EXTERNAL INFLUENCES IN INTER-ORGANISATIONAL KNOWLEDGE SHARING

Complete Research

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Abstract

Inter-organisational knowledge sharing is affected by many influences, both internal and external to the collaborative group. This is particularly so in government-industry collaborations where there is increased external stakeholder engagement and complex socio-political issues. While there has been research on the individual and organisational influences on knowledge sharing in the inter-organisational domain, there has been little examination of the external influences that are beyond the control of the collaborative group. This research uses the themes identified in the Environment Influences component of Holsapple and Joshi's Threefold Knowledge Management framework, to examine the external knowledge sharing influences on three government-industry knowledge collaborations. Results show that despite increased technology options, these groups use minimal technology to aid face-to-face knowledge exchanges. Additionally, access to, and promotion of, knowledge resources is influenced by the competitive market that develops in 'fashionable' socio-political issues. The external influences have three key effects on knowledge sharing: lack of technology application hinders the knowledge sharing activities of new members; the competitive market could promote a loss of group knowledge resources and the need to undertake socially or politically motivated projects can minimize the impact of knowledge shared.

Keywords: knowledge sharing, inter-organisational, public-private, external influences, government-industry, collaboration.

1 Introduction

With an increasingly complex, globally integrated world, for many organisations, collaboration provides a number of benefits. Industry collaborations provide opportunities for firms to share financial needs, exchange knowledge and combine complimentary competencies (Hatten and Rosenthal 2001). Inter-organisational collaboration is not restricted to the industry sector. Government and government-industry collaboration can provide multiple perspectives, develop social networks and provide innovative problem solving (von Malmborg 2003; Lozano 2007).

One of the key aspects of these collaborations is the exchange of knowledge between participants. Knowledge sharing is a necessary part of any collaboration as it provides those parties involved with learning opportunities and development of broad perspectives to issues. Sharing knowledge can stimulate the creation of new knowledge that can address unresolved problems or identify new opportunities. However, inter-organisational collaborations are fluid, complex and transient in nature. This can provide additional impediments on the knowledge sharing between those involved, such as:

- Increased stakeholders, particularly in the government and government-industry collaborations such as the inclusion of community groups and state or federal government agencies (Speckbacher 2003; Jones and Lichtenstein 2008; Kaiser 2011).

- The difficulty in developing a shared language between participants with different education and experiences, particularly where organisations have no common ground (Riege 2005).

- Conflicting agendas of the organisations such as the predominantly social focus of government organisations or the predominantly financial focus of industry organisations (Lozano 2007).

- Greater complexities with regards to oversight and negotiations (El-Gohary et al. 2006).

- Political and financial risks such as changes in legislature or government and political opposition (Kwak et al. 2009).

Despite the increase in inter-organisational collaboration, very few studies have investigated the role of knowledge sharing in these contexts and in particular the government-industry domain. Additionally, there has been little examination of how external elements can influence the knowledge sharing on the collaborative group. The central research question of this paper is what external influences affect knowledge sharing in government-industry inter-organisational collaborations?

This research utilised the Environment Influences identified in Holsapple and Joshi's Threefold Knowledge Management framework (2000; 2004) to examine the external issues that affect the knowledge sharing activities in three government-industry collaborative groups focused on regional sustainability.

This paper contributes to the existing literature on inter-organisational knowledge sharing and specifically to an understanding of external influences on collaborative knowledge sharing.

The rest of this paper is organised as follows. It begins with an examination of the issues in inter-organisational knowledge sharing and then a focus on the particular complexities of collaboration. An overview of the theoretical framework is provided and the Research Method outlines the data collection methods used and the analytical approaches of the data. Results of the study are provided and discussion on how the external Environment Influences defined by Holsapple and Joshi have influenced knowledge sharing in the inter-organisational collaborative groups examined.

2 Inter-organisational Knowledge Sharing

Inter-organisational relationships provide many benefits to those involved. They provide access to key competencies that may not be readily available internally, knowledge, experience or markets not currently available and opportunities to develop projects that were not achievable by one organisation alone (March and Simon 1958; Powell et al. 1996; Dyer and Nobeoka 1998; Newell and Swan 2000). The benefits of inter-organisational knowledge sharing also stem from the differences in perspective and the access to diverse knowledge that can bring different and innovative approaches to the resolution of problems (Lozano 2007). These differences in approaches and problem solving can aid in developing process efficiencies (Fadeeva 2004). For example, Lieberman found consistent productivity improvements in Japanese auto manufacturing networks over their U.S. counterparts (1994).

While the exchange of knowledge brings benefits to those involved in the inter-organisational collaboration, knowledge sharing in these relationships is far too often limited. There has been extensive research into knowledge sharing barriers within the individual and organisational domains that include level of understanding between those communicating, time to exchange knowledge, power imbalances between those involved in the exchange, trust, group boundaries and organisational culture (Davenport and Prusak 1998; Koenig 1999; Dixon 2000; Cabrera and Cabrera 2002; Rubenstein and Geisler 2003; Miller 2005; Riege 2005; Widen-Wulff 2007; Chait 2008; Helms et al. 2011). Additionally, technology itself has provided many opportunities for knowledge collaboration but can also hinder the process through poorly developed infrastructure and lack of support (Riege 2005; Marchewka 2006).

For the inter-organisational domain, these individual, organisational and technical barriers still apply. In some cases, the inter-organisational context can exacerbate the known barriers such as the increase in stakeholders that includes the individuals participating, the organisations they represent, personnel from the organisations and others connected to the organisations (El-Gohary et al. 2006; Kwak et al. 2009). Increased stakeholders can make developing trust and a shared understanding more problematic simply through the increase in participants. In addition, inter-organisational collaboration brings its own set of barriers to knowledge sharing. There can be legal difficulties such as level of 'equity' in the provision of resources or ownership of knowledge, and problems with the protection of proprietary knowledge (Dyer and Nobeoka 1998; Mowery et al. 1996; Speckbacher 2003). Defining equity of participation in the knowledge sharing to ensure that all benefit can also be problematic (Dyer and Nobeoka 1998). The type of inter-organisational collaboration will vary the amount these issues can affect the knowledge sharing influences.

2.1 Collaborative Knowledge Sharing

Inter-organisational collaborations develop in three main forms: 1) industry-industry; 2) government-government; and 3) government-industry, sometimes referred to as public-private.

The bulk of the inter-organisational knowledge sharing literature has focused on the industry collaborations such as in supply chain management (Dyer and Nobeoka 1998; Yang and Jarvenpaa 2005; Dyer and Hatch 2006; Wilhelm and Kohlbacher 2011; Marksberry 2012), research collaboration for product development in high-tech industries (Appleyard 1996; Casper 2007; Almeida et al. 2008; Tang 2008) and the development of knowledge networks within industry clusters (Giuliani 2003; Tallman et al. 2004).

Government collaborations are focused on inter-agency or public and non-profit relationships rather than inter-country collaboration (Wastell et al. 2004). These relationships often focus on complex social issues such as poverty, economic development, crime, child abuse and healthcare (Mulroy 2003; Wastell et al. 2004; Currie et al. 2007).

Government-industry collaborations focus on relationships between government agencies and industry organisations, though in most cases, the government participants are the initiator and driver of the relationship (von Malmborg 2003). Literature on government-industry knowledge collaboration, while limited, has examined broad, social issues such as disaster relief, sustainable development initiatives, social and economic growth or healthcare (Provan and Milward 1995; Manring et al. 2003; Kraak et al. 2012; Chen et al. 2013 Kozuch and Sienkiewicz-Malyjurek 2013).

While there has been research into knowledge sharing in these three key forms of collaboration, the main research focus has been in inter-industry collaborations. However, research into inter-organisational collaborations has shown that inter-industry collaboration has reduced while inter-government and government-industry has increased (Bakker et al. 2011; Hoecevar et al. 2011; Kaiser 2011). The increase in these forms of collaboration is due to the recent rise in complex projects with overlapping jurisdictions, shared responsibilities and a need to reduce or offset the expenditure of public funds (Jones and Lichtenstein 2008; Kaiser 2011). Examples of these complex projects include the 2005 Gulf Coast hurricanes in the USA and the need to develop coordinated, disaster resilient communities (Chen et al. 2013); sustainable development initiatives like the Monroe 2020 development of a geographical information system (Manring et al. 2003), social and economic growth with the Europe 2020 project (Kozuch and Sienkiewicz-Malyjurek 2013) or global malnutrition issues (Kraak et al. 2012). The knowledge sharing research in these types of projects has often focused on the collaboration between members within 'the group' of participating organisations.

As mentioned above, the knowledge sharing aspects that occur at the individual and organisational level also occur at the inter-organisational level and the inter-organisational domain provides its own

set of issues. The addition of further stakeholders can make the opportunities for knowledge sharing difficult. Many of the inter-industry influences on knowledge sharing are evident in other forms of inter-organisational collaborations including organisational culture, resistance to change, lack of managerial support and trust (Zhang et al. 2005). However, barriers are exacerbated where there is a mix of organisations that do not share common terminology or agendas and lack of physical structure and transient nature as can occur in government-industry collaborations (Provan and Milward 1995; Hartley and Benington 2006; Manring and Moore 2006; Lozano 2007).

To further complicate matters, in inter-organisational collaborations that include a government contingent, there are a number of external influences that can also affect the collaboration between members. These include political influences such as the reliability of government, changes in legislature, political opposition, market and revenue risks due to an inaccurate demand for results, and social pressures (Kwak et al. 2009; Kraak et al. 2012). However, there has been little research on the effects of these external influences on government-industry knowledge sharing.

3 External Influences on Knowledge Sharing in Government-Industry Collaborations

To structure this research, the Environment Influences from Holsapple and Joshi's Threefold Knowledge Management (TKM) framework were selected (2000; 2002). The TKM examines three areas of influence, Managerial, Resource and Environment. While Managerial and Resource Influences on knowledge are predominantly internal, the Environment Influences identified by Holsapple and Joshi examine external aspects that are beyond the control of the collaborative group (2000; 2002; 2004).

The key themes within the Environment Influences are:

- Competition – considers the competitive position in which the knowledge group operates.

- Fashion – focuses on pressures that the group may face to align itself with current trends in its environment.

- Markets – within which a knowledge group gains resources or delivers their product, in this case product is knowledge from the group.

- Technology – the state of technology available to use in their knowledge sharing efforts.

- Time – pressures to accomplish specific tasks within a specified timeframe.

- GEPSE Climate – that refers to the combined Government, Economic, Political Social and Educational climate within which the knowledge group operates (Holsapple and Joshi 2000; 2004).

The application of the Environment Influences of the TKM framework over other Knowledge Management (KM) frameworks provides a number of benefits:

- The framework recognises earlier KM frameworks providing a solid connection with theoretical development.

- Holsapple and Joshi recognised and included several variations of the framework for use in exploring different KM issues (2000).

- It includes inter-organisational aspects with the inclusion of the Environment Influences.

- It has been successfully used to examine KM and knowledge sharing initiatives in previous research on Nortel Networks (Massey et al. 2002) and the US military (Bartczak 2002; Myers 2006).

There are many known internal barriers to inter-organisational knowledge sharing. However, the research has focused on industry collaborations and there is limited examination of external knowledge barriers that collaborative groups have no control over. With the increased stakeholders and political influences in government-industry collaborations and a growing need for them to exist and succeed, identifying external influences that effect knowledge sharing in these collaborations can improve the effectiveness of the interactions. The Environment Influences identified by Holsapple and Joshi provide a demonstrated theoretical basis to examine these issues. The purpose of this paper is to examine the external influences on knowledge sharing in inter-organisational collaborations involving a mix of government and industry organisations.

4 Research Design and Method

An in-depth multi-case study examination of three regional, inter-organisational collaborative groups was conducted to develop an understanding and theoretical explanation of how the external environment influence the knowledge sharing opportunities (Yin 2009). The three case study groups are regional, government-industry collaborations focused on sustainability issues. These groups involve a mix of members representing state and local government agencies, industry, non-profit and educational institutions. They have all been in operation for at least three years, meet on a regularly scheduled basis and have a designated facilitator to manage the group's interactions. Table 1 provides a summation of the three case study groups. The use of multiple case study groups provide opportunity for cross-case analysis and/or the replication of findings for a more robust result and generalisation (Benbasat et al. 1987; Lee 1989; Yin 2009)

Table 1 Case Study Group Characteristics

Group	Established	Active Members	Member Type	Interaction Frequency	Leadership	Governance
EnviroAlliance (EA)	2002	30	Local/State Govt, Industry, Education, Non-profit	Bi-monthly + events	Chair	Board
SustainNetwork (SN)	2006	30	Local/State Govt, Industry, Education, Non-profit	Bi-monthly when funded	Facilitator	Committee
GreenAction (GA)	2007	12	Local/State Govt, Industry, Education	Monthly	Facilitator	Board

Note: names of groups and the names of interview participants quoted throughout have been changed to provide anonymity.

The main data collection methods involved observation of group interactions and an interview and questionnaire. During a period of 14 months, the groups were observed at a number of events (group meetings and knowledge sharing sessions). Questionnaires were provided to 42 participants across the groups with 33 returned. The questionnaires addressed the development of personal networks and informal knowledge sharing channels by members in addition to demographic information on participants such as organisational type and role within the network. This data was directional, indicating who members seek out rather than the assumption of reciprocal communication to highlight knowledge experts (Wasserman and Faust 1994). Semi-structured interviews were conducted with 23 members from the groups including interviews with the facilitators of each group, and members from each main organisational type (state and local government, industry, non-profit and educational). Audio-recorded interviews lasted between 30-60 minutes and were transcribed. There was also a review of group documentation and email interaction.

Data analysis involved Social Network Analysis (SNA) of the questionnaire data and coding of the interview and observation data. Questionnaires and observed interactions were analysed through SNA using UCINET to develop network maps of the interactions between members and between the three groups to understand the development of personal networks and informal knowledge sharing channels (Wasserman and Faust 1994; Borgatti et al. 2002; Hanneman and Riddle 2005). Centrality analysis was applied to examine the degree of contact a member has with others in a network (Wasserman and Faust 1994). Through centrality analysis, network maps highlighted prominent members sought for their knowledge and the number individual of members participating in multiple case study groups. Network maps also highlighted the connections across the three case studies through informal links such as social, work and personal connections.

Seed coding from the theoretical framework (Holsapple and Joshi 2000; 2004) provided for top-down micro-analysis of the interview and observation data to identify external influences on the knowledge sharing activities of the groups (Miles and Huberman 1994). Coding analysis was independently verified by two additional researchers and interpretation of the subsequent coding discussed to develop and refine consensus of the results (Miles and Huberman 1994).

5 Results and Discussion

The results of the analysis of interview and observational data highlighted several key external influences on knowledge sharing in the case studies. The lack of technology application and level of competition were most prevalent. The GEPSE Climate, by itself, had little effect on knowledge sharing but did combine to influence fashion and time on these activities.

5.1 Technology

Technology had little application in the knowledge activities of the case study groups. The predominant use of technology was email and phone for communication and each group had a website, though in all cases the websites had not been updated in over two years. For GreenAction, the website was changed to an 'Under Construction' page during the observation period and eventually removed. There was no centralised data repository to store documentation such as minutes of meetings, grant applications, white papers developed or supportive material in each group. The groups also did not utilise social media to support their interactions.

Facilities such as computers, tablets or smartphones were not provided by any of the groups. Members' utilised personal devices or those provided by their own organisations. The case groups had no technical or financial resources to support use of technology.

GreenAction and EnviroAlliance utilised email to carry out discussions or voting on issues outside of group meetings. SustainNetwork was more limited, using email only to distribute a monthly newsletter from the facilitator. During the observation period, GreenAction utilised email discussion several times to follow up on topics raised during group meetings that could not be resolved at the time. They also used email to vote on a time sensitive issue.

The facilitators of the case studies did not actively promote technology usage. When asked about the use of videoconferencing in GreenAction to reduce travel times for some of the members, Nadia_GA indicated that not all of the host members had videoconferencing technology. However, she was concerned that the travel time to meetings was not environmentally friendly and "…*trying to talk to people about how we need, as an environmental group, to start looking at Skype and stuff like that to have people as part of meetings*". This was the only indication that a member of any of the cases was considering the use of technology to help the group activities.

None of the interviewees indicated strong support for technology usage either beyond the use of online access to journals. Matt_EA indicated that he thought tools such as social media for collaboration was mostly *"…a lot of noise"*.

While these findings indicate that the actual use of technology is limited in these cases, does it impact on the knowledge sharing? For the out-of-date websites, it reduces the external boundary spanning of knowledge on the groups as their latest projects are not provided in an easily accessible location.

For group interaction itself, the lack of technology for documentation storage and access does impact on the new member's ability to learn the decision history of the group and topics that have previously been discussed. This lack of repository can impede the integration of new members to the groups. There is a steep learning curve for new members to develop a shared language with the group they join and in developing understanding of previous decisions and the agenda of the group (Van Der Meer et al. 2013).

While a lack of financial and technical support does prevent customised tools being implemented in the groups, there are free alternatives that could be utilised. However, in these forms of collaboration, there may be little need for more complex technology. For example, the National Response Team (NRT) predominantly used phone and email to maintain real time knowledge sharing between members when dealing with the Deepwater Horizon oil spill (United States Coast Guard 2011). This NRT was a similar collaborative group involving mostly representatives of government agencies. Yet, in other inter-organisational collaborations, established technical support has been demonstrated to reduce relational conflicts through knowledge exchanges (Cohen and Levinthal 1990; Mowery et al. 1996).

The findings here indicate that technology does not have a strong influence on the knowledge sharing activities in government-industry collaborations. The lack of funds and a centralised technical support limits the implementation in this context. However, the demonstrated need to improve documentation archiving means that other technology options could help. Further research on the use of free, collaborative tools to support this approach is needed. However, if there is no supportive environment for implementation from the facilitators, the use of alternative technologies may not be viable.

5.2 Competition and Market

The 'competitive market' in which the three groups operated was high. The three case study groups operated within the same geographic region. In addition to these three groups, there were two other groups focused on sustainability within the region that were not included in the study as they did not involve government-industry collaboration. During the observation period, a fourth government-industry collaboration with a focus on sustainability was started. Each of these groups was found to be competing for resources, particularly in terms of personnel and in attempting to provide their findings to local and State government bodies.

The increased competition with multiple sustainability groups can have both positive and negative influence on their knowledge activities.

In competing for resources, it was demonstrated during observations and in interviews, that individual members of the groups and/or their organisations were members of more than one of the inter-organisational sustainability groups within the region. Figure 1 demonstrates there were nine members that participated in more than one of the three case study groups (indicated by the purple nodes). All three case study groups have at least one shared member participating. A number of the participating organisations operated in multiple groups (demonstrated by the red connecting lines), with one organisation operating in all three groups observed (the large cluster of interconnected participants with red lines).

For those people in more than one group, the demands on their time increased as groups competed to maintain access to their personal knowledge. "*The problem I find, my time is locked down meeting after meeting after meeting, often with the same people, talking about a slightly different version of the same thing" (Gina_SN)* discussing how her requirements as part of both EnviroAlliance and Sustain-Network can impact attitude to participating. The pressure of being part of both groups could result in her leaving the field to focus on other priorities. This would result in the loss of a knowledge resource for both groups.
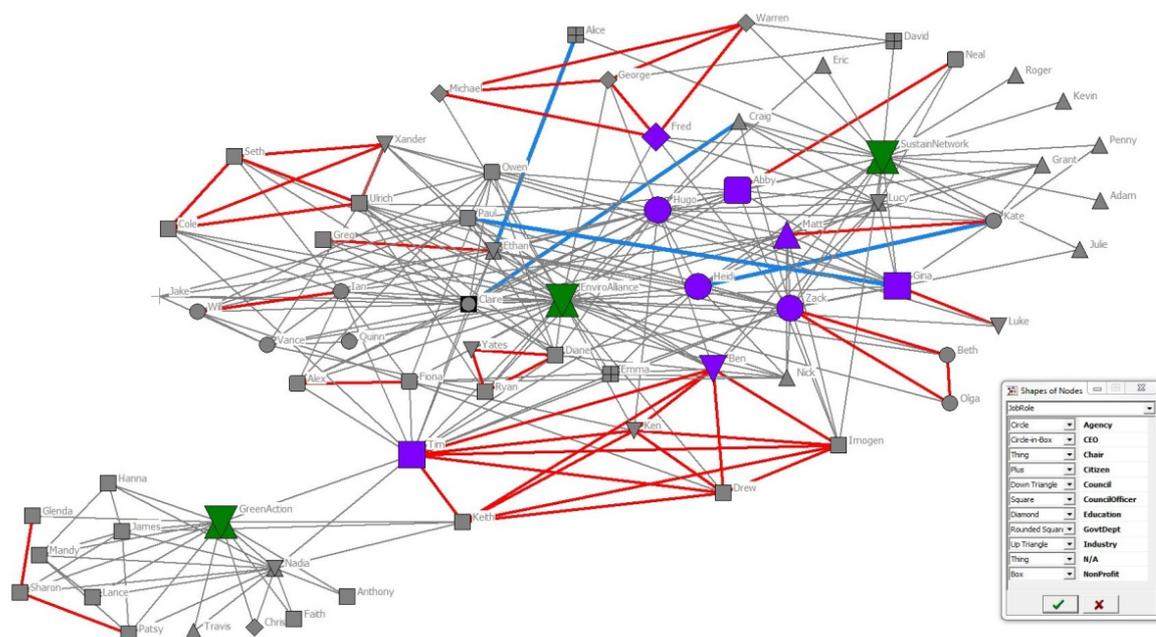

Figure 1 Cross Case Study, Organisational and Individual Participation

Note: Green icons are the case study groups (enlarged by variable type to improve identification); purple icons indicate participants who are members of more than one group; blue lines indicate personal relationships between participants; red lines indicate work relationships between participants. The shape of the icon indicates the organisational type of the member as outlined in the legend provided. The NetDraw spring-embedded algorithm was used to position nodes.

In a positive view, there are opportunities to exchange knowledge between groups via members and organisations operating in multiple groups. This allows the further dissemination of knowledge. However, in a negative sense, it can make groups difficult to differentiate their focus and could also lead to the loss of knowledge sources as members leave due to time pressures.

With a number of sustainability groups in the region, there was evidence that the market for a group's 'product' could be reduced. Ongoing discussions in SustainNetwork focused on how they defined themselves with the broader mandate of sustainability compared to their previous niche focusing on waste management. One of the difficulties they discussed was how to continue to be of interest to their members and how to attract new members to their group. Green Action also struggled with this issue to a lesser extent. EnviroAlliance did not have a similar problem, having a clearly defined product and purpose.

However, the increased awareness of sustainability as a social and political issue (GEPSE) has led to increased state and federal government interest and in turn, has led to the provision of more and larger grants than were previously available. The access to increased finances allows for more projects or support to group operations thereby increasing knowledge sharing opportunities.

During the observation period, the level of discussion on issues to do with finances increased. In particular, both EnviroAlliance and GreenAction discussed potential grants that were being advertised or developed ideas that could fit the criteria of new grants being proposed. EnviroAlliance also waited on the results of a grant application led by three organisational members of the group.

Operationally, EnviroAlliance and GreenAction combined limited membership fees with grants and thus were less affected by external financial issues. In contrast, SustainNetwork struggled to maintain consistent operational funding as their finances were only from government grants. They had difficulty finding grants to support the group's operations. The changing political climate and increase in sustainability groups removed traditional government funding sources for SustainNetwork. This contributed to the group's sporadic operations and a reduction in member attendance which, in turn, limits knowledge sharing opportunities and sources.

In time, groups could be competing for the same government grants available. This could then lead to a reduction in potential financial resources available for the groups. Where their operations rely on government grants to exist and operate, the groups could eventually disband through lack of financial support.

The interest and growing number of similar groups indicates a need for the knowledge developed within these collaborations and provides opportunities for increased funding that can improve operations and projects developed. This can provide positive knowledge sharing and in turn, knowledge creation. However, it can put pressure on the members and organisations across multiple groups that can lead to the loss of these knowledge resources if they are unable to maintain attendance. With no documentation archive, the loss of personnel in these groups means a loss of the collective group memory.

5.3 Fashion

In combination with the current social and political climate (GEPSE) the 'fashion' of sustainability as a popular concern has led to pressures to conform the results of group knowledge sharing to ensure that their message is heard and to act on these current trends.

In EnviroAlliance and GreenAction there was evidence that they adjusted their external knowledge sharing to improve acceptance of their message, through pragmatic boundary spanning. In Claire_EA's role as a gatekeeper and filter of knowledge, she indicated the need to alter and adapt messages to improve 'buy-in', *"...because it's no use putting up something...that's at odds with what the council's doing...and same with the government departments" (Claire_EA).* This view was supported by other participants who needed to conform the message to improve acceptance with political views. Ethan_EA indicated that *"...the politics of the Board are quite different to the politics of the (group) and so the manner in which I tell the Board and when I tell them needs to be sensitively handled".* While Mandy_GA indicated that she needed to adjust the message to gain support for initiatives, *"I need to be able to demonstrate what the objectives are going to be ... I have to be able to argue for things, make a case for them".*

However, there was also evidence that the pressure to conform does not just relate to adjusting the message delivered but can lead to the change of a groups purpose. SustainNetwork altered their overall purpose in order to conform to the changed operations of the government agency that provided the bulk of their funding during 2010/2011. Members had indicated that the previous focus, on the narrower field of waste management, differentiated SustainNetwork from other similar groups in the region and was more useful to them, *"Who are they going to sell this business plan to?... There are not many people who want it unless it's targeted" (Craig_SN).* However, SustainNetwork adapted their purpose to the wider field of sustainability to ensure continued funding support from the government agency.

The government agency that provided the bulk of SustainNetwork's funding had widened its own scope through a merger with other agencies so the government could be demonstrated as having a sustainability focus. The state government at the time had merged several agencies into a sustainability focused organisation because of increased attention on issues of waste management and resource efficiency including water, material and energy efforts. This need to conform to the agencies changing agenda was reinforced when the agency was reviewed in 2011 after a change of state government. The agency's strategy was adapted to ensure it aligned with broader government policies. If SustainNetwork did not adjust its focus, it would jeopardise the bulk of their operational funding and the future operations of the group.

For EnviroAlliance and GreenAction, adapting pragmatic boundary spanning to meet political interests provided a positive influence on knowledge sharing with external stakeholders. SustainNetwork's more extreme reaction to changing pressures, altering the group purpose, negatively impacted knowledge sharing internal to the group even though it contributed to on-going operations.

Sustainability is a key issue at the moment but there are many perspectives, differing opinions on what the problems are and some quality issues in the knowledge available. The popularity of the topic, the concerns on knowledge quality, media attention and public demand mean that at this time there is some question of whether it is a fad (Dahlberg 1991; Burritt and Schaltegger 2010).

In GreenAction, under their previous leader, the group took on many projects with little regard for the substance and outcomes of the project. This need to appear active in sustainability demonstrates the group's pressure to respond to public perception on this topic and social pressures. An example was a project that examined the use of industrial roofs for placement of solar photovoltaic (PV) panels. The problem with this project was that there were issues about who would receive the energy payments for power sent to the grid and who would pay for the panels (local government, the company, or the building owner)?

As group members indicated, the legislation was not yet developed to answer these questions or make the project feasible. *"But that's a classic example of a project being scoped and undertaken without really looking at what the reality is. That project sort of started when I joined (the group). And as soon as I heard it, I was like, 'that's not going to happen'. ... it's at a point where the business case for solar PV on industrial roofs ... if there was a business case for it, it would be happening"* (Mandy_GA).

The project was promoted by the group and the member councils because of the community and media interest in solar panels at the time. However, the project was somewhat aspirational, *"...it should have been an investigation, not an actual demonstration project, but just a piece of work that looked into what are the barriers to putting solar PV on industrial roofs"* (Mandy_GA). As a result, the project even though completed, provided no value and little effective knowledge because there was a *"lack of proper planning and lack of time to really think it through and ask the difficult questions and not go oh we haven't got time to answer that, we need to rush on and do it"* (Nadia_GA).

There was no evidence of this pressure to implement projects in EnviroAlliance. However, they had only just begun to develop projects during the observation period, despite the more mature status of the group compared to GreenAction. SustainNetwork did not develop any group projects for comparison.

There is the potential for groups to look like they are covering many of the current topics to show the community that something is being done about social issues. As the case studies involved a mix of government and industry members, this can result in the groups taking on projects that are currently popular, rather than that are strategically viable. Thus the groups can be tempted to take on projects that relate to a fad. This can lead to the collection of knowledge that has little effective value.

The resulting influence on knowledge sharing by social or political fashions can be both positive and negative. Conforming knowledge to improve reception increases the distribution of that knowledge but may reduce the message to something less effective. The quick uptake of fashionable social issues may mean the collection of knowledge that has little effective value to the group or its external stakeholders.

5.4　Time

There was not a strong influence and application of this factor in the inter-organisational groups examined. The main concern with time affecting resources was in meeting deadlines for funding applications in most cases, something that any group may deal with. For EnviroAlliance and GreenAction, the external influence of time on their knowledge sharing activities was limited to this aspect.

However, external time constraints did influence the selection of meeting spaces and advertising of events for SustainNetwork due to the requirements of their funding body. When SustainNetwork was allocated funds during the observation period to host meetings for members, there was a requirement that the events be held before the end of June 2010. However, notification that the finances would be available to support meetings was not made until February. This meant that the group's facilitator only had five months to plan and hold four events that included finding sufficient meeting space, organising catering and marketing the event. Additionally, themes for the events and appropriate guest speakers also needed to be sourced.

Pressure was applied to develop these meetings within a set time frame. The short notification time on advertising and availability of meeting spaces did affect both the quality of the knowledge sharing possible in the meetings both positively and negatively. For SustainNetwork, the meeting spaces were volunteered by members and could be problematic but also had beneficial aspects on the knowledge sharing. For example, one meeting attended was held in a café located in the foyer of an organisation. While the meeting space was cordoned off for the meeting, ambient noise made listening to guest speakers difficult.

Another volunteered facility was a recently opened community centre that had significant sustainable building aspects incorporated in its design. The meeting included a guest speaker from the architectural firm to discuss new innovations in green building design and included a tour to view the innovations incorporated in the community centre. This provided not just new information, but a hands-on, practical demonstration of the concepts discussed. One interviewee highlighted, *"...it was a great example seeing what was happening locally and (the architectural firms), design and construction principles, so that as a case study is fantastic to be able to draw from" (Julie_SN).* This aspect of the meeting space was well received and promoted a positive information exchange between members in the discussions after the meeting. It could be argued that the meeting space itself, in this case, conveyed knowledge to the group.

SustainNetwork was also able to replicate this positive knowledge facilitation at another meeting held at a vocational training facilities restaurant that included a tour of their environmentally friendly technology for food preparation in the restaurants kitchen. The theme of the meeting was on food waste and its sustainability impact. While some meeting spaces for SustainNetwork were not optimal, meeting spaces teamed with a themed discussion promoted positive group interaction and knowledge sharing.

The short timeframe affected the attendance at the events with all events promoted at the one time. Many of the organisations representatives were unable to schedule time to attend with only three weeks notification. The short notice contributed in reducing the potential number of members participating in the exchange of the knowledge and its diffusion within their organisations. The first meeting was attended by less than 20 members while the last event achieved over 30 participants.

External deadlines imposed on operations can reduce the opportunity to find suitable resources to support the knowledge sharing activities. Time pressures may not necessarily affect the knowledge sharing, but does affect the resources that help facilitate knowledge sharing activities.

6   Conclusion

With an increasing need for inter-organisational collaboration, the focus of this paper was the external influences that can affect knowledge sharing activities in these endeavours. The Environment Influences from Holsapple and Joshi's TKM framework identified the potential external influences (2000; 2004). The external influences included the competitive market, technology, fashions, time and the socio-political climate (GEPSE) (2000; 2002; 2004).

Through examination of three government-industry collaborative case studies that focused on sustainability, the results of this research highlighted that:

- Technology is not well utilised in supporting knowledge sharing, partly due to the lack of financial and technical support. This results in out-of-date channels of communication through poorly maintained websites and no alternative channels to record group discussions.

- The lack of documentation archives results in a steep learning curve for new members entering into a group as they have no place to learn previous decisions, operations or group language.

- The competitive market provides pressures that could lead to a loss of knowledge resources as members or organizations operate across multiple groups.

- The competitive market can make establishing the purpose of a group difficult, reducing the chance to attract new members for further knowledge dissemination.

- The pressure of socio-political fashions means groups may waste time and knowledge resources on projects that provide little substance or value.

- The demands of external stakeholders can lead to group's rushing development of knowledge sharing activities that reduces their effectiveness.

The focus in this paper has been on the external influences on knowledge sharing in these collaborative groups. However, the framework used includes two internal influences – Managerial and Resources including trust, organisational culture, and individual motivations. Additional research is being developed to examine the internal influences on knowledge sharing in these government-industry collaborations. Further research from this study is needed particularly in the area of technology application. Exploration of free collaborative tools to assist in knowledge sharing channels and to provide documentation repositories is the next step. Future research is also being developed to examine how the results found here compare to inter-industry collaborations.

A limitation of this research is the use of sustainability government-industry collaborations that have had very little technology application. An extension of the research is to examine government-industry collaborations where technology plays a greater role, such as in health care. An examination of these types of collaborations could provide a different technology perspective.

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