MANCHESTER 1824

The University of Manchester

Institute of Social Change

An Internet Mediated Domain of Local Governance?

ISC Working Paper 2010 - 02

Paul Hepburn, IPEG PhD student (University of Manchester)
Paul.Hepburn@postgrad.manchester.ac.uk

The UK government, with a view to redressing growing civic disenchantment with elected representatives and governmental institutions, continues to look to new technologies to provide a new 'architecture of participation'. But what are the current prospects for the local governance process being re-invented at the interface of the social and the technological? This paper seeks to empirically address this question by exploring the use made of the internet by a variety of local civic, political and institutional actors during a 2008 UK local referendum on introducing the largest traffic congestion charging scheme in the world. This paper draws upon Social Network Analysis theory and utilises Lusher and Ackland's innovative 'Relational Hyperlink Analysis' to quantitatively explore significance and meaning in a conceptually defined internet mediated domain of local governance.

This approach reveals a distinct homophily effect within the online 'congestion charge' network with local governance sites mainly hyperlinking to each other and websites hosting web 2.0 technologies also more likely to only reference each other. The paper concludes that, in this instance, where civic and local government actors failed to engage each other online, use of the web as a space for local deliberation on the policy making process is very much work in progress. As a consequence the potential of a new, civic, 'architecture of participation' has yet to be fully exploited by civic leaders and activists.

Key words: local governance, hyperlink analysis, social network analysis, exponential random graph modelling

Introduction

Certainly the UK government, with a view to redressing growing civic disenchantment with elected representatives and governmental institutions, has looked to new technologies to transform the political relationship between citizens and government. Despite equivocal levels of success with its e-government programme (Electoral Commission, 2002; Local e-Democracy National Project, 2004; Adam Smith Institute; eGov monitor; Pratchett, 2006), the Government is determined to press ahead and exploit the potential it sees in the new technology to reconfigure government and government to citizen relations. It anticipates the new social media, Web 2.0, will provide an *'architecture of participation'* that facilitates access to the *'….new forms of community out there which government currently is unable to talk to…'* (Tom Watson MP, Minister for Transformational Government, 1 April 2008). At a local level policy initiatives such as the Governments' white paper *'Communities in Control: real people, real power'* (2008) show how the government is keen to utilise the potential of social media to empower local people, increase their participation in civic society and engagement with local councils.

The methodological approach detailed in this paper seeks to capture evidence on how far the new media, the internet and Web 2.0 technologies in particular, have transformed the relationship between local governance and civic society. Of course local civic and political activity is characterised and complicated by the variety of institutional and individual activists engaging with different levels of commitment and different or competing, but overlapping, types of stakeholder interest. The description, below, of the case study used in this research illustrates this particular local civic complexity.

The case study

The Greater Manchester Transport Innovation Fund (TIF) proposal, or the Manchester Congestion Charge scheme as it came to be more popularly known - much to the ire of its proponents, was put to a referendum of 1.9 million registered voters in December 11 2008. The decision to hold a referendum on the scheme was taken in July 2008 by the Association of Greater Manchester Authorities (AGMA) the governance body through which the 10 local government authorities co-operate formally to co-ordinate a sub-region-wide approach to many issues including local transport (local transport policies are fashioned by the Greater Manchester Transport Authority (GMPTA) which is made up of 33 Councillors appointed by the 10 local authorities). This decision followed a year of intense, often acrimonious political lobbying, both for and against the proposal, by elected politicians – both local and national, the business community and activists from across the political spectrum ranging from environmental groups to car drivers' associations. It was, as one interviewee, a local media commentator put it, *' ..the most important issue or story that has effected this area in a long while ..almost everybody had an opinion'.*

This issue brings to bear a complex array of vested interests held by the civic and political actors who would contest the TIF proposal. Given these complexities the question posed for this research was how best to capture evidence of any online political activity associated with this issue and then understand and explain it by assigning significance and meaning to it. The first step in this process was to conceptualise the area of social activity under investigation in order to determine how it may be bounded and which data collection methods might be employed.

Specifying the network boundary

Following Postill (2008), concepts such as social field were borrowed from anthropological theory and employed to help frame the social area of enquiry within which the relationship between social change and technology may be captured at a local level. In this instance social field *' ..is a domain of practice in which social agents compete and cooperate over the same rewards and prizes'* (pg 418). Whilst Postill rejects the utility of network as an analytical tool Mishe and White (1998) argue that such a domain is made up of social network(s) stating that the *'…theory of network ties has thus far remained ad hoc, casual, indeed largely implicit, because networks have not been understood as embedded in domains'* (pg 703*).* Notwithstanding this, within such a domain boundaries of the social network(s) under investigation still need to be determined. Laumann et al (1983) in an evaluation of approaches to boundary specification suggest that researchers have bounded their studies according to *'….the time-honoured controversy in the social sciences between nominalist or realist views of the*

ontological status of social phenomena' (pg 20). For the realists the network is treated as a social fact only if it is *'…consciously experienced as such by the actors composing it'* (pg 21). In this perspective the network may be bounded by identifying shared attributes exhibited by the actor. It is this perspective that is adopted here and put into practice as described below.

Method

Using hyperlinks to map online networks is now theoretically grounded as a web epistemology (Rogers, 2004) and practically established as a research technique (Rogers and Marre 2000, Ackland and Gibson 2004) for collecting online evidence that could represent *'…a semblance of socio-epistemic network between organisations'* (Rogers and Marre, 2000, pg 145). More recently Park et al (2005) and Ackland and Gibson (2007) have identified a series of functions that hyperlinks may perform, such as: information provision; network building; identity building; audience sharing; and, message amplification. However, applying Social Network Analysis (SNA) to such hyperlinked data is less common. SNA is a sociological technique which focuses on a set of social actors and the relations between them and is an approach for the analysis of social structures that are formally represented as social networks. It uses network theory which consists of nodes and ties to explore social relationships. Here nodes are social actors and ties are the relationships between the actors. It was Park (2003) who described websites as social actors and argued for the application of SNA to hyperlink data. Lusher and Ackland (2008) advanced Park's idea of 'hyperlink network analysis' by applying a set of statistical models associated with SNA, Exponential Random Graph Models (ERGM) to hyperlinked networks. They termed this technique 'relational hyperlink analysis' arguing that it is *'…a relational social science framework, which pays particular attention to hyperlinks as social connections, not merely indicators of popularity or visibility (pg 3)'.* Moreover, in statistical models produced by ERGM it is possible to control for structural effects in a network enabling the researcher to distinguish, in all probability, between hyperlinks that may have been made as a consequence of the network structure and those that may have been made as a consequence of the individual website attributes or content. *'As such ERGM can explore the structure of ties as well as why some social actors with certain attributes may send or receive ties'* (Lusher and Ackland, 2008 pg 10). Thus, for Lusher and Ackland, the advantage of employing RHA is that it enables the internet researcher to ask the question *'Why do actors make or receive a hyperlink?*' (pg 13).

In analysing the Manchester Congestion Charge hyperlink network the ability to distinguish the social motivations behind hyperlinking behaviour should enable a greater understanding of the significance of the sites in the network. This in turn should inform how citizens and governance and non-governance organizations were using this network to communicate, pass and process information on the issue in question.

Data collection

Following Lusher and Ackland (2008), the web-crawling software VOSON (Ackland, 2008) was used to map the Congestion Charge hyperlinked network. VOSON 'crawls' the world–wide web following outward bound hyperlinks from a pre-determined set of web pages: a 'seedset', chosen by the researcher. This involves the web address of these pages, or the uniform resource locator (url), being manually typed into the software which then crawls the web looking for, a pre-set maximum, of outward bound hyperlinks. The software then uses the Google/Yahoo API to find inward bound hyperlinks pointing to each of the chosen 'seed' pages up to a maximum of 1000 hyperlinks (set by Google) per seed page. In this way the software develops a database of web pages and sites linked by inward and outward bound hyperlinks to the designated seedset. VOSON then enables a number of analytical operations on the collected database: the pages can be mined for text, the data can be visualised through a number of different mapping concepts and a series of basic Social Network Analysis measures can be derived.

The primary purpose in selecting a 'seedset' here was that it should provide a cross section of sites that were representative of civic actors engaged in the referendum campaign (table 1). Sites were selected by a Google search on 'Manchester Congestion Charge' and out of the top 20 rankings 9 sites were selected. A further 3 sites were chosen by the researcher; wevoteyes,co.uk; agma.gov.uk and a Facebook site established by a local council with a view to engaging young people in the TIF debate. The remaining sites were chosen by inputting these initial selection of sites into VOSON and crawling the web to map the hyperlink connections. From this initial trawl a further 5 sites were

chosen that matched the selection criteria. The sites were categorised as follows: a governance site, that is, they were a local government site or were an official site overseeing the TIF consultation and referendum; a non-government organisation, these included sites that were established by civic activist to protest or support the TIF proposal; political party sites; media sites and those sites employing Web 2.0 technologies. The latter were categorised according to the definition provided by Tim O'Reilly (2005): *'Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.'*

Table 1 'Seedset'

url	**Site type**
http://www.gmfuturetransport.co.uk/	Governance
http://manchestertolltax.com/	Non-government
http://www.gmmgroup.co.uk/index.php?id=71/	Non-government
http://www.tamesidetories.com/	Political Party
http://stopthecharge.co.uk/	Non-government
http://www.tamesidemart.co.uk/	Non-government
http://www.abd.org.uk/	Non -government
http://www.gmtu.gov.uk/reports/transport2007.htm	Governance
http://www.gopetition.com/online/12888.html	Web.2
http://www.agma.gov.uk/ccm/portal/	Governance
http://www.wevoteyes.co.uk/	Non-government
http://www.facebook.com/group.php?gid=44393024872	Web 2.0
http://www.tifreferendumreturningofficer.com/	Governance
http://www.bbc.co.uk/manchester/content/articles/2007/01/24/ 240106_road_pricing_feature.shtml	Media
http://en.wikipedia.org/wiki/Manchester_congestion_charge/	Web 2.0
http://www.libdemvoice.org/manchester-congestition-chrage-5900.html	Political party
http://www.foe.co.uk/resource/press_releases/ manchester_congestion_char_09062008.html	Non-government

Once the 'seedset' was finalised, VOSON was set to crawl the internet on a weekly basis commencing on November 15 2008 and finishing on Jan 12 2009. The referendum concluded on the 11 Dec 2008 and by taking extracts of the network over this period it was hoped would also reveal any temporal changes in the network. From the dataset that was harvested by this crawl only those sites that explicitly referenced the TIF proposal or referendum were retained for further analysis.

To facilitate analysis of the core of the network a sub-set was extracted from each of the network database created by VOSON's weekly crawls. Using VOSON a subset was selected of sites that had a degree score of 4 or more, that is, they were linked to by 4 or more seeds, or they had a reciprocated links with two seeds. The hyperlinked network derived from this process and analysed here is taken from the close of the referendum and contains 58 websites.

Mapping the Congestion Charge network

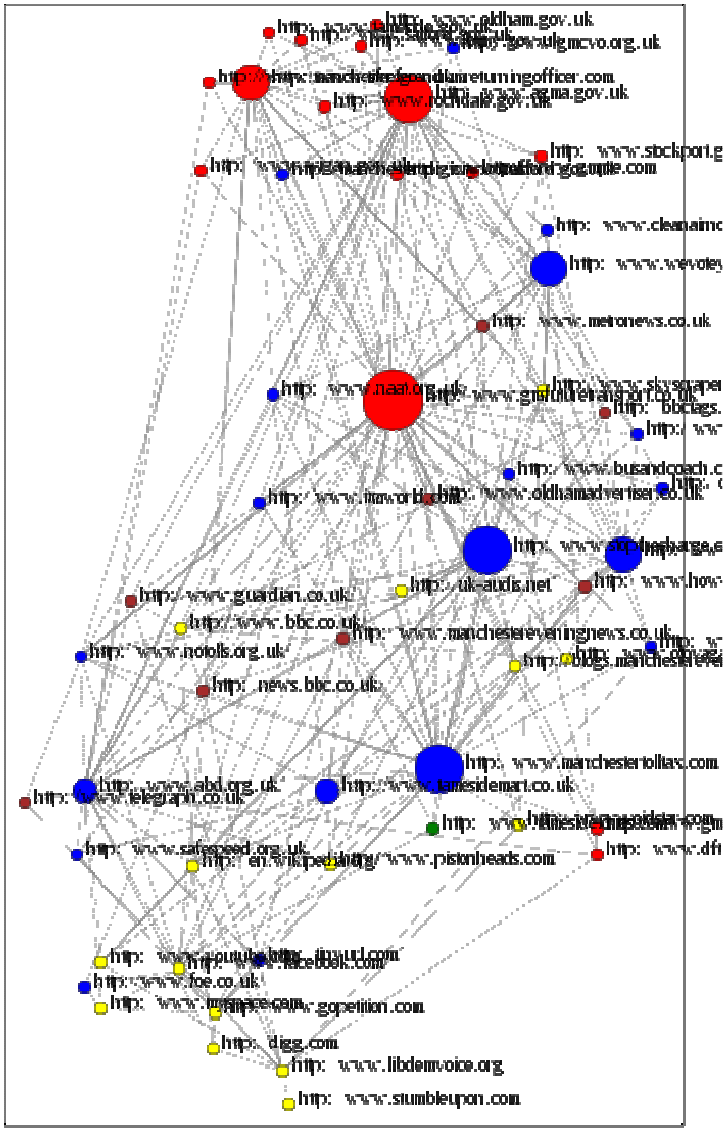
VOSON enables a number of SNA measures to be applied to the selected network. One such measure enables 'authoritative' sites within the network to be identified. Such sites are gauged by the application of a Hyperlinked-Induced Topic Search (HITS) algorithm. This calculates 'authoritative' sites as those sites that are most linked to by other sites in the network. This is a measure of node

centrality, that is, a measure of the extent to which a given node is important or prominent in a network.

Figure 1 details these sites at the close of the referendum in Dec 2008. The size of the node in this map is proportionate to the measure used; the bigger the node the higher the score on the measure. It can be argued then according to this map that the 7 largest nodes comprise 3 ‘authoritative’ governance sites and 4 ‘authoritative’ non-government sites.

The working assumption here, of course, is that such sites are highly referenced because of their attributes or, in other words, the information contained on their sites. The other point to bear in mind is that none of these sites utilised any Web 2.0 technology, they were very much fashioned as Web 1.0, broadcast sites.

Figure 1 ‘authoritative’ sites in network



Site categorisation

Gov		NGO		Political Party		Media		Web 2.0	

However, while this is illustrative of the relational links between these websites, it does not reveal the meaning or significance of these links. The problem is that a number of processes particular to social networks may be driving these links. Of course from an ideal political communication perspective it is the site content that should attract hyperlinks from other sites but as Laumann et al (1983, pg 18) argue *"From a network perspective, individual behavior is viewed at least partially contingent on the nature of an actor's social relationships to certain key others".* Accordingly in simple friendship networks, for example, social phenomenon exist such as 'reciprocity' where someone extends the hand of friendship and one responds in a like manner, or 'transitivity' where a friend of a friend is judged to be a friend. These are examples of purely network structural effects driving social relationships which may have nothing to do with the individual attribute(s) of the person involved. By contrast, there are social relationships which are driven by the individual attributes of social actors. 'Homophily' is a good example of this and is aptly described in the old adage 'birds of a feather stick together'. The challenge here is to distinguish between these network effects to draw inferences about the social processes that may have produced this particular congestion charge network.

Unlocking significance in the online network

The facility to control for structural self-organising properties of the network is an advantage of ERGMs but structural effects need to be specified by the researcher. As Robins et al (2007, pg 176) state '*in general, the structural characteristics in question help to shape the form of the model'*. As such assumptions need to be made about the structural features that are likely to occur in the observed congestion charge network. The statistical model will then determine whether these features are more likely to occur in the observed network than might be expected by chance. For example, an assumption has been made that both reciprocity and transitivity are a feature of the congestion charge network. Accordingly, these have been selected, amongst others (see Table 1), for the model where the index of the level of reciprocity and transitivity is a parameter. PNet is the name of the software chosen to run the ERGM and further details on this can be seen below.

Table 1. *Purely structural effects* used in higher order PNet social selection models

	Parameter	**Explanation**	**PNet parameter name**
1	Density	One actor nominating another actor (baseline propensity to form ties)	Arc
2	Reciprocity	Mutual ties between two actors (models the tendency for reciprocation across the graph)	Reciprocity
3	Simple connectivity	Correlation of the in and outdegree, such that it models the propensity of senders of ties to also receive them	Mixed-2-star
4	Popularity	Indicative of the presence of highly nominated individuals within a network (models the indegree distribution)	K-in-star
5	Expansiveness	Indicative of the activity of actors to engage many others (models the outdegree distribution)	K-out-star
6	Clustering	Triadic clustering (i.e. a friend of a friend is a friend)	AKT-T

Similarly, to model how network links may be driven by the attributes of individual sites the parameters specified in the model are detailed in table 2. These parameters model the propensity of each site with a given attribute (Gov, NGO etc) to send links, receive links or choose other sites with the same attribute. Each of these three parameters was applied to each of the five website categories or attributes (Gov, NGO, Political Party, Web 2.0 and Media) resulting in 15 individual actor attributes to be modelled.

Table 2. *individual actor attributes*

	Parameter	**Explanation**	**PNet parameter name**
1	Sender	The attribute of the sender of	Rs

		the tie, which may be continuous, categorical or binary (models the propensity of an actor with the attribute to send ties, i.e. to be active in network terms)	
2	Receiver	The attribute of the receiver of the tie, which may be continuous, categorical or binary (models the propensity of an actor with the attribute to be popular)	Rr
3	Homophily	The propensity of a person with a binary attribute (e.g. "sex") to choose other persons with the same attribute	Rb

.

Using PNet

PNet (Wang, Pattison & Robins, 2006) is a program developed for the examination of social networks using the new specifications (Snijders *et at*, 2006) for exponential random graph models. PNet can be downloaded from http://www.sna.unimelb.edu.au/pnet/download.html

For the attribute data file each of the website categories (Gov, NGO, Political Party, Web 2.0 and Media) was defined as a binary variable; '1' if it was categorised as such and '0' if it was not.

Reading the ERG model

This ERG model works to produce parameter estimates and associated standard errors which are used to establish confidence in the estimation. According to Lusher and Ackland (2008), '*The parameter estimates of the configurations in an observed network are compared to those in a hypothesized distribution of networks of similar qualities, such as a similar number of nodes and a similar number of network ties. It is then possible to see if there are more or less configurations in the observed network than might be expected by chance. If there are some configurations occurring at greater or less than chance levels, it can therefore be inferred that the observed network structures are not just coincidental observations but consistent patterns of social relations.' (pg 10).*

Table 3 details the statistics and fitted estimation collated using PNet to model the online congestion charge network. To explore the question of structural and individual level effects the network was modelled accordingly as model A, with mainly individual level attributes, and, model B with both structural and individual level attributes.

To briefly explain Table 3. The column down the far left hand side details the chosen parameters to be measured and controlled for: the 6 structural parameters followed by the 3 actor attribute parameters modelled for each of 5 the node/site level categories (Gov, NGO, Political Party, Web 2.0 and Media) resulting in 15 separated actor attribute parameters in all. Model A is characterised by providing an estimate on all 15 individual actor attribute parameters with just one structural parameter. Model B provides measures for all parameters in the model. In other words, it introduces the remaining structural parameters into the model thus controlling for the purely structural self–organising tendencies of the network. Thus to understand how the individual actor attributes play out over and above the structural effects it is necessary to read how the parameter estimates change from Model A to Model B. The estimates of interest are those denoted with an asterix*. This indicates there is a 95% chance (the only standard error applied by Pnet) that the statistic is significant, that is, it has not occurred by chance but is a real social effect. If such a parameter estimate displays a negative sign before it then this indicates that the effect happens at less than chance levels, given the

other parameters in the network, in other words, such network ties are unlikely to be observed within the network. A positive and significant estimate means that such an effect exists at greater than chance levels, and is more than likely to be observed within the network. It is important to emphasise the interdependence of the ERG model and that individual parameter estimates have to be read in relation to other estimates in the model.

Results

In Model A, it can be seen that the modelled homophily effect – birds of a feather stick together- for 'Gov' and 'Web 2.0' sites are significant and positive. This indicates that these sites have a greater propensity to hyperlink with sites similar to themselves. Moreover these statistics remain significant when the structural parameters are introduced in Model B suggesting that this effect is a consequence of the site attribute and is more than likely to occur as a consistent pattern of social relations in the congestion charge network. It can be seen that the more sophisticated structural effects introduced in 'Model B' have resulted in reducing the parameter values for the 'Gov' and 'Web 2.0' sites, but not enough to override the contribution of the sites' attributes. The homophily effect is also significant but negative for NGO sites indicating that they are less likely to hyperlink with sites similar to themselves.

A similar story can be seen when the sender effect for 'NGO', 'Political Party' and 'Media' sites is modelled. Their parameter estimates, significant and positive at Model A, remain significant and positive even when the structural effects in Model B are introduced. This suggests that these sites have a propensity for sending links to other sites and this is a unique consequence of these sites' attributes. Moreover, if these sender effects are read in conjunction with the homophily effect then it can be read that it is only these sites in the network that are sending links to other sites with different attributes to their own.

When the receiver effect is modelled it is only the Web 2.0 sites, in Model B, that are statistically significant but negative indicating that this effect will occur at less than chance levels. If this is read in conjunction with the homophily effect then it can be seen that Web 2.0 sites in the network are less likely to receive links from sites with different attributes.

Table 1. Summary of parameter estimates and standard error (p > 0.05) for online network at close of referendum**

	Model A	Model B
Parameter	Estimate (SE)	Estimate (SE)
Structural		
Arc	-3.79 (1.37) *	-5.58 (1.10) *
Reciprocity		0.99 (0.29) *
Simple connectivity (Mixed 2 star)		0.01 (0.01)
Popularity (K-in-Star)		1.46 (0.21) *
Expansiveness (K-out-star)		-0.79 (0.34) *
Clustering (AKT-T)		0.52 (0.10) *
Actor attributes		
Interactive/ Homophily Rb		
Gov	2.61 (0.38) *	1.99 (0.34) *
NGO	-0.49 (0.30)	-0.60 (0.29) *
Political Party		
Web 2.0	1.76 (0.41) *	1.60 (0.39) *
Media		
Sender Rs		
Gov	0.33 (0.91)	0.55 (1.02)
NGO	2.25 (0.86) *	2.38 (1.01)*
Political Party	0.86 (0.40) *	1.07 (0.42)*

Web 2.0	1.51 (0.85)	1.97 (1.00)
Media	1.93 (0.88) *	2.41 (1.02) *
Receiver Rr		
Gov	-0.29 (1.07)	-1.02 (0.67)
NGO	0.23 (1.09)	-0.51 (0.69)
Political Party	-0.85 (0.94)	-0.76 (0.59)
Web 2.0	-1.76 (1.09)	-1.74 (0.70) *
Media	-1.32 (1.09)	-1.24 (0.69)

****** The Goodness of fit for this model is not perfect. However, the vast majority of statistics did fit (100 out of 105) and this was the best fitting model for this data.

Discussion

The results of the ERG model appear to suggest that website producers during the congestion charge referendum were networking or interacting with other sites in different but meaningful ways. The producers of the Governance sites were mainly linking to other Governance sites and a similar pattern of social relations was being observed by the Web 2.0 site users who were, in the main, linking to other Web 2.0 sites. This was, according to the ERG model, a decision motivated by the attributes of the site(s) and not a consequence of the particular structure of the network. As such, from the Governance perspective it appears there was a conscious decision not to link to the Web 2.0 sites and not to encourage visitors to their sites to participate in the many discussion forums or view the videos hosted by the Web 2.0 sites in the network. Similarly it appears that the Web 2.0 users were only interested in directing their traffic to other Web 2.0 sites and not towards the official information on the proposed 'congestion charge' scheme posted on the Governance sites.

Interestingly, it is the NGO, Political Party, and Media sites that displayed a greater propensity to link to other sites different to theirs and potentially attempting to engage their visitors in perspectives or points of view different to their own.

It is also instructive to view the ERGM results alongside the visualisation of the network as seen in Figure 1. This network map indicates that it is the Governance sites that are the most prominent in the network. However, the ERGM analysis suggests that whilst this may be true on one level, that of the number of hyperlinks received and sent, it is likely, in the sense of engaging with sites content, they were really only of importance to part of the network and for others, such as the Web 2.0 sites, they were less important.

Conclusion

From the evidence presented in this paper it would appear that use of the web in this instance as a space for local deliberation on the policy making process is very much work in progress. The Government's notion of utilising Web 2.0 technologies to create a new 'architecture of participation' was not in evidence in the context of the local civic online discourse around the Manchester Congestion Charge referendum. The propensity of local government websites to link to similar others did not exhibit a desire to engage with '*….new forms of community out there which government currently is unable to talk to'.* However, it was apparent that the 'new forms of community', represented here by the Web 2.0 sites, were also unlikely to engage with the local governance sites. On the face of it then, what this analysis suggests is an online discourse occurring within two different local civic 'communities' but not between them. Ethnographic research associated with this particular investigation is forthcoming and will present explanations for this apparent online schism. However, notwithstanding this, it is clear that the potential of a new, civic, 'architecture of participation' has yet to be fully exploited by civic leaders and activists and it is possible that either the new media and/or governance institutions are not yet 'fit for purpose' in meeting the requirements of reinventing the local governance process for contemporary society.

References

Ackland, R., Gibson, R.K., Lusoli, W., and S. Ward (2007), "Mapping small things on the Web: Assessing the online presence of the nanotechnology industry," paper presented (by R. Gibson and W. Lusoli) at the Annual Conference of the International Communication Association, San Francisco, May 24-28, 2007.

Ackland, R. and R. Gibson (2004), "Mapping Political Party Networks on the WWW," refereed paper presented (by R. Ackland) at the Australian Electronic Governance Conference, 14-15 April 2004, University of Melbourne

Ackland, R. (2008) VOSON System User Guide, The Australian National University

EGov Monitor (2006) Available at: http://www.egovmonitor.com

Electoral Commission (2002) `*Public Attitude toward the implementation of electronic voting'* *http://www.electoralcommission.org.uk*

Laumann, E. O., Marsden, P. V., & Prensky, D. (1983). *' The Boundary Specification Problem in Network Analysis'* . In R. S. Burt & M. J. Minor (Eds.), Applied Network Analysis (pp. 18-34). London: Sage Publications.

Local Democracy National Project (2004) `*Barriers to e-democracy'* Local e-gov National Projects, available online at www.e-democracy.gov.uk

Lomas, A. (2005) '*Rewiring Democracy'* Adam Smith Institute
http://www.adamsmith.org/publications/government/rewiring-democracy-2007112090/

Lusher, D. Ackland, R. (2008) ' A relational hyperlink analysis of an online social movement: asylum seeker advocacy groups in Australia' forthcoming in Journal of Social Structure

Mische, A (2003) *'Cross-talk in movements: reconceiving the culture_ network link'*, in M. Diani and D. McAdam (eds) '*Social Movements and Networks: Relational Approaches to Collective Action'* , Oxford: Oxford University Press, pp. 258_ 80.

Mische, A. White, H (1998*) 'Between conversation and situation:*
public switching dynamics across network domains', Social Research 65: 695_ 724.

O'Reilly, T .(2005) *'Web 2.0 : Compact definition ?'* Available at :
http://radar.oreilly.com/2005/10/web-20-compact-definition.html

Park, H.W (2003) Hyperlink Network Analysis. A New Method for the study of Social Structure of the Web. Connections 25(1), 49-61

Park, H. W., Thelwall, M. and Kluver, R. (2005) ' Political Hyperlinking in South Korea: Technical Indicators of Idealogy and Content'. Sociological Research Online 10 (3) available at : http://www.socresonline.org.uk/10/3/park.html

Postill, J (2008) '*Localising the internet beyond communities and networks'* New Media and Society 10;413.

Pratchett, L. (2006b*) 'Comparing local e-democracy in Europe- a preliminary report'*. Prepared for the International e-Participation and Local Democracy Symposium, Budapest July 2006.
http://www.dmu.ac.uk/faculties/business_and_law/business/research/lgru/pp_lgru_europe.jsp

Robins, G., Elliott, P., & Pattison, P. (2001) *'Network models for social selection processes'.* Social Networks, 23(1), 1-30.

Robins, G., Pattison, P., Khalish, K., Lusher,D. (2007) An introduction to exponential random graph (p*) models for social networks. Social Networks, 29(2), 173-191.

Rogers, R. (2004) *'Information Politics on the Web'* MIT Press, Cambridge Mass.

Rogers, R. & Marre, N. (2000) ' Landscaping climate change: a mapping technique for understanding science and technology debates on the World Wide Web' Public Understanding of Science, Vol 9 , pg 141- 163

Snijders, T. A. B., Pattison, P., Robins, G. and Handcock, M. (2006) '*New specifications for exponential random graph models',* Sociological Methodology, 55, 99-153

Watson, T (2008) '*Speech by Tom Watson MP, Minister for Transformational Government: 'The Power of Information'* http://www.publictechnology.net/modules.php?op=modload&name=News&file=article&sid=15014