

Working paper

Trust building in a Complex Innovation Ecosystem: a Contingency Framework

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ABSTRACT

This paper is concerned with improving our understanding of trust building in a complex network, or what is more commonly being referred to as an innovation ecosystem. We adopt a processual sensemaking approach to exploring the relationship between types of trust, identified from the literature and our findings, which promote or inhibit trust building in a complex innovation ecosystem. Our paper makes two key contributions to our understanding of trust building in a complex innovation ecosystem context. First, we demonstrate how affiliation-based innovation ecosystems act as enablers of both internally and externally oriented knowledge related capabilities that support innovation. Second, our contingency framework highlights the most effective types of trust building approaches adopted by firms most associated with network or platform affiliation approaches.

Key words

Trust building, innovation, network, ecosystem

INTRODUCTION

In this paper we set out to explore trust building in a complex innovation ecosystem. We adopt a processual sensemaking approach (Fuglsang & Jagd, 2015) to exploring the relationship between types of trust, identified from the literature and our findings, which promote or inhibit trust building in a complex innovation ecosystem. In doing so we build a contingency framework of the most effective factors that enable or constrain mutual trust and trust building in an innovation ecosystem. We make a distinction between what we call *network affiliation*, focused on configurations of connectivity between individual actors, and *platform affiliation*, in which firms' innovations provide a platform for other firms to develop complementary new products and processes. Our paper makes two key contributions in enhancing our understanding of trust building in a complex innovation ecosystem context. First, the findings demonstrate how affiliation based innovation ecosystems, representing communities of connected actors defined by their networks and/or platform affiliations, act as enablers of both internally and externally oriented knowledge related capabilities (Maes & Sels, 2014) that support both incremental and radical innovation. Second, our proposed contingency framework aids understanding of the most effective factors that promote or inhibit trust building in an innovation ecosystem context.

CONCEPTUAL BACKGROUND

Trust and Trust building

Trust is important for all forms of entrepreneurial activity (Troilo, 2010) and Autio and Thomas (2014) suggest informal coordination mechanisms such as trust building influence the evolution of innovation ecosystems. Fuglsang and Jagd (2015) argue that organizational actors who engage in robust and local sensemaking activities are better able to replicate such institutional-based, inter-organizational and inter-personal trust (Amoako & Matlay, 2015; Ashnai, Henneberg, Naudé, & Francescucci, 2016), particularly where institutions are relatively unstable, unfamiliar to the actors and ambiguous. Indeed, Ulhøi, Neergaard and Bjerregaard's (2012) work illustrates that trust can be institutionalised within networks (Kroeger, 2011), but only if it can be transferred from the personal to the organizational level. Top-down measures are likely to negatively attenuate existing relationships. The use of explicit contractual agreements (Braun, 2005) represents a form of institutional-based trust that arguably inhibits trust building activities in networks. On the other hand, it has been suggested that formal control (in the form of contracts) and trust can work contingently, specifically in weak tie relations (Yang, Zhou, & Jiang, 2011, p. 90). Trust building is a laborious but valuable process (Pattinson, Nicholson, & Lindgreen, 2017) and might be difficult for SMEs, which can be secretive about their processes and which are often generating novel ideas and radical innovations in their field (Pattinson & Preece, 2014). Both irrelevance, linked to the degree of novelty and uniqueness of the knowledge base, or a lack of trust (Bagchi, 2010) can make participation in open innovation relationships difficult.

Innovation ecosystems

Innovation ecosystems model the economic dynamics of the complex relationships formed between actors whose purpose is to enable technological advancement and innovation (Jackson, 2011). In further conceptualizing ecosystems, Adner (2017, p. 40) makes a useful distinction between "ecosystem-as-affiliation", representing a community of related actors defined by both their network and platform relationships, and "ecosystem-as-structure", a configuration of activities defined by a value proposition. The latter view focuses on an ecosystem strategy approached. In this paper we therefore maintain an actor-centric view of ecosystems in which we conceptualize trust building relationships as being built around affiliations within networks and platforms. Here we make a distinction between what we term

network affiliation, which focuses on patterns of connectivity between individual actors in firms, and *platform affiliation*, where firms’ innovations can act as a technology platform for the development of complementary new products by other firms and which is an increasingly important influence on firm-level innovation activity (Garud, Tuertscher, & Van de Ven, 2013). This approach helped us build a useful narrative for exploring trust building activities in an innovation ecosystem.

METHODOLOGY

The sampled companies are all science-based SMEs located in the north of England, with global connections through their industrial company level linkages. Interviews were conducted principally with scientists and engineers, some of whom were managers. The study used critical case sampling (a sub-set of purposive sampling techniques) to select a small number of important cases that were likely to yield the greatest insight central to addressing the research question. Critical case sampling focuses on selecting cases on the basis that they make a point dramatically or, as in this study, because the selection of the companies and the interview participants are important in relation to the research questions. A total of 16 in-depth, semi-structured interviews were completed with a diverse range of participants, including scientific and engineering staff as well as those occupying non-technical roles in areas such as financial, operational and sales management in six science-based SMEs. The transcriptions were then analyzed using a thematic analysis (King, 2012).

FINDINGS

The findings revealed a range of trust building activities centred round an innovation ecosystem comprising of the six participant organizations, their customers and suppliers from both commercial and R&D organizations. In Table 1 we identify from our sampled companies two different but complimentary approaches to trust building within an affiliation-based ecosystem; namely those most closely associated with *network affiliation* and those more aligned with *platform affiliation*.

Table 1. Trust building in an affiliation-based innovation ecosystem

Trust building approach	A	B	C	D	E	F
Most associated with network affiliation	*	*	*	*		
Most associated with platform affiliation					*	*

Network affiliation

Initial trust building efforts often involved knowledge transfer activities within an innovation ecosystem. For example, the Technical Manager in Company B had built a strong personal relationship with one of its suppliers, a firm supplying them with the freeze-drying equipment, to the point where they trusted the Technical Manager to service and repair the equipment himself. In this instance, the supplier relied on the elicitation of tacit knowledge and the expertise of the Technical Manager to improve the performance of its equipment on behalf of other customers who had issues using the equipment. Here, knowledge-based trust (Ardichvili, Page, & Wentling, 2003) was crucial in building shared language within a relationship founded on the recurring social interactions associated with relational trust building (Rousseau, Sitkin, Burt, & Camerer, 1998), improving Company B’s propensity to provide added value to the customer. Through a process of knowledge transfer related to optimising the reliability and performance of the freeze-drying equipment new knowledge was created within Company B that all the network members benefitted from. As the MD of Company B confirmed: “Good

personal relationships are critical” when choosing suitable collaboration partners. We equate this comment to a calculative approach to trust building (Davies & Prince, 2005), in that the interactant is confident that the relationship won’t be exploited. We further argue that, by sharing expertise, the pros and cons of sharing knowledge become more transparent because of the presence of knowledge-based trust, thus encouraging affiliation-based ecosystems development that adds value to the customer:

“Customers] seem to come to you for advice... then I think you’re in a strong position for building on the future with them. Same with suppliers. I think with all my suppliers I’m on a fairly good personal footing with them, [it’s] just how I do business” (Technical Director, Company D).

For some companies once relationships had been established, they were maintained through regular engagement between individuals within the companies who leveraged their personal networks, often on an informal basis, and in the process sometimes these trust-based relationships developed into wider networks. The MD of Company B, for example, once he had identified a company he wanted to work with, would initiate contact and then attempt to build on this initial engagement. Although an initial contact with one potential customer first occurred in 2005, the Company did not receive an order from them until two years later. The MD of Company B displayed a high propensity for risk and used these visits as opportunities to build personal relationships with existing and potential customers and, as the Technical Manager explained, the MD “used these visits as opportunities to build personal relationships with existing and potential customers”. We associate the MDs behaviour with calculative trust building, in that he used his personal connections with customers to gather intelligence about their intentions and exploit gaps in their competence (Rousseau et al., 1998). Offering on-going advice and support encouraged cross-organizational informal interaction and trust building was also evident in other companies, some of whom offered free validation test facilities:

“In certain cases what we might do is offer a kind of validation that our system might work by a sort of a... my co-founder hates this word, but a ‘free test’. She doesn’t like the word free complimentary test” (Technical Director, Company D).

Such reciprocal arrangements were used to make contact with new customers and suppliers, or maintain contact with existing ones. Showcasing expertise, a form of tacit knowledge founded on knowledge-based trust, encouraged informal, trust building interactions. Adding value in this way was closely linked to building the strong personal relationships required in supporting a robust innovation ecosystem as one interactant observed: “it does make life an awful lot easier when you have a better personal arrangement in there” (Technical Director, Company C). Here we observe that, similarly to Company B, relational trust building (Rousseau et al., 1998), developed through repeated social interactions and engagement with the ecosystem, SMEs pooled their expertise, a kind of incremental innovation, providing advice to customers and suppliers. Knowledge transfer within the ecosystem was reinforced using knowledge-based trust based in building credibility, as one interviewee observed “You’ve got to build up credibility... people need to trust [in your knowledge]” (Technical Director, Company C). Building credibility was often through the elicitation of tacit knowledge within the network or ecosystem, where providing advice and scientific expertise was a way to build trust with customers and suppliers. Here, predication-based trust building process (Doney, Cannon, & Mullen, 1998) were important in building an network affiliation approach to trust building.

Platform affiliation

A second approach emerging from the findings was observed where companies used their platform affiliations as an alternative to trust building and contingent to the exploitation of a particular innovation ‘platform’ rather than reliance on knowledge transfer via network

affiliation based relationships. For example, Company E, had developed a novel method for growing Zinc Cadmium Telluride (ZCT) crystals use in the manufacture of semiconductors. The initial intention had been to grow the ZCT crystals and sell them to other manufacturers to use in their products. However, the company quickly realised that by offering additional functionality to the crystals, or incorporating them into its own products, they could improve on the original novel aspects of its radical innovation business model, adopting a more incremental approach to new product development:

“Really it was the ‘roast chicken’ model. If you cook it, you get more. Make it into sandwiches you get even more... and that’s exactly what we realised we can do.”

(Materials Manager, Company E).

The propensity to add value via its new business model combined the original idea of selling ZCT crystals to other manufacturers with plans to develop and manufacture its own range of new products (called ‘systems’) incorporating ZCT crystals, e.g. radiation detectors, airport security scanners and medical x-ray devices. Similarly, Company F, also used its product development expertise and knowledge in combining existing science-based technologies as a platform to produce gas sensing solutions for customers. For Company F, added value was achieved through problem solving on behalf of customers by using its gas sensing technology as a platform to develop new and innovative solutions:

“If somebody... gets a call from a customer [and] they ask for something we don’t necessarily have a product offering for, that can be identified as a problem. So, we... try and see if there is a product we could develop to offer that customer”

(Service Manager, Company F).

Trust building was strongly linked to these promissory or implied ‘problem solving’ activities often associated with pre-experiential trust building and linked to radical innovation platforms. For these two companies, it was not that trust building was sometimes a secondary consideration, coming after getting someone with the necessary expertise. Rather, expertise was seen to facilitate the development of trust, in which integrity was allowed to grow. However, difficulty in trusting others, based on estimating their integrity, was a particular issue for Company E and related to the novelty of its innovation platform. It was unable to rely on predication-based trust building processes, which are founded on the ability to assess the consistent, rational, and therefore predictive, behaviour (Doney et al., 1998) of individuals, who they often sourced for their ‘rare’ skills:

“I’m looking for a solution to an area that I’ve never dealt in before, so then I’ve got to find someone completely new, and... if you’re scouring for a particular skill and it’s a rare skill then I think you do end up with people who don’t fit the... criterion” (Chief Technical, Officer, Company E).

This made applying capability-based trust building processes, where the trustor assesses a target’s ability to fulfil his or her promises (Doney et al., 1998), difficult for Company E. In these circumstances the expectation that an individual could be relied on to ‘perform’. Here, we argue, pre-experiential trust becomes necessary in order to ‘kick-start’ a relationship and instigate the early formation of networks that lead to more knowledge-based trust relationships.

CONTINGENCY FRAMEWORK

In table 2, we present a summary of five contingencies we have identified from our findings with examples from our sampled SMEs. This contingency framework facilitates our understanding of the factors that enable or constrain trust building in an innovation ecosystem.

Table 2. Contingency framework for trust building in a complex innovation ecosystem

Contingency	High	Low
Degree of novelty	Language barrier reduces elicitation of tacit knowledge	Comfort conversing in same language makes it easier to elicit tacit knowledge
	Pre-experiential trust essential in order to ‘kick-start’ relationship and instigate the early ecosystem development	Knowledge-based trust crucial in building a strong trust-based ecosystem through recurring social interactions
	Company E – novel production method for ZCT a barrier to innovation	Company B - shared knowledge by providing ‘free’ advice Company D – complimentary testing Company F – problem solving
Protection of innovations	Reluctance to share knowledge (due to greater uncertainty associated with radical innovation)	More comfortable in sharing and exchanging knowledge (since less to lose)
	Institutional-based trust, founded on reassurances that the necessary organizational structures are in place	Knowledge-based trust underpinned the expectation that an individual could be relied on to ‘perform’
	Company E – conflicted between desire for external knowledge and protection of novelty Company A – ‘protected’ relationships	Company B - showcasing expertise underpinned by knowledge-based trust
Propensity for added value	More willing to share knowledge due to potential opportunities	Less willing to share knowledge due to concern for protecting limited offering
	Knowledge-based trust reinforced through knowledge sharing. Pre-experiential trust essential in sourcing rare/distinctive skills	Institutional-based trust necessary to protect limited offering/intellectual property
	Company B – ‘adding value’ to customer products Company E - ZCT viewed as a platform innovation Company F – added value through gas sensing solutions	Company A – use of NDA’s to protect (inhibit?) potential collaborations
Propensity for risk	Showcasing expertise provides opportunities to build relationships with existing/ potential customers	Reluctance to invest in informal relationships inhibits knowledge sharing and exchange
	Knowledge-based trust encourages informal knowledge sharing and exchange with customers/suppliers	Institutional-based trust in the form of NDA’s and contractual arrangements to protect intellectual property (IP)
	Company B – MD willingness to share expertise with customers	Company A – risk averse and therefore reluctance to network
Previous success of networks	Successful network engagement resulting in healthy personal relationships which enhances perceived integrity	No previous experience/suspicion of network participation results in cynical, jaundiced attitudes, unwillingness to invest in relationship building
	Knowledge-based trust encouraged informal, trust building interactions associated with network-affiliation	Reliance on pre-experiential trust, possibly backed up with institutional trust (e.g. NDA/contracts that incorporate sanctions)
	Company B – success building extensive inter-organizational networks reliant on knowledge-based trust	Company A – reluctance to invest in informal relationship building
	Company E - reliant on pre-experiential trust, possibly backed up with institutional trust (e.g. contractual agreements/NDAs/sanctions)	

CONCLUSION

Our paper makes two significant contributions. First, although we found evidence that network participation was sometimes problematic for the science-based SMEs, our findings challenge earlier research regarding SMEs’ capacity to participate in collaborative innovation (See, Brinkmann et al., 2014; Hamburg, 2009; Harding & Pawar, 2001; Havnes & Senneseth, 2001)

and we found many examples of how networks facilitated trust building that supports innovation ecosystem development. Second, our contingency framework provides an improved understanding of the factors that promote or inhibit trust building in a complex innovation ecosystem context.

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