# NETWORK PICTURES AND SOME ENVIRONMENTAL INNOVATION INITIATIVES.

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## ABSTRACT

Anecdotal evidence available to the author suggested that whilst some apparently innovative firms launched environmental innovation initiatives, but most did not. There seemed to be something special about the enterprises that did launch such initiatives but there did not seem to be one dominant theme. It was noted that most enterprises chose to network with others having access to special knowledge or complementary assets in implementing their projects. The concept of some IMP group research of network pictures that moderate between networking and networking outcomes was adapted from a personal or organisation perspective to a project perspective, and this gave insights into influence factors in fourteen cases considered. A kind of scenario based on four factors of focus, weight, coherence and context could be enunciated drawing on four to six candidate project descriptors associated with each dimension to characterise each case. It is suggested that the enterprises studied used some kind of mental map like a network picture to decide on the relative importance of candidate projects, which combined with appropriate capabilities, delivered network outcomes. An interpretation of the nature of linkages between networking, network outcomes and network pictures is presented

**Keywords**: Innovation, Sustainability, Network Pictures

## INTRODUCTION

Australian Bureau of Statistics data suggest that less than 40% of Australian firms undertake innovative activities and that 19 per cent of all firms undertaking product, process or organisational innovation did so to be 'environmentally responsible' (ABS 2006: Table 2.4).
In this paper the research question *what influences the readiness of enterprises to engage in environmental innovation projects* is explored using the concept of network pictures developed by some IMP Group researchers (IMP, 2010). These researchers suggest there is a multi-dimensional relationship between networking and network outcomes that is moderated by a kind of individual and enterprise mental model they call network pictures (Ford et al, 2002; Henneberg et al, 2006). Ramos (2008) developed a research tool based on this concept to help reveal attitudes to network engagement.

A research program initiated by the author in 2009 explored the use of some different kinds of instruments that might embed environmental management practices in enterprise operations in response to changing business requirements. For many firms this represented a significant change, as incorporating an environmental agenda in their established business models was

potentially problematic. It was observed that many enterprises obtained benefits from incremental improvement in operational practice, but after about two years, began to lose momentum. There was a need for more innovative, strategy-driven change. In 2010 an action research program was launched to work with enterprises undertaking some form of innovation intended to deliver environmental benefits. In both studies, the changes undertaken were regarded as radical in some way for the enterprises involved in that different decision criteria and application / market approaches were required. The enterprises involved commonly engaged with new sets of actors, undertook new kinds of activities and drew on new resource networks consistent with the observations of others (e.g. Powell et al, 2005).

Literature related to business networks and sustainability is reviewed to consider some matters of context that frame a need for change, followed by a review of literature related to use of the network pictures concept as a research tool.

## BUSINESS NETWORKS AND SUSTAINABILITY

It is observed that an increasing number of firms are implementing formal environmental management systems such as those based on the ISO 14000 series of standards. In Australia between March 2008 and April 2009 the number of ISO 14000 accredited firms increased from 600+ to more than 1300. Market support for cleaner products and the adoption of Corporate Social Responsibility principles by large firms in particular is driving environmental management considerations down the supply chain, with requirements for supplier compliance. Zutshi and Sohal (2005) have observed that many firms manage environmental, quality and OH&S requirements as an integrated set, as they promote the same underlying values of risk management and continuous improvement.

Tickner (1998) argues that a voluntary standard like ISO 14000 alone will not help achieve improved environmental outcomes without a continued strong role for regulation. Governments at all levels are introducing sustainability legislation that tends to be focused on protection and pollution control, and are encouraging both large firms and SMEs to buy-in to thematic structured action programs oriented towards conservation and renewal. A variety of initiatives are being stimulated at national, regional, and enterprise levels. The focus may be on energy or water conservation, recycling, the use of renewable resources, airborne / water pollution control or land remediation. It is suggested here that firstly, the operating environment of a project will be influenced by the area of focus involved, and secondly that all require a mindset change as well as action to achieve the desired outcomes.

The drivers of change introduce new actors (e.g. different regulatory authorities), new activities (e.g. measurement to demonstrate compliance) and the need for access to new resources (e.g. for waste disposal) into an organisation's business network. It is also observed that sustainability imperatives are stimulating the formation of special interest networks where firms work together on common issues (Collins et al, 2007).

An enterprise (or parts of it) may have particular attitudes to sustainability initiatives in general or to a particular project. Some characteristic positions are illustrated in figure 1. There a both matters of attitude and capability associated with each position.

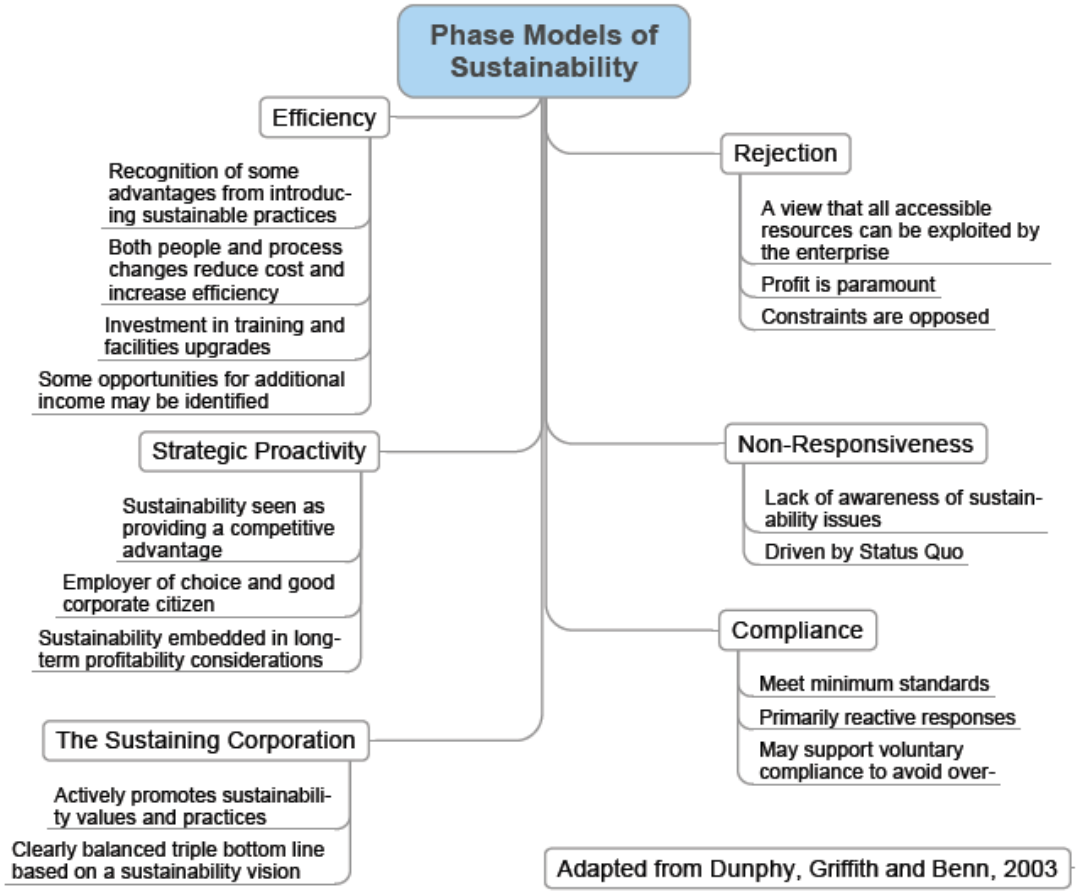


Figure 1. Some characteristic positions that may be adopted in response to environmental imperatives.

In the discussion to date, drivers of change and the possible need for enterprises to adopt different world-views is signalled. In this paper, we are interested in enterprises that have identified a need to do something innovative in moving beyond compliance into the efficiency, strategic proactivity or sustaining organisation regimes shown in figure 1.

## SOME NETPICS CONCEPTS

The notion of network pictures – Netpics – is about the perceived position of an enterprise in the networks of actors, activities and resources it is embedded in and about its view of those networks. These pictures evolve over time as a result of changes within the enterprise and in its environment (Ford and Redwood, 2005). Ramos and Ford (2011) suggest that Netpics evolve from interaction between network scale and structure, processes and personal positioning. Their study of a number of cases resulted in an empirically derived framework having four dimensions that are linked to these three elements. This framework was used to help enunciate the network

pictures of individual managers. Naude et al (2009) have used a Netpics concept of a "collective mind" to study interactions within a project. Descriptions of the four dimensions using information present in table 3 from Ramos and Ford (2011) follow. Some supplementary comments and interpretations are included, reflecting our interest in environmental innovation project attitudes rather than those of particular individuals.

**The Focus Dimension (what the project 'thinks' about, the value proposition)**

It is assumed here that the focus of actor network pictures is related to the value proposition associated with network participation. Ramos and Ford (2011) suggested that six focus dimensions, each with a number of sub-dimensions be considered in identifying the attitudes of actors. In this paper an individual project is considered as the actor. In Table 1 a paraphrased definition of each individual perspective is compared with a suggested environmental innovation perspective.

| **Components of the focus dimension** | |
|---|---|
| **Aspects of individual focus suggested by Ramos and Ford (2011 – Table 3)** | **Aspects of project environmental innovation project focus suggested here** |
| Who the focal actor or groups of actors in the network are | What the project champion(s) and project manager thinks about in terms of the project |
| Relationships that an actor thinks most intensively about | How the project relates to sponsors (may be internal or external, e.g. as a result of a government grant) |
| Perceptions of the surrounding network as a set of actors | The relevance of regulatory authorities and the project local community |
| Structural features of the surrounding actors that an actor thinks most intensively about | The project orientation in terms of compliance and subsequent market positioning |
| Distinct periods of time an actor thinks most intensely about | Antecedent activities and project milestones |
| Whether an actor thinks in terms of a particular function or not | The nature of the project organisation (e.g. self-contained team, matrix organisation, what kinds of things are outsourced) |

Table 1. A comparison of individual and suggested project focus dimensions

**The Weight Dimension (values influencing project establishment and operations)**

Ramos and Ford (2011) suggest that a normative perspective allows characterizing actor perceptions in terms of whether he/she knows what should or should not be done so that success can be achieved in business practice. A moral perspective is about whether there is a moral philosophy underpinning the way an actor perceives the world. Knowing what is going on reflects if an actor considers it to be important or not to be aware of what is taking place in the surroundings, no matter how much it is related to his/her activity. Views about internal procedures addresses the extent to which an actor considers it important to know about the relevance of internal procedures.

In a sustainability context, this may relate to broad world views and the relative importance of compliance with a standard like ISO 14000. People interpret the same information differently,

and by way of example Peterson (2010) presents a cultural theory-based (Douglas, 1992) interpretation of climate worldviews:

- *The hierarchist's story (nature perverse/tolerant): International protocols and national commitments are needed to address the tragedy of the atmospheric commons and reduce greenhouse gas emissions.*
- *The egalitarian's story (nature ephemeral): The underlying problem is consumption (resource throughput). Precaution, lifestyle simplicity and grass roots action are the most effective responses.*
- *The individualist's story (nature benign): To address climate change, rely on laissez-faire markets to spur competition and innovation. The benefits of climate change may even balance out the costs.*
- *The fatalist's story (nature capricious): Natural forces are beyond human understanding, much less human influence.*

Such views co-exist within enterprises and in the community at large, although individual members may be aligned towards a particular view. How this plays out within a project will depend on the dominant world-view supporting the project.

**The Specificity / Coherence Dimension (the nature of the project brief)**

At the personal level, Ramos and Ford (2011) suggest that coherence with a Board identity reflects whether an actor agrees with the principles that his/her company's board explicitly states for the organization. Situation specificity is about the extent of detail to which an actor thinks about situations. Actor specificity reflects the extent of detail to which an actor thinks about groups of actors or specific actors.

It is suggested here that the nature of the project brief and its clarity may influence the view of coherence within "the project". An incremental innovation consistent with normal commercial justification business models may appear quite coherent. An incremental innovation strongly oriented towards environmental sustainability may not appear coherent compared with other projects, and a radical innovation project with an emergent outcome may not appear to be coherent at all. We will use this typology to characterise the coherence dimension

**The Surroundings (Context) View Dimension (external interaction context)**

Ramos and Ford (2011) suggest that from an individual's viewpoint, identification of a stereotype perspective characterizes the view held by an actor in terms of the distinct forms of visual representation or framework that he/she uses to represent the surrounding network, for example as a network of independent actors or a supply chain. A consistency perspective reflects if an actor sees things in a more or less comprehensively coherent way, or if there is some kind of conflict. "Structuredness" is about whether an actor perceives the world in a more or less structured and organized way, and "Statis" is associated with the extent of dynamism that an actor perceives. The notion of "Broadness" characterizes an actor view with regards to the scope of his/her perception of the surrounding network. Comprehensiveness is about the extent of specificity associated with an actor view of the surrounding network. A conflict/collaboration perspective characterizes an actor view in terms of whether he/she sees the surrounding in terms of power/conflict/collaboration situations. Actors as providers defines how an actor perceives the surrounding actors in terms of services provided, for example are they customized or standardized offers.

From a project perspective, it is suggested here that this dimension may be represented by a stereotype relevant to the project outcome sought and the scope of the project.

## THE RESEARCH APPROACH

Exploratory case study (Yin, 1994) data that was collected for other purposes from 14 environmental innovation projects was re-assessed using a network pictures framework to address the research question: *what influences the readiness of enterprises to engage in environmental innovation projects*. A purposeful sampling method was used to select a cross-section of cases identified from either public information related to government intervention programs or from responses to a mail-out to 400 innovative firms on a university database. The selection criteria required the cases to be currently undertaking some form of innovation (from their perspective) that would deliver an environmental benefit. The cases, where the unit of analysis is the project in an enterprise context, are outlined in Table 2. The informant was the project champion and/or project manager, in the SA and Symphony cases supplemented with some participant interviews. This was supplemented with secondary data from websites or documents provided. Some of the cases related to government funded interventions encouraging enterprises to embrace a sustainability agenda, some describe initiatives taken by a university, and some relate to the activities of innovative firms.

Network picture attributes of focus, weight, coherence and context previously described were used to reframe the research question as four subsidiary questions:

1. What view related to focus influenced the readiness to engage in environmental innovation projects?
2. What view related to weight influenced the readiness to engage in environmental innovation projects?
3. What view related to coherence influenced the readiness to engage in environmental innovation projects?
4. What view related to context influenced the readiness to engage in environmental innovation projects?

The researcher used these questions to reflect on information gathered in the prior case study activity. The characteristics of each network dimension of each case was encapsulated using a short descriptor. Subsequently, the influence of network pictures in mediating between networking and network outcomes was considered, and this is discussed later in the paper.

| Case | Driver | Description |
|---|---|---|
| S.A | Government intervention | A State Government program funding mentors to help more than 300 enterprises introduce environmentally beneficial change and embed appropriate practices in their operations |
| Symphony | Government intervention | A Regional initiative funding a facilitator to help about 50 micro-firms introduce environmentally beneficial change |
| Sheetco | "Green" accreditation and supply chain | An innovative manufacturing SME seeking "green" process and product accreditation |
| Toolco | "Green" accreditation and supply chain | An Innovative manufacturing SME seeking "green" process accreditation and developing a product to support clients achieve their "green" aspirations |
| UniWS 1 | Living Laboratory Corporate strategy | Support function of a University pursuing novel water harvesting and recycling innovations associated with an agriculture faculty |
| UniWS 2 | Living Laboratory Corporate strategy | Support function of a University pursuing smart building ideas to reduce energy consumption |
| UniWS 3 | Living Laboratory Corporate strategy | Form of open innovation funding University academic and student ideas for enterprise environmental improvement |
| SWF | Corporate strategy | Form of open innovation funding research and community initiatives supporting smart use of water |
| Auto | Technical invention | A start-up company seeking to introduce a new eco-friendly form of personal transport |
| Harvest | Technical invention | An SME that developed a system for harvesting aqueous weeds and is seeking to convert the waste to a value-adding product |
| IWT | Technical invention | An SME that is seeking to further develop an improved irrigation system |
| Algae | Technical invention | A start-up firm seeking to convert carbon dioxide effluent to fuel using algae farms |
| Render | New process | A meat and poultry waste processing SME seeking to capture methane for use as a fuel |
| Meatco | New process | A meat production and processing SME seeking to convert waste streams to fuel and feed |

Table 2. Overview of cases

## FINDINGS

A summary is presented in table 3. A brief discussion of each descriptor follows.

The focus dimension – what "the project" thinks about:

- Pursuing compliance. Most, but not all of participants in the SA and Symphony cases were just starting their environmental sustainability journey, stimulated by government interventions. The focus was on learning and process with the aid of a facilitator. Most firms were satisfied with achieving some level of compliance, but some firms moved on to "green" product innovation.
- Beyond compliance. Cases in this category had built up some experience that provided insights into the potential benefits of pursuing innovations that delivered an environmental benefit.

- Potential exemplar. Cases in this category saw themselves as providing examples of what could be achieved by actively supporting an environmental sustainability agenda
- Facilitating eco-efficiency. Cases in this category saw themselves as providing capabilities for others to achieve environmental benefits
- Offering alternative lifestyle. The one case in this category (Auto) had ideas about an alternative form of personal transport that would deliver environmental benefits.

The Weight dimension – values influencing project establishment and operation:

- CEO World View. These cases were family-owned businesses where the CEO supported an environmental sustainability agenda.
- Strategic Intent. In these cases, there was an enunciated corporate ethos supporting a sustainability agenda
- Corporate Strategy. In the UniWS cases, the University had signed up to the Talloires Declaration, along with several hundred other universities around the world, to be a place that researched, demonstrated and taught about environmental sustainability. In the SWF case, several regional water utilities had established a pooled fund to support community sustainability initiatives.
- "Green" business model" In these cases the focus was on the development and introduction of a technological product that could deliver environmental benefits, but had to make business sense for the investors in the project.

The Coherence dimension: the nature of the project brief

- Limited innovation. In these cases any innovation activities were incidental to other objectives in the adoption of environmental sustainability concepts
- Exploratory innovation. In this one case, the focus was on exploring the impact of some alternative environmental innovation technologies
- Incremental Innovation. These cases involved adaptation of an existing product or process to improve environmental sustainability attributes
- Open Innovation. In these two cases, the idea was to get ideas from a user community, then support the implementation of these ideas.
- Radical Innovation. These four cases were examples of technology push, where the intended users may or may not be well prepared to adopt the innovation. This meant there may be some fuzziness in just how things were supposed to happen.

The Surroundings / Context dimension: external network interaction context

- Brand enhancement. The orientation in these cases was being seen to be "green" as a point of market discrimination.
- Supply chain. The orientation here was towards meeting the demands of a supply chain to help the whole chain deliver environmental benefits.
- Concept development / Concept demonstration. The orientation here was on providing new options for future uptake by or in conjunction with others.
- Innovation incubator. The UWS 1 and SWF cases were both related to water conservation initiatives. In the UWS 1 case, waste water from a nearby township had been filtered through reed beds and made available, along with leased land, to start-up agriculture companies. Both cases provided resources to facilitate innovation by others.

- Corporate social responsibility. The emphasis in this case was on acting responsibly
- Local community interaction. In these cases, the operations of the businesses launching the environmental innovation projects had some potentially negative impact on their local community, and it was in their own interests to take pre-emptive action and keep the community informed about such action.

| Case | Focus: | Weight | Coherence | Context |
|---|---|---|---|---|
| S.A | Pursuing Compliance | Community alignment | Incremental Innovation | Brand Enhancement |
| Symphony | Pursuing Compliance | Community alignment | Limited Innovation | Brand Enhancement |
| Sheetco | Beyond Compliance | CEO World View | Incremental Innovation | Supply Chain |
| Toolco | Beyond Compliance | CEO World View | Incremental Innovation | Supply Chain |
| UniWS 1 | Potential Exemplar | Corporate Strategy | Leverage from prior Inovation | Innovation Incubator |
| UniWS 2 | Potential Exemplar | Corporate Strategy | Exploratory Innovation | Corporate Social Responsibility |
| UniWS 3 | Potential Exemplar | Corporate Strategy | Open Innovation | Community Engagement |
| SWF | Potential exemplar | Corporate Strategy | Open Innovation | Innovation Incubator |
| Auto | Offering Alternative Lifestyle | CEO World View | Radical innovation | Concept Development |
| Harvest | Facilitating Eco-efficiency | "Green" business model | Radical Innovation | Concept Development |
| IWT | Facilitating Eco-efficiency | "Green" business model | Incremental Innovation | Concept Development |
| Algae | Potential Exemplar | "Green" business model | Radical Innovation | Concept Demonstration |
| Render | Beyond Compliance | Strategic Intent | Incremental Innovation | Local Community Interaction |
| Meatco | Beyond Compliance | Strategic Intent | Radical Innovation | Local Community Interaction |

Table 3. An overview of case study Netpics dimensions

## DISCUSSION

Håkansson and Ford (2002) posed three managerial questions about relationships and networks, and in the following discussion, some insights from the cases studied here are presented from this perspective.

Their first question was: *What kind of special opportunities and restrictions does a network bring to a company?* In the SA and Symphony cases (see Table 2) the facilitated networks that were established helped firms engage with an environmental sustainability agenda, but they had to commit some resources to be involved. In the Sheetco and Toolco cases, the supply chain was

the driver, and they had to pursue formal accreditation to an environmental standard (ISO 14000). The UniWS cases were inspired by a background international network of universities and the SWF case was inspired by a network of water utility firms. The other cases were inspired by broader community perceptions of a need for change.

Håkansson and Ford's second question was: *What is the interplay between influencing others and being influenced by them?* In the SA and Symphony cases, meetings of participating enterprises facilitated sharing of their experiences. In the Sheetco and Toolco cases, the interplay related to achieving a preferred supplier status with clients. In the other cases, the interplay related to sharing ideas and resources with actors having complementary interests to deliver desired project outcomes. In the background there is an interplay between the innovating enterprises, relevant regulatory authorities and the community at large.

Håkansson and Ford's third question was *How can a company control a network and what are the effects on the network and on the company?* They saw this was related to positioning and network structure, and suggest (p138): *Firstly, this paradox reinforces the need for a manager to analyse his company's position in terms of its specific relationships and its own and others' resources, rather than in terms of a set of products, markets and competitors.* Here we saw the positioning of the enterprise in the context of prior experience with cooperation related to sustainability matters (see figure 1) as important. *Secondly, it highlights the problems for managers if they take a self-centred view of the network. A network will look very different from the perspective of different companies, each with their own motivations, resources and understandings. A company that only sees the network from its own perspective will fail to understand its dynamics and the interface between the well-being of others and itself.* The observed case network structures related to environmental sustainability projects may include government and community networks as well as supply chains (see Table 1). The positioning of a project in this space influenced the perspective of the project e.g. is it conditioned by a government regulation or intervention program. *The third network paradox also has strong implications for the conventional view of business strategy.* What has emerged from our interaction with those enterprises implementing (or seeking to implement) an environmental innovation is the need for a project business model that considers environmental and social as well as economic impact.

In the context of Håkansson and Ford's questions, it may be observed that the position of an environmental innovation project may be different from other enterprise projects due to different kinds of linkages with traditional networks, and/or linkages with different networks. In the SA and Symphony cases, anecdotal evidence suggested that not all similarly capable firms established innovative projects. In the context of Table 4, many of these firms would be judged to have adopted 'passive' or 'reactive' positions. In seeking out firms implementing environmental innovations to develop case studies, somewhat similar observations were made. It seemed that our case study firms were in either the 'strategic' (the majority) or creative' category combined with a 'beyond compliance' (Figure 1) orientation. These attributes may be regarded as antecedents to formulating network pictures in relation to a particular project opportunity, but the innovation capabilities also influence the capacity to deliver outcomes.

| Enterprise Position | Key Characteristics |
|---|---|
| **Unaware / Passive** | Do not realise or recognise the need for technological change and also do not know where or what they might improve, or how to go about the process of technology upgrading. |
| **Reactive** | These enterprises recognise the need for change but are unclear about how to go about the process in the most effective fashion. Because their internal resources are limited - and they often lack key skills and experience in technology. |
| **Strategic** | Firms positioned here have a well-developed sense of the need for technological change and have good implementation capability. They take a strategic approach to innovation and have a clear idea of priorities. |
| **Creative** | Firms adopting this position have well-developed technological capabilities and are able to help define the international technology frontier. In many areas, they take a creative and proactive approach to exploiting technology for competitive advantage. Strong internal resources are coupled with a high degree of absorptive capacity which can enable diversification into other sectors, where their own skills and capabilities bring new advantages and re-define the ways in which firms traditionally compete, or wish to compete. Their technology and market networks are extensive so that they are kept informed about new technological opportunities and remain in touch with suppliers of equipment and ideas. |

Table 4 Some characteristic enterprise positions on innovation (adapted from Bessant, Tsekouras and Rush, 2009)

Geiger and Finch (2010) explored three interpretations of the network pictures concept: representationalist, mentalist and situated (where the pictures are seen as 'actants' – accomplishing or undergoing an act). Some attributes of a situated Netpic are shown in Table 5. They suggest this view captures the relational quality of mapping activities, shaping and being shaped by action, and is associated with negotiations and actions to establish a stable network. Geiger and Finch summarise four characteristics of network pictures as actants (p 386): *First, network pictures are examples of situated cognition and of calculation. They are relational because they "enroll" and translate, and because they are in constant contact with their environment. Second, network pictures are open to negotiation and can be revised and adjusted, which we see as their most important attribute in practice. Third, network pictures comprise human and non-human actors, which is particularly notable where mapping involves combinations of pictures. Fourth, picturing is an activity and this active quality undermines any ambitions for maps in representing an external and stable environment.*

| Attribute | Network Pictures as *Actants* |
|---|---|
| **Epistemology** | Practical Constructivism |
| **Ontology** | Relativism |
| **Object** | Firms and actions |
| **Subject** | Actor network |
| **Perspective** | Performative view of network |
| **Representation** | Mapping as an activity inextricably embedded in an industrial context, multiple versions are likely |
| **Aggregation** | Actor network |
| **Boundary** | Around calculative space, but instable |

Table 5 Some attributes of a situated network picture view (from Geiger and Finch (2010)

It is suggested here that the overview of cases shown in Table 3 represents a number of situated network pictures, each presenting a performative view. The boundary is unstable as learning associated with the project (practical constructivism) may alter the relative environmental positioning of the host enterprise (see figure 1) and its collaboration and innovation capabilities associated with the current project or future ones. Whilst the descriptors in Table 3 are short, reading across the four Netpic dimensions in a particular case gives a snapshot of the project drivers, which can be expanded into a scenario using the brief definitions of each descriptor provided. This may have practical utility in formulating a new project by assembling some alternative combinations of descriptors. The three cases within one enterprise, UniWS, highlight some common corporate enterprise concepts in the focus and weighting dimensions, and some project attributes that form the individual project picture in the coherence and context dimensions.

Hennebeg et al (2004) suggest that not all Netpic dimensions are equally useful. Ramos (2008) observed that there were multiple interactions between the dimensions focus, weight, coherence and context. Ford and Redwood (2005) noted that network pictures evolve over time, highlighting the importance of antecedents. In considering these observations, the view taken here is that a project's host enterprise Netpics may be interpreted as weight-driven antecedents influencing the formation of project Netpics. Ramos (2008) put the proposition that network pictures influence the nature of networking from an individual or organization perspective. A reverse flow is suggested here as whereas such a link may influence project formulation, the project Netpic primary input is the perceived nature of the project (e.g. incremental or radical innovation), expressed as apparent coherence. The terms perceived and apparent are used as what may be seen as radical for one enterprise might be considered as incremental for another. The apparent coherence is informed by networking activity during project formulation where scale/scope and project focus are identified, leading to a project brief. In the process some project boundaries and timelines are also identified to help form an implementation proposal. It is suggested here that the dominant influence of project Netpic formation is in sensemaking (Leek and Mason, 2009) related to the relative importance of the project, which in the context of situated Netpics as an actant (Geiger and Finch, 2010) will in turn impact resources assigned to deliver project outcomes. Such resources and the way they are organised will depend on enterprise norms and project characteristics (incremental or radical, Christensen, 2002). The quality of the network outcomes will also depend on the accessible delivery capability, and external complementary assets likely to be required to complete the proposed project.

The literature had suggested two things – that network pictures mediated the relationship between networking and network outcomes, and that scale and scope, processes and personal positioning were key elements of network picture structures Based on the earlier discussion, the interactions observed in this paper are illustrated in Figure 2.

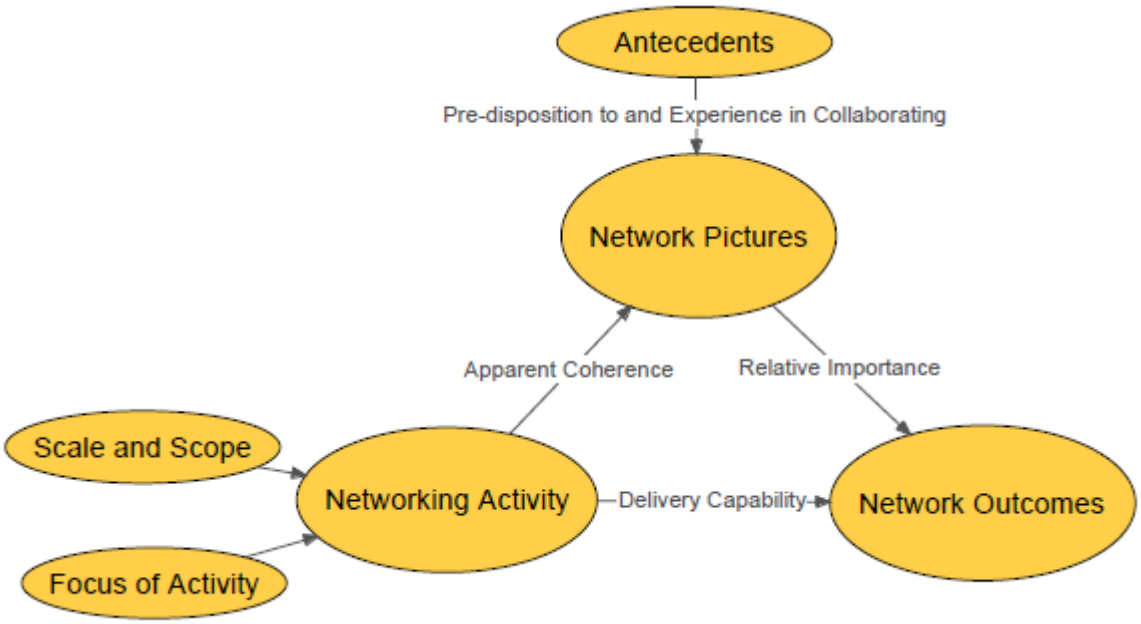


Figure 2. Project Networking, Network Picture and Network Outcome Linkages

Colville and Pye (2010) do not see network pictures as static representations, but rather the result of ongoing 'network picturing' as ongoing exercises in organisational sensemaking. They suggest that establishing a new picture in radically changing times requires initially 'becoming lost' and considering broader world views. In the four radical innovation cases associated with this study, each 'got lost' (and may still be lost) in a different way. In the Auto case, finding a link with a market for the technology being developed has been an issue. In the Harvest case, refining a business model to capture full value from the technology being developed has been an issue. In the Algae case, a relatively stable project Netpic was only developed after a project consortium agreed to a rather novel business model. In the Meatco case the enterprise Netpic was clear, but the choice between alternative project possibilities was not.

Three of the four radical innovation cases and one incremental case have some underpinning form of biotechnology at their core, and this influenced their engagement with networks of experts in this emergent science. One established linkages through industry connections. One established linkages through a large government research organization. Two established linkages through a specialist consultant they hired. Two obtained government grants, which brought some other requirements with them. These connections helped improve delivery capability, but also influenced the nature of project plans, which in turn influenced the project Netpics. Powell et al (2005) observed four network connection patterns in collaboration in the emergent life sciences. The first they called 'accumulative advantage' *where network expansion occurs through a process in which the most connected nodes receive a disproportionate share of new ties*. This was the least favoured pattern. The second was called 'homophily' *where network expansion follows a process in which new partners are chosen on the basis of their similarity to previous partners*. This pattern was favoured when firms were geographically close and differed in age and size. The third was called 'follow-the-trend where *network expansion entails herd-like behaviour, with participants matching their choices with the dominant choices of others,*

*either in mutual response to common exogenous pressures or through imitative behaviour*. This pattern is favoured by new entrants into a field, but only until they obtain a better understanding of other options. The fourth was called 'multiconnectivity' where *network expansion reflects a choice of partners that connect to one another through multiple independent paths, which increases reachability and the diversity of actors that are reachable.* This was the most favoured pattern. In our four radical innovation cases, even though there tended to be one expert connection, this was seen as a way of accessing a diversity of other actors.

## CONCLUDING REMARKS

In exploring the characteristics of environmental innovation projects, anecdotal evidence suggested there was something special about enterprises that chose to implement such projects, but just what that special characteristic was seemed to vary between enterprises and between projects within enterprises. A number industry contacts made during case study development spoke about scenarios 'beyond compliance'. They were referring to a change in mindset needed to address sustainability-inspired opportunities separate from just meeting regulatory requirements or adapting to supply chain environmental management expectations. But was this the only consideration? In this paper the research question *what influences the readiness of enterprises to engage in environmental innovation projects* is explored using the concept of network pictures (Netpics) developed by some IMP Group researchers. The focus was on project network pictures considering a number of cases, not on the network pictures of individuals per se, and as such this paper extends the application of the Netpics idea.

A research methodology primarily used to characterise the Netpics of individuals was adapted to a project context. The purpose was to see how the concept could be utilised via this exploratory study. Four primary Netpics dimensions were used:

- Focus (what "the project" thinks about, its value proposition) – five typical descriptors were identified across 14 cases,
- Weight (values influencing project establishment and operation) – four typical descriptors were identified across 14 cases,
- Coherence (the nature of the project brief) – five typical descriptors were identified across 14 cases, and
- Context (external network interaction context) – Six typical descriptors were identified across 14 cases.

There was not one dominant view, but logical set of descriptors. On one occasion two cases had the same set of descriptors, but otherwise, each combination of descriptors was unique. Some word pictures associated with each descriptor combine to describe a project scenario. The descriptors suggested in this paper may be combined in a large number of ways. It is not claimed that the group of descriptors presented here is complete, and others may offer alternatives. But it is suggested here that combining them using the four Netpics dimensions may be useful in contemplating new projects.

The literature suggested firstly, that Netpics evolved over time and secondly that not all dimensions were equally useful. It is suggested here that weight is the primary driver and is conditioned by antecedent activities, with coherence in terms of a project brief being the next

most important dimension from a project perspective. The project Netpic that emerges determines the relative importance assigned to the project. Focus and context are represented in the project brief (coherence) and emerge from networking activities. The networking activities also inform what access to other partners and complementary assets will be needed to deliver the intended network outcome. It is suggested that these capabilities and the relative importance assigned to the project moderate network outcomes.

Our research question was about readiness to engage in environmental innovation projects. Interaction with the cases examined suggested that the relative experience of enterprises in relation to three areas influenced their capability to implement such projects. These areas were: buy-in to the environmental sustainability agenda, innovation management competency and access to new knowledge through collaboration. Some of the case study enterprises were judged to be accomplished all three areas, and this provided a good foundation to implement environmental innovation initiatives. Some did not embark on an innovation journey, but sought to build a reputation or brand espousing environmental innovation values. Some that did get started on an innovation journey began to experience difficulties where there was some form of shortcoming in one of the focus areas. Combined with observations in relation to network pictures, this led to a particular view about linkages between Netpic dimensions, networking and network outcomes.

The research presented here is exploratory in nature, but has provided the author with insights into factors that influence an enterprise to launch an environmental innovation project. One size certainly does not fit all, but an application of Netpics ideas can help identify the situated position of a particular project. It is suggested here that potential projects are informally or formally tested against enterprise network pictures to decide if action will be taken or not.

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