

2011

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Recommended Citation

Aoun, Chadi; Vatanasakdakul, Savanid; and Cecez-Kecmanovic, Dubravka, "Can IS Save the World? Collaborative Technologies for Eco-Mobilisation" (2011). *ACIS 2011 Proceedings*. 50.

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Can IS Save the World? Collaborative Technologies for Eco-Mobilisation

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Abstract

This paper adopts a transdisciplinary perspective to studying the use of collaborative technologies for environmental collaboration among diverse stakeholders, mobilised towards creating and achieving shared environmental goals. Environmental collaboration is a complex phenomenon involving a multitude of stakeholders and resources often dispersed across vast geographically, politically and culturally diverse areas. The study contextualises the environmental problem situation in Australia and Thailand, and considers the multifaceted emergence of environmental collaboration enacted by various local Environmental Non-Governmental Organisations (ENGO). A research approach, based on the Actor-Network Theory (ANT) is adopted. By retracing the associations and the complex webs of translations taking place in the environmental actor-networks of diverse stakeholders and collaborative technologies, the study reveals the emerging roles and limitations of collaborative technologies as mediators of eco-mobilisation.

Keywords

Actor-Network Theory (ANT); Climate Change; E-Collaboration; Eco-Mobilisation; Environmental Non-Governmental Organisations (ENGOS)

INTRODUCTION & RESEARCH BACKGROUND

There is a growing consensus in the scientific community of the risks associated with climate change. The global climate has gradually warmed since the industrial revolution in the mid-eighteenth century. The latter part of the twentieth century has however witnessed a substantial acceleration in such increase (IPCC 2007). With the growing awareness of this problem and its associated risks over the past two decades, an international debate has emerged about the causes of such warming and about mitigation and adaptation measures that could assist in decelerating its progress and accommodating its effects. This debate, however, is yet to translate to substantial global action. Given the ubiquity of the problem and its far-reaching economic and socio-cultural consequences, a wide-spectrum mobilisation of stakeholders across the globe, and across all levels of society, is required. It is not only imperative to lobby decision makers towards legislating for action. All stakeholders are called for to take action themselves and coordinate their activities to assist in mitigating what most climatologist consider an imminent and rapidly manifesting risk. We call this action *Eco-Mobilisation* as it involves the enrolment and engagement of actors and a broad range of agencies in order to achieve shared ecological objectives. We use the term 'eco' in a more general sense to encompass both natural and human ecology, mutually under the threat of the predicted environmental calamities. While individual actions are local, their implications are global. Eco-mobilisation requires a persistent and concerted collaborative effort aimed at reaching environmentally sustainable objectives. It requires continued communication and coordination to identify environmental problems, localise them to specific national geographies and communities and take coordinated action.

Efforts towards creating a shared understanding among diverse and dispersed stakeholders, creating a political momentum, along with pooling resources and synchronously implementing them towards joint action, are essential. This suggests that Information and Communication Technologies (ICTs) can play vital and critical roles in real action on climate change as enablers and mediators of both global and local environmental endeavours. Electronic Collaboration (E-collaboration) may therefore hold an important potential for global and

local environmental mobilisation, given the wide spectrum of environmental actors and the multidimensionality of decisions and their ramifications. However, in spite of the global importance of current environmental issues, the diffusion and utilisation of e-collaboration by major stakeholder, particularly Environmental Non-Governmental Organisations (ENGOS) have not yet been thoroughly explored. In fact, research on NGOs (also referred to as the nonprofit sector) has been largely ignored by Information Systems (IS) researchers (Zhang et al. 2010). Moreover, although the need to undertake IS research in the environmental domain has been expressed by many IS researchers (referred to as Green IS/IT), particularly, the importance of integrating IS research within the issue of global warming (e.g. Chen et al. 2008; Desouza et al. 2006; Hasan and Kazlauskas 2009; Watson et al. 2008; Watson et al. 2010), this is yet to attract adequate research attention. In defining the significance of IS research, Richard T. Watson proposes that: “we need to get involved in solving societal problems, and in particular we need to consider the most pressing problem of our times, global warming” (Desouza et al. 2006, p.348). Raghupathi and Friedman (2009) also agree that IS studies that focus on critical social and economical issues, such as global warming, would contribute to IS research by increasing its relevance and transdisciplinarity. These calls are echoed by Hasan et al. (2009, p.6) who propose that “the IS community can take a more positive stance and promote itself as a provider of solutions to environmental problems.”

This research responds to these calls and explores the use of e-collaboration for eco-mobilisation among ENGOS. More specifically this study intends to answer the following research questions: *How do ENGOS collaborate to achieve shared environmental goals? What roles do collaborative technologies play in the emergence of eco-mobilisation in different socio-cultural contexts?* To examine these questions, the study investigates ENGOS adoption of e-collaboration to tackle pressing ecological issues in Australia and Thailand. It contextualises the environmental problem situations in the two countries and empirically considers the multifaceted emergences of eco-mobilisation from various local ENGO vantage points. For this purpose, we adopted the Actor-Network Theory (ANT) as a unique research approach that enables tracing various actors including ENGOS, their activists, collaborative technologies, and targeted ecological problems in a seamless way without changing register (Callon 1986, 1991, Latour 1999, 2005, Law 1999, 2007). ANT enables us to follow the enrolment of actors and the creation of actor-networks as embodiments of eco-mobilisation. Before presenting our empirical results we discuss the role of ICT in NGOs in the next section, followed by presenting the research perspective and methodology. We then introduce the empirical cases of ENGOS eco-collaboration in Australia and Thailand, followed by the analysis and discussion, and finally the conclusion and future research propositions.

NGOS AND ICT

NGOS stand to play a pivotal role in the mobilisation of stakeholders towards joint action and effect. The Australian Government states that: “A nonprofit organisation is one formed to achieve a common goal or benefit, is member or public serving in nature, is based on voluntary membership and is prohibited from collecting or distributing profit” (DCITA 2005, p.8). Millar et al. (2004) explain that NGOs do not exist in isolation, but rather emerge from communities and constituencies aspiring towards a common aim or objective. An NGO is therefore a social, institutional mechanism to operationalise a collective aspiration, coupled with a predominantly voluntarily endeavour to achieve it. These aspirations may arise from the need for services due to the unavailability or departure of public organisations (Bryson 1988) making NGOs and their services indispensable (Klemz et al. 2003). Some examples of such services are provided by Klemz et al. (2003), and include the implementation of programs and policies to assist weaker sections of society, the front-line execution of governmental programs, the provision of educational services, and acting as a watchdog for society.

ICTs are set to play a critical role for NGOs (Klemz et al. 2003), not least of which is the global reach and influence provided by such systems in the age of globalisation (Millar et al. 2004). Moreover, NGO resource poverty and need for multi-stakeholder collaborations often lead them towards using e-collaborative technologies to reduce their operating costs while increasing their centrality and efficacy in environmental campaigns. E-collaborative tools such as online wikis and freely available social networking and blogging websites like Facebook and Twitter, along with web-based email and conferencing systems, such as Skype and MSN Messenger, are revolutionising environmental endeavours, and providing significant voice and leverage to ENGOS that exploit ICTs for eco-mobilisation (Aoun, 2010). In fact, Brainard and Siplon (2002) assert that the advent of the internet has revitalised the NGO sector, enabling the emergence of many technologically savvy, ‘modernist’ NGOs. This, they suggest, has placed competitive pressures on traditional NGOs, forcing them to join-in, as a matter of competitive necessity. This has, however, placed renewed pressures on governments as the objectives, approaches, and priorities of both NGO groups were sometimes conflicting and contradictory, allowing governments to be selective regarding which to support. Consequently, the modernist NGOs were generally favoured, as the internet enabled them to be more flexible, adaptable and timely in mobilising support to new courses of action, which proved a complex undertaking for their traditional counterparts who tend to

lock-in to a particular approach. One of the ways this was achieved is by posting announcements on their website, listservs and electronic bulletin boards advising their supports to take direct action with their political representatives. This also allowed the modernists to easily engage with other NGOs and form coalitions – often posting links of like-minded NGOs on their websites. A fundamental shift came about through the substitution of ‘cheque-book democracy’ with real activism. The traditional model of members supporting a campaign by issuing a cheque to an NGO did not provide members with the opportunity to be directly involved. The new model, enabled by the internet, allowed members to contribute their knowledge, time, and expertise, and became active participants in their support. This nurtured real ownership and passionate attachment to issues, which supporters could follow as they unfold, vote upon, and provide genuine feedback and advice about. Brainard and Siplon (2002) therefore proclaim that the internet has transformed passive donors to committed activists – a seismic shift in NGO operations. However, the adoption and acceptance of ICT still pose significant challenges for many NGOs (DCTIA 2005; Howard and Swatman 2009). Howard and Swatman (2009) propose that the poor diffusion of ICT in the NGO sector is due to technological, social, as well as organisational hindrances, including the intrinsic motivation driving NGO personnel, which need to be preserved or ideally enhanced via the introduction of technology.

RESEARCH PERSPECTIVE & METHODOLOGY

ANT arose out of Science and Technology Studies as an alternative ontological and epistemological approach that aims to explain how the ‘social’ is assembled through associations of both human and non-human (Callon 1986, 1991; Latour 1999, 2005; Law 1999). ANT deconstructs the assumptions behind the traditional conceptualisation of the ‘social’, and argues for a ‘sociology of association’ or a ‘sociology of translation’ where the social is defined not as “a special domain, a specific realm, or a particular sort of thing, but only as a very peculiar movement of re-association and reassembling” (Latour 2005, p.7). Instead of taking the social as explanant ANT proponents converted the social into explanandum, that is, something that needs to be explained. The inclusion of both humans and non-human actors or actants, without privileging any, is another key characteristic of ANT. Importantly, non-humans are often considered to be ‘mediators’ (active agents holding agency, influence, and effect on a network of associations) and not mere ‘intermediaries’ (passive links which hold no agency, significance, or value) (Latour 2005). ANT proposes that actors are in a continuous state of flux, along with the network of associations among and within them (Law 1992). These associations come to light whenever major changes eventuate, and become easier to detect and ‘translate’. The role of the researcher, Latour (1999) advises, is to faithfully ‘follow the actors’, without a priori selection or filtering of actors. It is through providing a thorough description and representation of such actors and their creation and recreation of relations that the ‘social’ and the ‘technological’ are understood and re-assembled – through the researcher’s account (Latour 2005), which serves to explicate the socio-material power dynamics inherent in such associations.

ANT views power as a process emanating from social dynamics that become evident through processes of displacement, enrolment, and representation (Callon 1986). Such processes could be studied through Callon’s (1986) *moments of translation* consisting of four moments, and originating from the French terminology, namely: (1) *Problematization*: where initiating actors define a problem, and a way for resolving it, which renders them indispensable; (2) *Interessement*: where primary actors recruit other actors to their cause, which ensures their network centrality and dominance (3) *Enrollment*: where roles are defined by the primary actors and accepted by others; and (4) *Mobilisation*: where primary actors become representative spokespeople and mobilise other actors into action. Consequently problematization, interessement, and enrollment are important processes for mobilisation.

ANT applies a distinctive research strategy grounded in empirical case-studies and qualitative methods. It views theory as “embedded and extended in empirical practice, and practice itself is necessarily theoretical” (Law 2007, p.2). In adhering to ANT’s standpoint, this study adopted a multiple-case study design incorporating in-depth interviews, documentation analysis, and observations as empirical data gathering techniques to contextualise and clarify how and why actors do what they do. This allows actors to tell their own stories, and the researchers to thoroughly investigate how ENGOS collaborate, and how they use collaborative technologies for eco-mobilisation. The data gathering for the two cases involving 9 ENGOS was conducted – after receiving university ethics approval - within the span of over a year, from November 2007 and September 2008. Although the data were collected in Sydney, Australia (including 8 interviews) and Bangkok, Thailand (including 10 interviews and), they refer to the activities of ENGOS state wide. The interviewees, who were predominantly senior ENGO operatives, took a national operational perspective in describing activities and eco-mobilisation. The textual documents were then imported into QSR NVivo, coded and analysed in multiple iterations. The coding involved both open coding and thematic coding (Ezzy 2002) as part of ANT analysis. The analysis focused on the enrolment of actors, the emergence of actor-networks leading to the processes of eco-mobilisation. A summary of each case study is presented in the next two sections.

THE AUSTRALIAN CASE

Australia is the sixth largest country in the world with an area of 7,692,024 km². This puts it at a comparable size with mainland United States, and about 50% larger than Europe. Australia is sparsely populated, beyond the major capital cities where 64% of the 23 million inhabitants reside. It is regarded as one of a handful of economically developed countries in the southern hemisphere. About 70% of the Australian mainland is classified as arid or semi-arid receiving less than 500mm of rain per annum, with about 35% of its total area classified as desert. However, the coastal rims and the island state of Tasmania are abundant with lush mountainous regions, and the Australian marine environment harbours rich and thriving aquatic life including the Great Barrier Reef which spans the north-eastern seaboard. Unfortunately, this unique marine ecosystem, one of the natural wonders of the world and an international tourist attraction, is under growing threat from climate change due to oceanic acidification leading to coral bleaching and a loss of biodiversity. Equally vulnerable are the sub-tropical north threatened with an increased frequency of destructive cyclones and flooding and the southern regions at risk of extended droughts. In this context ENGOs play a major collaborative role.

Australian ENGOs tend to follow rational, often scientific processes, in identifying environmental issues. The inception of a campaign is predominantly an intra-organisational endeavour, involving an internal negotiation of scope and direction and an identification of potential stakeholders and interest mechanisms. Consequently, once the problem and its corresponding solutions are internally defined, ENGOs adopt an extra-organisational approach focused on pooling of resources to achieve environmental objectives. A campaign based, pragmatic perspective is favoured in all interactions, where collaboration is issue based. An ENGO may work with government on one campaign but lobby against it on another. They may collaborate with another ENGO on a project while concurrently opposing them on other initiatives. Such pragmatism and early internal problematisation empower ENGOs to deploy multiple collaborative strategies to attract campaign support.

Primarily, email is regarded as particularly important by Australian ENGOs because it allows them to readily engage and mobilise their supporters. Moreover, email plays a pivotal role as an obligatory point of passage (OPP). In order for a supporter to join the ENGO actor-network, they often had to join the mailing list, hence declaring an interest in an ENGO's operations. This gains email an abundance of praise:

Email is probably the most important tool we have.

Email really is the thing we use extensively.

We have [...] e-lobbying at the moment. We use quite extensively email lists.

Along with keeping extensive organisational websites, Australian ENGOs are proactive in embracing interactive social media from micro-blogging tools like Twitter, to social networking websites like Facebook. This is seen by many ENGOs who deploy these tools as an essential component of e-lobbying and as a central mechanism for maintaining interest and engagement with stakeholders.

If you go to our website, people can click through and if they want to write a letter to a politician they just click on there and add their name and off it goes so technology does help what we do...

Another advantage of such tools is that they provide grassroots supporters with the means to interact, brainstorm, and evaluate issues. However, this is seen by some ENGOs as a double-edged sword as it empowers supporters to become active members, but also allows other issues, concerns, and worldviews to emerge in a fashion that bypassed centralised ENGO control. To counter this, some ENGOs preferred to initiate and moderate discussion threads and to favour proprietary organisational websites over online social media, as they are seen to offer better organisational control. On the other hand, the use of conferencing tools is very limited among Australian ENGOs. Only occasional use of teleconferencing, via Skype, was reported. This involves the periodic contact of some key stakeholders when a campaign is initiated, and is driven by cost considerations particularly when long-distance calls are required. Dataconferencing was viewed as disruptive and unprofessional and therefore never used.

Importantly, the enrolment of collaborative technologies in the Australian ENGO actor-networks is moderated by four main dimensions, namely, the metropolitan/regional digital divide, demographics, resources, and the traditionalist view of activism. Firstly, while major cities and towns enjoyed extensive IT infrastructure and good broadband penetration, many regional and rural areas, the target of much environmental endeavour, suffer from very poor and slow dial-up connectivity. This restricts the viability of collaborative technologies, particularly social and interactive media, in such context, and forces ENGOs to maintain traditional links with regional stakeholders dominated by postal and phone interaction.

Rural Australia still is the very poor cousin in many areas. So you've got to be very careful what you send [...] there is still a big divide there.

This leads to the emergence of a hybrid actor-network, distinctly segregated by the moderating effect of locality, as depicted in Figure 1 below.

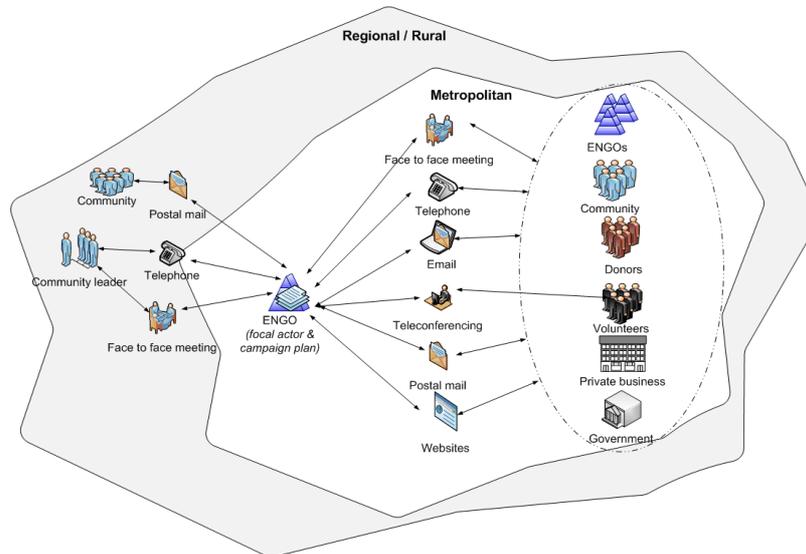


Figure 1. Australian ENGO Interssement

Moreover, demographical difference also plays a role in moderating the use of collaborative technologies, as younger generations are considered to be more technologically savvy and attuned to electronic communication, while older generations are viewed as in favour of more traditional forms of communication, dominated by richness and naturalness (Kock 2008), mainly through face-to-face meetings and telephone conversations, and were more trusting of paper documentation.

...particularly in the older generation, people get so many emails that they tend to ignore them whereas paper tends to get acted on.

Furthermore, given that ENGOs are resource poor and often rely on uncertain sources of funding such as donations and government grants, they are often reliant on volunteers to undertake essential operational roles. The conventional organisational hierarchy and chain of command are somewhat hindered here as volunteers cannot be compelled to undertake their assigned work in a timely fashion.

That also has a burden in terms of work, if one of the links breaks down, say our voluntary webmaster - this is where volunteers come in - if your honorary webmaster is too busy then you get a gap and it doesn't go up on the web. So you do it, you send it and it doesn't happen and then, you know, gaps occur.

Finally, resistance from traditional campaigners, who consider that collaborative technologies detract from the main objective of ENGOs which, in their opinion, should provide for direct involvement in conservation tasks (e.g. forestation) and non-mediated (face-to-face) contact with stakeholders in order to convince them to support an environmental cause. Consequently, ICTs are shunned as an undesired opportunity cost. This is a minority view however, as the majority of ENGOs were experiencing tangible benefits emanating from ICT.

There's not many of us and so proper use of good technology can help us because we can target the correct audiences and become more efficient and effective.

THE THAI CASE

Thailand is a developing country in south-east Asia with a landmass of 513,115 km². The country is divided into four topographic regions spanning from mountainous bushlands and arid plateaus in the north, to fertile plains in the centre, and lush tropical islands and mountain ranges in the south. Thailand is the only country in the region never to be colonised by western powers, from where the name Thailand transpires, which translates to the "land

of the free". Consequently, there was limited impetus for acquiring foreign languages like English or French. Thais complement this proud autonomous heritage with a strong sense of harmony and respect in the way they interact with each other (occasionally interrupted by politically motivated infighting) and the natural context in which they exist. Such sense is continuously nurtured by the Thai devotion to Theravada Buddhism which 95% of the 68 million populations follow.

The strong Thai connection to the land in what was a predominantly an agricultural economy is commonly reflected in Thai art and folklore, and is still witnessed in contemporary ENGO environmental interactions where local communities are viewed as custodians of their environment. An ENGO's main objective in such context is to educate and empower stakeholders to conserve and sustain their environmental milieu. In order to achieve such objective, therefore the establishment of trust is essential. This emanates from the mediation of local authority figures, such as elected government representatives or community leaders, who are contacted by ENGOs, and taken along to meet local communities in order to initiate a trustful and harmonious relationship.

[We are] more on the social environmental rather than scientific environmental. So, the technique that [we use] to get information is basically qualitative research to gather general knowledge of the ranking in basically a qualitative phase, and then [we] will see the enthusiasm of the local community leaders at different levels and see how eager they are to cooperate and see the potentials, if they would be able to continue this project when the organisation [leaves] them...organisation won't be there forever, [we] will try to use someone that has potential and eagerness to sustain the project.

A distinct characteristic of Thai ENGOs is manifested in their joint problematisation with local communities. Although an ENGO may have a conservation objective in mind, it is viewed as a broad tentative assumption that needs to be clarified and developed through discussions with local communities. The ENGO therefore does not assume a superior role or attempt to impose its view (scientific or otherwise) of the problem situation, but rather aims to develop its view, learn from local stakeholders, and jointly define the problem in collaboration with local communities. Along with better understanding, the face-to-face communication is undertaken as a gesture of good will and trust building. There is a suspicion associated with written communication from unknown entities, which is transcended by a 'truthful' face-to-face discussion and relationship building exercise. Moreover, given the mutual learning perspective by which all parties approach an environmental situation, a strong preference for prolonged co-located meetings and discussions ensues. This is also driven, in part, by the often poor or non-existent IT infrastructure in rural or remote areas where much of the conservation work occurs.

Using telephone or face-to-face, I get better information, clear information, and more accuracy; and [I] can go and ... discuss in detail.

Given such perspective, there is a strong focus on instilling and nurturing environmental awareness, where ENGOs collaborate with schools and other social and educational organisations. This is perceived as a fundamental role for ENGOs, as it assists in establishing and sustaining a new generation of environmentally active citizens. ENGOs often contribute to the training of school teachers and the provision of curricula material towards such effect. What is surprising in such context, characterised by a very limited use of inter-organisational collaborative technologies, is the flourishing dependence on dataconferencing tools, like MSN Messenger, for intra-organisational collaboration. This dependence arises from the synchronous communication that dataconferencing provides to ENGO personnel allowing them to discuss issues in detail. The dataconferencing tools are preferred to audio or video conferencing as they are seen as less intrusive in an open office environment, and provide for a short delay in responding which allows for a considered, less impulsive or abrupt, answering. This short delay also contributes for better multitasking opportunities. To complement staff enthusiasm, ENGO management encourage the use of dataconferencing as it assists in reducing costs associated with phone calls, and relays ongoing information on the operations of dispersed staff and stakeholders. This is exclusively for intra-organisational use and is viewed as inappropriate for extra-organisational communication.

Moreover, organisational websites are viewed as fundamental to ENGOs. The concept of 'face' and maintaining a positive presence and reputation is a central social norm in Thailand. An organisational website is the public face of the organisation. However, while Thai ENGOs invest in establishing an online presence, such investment is not carried through to maintaining and regularly updating websites due to resource limitations. Consequently, organisational websites end up being static means to introduce the public to an ENGO and its endeavours that do not provide any online functionality. Any subsequent public interest in collaboration is diverted towards traditional means, such as phone or postal contacts. Moreover, Thai ENGOs tend to avoid using social networking as they are perceived to exist beyond the scope of organisational management and control, and judged as potentially limiting to face-to-face personal interaction and therefore relationship building.

The role that email plays in extra-organisational collaboration in Thailand is particularly interesting. In such context, using email, especially with communities and governmental organisations (who do not usually reciprocate such contact), is viewed as a hindrance to relationship building and is usually avoided:

...some of these guys have email... They don't use it, I send them things once in a while, but I prefer to actually take things and meet face-to-face. Email may be useful to get to know someone, but the thing is in Thai society it is very important, especially in developing collaborations to have face-to-face contact. Actually, if you relied on email, especially at the beginning of a project, it probably would not be helpful. You would lose that initial period we get to know each other.

While email's role is enhanced if a relationship has already been established, such as between colleagues in an intra-organisational context, it remains very restricted in its extra-organisational utility. In the Thai context, it is not viewed as a medium that could assist in relationship building, on the contrary, many fear that it may detract from getting to know people, hence, it is given a conditional secondary role, as depicted in Figure 2 below:

[We] send emails first and then [we] call that person that [we] already have sent email, please check it [...] By doing this, [we] have a better response and also even though this top management they have technology but some of them won't be able to use it by themselves.

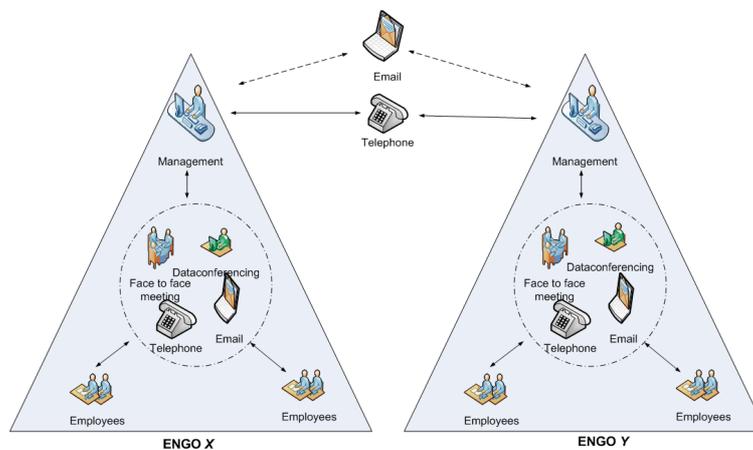


Figure 2. *Extra-Organisational Use of Email*

Within such context, extra-organisational use of collaborative technologies is generally viewed as a double-edge sword. Although it may enable mass communication and collaboration, it may also diminish local values that are viewed as important for preserving the people's connection to the land and therefore environmental conservation. Therefore, although ICT infrastructure may be available in metropolitan areas, a face-to-face approach is often favoured to complement occasional ICT-enabled mass announcements and broadcasts. Furthermore, trust plays a fundamental role in the interrelationship process. ENGOS engage high profile champions that are well known and trusted in ceremonial roles. This assists an ENGO in attracting support for a project or campaign, as it is associated with a trust-worthy and respectable public figures.

DISCUSSION

The ANT analysis and in particular Callon's (1986) concepts of problematisation, intersement, enrolment, and mobilisation, help us investigate how ENGOS collaborate to achieve shared environmental goals and the roles that collaborative technologies play in the emergence of eco-mobilisation. Our findings demonstrate many interesting aspects on how ENGOS in two different socio-cultural contexts collaborate and how their use (or otherwise) of e-collaboration affects eco-mobilisation. From the two contrasting cases we can discern how collaborative technologies are differently translated when brought into relations with other actors within ENGOS and in broader society. Distinct translations of collaborative technologies in the two cases explain the varied roles of collaborative technologies, leading to diverse agencies in achieving environmental objectives.

The findings indicate that, in the Thai case, collaborative technologies are translated into an instrument for extending relations (within ENGOS and more broadly) in a way that does not disturb existing hierarchies and networks that maintain them. This is demonstrated in the continued ENGO focus on *building and maintaining relationships* with local communities. Given that such approach has been traditionally dominated by richness and naturalness (Kock 2008), namely face-to-face meetings and telephone conversations, such preference seems to

detract from the reliance on collaborative technologies and consequently the viability of e-collaboration, particularly at earlier stages of establishing a relationship. This is evident through ENGO endeavours with community leaders and the youth through formal programs and collaborations with educational institutions, such as schools and universities, perceived to build trust through personal presence. Moreover, the strongly *hierarchical* nature of the Thai society and the insistence on the enrolment of elders and respected mediators and representatives necessitates and reinforces face-to-face meetings for establishing trust and building ENGO relationships. Interactions among 'equals' in lineage, position, and social standing also contribute to the maintenance of such hierarchy and reduce the diffusion of e-collaboration and ultimately the efficacy of eco-mobilisation. This is clearly demonstrated in the inter-organisational use of email among ENGOs, where communication is restricted to top managers, and is often complemented by the ceremonial phone call to precede or follow an email. This is also exacerbated by the poor *proficiency in the English language*, the dominant language of the internet. Furthermore, ENGOs in the Thai case, view local communities as *environmental custodians* with their own knowledge and experience. Thai ENGOs approach communities to create a shared understanding and problematisation and assist communities in developing sustainable practices which they can independently continue. This often requires a considerable degree of learning, discussion, and consensus building which seems to detract from the use of collaborative technologies, particularly given the poor IT infrastructure in rural and regional areas where environmental work often occurs, along with the insistence on relationship building and respect to social hierarchy mentioned above. Such attitudes limit Thai ENGOs' ability to use e-collaboration and constrain the scope and the efficacy of eco-mobilisation.

On the other hand, in the Australian case, collaborative technologies are translated into effective means of targeting particular audiences, extending reach and efficacy of eco-mobilisation. This translation is strategic as ENGOs use technologies to influence other actors and mobilise them for reaching their desired environmental objectives. The focus is on campaign success, with an acceptance that the involvement of stakeholders is associated with a campaign's objectives rather than personal affiliations and relationships. Given such perspective, e-collaboration is viewed as an effective means to galvanise broad-based support, strategically target certain segments of the population, and mobilise resources.

Two particular aspects of translation that were revealed in the cases concern ENGO *intra-organisational/extra-organisational* affiliation and *demographics* effecting the adoption and utilisation of collaborative technologies for eco-mobilisation. For instance, in the Australian case, we find that technologies such as teleconferencing are only enrolled by ENGOs for external collaboration. Similarly, in the Thai case, dataconferencing is heavily used within ENGOs strictly for internal collaboration, particularly among younger staff members. Furthermore, the Australian case points to a distinction in the technologies enrolled by ENGOs for collaboration with younger demographics as opposed to those used to collaborate with older generations. Younger generations are viewed as technologically savvy, and are more likely to be interested and engaged via technological means; while older generations are generally construed as valuing a face-to-face or phone conversation, and as being more trusting of hard copy documentation. The Australian case also reflects a consideration of online social networking fora for interactions with younger demographics given their perceived familiarity, affinity, and proficiency with such technologies. Intra-organisational/extra-organisational affiliation and demographics, therefore, play an important role in mediating the translation of collaborative technologies in environmental actor-networks.

Moreover, ENGO e-collaboration in an environmental actor-network is translated through its affiliation with government. Government's agency is evident through its dual role of controlling both environmental policy and technological infrastructure. In turn, environmental policy is an emergent statement of purpose based on a particular government's perspective on environmental issues. Whether a government adopts the position of 'a sceptic or a believer' in anthropogenic emissions and their effects on global warming determines the government's role in the environmental actor-network. A strong role is played by governments either as leaders of conservation action or conversely as a primary opponent of ENGOs undertaking such actions. Consequently, ENGO associations with government, whether friend or foe, are often dependent on a government's stance on environmental issues. This is particularly evident in the Thai case where the *insider/outsider paradigm* (Jordan 1998; Richards and Heard 2005), denoting a distinct collaborative or oppositionist stance towards government, seems to have persisted. Thai ENGOs generally perceived opposition to authority undesirable and inappropriate, and were generally more obliging in taking an insider stance. This made them susceptible to the general lack of interest of governmental personnel in e-collaboration, although collaborative technologies such as email were available. Even when ENGOs attempted to initiate communications with governmental agents through collaborative technologies, there was no reciprocation from their governmental counterparts, rendering such potential unviable. On the other hand, the insider/outsider paradigm seems to have truly dissolved in the Australian case. ENGO collaborations with government were campaign based, rather than absolute value oriented. This empowered ENGOs to enrol and mobilise multiple collaborative technologies to enable campaign specific e-collaboration. ENGOs were not locked in to static positions, and displayed a range of appeasing and confrontational approaches in their campaigning, particularly when operating as part of larger coalitions, in line

with Richard and Heard's (2005) findings among European ENGOs. This may also allude to governmental pragmatism and acceptance of alternative strategies and opinions in public debate.

Finally, ENGO e-collaboration is also mediated by the *metropolitan/regional digital divide* evident in both cases. On the one hand, poor, unreliable or inexistent national IT infrastructure in rural regions and on the other a modern IT infrastructure in metropolitan regions, witnessed in both cases, can be viewed here as a government controlled obligatory passage point (OPP) mediating actor-network association on either side of the digital divide. By controlling the requisite IT infrastructure governments influence the viability of e-collaboration and ultimately limit the efficacy of broad-based environmental eco-mobilisation.

CONCLUSION AND FUTURE RESEARCH

Drawing upon these empirical findings, it becomes apparent that the emergent norms on relationship building, social hierarchy, proficiency in the English language, environmental custodianship, demographics, intra-organisational/extra-organisational affiliation, the insider/outsider paradigm, along with the metropolitan/regional digital divide, all play a mediating role in enabling or detracting from the adoption and utilisation of collaborative technologies and their deployment towards eco-mobilisation. This is of significance, as it demonstrates that the emergences of collaborative technologies within environmental actor-networks are subject to their interaction with a broad-range of established associations. Such associations influence, and are in turn influenced by, the translation of collaborative technologies as agents of eco-mobilisation.

These findings may be of significance to researchers, environmentalist, policy makers, and community wide stakeholders. Particularly, while research on collaborative technologies has been predominantly limited to laboratory settings and intra-organisational situations (Bajwa et al. 2005; Lewis et al. 2007), this research context allowed for an investigation of the empirical roles and real usage of collaborative technologies in complex situations in which numerous stakeholders with diverse interests cooperate to address pressing environmental problems. A limitation of this study, however, arises from its consideration of the actor-network views constructed by a limited number of ENGOs. Although these constructions were largely coherent in each of the cases studied, the realities and constructions of non-ENGO operatives, such as community representatives, governmental representatives, scientists, donors, and private enterprise may differ, due to the fractal nature of constructions (Law 1999). Even ENGO realities, their processes of interaction, and their associations may indeed change, given the volatility of actor-network translation, reconfiguration and convergence. Actor-networks should not be assumed to be 'black-boxed' indefinitely. This calls for an ongoing research consideration by broadening the scope of empirical data collection, and targeting a wide range of stakeholders, which would prove beneficial for exploring other views, realities, and associations pertaining to eco-mobilisation and its convergence over time. Moreover, given the global nature of the problem, and its anticipated solutions, a study of other socio-cultural contexts would shed further light on the roles and agency of collaborative technologies and their mediating effect on global eco-mobilisation. Through enabling a broad-based yet locally informed mass movement of real and inclusive eco-mobilisation, IS could potentially hold the key to saving the world.

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