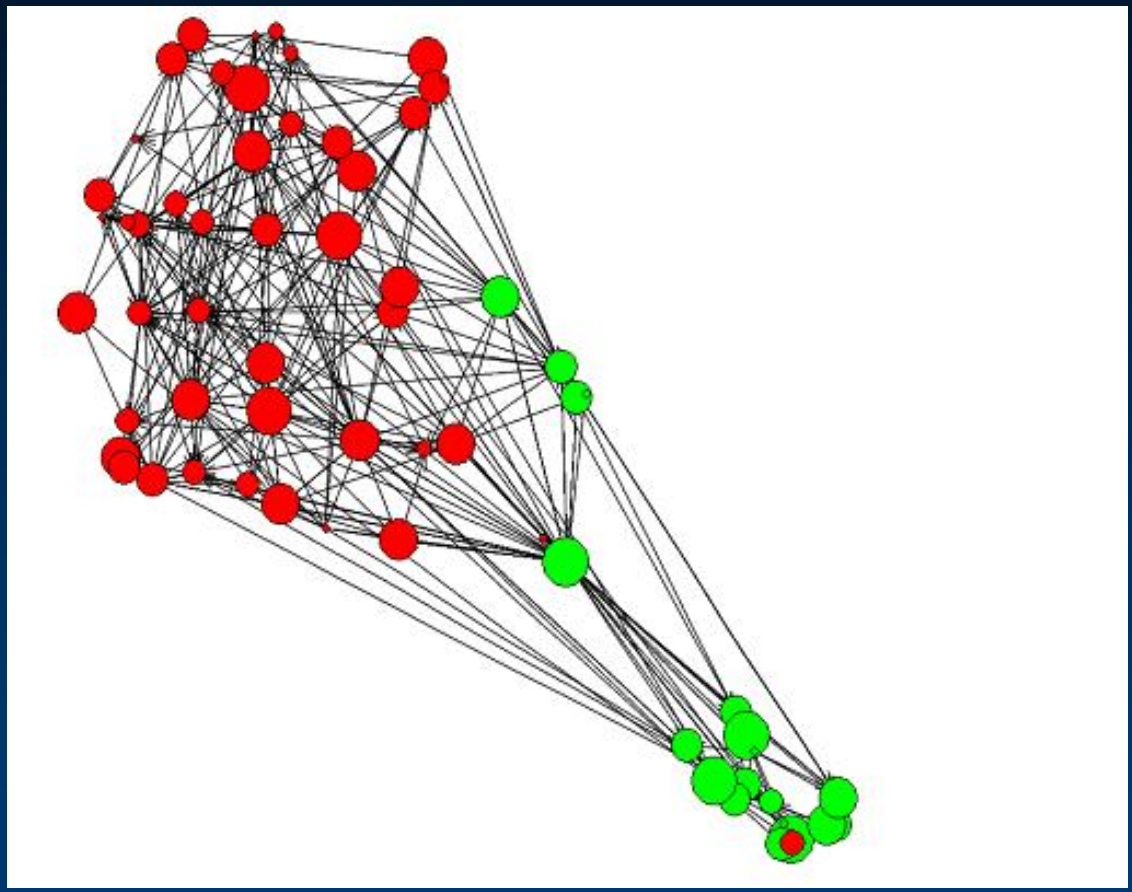
- Centralisation highest for oldest challengers (toxics), dominant group (globals).
- Contradiction with?…
- Density and dyadic reciprocity higher for oldest challengers (toxics) and actors promoting new stake (some & substantial nano).
  - Consistent with study of online extremists such as far-right networks (Burris et al. 2000). Provides sense of critical mass lacking in real world (Park et al. 2005).
  - Indicates that efforts to spread new stake have limited success (consistent with our dialect diffusion analysis).

[dialect diffusion: results]

- Leadership role taken by two globals: Environmental Defense (US): “green nano”; Greenpeace UK. [FoEA not included].

- Most influential on activist field has been ETC Group (bio-advocacy group; sixth highest indegree overall). Risk / danger frame: “atomtech”, “nanotoxicity”. [Emulate “frankenfood”?]

- 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”.



LinLogLayout
FDG of 66 nodes
(node repulsion version)

red: bios

green: toxics

[conclusion: network mechanisms]

- Influence sought by actors using SK – HLK accumulation mechanisms: diffusion and brokerage.
- According to McAdam (2003) more success for spread through brokerage than internal diffusion.
- If Pesticide Action Network fulfills its role as a broker – anti-nano frame may spread from bio subgroup to toxics subgroup.
- But why “structural hole” between these two groups?

[conclusion: network divisions]

- Frames serve to link the everyday to broader issues of equality, solidarity and injustice: what is the everyday?
- Risk: affects a stigmatized minority (toxics frame) or affects everyone (bios frame)?
- These divisions have a class basis (Lichterman 1996). Yet it is precisely the environmental movement's diversity which has allowed it to survive.
- New stakes (re) generate divisions, thereby contributing to network resilience.

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