

Networks of Practice for Energy Efficiency: a Role for Boundary Objects

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Abstract

In this paper we explore the ability of a network of practice to promote business awareness and capability around energy efficiency. Our theoretical approach draws on Hajer's (1993) seminal study of the relationship between discourse coalitions, networks and the institutionalization of organizational and network practices. We develop our theoretical perspective through a case study of a government sponsored program encompassing diverse actors that appeared to have been successful in promoting awareness of the business benefits of energy efficiency, with a particular focus on the role played by the accountancy profession in this process. Drawing on data collected at the time to trace success of the initiative, we ask what factors enabled this outcome. Our findings are that the network formed and was maintained as a discourse coalition of key government, industry, professional associations and academic specialists which shared norms and practices concerning energy efficiency. Various boundary objects facilitated shared meaning making around energy efficiency across the network and resulted in shifts in institutional logic around the role of the accountancy profession as regards energy efficiency. The boundary objects enabled the breaking down of disciplinary and role based silos so that the diverse participants in the coalition can more effectively engage with and progress energy efficiency. Our paper adds some understanding as to why some networks rather than others have impacts in terms of shifting institutional logic and facilitating organizational capability. In more general terms, our research informs the question of how networks enable change.

Key words: energy efficiency; discourse coalition; networks

NETWORKS OF PRACTICE FOR ENERGY EFFICIENCY: A ROLE FOR BOUNDARY OBJECTS

Introduction

In this paper we aim to understand how a network of practice might promote business awareness and capability around energy efficiency (EE). We develop our theoretical perspective through a field study of a government sponsored program encompassing diverse actors designed to promote awareness of the business benefits of EE, with a particular focus on the role played by the accountancy profession in this process. We define EE as involving the delivery of equal or greater levels of 'energy services' with less energy supply. The paper examines the shift in institutional logic that underpinned EE developments resulting from the network interactions and the various boundary objects that facilitated knowledge and practice around EE.

In a recent statement (IEA, 2013), International Energy Agency (IEA) Executive Director Maria van der Hoeven noted:

Energy efficiency has been called a 'hidden fuel', yet it is hiding in plain sight....Indeed, the degree of global investment in energy efficiency and the resulting energy savings are so massive that they beg the following question: Is energy efficiency not just a hidden fuel but rather the world's first fuel?

Two factors appear to be influencing the shift towards EE as a major fuel: the rising price of energy and effective government strategies (IEA, 2013). This paper examines the latter; exploring the impact of government networking strategies in shifting what has been termed the 'EE gap'. However, we preface this paper by recognising the pertinence of Jevon's paradox

(Jevon, 1986) in relation to energy use and that the benefits of EE in terms of reducing emissions need to be judged in the context of parallel government policy.

Aside from the recent move towards EE, the discrepancy between optimal and actual implementation of energy efficient technologies has long been described in the energy policy literature (Backlund et al, 2012; Jaffe & Stavins, 1994). Numerous researchers focussing on different areas of emphasis have investigated this gap from across market, non-market, behavioural and organizational perspectives (eg Palm & Thollander 2010; Sorrell et al, 2004) . Of particular interest to researchers in management and organization studies are findings that at the organizational level, the barriers may relate to socio-cultural factors and the different discourses in which EE is embedded (Backlund et al, 2012; Palm & Thollander, 2010). A key issue appears to be that EE initiatives involve knowledge sharing and decision making across disciplinary and professional backgrounds and hence EE faces inherent challenges of different actors problematizing energy issues in different contexts using different knowledge sets and discourses (Backlund et al, 2012).

Theoretical basis

The network approach In this section, we explain the theoretical approaches taken in the paper. We justify our focus on networks firstly because networks offer an opportunity to study the actor heterogeneity that appears to contribute to the EE gap (Palm & Thollander, 2010). Secondly, connecting individuals and organizations into networks and then enhancing these connections are predictors of innovation (Wineman, Kabo & Davis, 2008) and hence a network based approach might offer insights into how the EE gap can be addressed. Thirdly, we address

current scholarly interest in how networks generate change and knowledge development, particularly in the social utility of network interactions (Clegg et al, 2013; Kilduff & Brass, 2010; Van Wijk, 2011).

Discourse coalitions Our theoretical approach is also informed by the seminal work of Martin Hajer on discourse coalitions (Hajer, 1993; Hajer & Versteeg, 2011). Hajer defines a discourse coalition as basically ‘*a group of actors who share a social construct*’ (Hajer, 1993: 45) or as ‘*a group of actors that, in the context of an identifiable set of practices, shares the usage of a particular set of story lines over a particular period of time*’ (see http://www.maartenhajer.nl/?page_id=14). The point is that members of such a coalition may have different perspectives on say, acid rain or EE, but they use the same vocabulary encased in story lines. In Hajer’s terms, story lines are ‘*a condensed form of narrative in which metaphors are employed, used by people as ‘short hand’ in discussions*’. The story line thus describes what actors are actually doing (see http://www.maartenhajer.nl/?page_id=14). Discourses themselves are ‘*an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices*’. In this approach, practices are embedded routines or shared norms (see http://www.maartenhajer.nl/?page_id=14).

The link to the study of networks is that the discourse coalition explains why and how a network forms around a set of practices. It is important to note that a discourse coalition approach in Hajer’s terms does not imply orchestration around shared values (such as the level of intrinsic value accorded to nature, for example) but simply how different interests may come together to

reproduce a certain set of practices or approaches, such as towards EE in our case. Returning to our question of how networks might foster action around EE, it would seem reasonable to study how a government sponsored network forms and how it stays together in terms of its shared story lines, particularly as government strategies are said to be a key driver of a current inclination to EE (IEA, 2012). As Hajer puts it, if a discourse is successful (that is, if many people in a certain context take it up) then it may 'solidify' around certain practices so that they become institutionalized, sometimes as organizational practices (Hajer 1993: 46). The influence of certain powerful actors for example, may cause the coalition to solidify in certain directions that suit the interests of these actors.

Here then Hajer's work in public policy links into the more familiar area for management or organization studies, that of institutional logic. Hence our theoretical perspective should be informed by the institutional logics that are encompassed by the network. Institutional logic has long been a topic in management studies, being usually understood as the worldviews and organising principles within organizational fields which create a common purpose and alignment amongst field constituents (Scott, 2001). Further, and of particular significance in considering the implications for behaviour within a profession such as in our case, institutional logics influence the collective identifies of social groups (Polleta, 2001: 1955). Researchers have shown that they can support understanding of institutional change as change in a dominant logic can provide an important indication of change (Reay & Hinings 2009). Multiple logics are at play in institutional fields and in organizations themselves.

However, the recent work of Thornton, Ocasio & Lounsbury (2012) links the concept of institutional logic more closely into the discursive practices approach of scholars such as Hajer. In this more recent definition, institutional logic refers to vocabularies of practice, not so much dependent on internalised values but more on frames of reference and vocabularies that influence actors' choices for sense making, and then motivate action. This understanding enables a much stronger focus on variation (Friedland, 2012; Thornton, Ocasio & Lounsbury 2012). In this dynamic approach, it is accepted that logics are in co-existence with other logics and perhaps a matter of strong competition, as indeed has been noted concerning environmental issues (Hoffman & Devereaux, 2011). If we relate this approach to our EE research interest, we can suggest change happens when one logic is taken up enough by the diversity of actors in an EE network so that practices are institutionalized across the network.

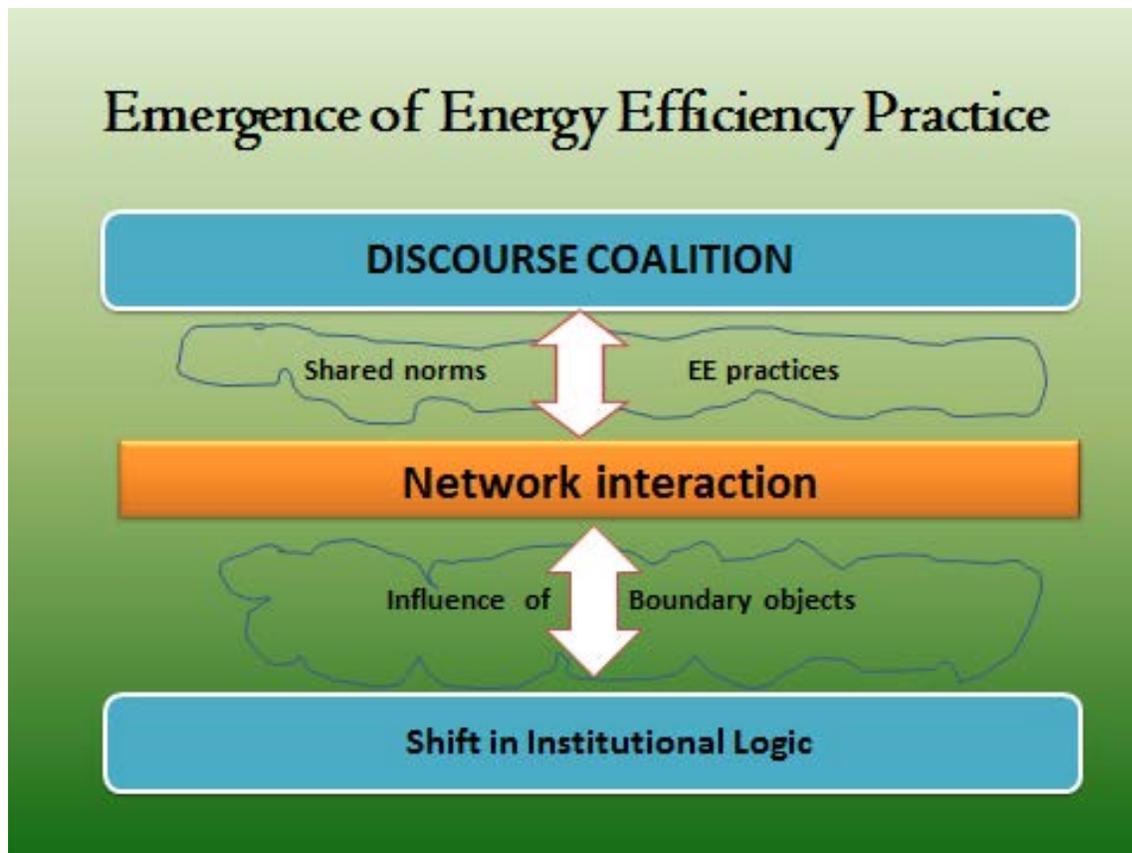
Boundary objects Discourse coalitions refer to shared vocabularies around complex multifaceted issues such as climate change and acid rain. However, the actor diversity surrounding EE also reflects a cognitive element that contributes to the EE gap. Energy transformation requires combining perspectives from social sciences and engineering and hence a cross-disciplinary approach. The problem is that while energy systems appear to be best thought of as a seamless web of interconnected social and technological issues, information that may assist in reducing the EE gap must be related to the individual's knowledge base and experience (Thollander & Palm, 2012). It seems reasonable then that these knowledge silos somehow need to be broken down in order to take the systems approach required and that the actions of boundary objects may underpin this shift.

Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. Boundary objects allow different actors or groups or stakeholders to work together ‘without consensus’ (Leigh Star, 2010: 602). Boundary objects exist in different forms: the repository, such as a library or a collection or a data base where heterogeneity is modularised; the ideal type or general model and standardized methods, protocols and forms, including training materials which facilitate communication and the grouping of diverse content (Star & Griesemer, 1989). They can be conceptual or material.

Boundary objects are claimed as a means of changing practice through transforming knowledge across diverse or specialised knowledge or role base domains (Benn & Martin, 2010; Briers & Chua, 2004; Oswick & Robertson, 2009). They act as a temporary bridge which is fairly unstructured when used jointly and highly structured when used within one of the worlds involved (Trompette & Vinck, 2009). They have qualities of interpretative flexibility and eventually act as a ‘set of working arrangements’ (Leigh Star, 2010). As texts, boundary objects facilitate interaction across different work-related worlds. Formalization processes create boundary objects as texts, such as minutes, diagram, models, charts. As texts, boundary objects also play a role in recontextualisation or the transferring and translating of knowledge (Oswick & Robertson, 2009). We argue boundary objects are particularly appropriate to consider in relation to the networks of practice and discourse coalitions that might form around EE as they allow for the tension between coordination across heterogeneous groups of actors and the need for more depth and understanding in specific knowledge bases.

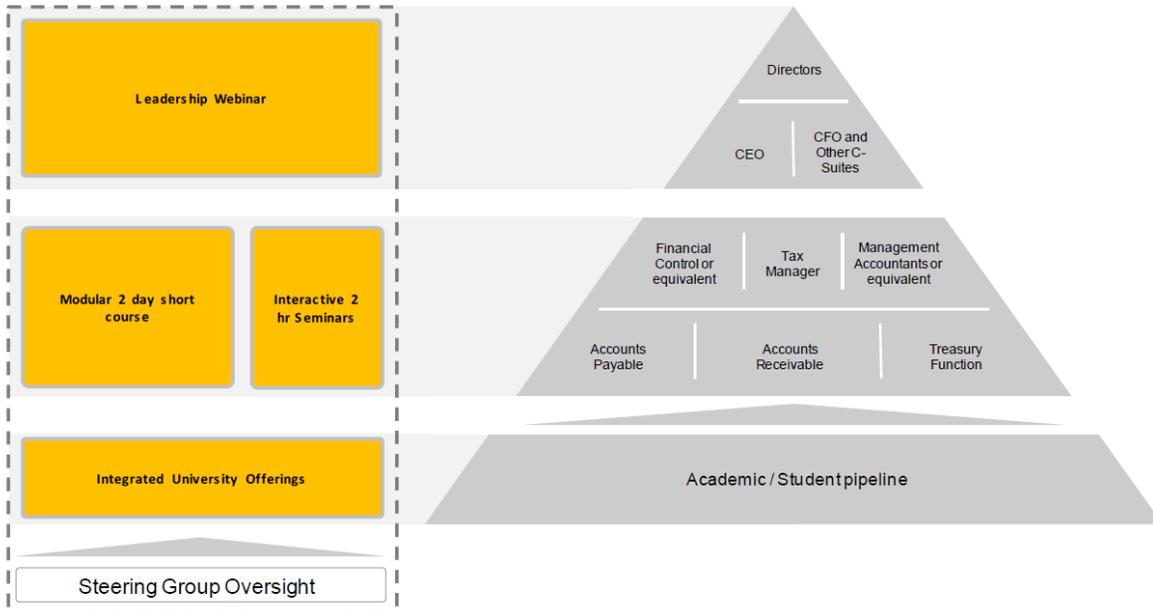
Our theoretical perspective can be summarised as below:

Figure 1: Emergence of EE practice



Research Method and Case Description

The case we select to explore the question of network based change towards narrowing the EE gap is of a government sponsored initiative that appeared to be successful in promoting awareness raising and capability development in the accountancy profession concerning EE. The initiative was in the form of a project designed around a range of training and educational materials targeted to reach across the accountancy profession in one state in Australia (see Figure 2 for project overview).

Figure 2: Project overview

We use a retrospective, longitudinal approach to study the events of this initiative as they unfolded that are relevant to our research question. A retrospective case study (Street & Ward, 2010) focussed on an apparently successful initiative focussed on the accountancy profession is relevant to our research question because members of this profession can play a key role in bringing energy and non-energy data together in the context of business. Indeed, they frequently act as gatekeepers in business decision making around sustainability projects in general (Gray, 2001). Accountants stand in a pivotal role in regard to communication of the significance, in terms of costs and benefits, of decisions made by organizations, including decisions that take, or that fail to take account of matters involving social cost such as energy use from fossil fuels. Over the years there have been many attempts to introduce a greater focus on issues associated with sustainability in the accounting profession and associated educational institutions (Bebbington, 1997; Gray, 2001; Mathews, 1997; Ullmann, 1976), also linked to the perceived

need to foster a critical approach and ‘soft’ or ‘generic’ skills (Bennett, Bouma, & Ciccozzi, 2004; Gray & Collison, 2002; Howieson, 2003).

The network formed under this project included two levels of government, academic sustainability management and accounting specialists, the building development section of a large university, several professional accounting associations, a major financial institution, a large technical training institute, EE consultants, university accounting students and lecturers . A steering group including representatives of network members as well as external experts in EE monitored the project at regular intervals. The authors of this paper were participant observers in the initiative, co-directed the project and traced the development of the network and interactions between the various stakeholders over an 18 month period from 2011-2013. The interests of the various stakeholders are set out in Table 1.

Table 1: Interests of the various project stakeholders

Who	Interests
Government	Address existing information and organizational barriers to the uptake of energy efficiency leading to reduce business operating costs and investment requirements associated with publicly-owned electricity infrastructure.
University Business School	The business school had explicit goals associated with incorporating teaching and learning material on corporate sustainability into the curriculum. The school also valued the funding which provided the resources to develop such material and the project also provided positive reputational benefits.
Professional accounting firm	The project provided the organization with fees, recognition of its reputation as an innovative leader and it funded training for internal personnel. The project also supported the aims of the Sustainability function within the organization by raising awareness internally and with its clients of the business relevance of attention to energy efficiency, climate change and sustainability.

Professional accountancy associations	Ensure education and training meets standards and is relevant to the audience. Can be incorporated into existing programs where relevant and meets accreditation requirements associated with Continuing Professional Development. Provides a reputational benefit by illustrating willingness to form multi-stakeholder partnerships and to progress current issues relevant to the accountancy profession.
Technical institute	Able to leverage the resources to update existing and develop new programs.
Financial institution industry partner	Reputational benefits and opportunity to support implementation of own corporate sustainability program.

Over this period we explored the factors that were perceived by network members to be effective in generating shared importance of awareness raising around EE practices. Over the progress of the project, we collected data from network participants via a wide range of sources: exit questionnaires, interviews and focus groups with a sample of all project participants and stakeholder groups, training needs analysis, evaluation reports, minutes of meetings such as the steering group meetings.

In analysing this data to address the research question of this paper, we examined indicators such as number of participants in the various interactive seminars, webinars, short courses and university offerings. As per our theoretical framework, we conducted an analysis of our qualitative data looking for a) evidence of discourse coalition emergence b) factors impacting on network formation and stability and c) boundary objects that enable EE actors to share practice based understanding of EE and d) shifts in institutional logic or accepted practices around EE.

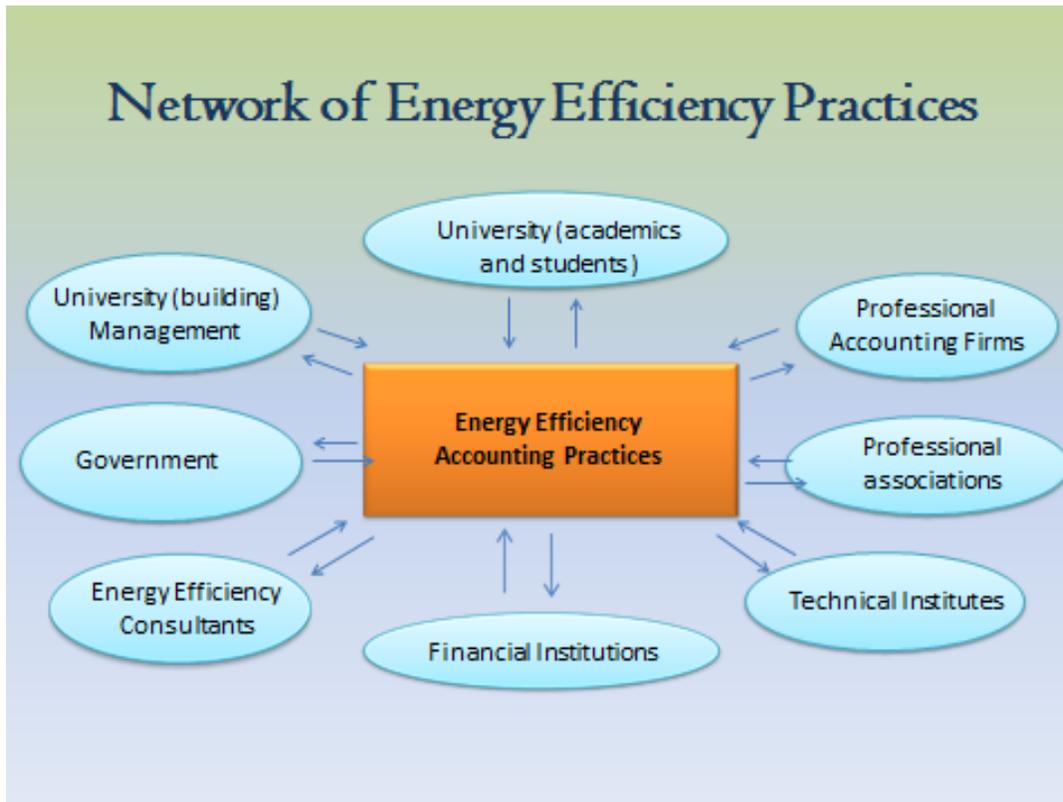
We used the approach recommended by Hajer for the study of discourse coalitions entailing document analysis looking for metaphors and story lines followed by analysis of interviews with key respondents (see http://www.maartenhajer.nl/?page_id=14).

Results

The discourse coalition As mentioned, the EE initiative was initially driven by government funding targeted at providing training resources to raise awareness in the accountancy profession around EE, competitively tendered for by the authors of this paper in partnership with a large firm of professional accountants and an international professional accountancy association. Across the period when the project team was being forged, a discourse coalition formed around what was perceived by the government sponsors as a common problem. The shared story line was that '*EE projects were not being taken up as business opportunities, reflecting the EE gap*'. This was the EE framing that was taken to the overarching steering group and supported by all core project team members: that is, the professional accountancy firm and associations, the technical institute, the university academics and the EE consultants and echoed government policy at the time, with both federal and state governments. It was also reinforced from the findings of the Training Needs Analysis conducted at the beginning of the project (see Figure 2).

The network of EE actors The network that formed on the back of this initial discourse coalition is illustrated in Figure 3

Figure 3: Network of EE Practices



As the project began to engage directly with key leaders in accountancy and the business community in a series of focus groups and interactive seminars with all leading partners, the network expanded further, with the story line of *'EE has a business case and accountants are necessary to manage the business case of EE'* remaining intact.

Then through the 2 day short course program and webinar (see Figure 2) the project team expanded the network's connectivity to over 400 accounting and management professionals to provide EE training, targeting the identified skill gaps. Although feedback from the training was positive, with typical responses from participants being that they better understood the role they can play in progressing EE projects in their workplace, exit interviews from the short courses and webinar suggest the emergence of other story lines and the discourse shifting under the influence

of a wider group of actors. Individual stakeholders began to push story lines which reflected their more specific interests in environmental matters. For example, while some actors in the coalition voiced support for EE as reflecting the transition towards a '*low carbon future*', a senior representative from the major financial institution supported shifting the '*conversation away from carbon and climate change to resource efficiency and environmental constraints*'. Another perspective from the technical institution, also in retreat from the highly politicised low carbon discourse, saw EE in shorthand as '*good corporate citizenship*'. Finally the integrated university offering further expanded the EE network to tutors, lecturers and students. Here the story line shifted again, with lecturers reporting their concern to tie EE into extant student areas of interest storying it as *strategic risk and cost management*.

Overall, not surprisingly, the focus of the original discourse coalition became somewhat lost as the network expanded across multiple levels of the accountancy profession pipeline and individual groups of stakeholders attempted to adjust the bias of the story line. As the network grew and multiple story lines became apparent, the project team attempted to maintain the network across this diversity by linking project outcomes with incentives of the participants such as by holding interactive seminars as part of existing professional development programs conducted by the professional accountancy associations and by developing course material in collaboration with the needs of subject co-ordinators. According to one of the project team:

'it worked well to make a link between the interactive seminars with integration into (university) course work by inviting key teaching staff along and including them in the training along the way'.

From network responses, the project team also made an important finding concerning how different groups of decision makers understand EE project evaluation and the original discourse coalition storyline of *EE has a business case*..... At a macro and policy level, EE is seen as a way to reduce greenhouse gas emissions and boost productivity: *a win-win*. But at the firm level, the team found little evidence of this broader societal concern. Rather, decision making around EE was seen as dependent upon perceived *payback periods*.

In summary, as the network expanded so did the various interests within the discourse coalition begin to voice competing story lines and for some period there seemed little likelihood of solidification into institutionalized practices that would constitute the new role of the accountancy profession in EE.

Boundary objects However, despite these twists and turns around the various story lines of EE, the project team began to make gains at the level of knowledge development required for accountants and other decision makers around EE. Via the judicious use of boundary objects, some shared practice began to emerge across the network. We identified three key forms of boundary objects that supported the awareness raising around the business importance of EE across the network. Each of these artefacts could be seen as relevant by the diverse stakeholders in the network but could be then taken away and developed with more depth in their own work or disciplinary context.

Firstly, conceptual diagrams and models (such as the Project Overview shown at Figure 2) were utilised to illustrate the target audiences and associated teaching and learning materials and to

promote a shared understanding of the project as a common body of knowledge. A Marginal Abatement Cashflow Curve, developed by one of the academic accountant authors of this paper, was found to be widely useful across the diverse audiences in explaining the relative benefits of a diverse range of energy efficiency projects on the basis of profitability, strategic alignment and financial risk. A slide pack of EE teaching materials containing numerous diagrams was utilised in different seminars delivered to different target audiences and was made available to be customised. As well as being made freely available on the website of the project, it has been downloaded from a sustainability educators site more than 3000 times, suggesting it has been taken up usefully by a broad-based audience. The fact that the slide pack can be customised for diverse needs was meant to reinforce its usefulness as a boundary object, its plasticity thus enabling the different knowledge communities concerned with EE to develop some shared understanding, while its robustness was to ensure relevance and utility to the target group. Although many of the post interactive seminar interviewees found the slide presentations too 'general', they at least served to introduce the participants to EE features and benefits. As a number of them commented, they could then take this knowledge back to develop within their own workplace or disciplinary context.

Secondly, formalising information generated through the project such as minute taking and distribution also provided the project team with boundary objects that could be used as standardised materials in order to generate a more controlled and coordinated approach across the network. Similarly, converting seminar materials into Continuing Professional Development (CPD) materials for the professional accountancy association within the network allowed for standardisation and an increased level of control of the EE message that the project was

delivering. Project outputs were taken up and publicised and made freely available through engagement with a national committee on EE, have been presented at several educators conferences and are available on several government funded websites (details available on request, withheld for anonymity). The extensive use of these boundary objects highlights their ability to recontextualize and their transformative potential in bringing about change via the network of practice. Although we could not trace whether network participants were applying EE principles, the network clearly did assist in dissemination of a wide range of training materials that had boundary spanning potential in drawing an even wider range of stakeholders into the EE discourse.

Texts such as the Training Needs Analysis also acted as boundary objects. They helped to clarify and provide legitimacy for key concepts applied within the training, which could then be interpreted more specifically into the work expectations of the various stakeholder groups. The Training Needs Analysis was particularly useful to emphasise the application of existing management and accounting skills that were typically held by participants, to the topic of EE. With the integrated offerings for undergraduate students this took the form of using EE as a 'case' that could be used to illustrate and develop core accounting and management skills.

Institutional logics Our theoretical framework suggests that change at the network level happens when one logic is taken up by enough actors in an EE network so that practices are institutionalized across the network. In Hajer's terms, when enough actors are on board around a discourse coalition the network solidifies and practices become institutionalized. In our case, we noted solidification was enabled as an aspect of the ongoing interpretation and re-interpretation

processes surrounding the boundary objects. Practices became embedded because they were controlled through the formalisation and standardisation processes described above and translated through recontextualization. Our analysis of this project suggests that the concept of '*accountant as partner*' emerged as a new institutional logic as an outcome of these processes. The notion facilitated through sensemaking of the Training Needs Analysis and other boundary objects utilised across the various training programs was that EE is likely to be adopted when accountants work in partnership with engineers and other operational staff to identify, evaluate, and control EE projects.

The discourse coalition formed around '*Accountant as partner*' effectively marginalised the other story lines described above, including the *EE has a business case* story line initially embraced by the government sponsor. The '*Accountant as partner*' story line suited the interests of the C-suite participants of the network, accessed through the webinar, as it provided a strategic business context for the accountant. It made meaning in the existing networks of the professional accountancy firm in the context of their client engagement methods. It rang well in the ears of the government because it linked to their focus on partnership. To the accounting academics and accounting students it added more credence to the role of the management accountant. To the professional accounting associations, it spelt a new professionalization.

The concept of '*accountant as partner*' provided wide legitimacy for the project as it aligned with an existing objective within the accounting sector – that is, to provide training that supported accountants in providing additional value to their clients by helping them to understand relevant and emerging issues. EE was perceived to be one such issue.

Table 2 summarises the involvement of the various stakeholders at stages in the project and shows the alignment between stage of project and emergence of different logics..

Table 2: Involvement of stakeholders at different phases in the project

Project stage	Key stakeholder involvement	Storyline	Boundary objects utilised
Request for Tender	<p>Government provided funding which legitimized the importance of EE in accounting. The funding provided the initial driver for partnerships to form as this was an explicit project requirement.</p> <p>Partners - including the University, firm of professional accountants, international professional accountancy association, establish a collaborative model to deliver the project and identify relevant additional partners to guide project implementation and dissemination of the education and training materials.</p>	<p><i>'EE projects were not being taken up as business opportunities, reflecting the EE gap'</i></p>	<p>Conceptual diagrams and models e.g. Project Overview (see Figure 2)</p>
Development and piloting of training materials	<p>Partners interact with a wider network including steering group members, industry participants in the training needs analysis research and piloting of the education and training materials.</p>	<p><i>'EE has a business case and accountants are necessary to manage the business case of EE'</i></p> <p><i>The rationale for acting on energy efficiency includes:</i></p> <p><i>... 'low carbon future'</i></p> <p><i>.... 'conversation away from carbon and climate change to resource efficiency and</i></p>	<p>Training needs analysis</p> <p>Minute taking and distribution</p> <p>Slide pack incorporating diagrams and concepts</p> <p>Marginal Abatement</p>

		<i>environmental constraints'</i> ... 'good corporate citizenship' 'strategic risk and cost management' ... 'Accountant as partner'	Cashflow Curve EE as a case illustrating the application of accounting skills Conversion to Continuing Professional Development materials
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Discussion

Success factors for the EE network In informing our research question of how a network of practice might promote business awareness and capability around EE, our case of change in the accountancy profession highlights the value of our theoretical framework and the discourse coalition approach as a means of studying environmental issues which inevitably involve multiple and diverse stakeholders, heterogeneous interest groups and bodies of knowledge. It enabled us to focus on the different interests and biases of the various stakeholders in the network and trace how these differences played out in terms of the logic that became eventually dominant. In terms of network building, we saw the importance of the clear story line for the initial discourse coalition to form around and that then this readily enabled the establishment of the network of practice. Our case highlights why Hajer is emphatic that the story line be embodied through the use of metaphor or shorthand. It would have been much more difficult to establish and gain commitment from diverse players around an open sustainability issue which did not play out in terms of what stakeholders actually do. As it was, the network formed from a

discourse coalition of key government, industry, professional associations and academic specialists which shared an embodied understanding of EE.

As the project progressed we saw different actors asserting their own bias and interests to influence the leading story line around EE. But despite the fragmentation of its original story line we saw the network maintained with the assistance of the various boundary objects as a means of information sharing that appeared to be reasonably effective in translating EE awareness and capability across its diverse components. With some aspects of the case network, success in terms of awareness raising and capability development was difficult to assess, beyond exposure of participants to the training materials. But with the integrated student offerings we are more confident in claiming success. Over the final 12 months of the program more than 4300 students will have been exposed to EE materials; more than 1500 will be assessed as having engaged with applying EE principles into their decision making and more than 1000 assessed in terms of their critical comparative evaluation of EE principles in business.

As said, this success appeared due to the various boundary objects that facilitated shared meaning making around EE across the network. The boundary objects facilitated the ongoing operations of the network and enabled new shared understandings on EE to be translated into more specific knowledge areas or roles.

Important in the actions of the boundary objects, such as the diagrams, models and slide packs was their capacity to facilitate recontextualization of EE business principles from the undergraduate case study of EE in building development projects, to 2 hour seminars to

webinars. Similarly, the webinar itself could be recontextualized according to different audience needs across the network. The various standardised presentations, incorporating some of the same materials used for the professional development seminars held by the professional accountancy associations, assured embedding of certain levels of EE knowledge.

On another plane, the fact that the network hung together over a period of time allowed for the eventual emergence of a new institutional logic around the role of the accountant in relation to EE: *the accountant as partner*. While this outcome cannot be directly attributed to the actions of the boundary objects, it seems to us unlikely that if the boundary objects had not supported the network as a means of perceived relevant knowledge sharing then the new story line would not have emerged and become dominant enough to become institutionalized. *Accountant as partner* is a positive outcome in terms of the accountancy profession relating to the need of implementing EE in the workplace.

Explaining changes in institutional logic Researchers have been challenged to explain the way in which actors change institutions when actors are themselves subject to institutional pressures – the so-called ‘paradox of embedded agency’ (Dorado 2005; Holm 1995; Seo & Creed 2002). Examining the use of boundary objects across discourse coalitions and networks provides insights into how established practices can be shifted and new practices become legitimised. This was demonstrated in the involvement of the professional accountancy association in the network we studied. Perhaps it is the action of suitable boundary objects that goes some way towards explaining how the normative processes of professionalization work according to the tenets of traditional institutional theory (DiMaggio & Powell, 1983).

While we would say it is judicious use of these objects that enables this shift in logic around the important principle of EE, we also emphasise the highly political nature of the boundary object. Formalisation and standardisation, for example, need to be recognised as a means of shutting out certain discourse groups. Our case well illustrates these power dynamics. The government led into the discourse coalition on the platform of reducing emissions and the original story line evolved from that concern. Two years on and the political framing of EE in Australia is very different. Formalisation and standardisation processes and associated boundary objects would likely be linked into other institutionalisation outcomes.

The Business School stakeholder The observations from the case are also important in trying to understand how our business schools can be more interactive with the business, government and not-for-profit worlds they not only serve but should lead. Even within business schools, specialty streams in teaching programs limit the ability of our students to address EE, let alone to communicate effectively with the technical specialists trained in engineering or other technical areas. In this sense, EE can be taken as an exemplary case of other sustainability or interdisciplinary issues, as it highlights the need to equip our students with the silo-crossing capabilities that enable them to overcome tensions between different disciplinary backgrounds and create shared understandings. So the lessons for the business school that can be taken from our case are: engage with a discourse coalition, remain committed while a network is established then use boundary objects to both transfer and receive appropriate knowledge.

However, we acknowledge that the accountancy profession we studied might provide a special case that could not be replicated across the business school. Clearly, the professional association and accountancy firm played a key role in keeping the network together and in the impact of the boundary objects.

Conclusion

This paper reports on a study which demonstrates how a discourse coalition forming around key government, industry, professional associations and academic specialists can assist in breaking down knowledge and organizational silos so that all participants in the coalition can engage with and progress EE (and potentially other environmental challenges for business). It highlights the importance of educational institutions working in the context of a network of practice, built around the need to develop a shared syntax that is meaningful to each actor concerning EE, but which each actor can then more specifically work with in their own domain.

We studied boundary spanning activities and artefacts that enabled this collaboration in the case of EE across the varied social worlds of its key actors. We thus build on earlier work (Benn and Martin, 2010) showing how boundary objects can mediate a shared understanding of practice around an aspect of sustainability. The research also indicates the value of boundary objects as both ‘meaning-producing’ and ‘practice-generating’ – not only allowing for sharing meaning but to generate new ideas (Macpherson & Jones, 2008). This paper thus responds to recent calls for more research on network dynamics and how networks can act to transform their context (Clegg et al, 2013). Our work on boundary objects indicates there are means by which ‘the evolving

agential properties of social networks' can be managed to achieve desired ends', as these authors call for.

In summary our work suggests embedding organizational practices that may tap into competing institutional logics and draw on diverse skills and knowledge bases can be facilitated through membership of networks that act as discourse coalitions, where suitable boundary objects have enabled coordination around some shared understandings, accepted scripts for action or institutional logics. The findings have implications for the relationship between government, business, academic specialists and associated professions.

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