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Abstract. We observe that trust is context sensitive: actors that may trust each other in one situation may not display the same level of trust in other situations, for example when different competencies are required. It is broadly agreed that trust is important in relation to collaborative ventures. In this paper we use the ARCON reference model as a framework to consider endogenous and exogenous aspects of trust important in the establishment, operation and dissolution of collaborative ventures. Some comments are made about the use of the model and some possible shortcomings are noted

1 Introduction

The focus of collaboration activities is changing and there is an expectation of increasing levels of collaboration [1]. In 2004 a review of ten years of European collaboration research [2] noted changes in collaboration focus, seeing movements away from a supply chain focus to a customized products orientation. In addition, as a result of advances in information and communication technologies (ICT), the study predicted further evolution in the area of collaboration with an increased focus on sustainable collaboration, managing and taking advantage of complexity, and inter-enterprise creation and innovation. New ways of doing business may require new forms of collaboration that may introduce unique interdependencies between the collaborators. As a result there is now increased emphasis on trust and the important role it plays in ensuring collaboration success. Trust, in its various permutations, (trust in the product, trust in the enterprise, trust in the people, trust in ICT) impacts on how disparate business practices make sense to collaborating firms [3].

While trust may be important in facilitating the endogenous workings of collaboration, we observe there are some exogenous interactions relating to trust in and by a collaborative network organization (CNO). This is what we are exploring in this paper. Our research approach draws on our own case study material accumulated over many years. These studies are combined with similar research projects taken from extant literature. Combined, these data will illustrate the variable nature of trust

as it occurs in different collaborative environments. The paper will reference findings and proposals according to a comprehensively researched virtual enterprise reference model, ARCON [4]. The paper will discuss the utility of ARCON from a trust perspective, and will present a number of issues for future consideration.

2   The Context-dependent Nature of Trust: Some Illustrative Cases

2.1   Trust in cooperative marketing

2.1.1 Austmine [5]. Austmine was established in the early 1990's as a virtual enterprise to assist in accessing export markets. The collaboration comprises around 80 member companies each with a diverse range of specialities focusing on the provision of equipment and services to the mining industry. Members are relatively small by international standards, typically ranging in size from around ten employees to a few hundred. The collaboration has established competence-based trust [6] which revolves around the equity endowed in the Austmine brand. Austmine provides a central point of contact, and then contract negotiations are between the client and the individual member firm. The focus of trust in this case is on the CNO.

2.1.2 TIFA Aerospace [5]. TIFA Aerospace was established in 2002/03. The original collaboration comprised three focal firms (each with many years experience making tooling for the Australian Aerospace industry) and an industry association, potentially involving up to 60 small firms. The collaboration was intended to expand business opportunities with overseas aircraft manufacturers. After business links had been established, the three focal firms promoted themselves separately, and the collaboration fell apart. This case demonstrates failure based on poor economic trust. TIFA Aerospace operated in the style of a short-term opportunity-driven network.

2.1.3 Nepean IT [5]. Nepean IT was established to create a business network that would assist a large telecommunications company (Telstra) in fulfilling its clients' needs by providing an extended range of combined information and communication technology services. A group of firms decided to form a virtual company and a participant code of behaviour was agreed. The project was championed by the CEO of a regional development organisation. Eventually the strategic partner, Telstra, withdrew from the collaboration which led to a reduction in business referrals from that source. Some participants dropped out when they could not meet the performance standards required by the group, leading one of them to comment that they should have learned more about each other before committing to work together. Nepean IT operates as a virtual enterprise impacted by both external market conditions that diminished the need to collaborate, and issues of internal competency-based trust [6].

2.2   Trust in the supply chain

2.2.1. Nielsen et al [8] compared two enterprises that sought to get their suppliers involved in innovation initiatives. They observed an interplay between power, trust

and politics at different levels (personal and departmental) within and between the cooperating enterprises that in turn led to different levels of commitment, openness and participation. In some cases, a change in the individuals involved was (or could have been) beneficial. The supplier firms were collaborating to support their customer, but parts of the customer organization were not comfortable with collaborative arrangements.

2.2.2. TAAG (Tooling Australia Automotive Group) [9] formation was stimulated by some collaborations being explored by other members of their industry association. Impressive brochures describing the combined capabilities of firms in plastic mold-making were produced, and the group started to work with the engineering departments of new international clients, establishing significant levels of goodwill and competency-based trust. However, once a level of competency had been verified, the client firm purchasing departments were only interested in price. In one instance, the purchasing department was given a directive to buy everything from China. This discounted the value of any goodwill trust that had been established.

2.2.3 A Japanese manufacturer-supplier study [10]. This study investigated collaborative buyer-supplier relationships from the perspective of a Japanese manufacturer. Feedback was obtained from 117 Japanese manufacturers and structural equation modelling was used to assess relationships and antecedent interactions between the firms and the roles of three attributes of customer trust (contractual, competence and goodwill trust). It was found that four forms of interaction supported all three trust attributes. These were:
- Task compliance and competency demonstrated over time
- Responding behaviour – the actions a supplier undertakes to satisfactorily accommodate a customer's requests, or operational and/or strategic 'needs'
- Alerting behaviour – the actions a supplier engages in to alert a customer, at the earliest point, of any possible supply problem that affects the customer's sourcing operation in order to allow the customer to make, in advance, necessary adjustments in the exchange and
- Initiating behaviour – the initiative a supplier takes in realising a customer's operational and/or strategic 'wants'.

2.3   Trust in inter-organisation innovation

2.3.1 An agricultural network. Kilpatrick and Bell [11] have observed the evolution of small business networks of farmers in regional Australia. A community of practice was formed to help make changes in the operations of participating firms to improve business outcomes. A series of network "chapters" were formed in a number of geographical centres, and members were required, as a prerequisite, to complete a farm management training course. This provided them with some common experiences and a common language. It also provided a foundation for building trust. The CNOs operated in the style of a professional virtual community with external training support. This type of trust is similar to the behavioural perspective from Ratnasingam (2005) where trust is developed through normative influences deriving from common experiences and values, and through shared competencies.

2.3.2 An innovation incubator. Burnett & McMurray [12] studied the experience of twelve start-up entrepreneurial firms supported by a business incubator. The incubator provided space, access to business services and networks, mentoring and regular performance reviews. Analysis of interview data showed that trust and networking were the two dominant themes supporting success, particular that of trust between mentor and mentee. The most valued external networks were entrepreneurial networks that may stimulate new linkages and business opportunities, and linkages with other family businesses. The incubators established a form of 'breeding environment' CNO. Trust in an intermediary was a feature of this case. This is similar to affective trust (Huang and Wilkinson [13]).

2.3.3 An aerospace design and development network [14]. A number of one-to-one strategic alliances evolved over time, and exhibited high levels of trust between collaborators. This allowed the alliance to operate in the style of an extended enterprise when required. After a period of time discussions took place regarding the extension of relationships into a multi-partner network that would offer a wider range of services. Despite the well-established history of working together, which generally supported positive responses to the new network, most participants wanted to address new issues of potential risk. Some only wanted an associate relationship and wanted to offer services on the historical project-by-project basis, as they saw a risk that any other arrangement might be regarded by other stakeholders in their business as some form of exclusivity (response – too risky, so withdraw). Some were concerned about protecting any intellectual property that might be shared, and wanted to set up a contractual framework for further development of the concept (response – enhance situational control, focus on contract based trust). Others wanted to have a meeting to clarify goals and practices and to meet some of the people that would be the "organizational influencers" (response – try and initially assess trust at a personal level by establishing the extent of goodwill). In this case, the additional risk altered the trust relationships creating a range of reactions. However, all of these reactions were based around Huang and Wilkinson's [13] concept of calculative and affective trust.

2.4   Trust in e-collaboration

2.4.1 Promoting e-collaboration. Three established cluster groups were encouraged to enhance their collaborative relationships through the use of e-collaboration [15]. E-collaboration approaches the formation and maintenance of cooperative enterprises through the introduction of electronic communication tools to facilitate collaboration. With e-collaboration the interface between firms changes and can take a multitude of forms. The Internet and email are two forms most commonly used. A focus group approach involving about 70 business owner-managers in groups of 8 - 10 was used to identify perceived barriers. Four distinct aspects of trust emerged: individual (interpersonal) trust [7], economic trust [7], system trust [16], and technology trust [7]. We observed that all four aspects had to be addressed before e-collaboration could proceed. Of these, individual (interpersonal) trust was considered the most important, leading to the suggestions for face-to-face networking events. However,

consistent with other research [17], it was thought that such trust would take some time to develop, depending on the nature of antecedent linkages between the parties.

3   Characterizing Collaborations

3.1   The ARCON Model

The ARCON model [4] was constructed to provide a framework that helps capture the multi-dimensional complexity of Collaborative Networked Organization (CNO). Aspects of the social networks and technology networks that support CNO operations are inter-woven in the model. At the highest level there are seen to be three interacting perspectives: life-cycle stages, environment characteristics and modelling intents. CNOs are seen to have both internal (endogenous) and external (exogenous) environment interactions. The ARCON model defines three levels of detail in each category. The modelling intent may be to identify general concepts and relationships in a particular instance of a CNO, or to more specifically identify how it is to operate, or at a finer level of detail, define how operations are implemented. In this paper, we are only concerned with the general conceptual level

3.2   Trust and the ARCON Model

Taking the view of Sako and Helper [6], there are elements of contract, competence and goodwill trust evident in B2B relationships. We identify aspects of trust embedded in the ARCON model at the third level of detail.

   3.2.1. Endogenous Interactions in relation to trust were seen as:
- Relationship - trust between actors (goodwill)
- Knowledge resources - profile and competency (competency)
- Network management, operational competencies and approach (competency)
- Functional processes - trust management (goodwill)
- Functional processes - risk management (contract/competency/goodwill)
- Prescriptive behaviour - general principles (contract)
- Contract/Agreement constraints and conditions (contract)

   3.2.2. Exogenous Interactions in relation to trust were seen as:
- Market - Network identity - references and testimonials, interaction parties: customers and suppliers (contract and competency), Interactions: advertising and customer/supplier-oriented transactions (goodwill)
- Support - Network identity: social aspect e.g. not-for-profit (goodwill), Interaction parties: certification entities, coaching entities and training entities (competency),
- Societal - Network identity: values and principles (goodwill)
- Constituency - Network identity: inclusiveness of external members (goodwill)

To summarize; there are elements related to trust *within* the network and elements related to trust *of* the network. Not surprisingly, contract trust has an endogenous inter-enterprise focus and an exogenous supply chain focus. Competence trust has an endogenous focus on both capabilities to contribute to the goal of the CNO and collaboration capabilities, whilst the exogenous focus is on the supply chain and external certification. The goodwill trust endogenous elements are relatively simply represented in the model as various forms of rules and procedures. The exogenous elements are focused on network identity and seen as more complex due to the variety of stakeholder perspectives that may have to be addressed.

4   Some Observations from our Case Studies

We tabulated the main focus of exogenous trust from each case in terms of their ARCON market, support, societal and constituency interactions. This simplified view of the cases indicated that some of the collaborations presented may not have a direct link with markets, but when they do, the objective is to establish network identity trust in a CNO brand or via the reputation of the participants. The other market approach is to establish trust in the CNO by direct interaction with specific customers. Customers may not choose to contract through the CNO, and may exercise power in constructive or destructive ways. Notions of 'economic trust' came up in some cases, and this will be discussed later.

Support may be provided through government agencies in a policy context, through industry associations pursuing industry objectives, through academia in an action research context, through training organizations or through mentors. Here the CNO has to have trust in the support agency. Trust in the CNO can be enhanced by interaction with certification entities. The e-collaboration cases raise questions about trust in the internet, and other ICT, as an external logistics entity.

Societal interactions in all of the cases related to economic sustainability values supporting growth or competitiveness for both the benefit of the CNO members and their broader stakeholder community, and this is linked to government support. The focus is on trust in the network entity.

Constituency interactions varied, but none were completely open. Some were restricted by the establishment of a CNO company, some by a pre-requisite membership of an industry association or regional group, and others by some form of competency test. These are matters of trust in the network entity, and bear further consideration from a social capital perspective.

Doing things together was a recurring theme in building trust within a CNO. However, this might draw on external resources.

5   Concluding Remarks

Our first comment relates to working with the ARCON reference modelling framework using some pre-conceived aspects of trust (contract-based, competency-based, goodwill-based trust) and a comprehensive (60 page) description of the

framework [4]. We selected items within the model that we thought could impact on the assignment or development of trust. All of these items were found at least somewhere in our case study set, implying that the ARCON framework can be used in a variety of circumstances. Reversing the position and using a high level view of the ARCON framework to characterize our cases provided an interesting overview.

Our second comment relates to context. Some of the cases illustrate that trust developed in one context does not necessarily translate to the same level of trust in another context. The ARCON framework presents some internal and external views of CNO context. Endogenous elements we identified were relationship structures, competencies, some functional processes (e.g. trust management) and contract-driven behaviour. This presented as a structural view, whereas much of the literature on trust takes an agency view. From a trust perspective, the ARCON framework generally views exogenous interactions in the context of trust *in* the CNO as an entity. Our case studies suggest that exogenous factors also impact on trust within the CNO - if the original CNO objectives are compromised, if a client, a sponsor or the community introduce some 'rules' or behaviours that cause conflict, or if some form of support is not effective.

Our third comment relates to things that we did not perceive to be part of the ARCON framework - matters of agency related to the constructive or destructive use of power, to the role of interpersonal trust amongst key internal or external supporters of a CNO.

Our final comment relates to trust and the CNO life-cycle. An initial quantum of trust has to be assigned by the participants to get a CNO started. This may be based on prior relationships or some past performance data [18]. But trust must be built as the CNO evolves for it to operate effectively. This did not happen in some of our cases, sometimes due to internal factors, sometimes due to external factors. Trust and related aspects of power may have their own life-cycle [11, 13], which may or may not synchronise well with the CNO life-cycle.

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