

Antecedents of Successful Collaboration in Community of Practice between Academia and Industry: A Case Study

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Abstract: This article examines the potential of a community of practice (CoP) to generate the dynamic capability of organisations in an academia–industry collaboration. This empirical qualitative case study was carried out within the Northern Research and Innovation Platform (NRIP), a university-led CoP with the aim of intensifying academia–industry collaboration in the field of environment, energy and natural resources. This article offers a conceptual framework which could be applied in order to understand the antecedents needed for successful academia–industry collaboration to use community as an engine for the knowledge development and dynamic capability of the organisations. The study explains who the participants are and why they are participating as well as what their expectations are and how they are willing to participate. The utilisation mechanism is also explored from the knowledge management point of view.

Keywords: community of practice, dynamic capability, open innovation, academia-industry collaboration

1. Introduction

The global business environment is characterised by distributed knowledge, the innovation process itself being distributed across a number of actors (Acha & Cusumano, 2005). Innovating firms search for interesting ideas far beyond their organisational boundaries, and they also leverage internal ideas outside their own businesses (Chesbrough, 2003). Collaborating to gain access to knowledge is an attractive alternative, and the rising popularity of open innovation has resulted in new actors emerging in the innovation process (Gassmann, 2006; Ollila & Elmquist, 2011), such as networks (Vanhaverbeke, 2006) and communities (West & Lakhani, 2008; von Hippel, 2007). As markets become more globally integrated and new forms of technology and competition emerge, firms adapt and exploit changes in their business environments and seek opportunities for change through technological, organisational or strategic innovation (Helfat et al., 2009, Plattfaut et al., 2015). Firms adapt to business ecosystems and shape them by innovating and collaborating with customers, competitors, suppliers, public and private research institutes and universities, and even unrelated businesses (Moore, 1993, 1996; Teece, 2007; Acha & Cusumano, 2005, Bessant & Phillips, 2013).

Cooke (2005) argues that achieving competitiveness through innovation demands greater scientific involvement; thus, firms are encouraged to intensify academy–industry collaboration. Interactions between academia and industry facilitate knowledge transfer and even stimulate new knowledge creation; this has a positive effect on industrial innovativeness (Kale & Singh, 2007) and regional economic growth (Audretsch & Keilbach, 2004; Kitagawa, 2009; Muller, 2006; Ramos-Vielba et al., 2010).

To achieve mutuality, universities and firms must first know each other, developing some kind of social glue in the same manner as clusters (Gustavsen et al., 2001). Instead of formally established interorganisational arrangements and rigid research collaboration structures, more informal relationships, human interactions and social networks are needed (Baldwin & von Hippel, 2011; Franke & Shah, 2003; Perkmann & Walsh, 2007), while the locus of innovation is in innovation networks involving a mix of partners — universities, labs, start-ups, multinationals and governments (Powell et al., 1996). Wenger (1998) proposed the community of practice as a knowledge-transfer channel and social forum for learning and innovation where people can work together to develop a shared identity, improving mutual understanding to transfer knowledge (Lave & Wenger, 1991; Wenger, 1998). CoPs, given the nature of collective learning, social interaction, trust-building and users' commitment (Gassmann, 2006; Ollila & Elmquist, 2011), support open innovation when experts from different organisations establish self-organised communities and freely create and share knowledge for innovation development (Baldwin & von Hippel, 2011; Franke & Shah, 2003; O'Mahony & Lakhani, 2011).

This empirical qualitative case study was carried out within the Northern Research and Innovation Platform (NRIP), a university-led open CoP in northern Finland was established to promote academia–industry collaboration in the field of environment, energy and natural resources. The article contributes to the understanding of the potential of CoPs in promoting academia–industry collaboration. We analysed the experiences and expectations of members and also the benefits gained, using a conceptual framework which could be applied to understanding the antecedents needed for successful academia–industry collaboration in using CoP as an engine for knowledge development and dynamic capability of organisations. Our aim was to understand the conditions under which participants were expecting to benefit from participation in the work of the community.

2. Theoretical approach

2.1 Knowledge creation, learning and dynamic capability

Knowledge is defined as ‘a justified true belief’ which increases an organisation’s capacity for effective action (Nonaka & Takeuchi, 1995). Knowledge is the most important organisational resource (Alavi & Leidner, 2001, Alegre et al., 2013), because it is intangible, and its value will increase while it is used (Davenport et al., 1998). The reason to acquire, share and assimilate knowledge is to create new knowledge but also to advance and modify existing knowledge to produce innovation (Porter, 2000; Herkema, 2003; Tether & Tajar, 2008). The learning process in human brains generates and uses personal and collective interplay in various contexts, providing individual and company-level competences to appropriate new, necessary and economically useful knowledge (Dahlström & Hedin, 2010). Therefore, knowledge is seen as both a resource and a process, both linked to interactions among actors in the concept of knowledge dynamics (Strambach & Klement, 2013).

Firms in the modern business environment depend on external knowledge sources to promote innovation and improve performance (Morgan & Berthon, 2008). To avoid shortcoming of external knowledge flows, firms must develop their absorption capacity, the ‘ability to recognise the value of new information, assimilate it, and apply it to commercial ends’ (Cohen & Levinthal, 1990, p. 128). Knowledge creation and absorptive capacity are parts of dynamic capability creation (Zahra & George, 2002; Malhotra et al., 2005). Dynamic capability was introduced by Teece et al. (1997, p. 516) as ‘the firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments’. According to Peteraf et al. (2013, p. 1407) dynamic capabilities may enable firms to attain a sustainable competitive advantage in certain conditional cases. It refers also to a firm’s ability to successfully manage its knowledge base over time (Lichtenthaler & Lichtenthaler, 2009, p. 1315). Knowledge dynamics emerge from the processes of creation, usage, transformation, movement and diffusion of knowledge, resulting in innovations in products, services or processes (Strambach, 2008). The dynamic growth of economic transactions related to knowledge itself and the more systematic generation and commodification of knowledge are the main underlying characteristics of the knowledge economy (Strambach & Klement, 2013).

2.2 Community of practice in open innovation era

Open innovation is defined by Chesbrough (2006, p. 1) as ‘the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively’. Focus lies on open innovation between organisations which fosters the emergence and growth of innovation ecosystems in multi-partner networks to accelerate internal R&D processes and economic performance (Vanhaverbeke et al., 2014). A central part of the innovation process is also to organise the search for new ideas which have commercial potential (Laursen & Salter, 2006). According to West and Lakhani (2008) an important development in the past decade of innovation studies has been the recognition of the role of communities outside the boundaries of firms in creating, shaping and disseminating technological and social innovations. CoPs are based on open innovation, and given the nature of collective learning, social interaction, trust-building and users’ commitment, they have become particular interesting for knowledge transfer (West & Lakhani, 2008; Pattinson & Preece, 2014).

A CoP supporting open innovation and experts from different organisations can establish self-organised communities and freely create and share knowledge for innovation development (Baldwin & von Hippel, 2011; Franke & Shah, 2003; O’Mahony & Lakhani, 2011). Wenger (1998) defined a CoP as ‘the informal social context for learning and knowledge generation, where people from different organisations openly share their knowledge and expertise based on joint practices and a collective identity’. CoPs offer effective platforms for uniting individuals from different backgrounds and cultures to participate in a collaborative and friendly environment through informal discussions and open dialogues (Nonaka & Takeuchi, 1995; Schenkel & Teigland, 2008). The effectiveness of a CoP is based on its social

learning nature and ability to promote knowledge and innovation in both inter- and intraorganisational environments (Amin & Roberts, 2008; Swan et al., 2002; West & Lakhani, 2008). Community members are integrated into the community and community development by interacting with each other through numerous interpersonal contacts (Tsai et al., 2012). According to Tsai et al. (2012, p. 2) member–activity involvement refers to the extent to which members participate in the activities, which should influence the evolution of the social system — ‘an interacting collectivity that has ongoing patterns of scripts, rules, norms, values, and models’ (Zimmerman & Zeitz, 2002, p. 416). According to Simplican et al. (2015), people have different levels of engagement in communities, with presence perhaps the most important component.

According to Lundberg (2013), there is a need for bridges within networks and institutions as well as boundary-spanning actors who know many other network actors. Collaboration creates strong potential by fostering a community where one’s specific professional identity as an academic or a practitioner is minimised, and community members work toward mutual goals (Kline & Barker, 2012). Collaboration between academic and practitioner communities creates better research and education and a more comprehensive body of knowledge (Kline and Barker, 2012), and a CoP can encourage professional consciousness.

2.3 Academia–industry collaboration

In the context of open innovation, universities are a crucial in cooperating and sharing knowledge with other organisations in knowledge-transfer exchange processes, where researchers at universities are seen as key agents in the whole process (Padilla-Meléndez & Garrido-Moreno, 2012). Universities offer creative ways of solving problems and provide insights into emerging technologies to contribute to a firm’s innovation process (Giannopoulou et al., 2011). Academia–industry collaboration can take many forms, requiring different levels of formalisation and organisation (Thune, 2011). The drivers for universities pursuing collaboration include access to funding and technology, improved status in competing for public funding and feedback on the practical validity of research, while for companies they include access to scientific competencies, the ability to source innovation and ultimately to obtain a competitive advantage resulting from collaboration (Dooley & Kirk, 2007; Perkmann & Salter, 2012; Philbin, 2011).

In academia–industry collaboration, formal structures such as research project groups are quite typical. As opposed to such structures, CoPs are more informal, spontaneous, voluntary-based structures based on individuals’ willingness rather than on organisations’ constraints (Brown & Duguid, 1991). Lindkvist (2005) states that these features are not always present in formal structures, which are characterised by transactional rather than social relationships (Amin & Roberts, 2008). Gertner et al. (2011) state that through participation, members have the ability to negotiate the meaning of a CoP. Academia–industry collaboration assists knowledge transfer in both directions and stimulates regional economic growth by raising the rate of innovation (Audretsch & Keilbach, 2004; Kitagawa, 2009; Muller, 2006; Ramos-Vielba et al., 2010). Innovations drive regional development which is not necessarily pushed by technological breakthroughs; equally important are factors such as ‘learning by doing’, (Gloersen et al., 2006).

Universities primarily create new knowledge and educate students, while companies focus on capturing valuable knowledge to leverage for their dynamic capability and competitive advantage (Dasgupta & David, 1994). The open nature of universities contrasts with the more closed, protective approach of industry, and despite movement on both sides to more mixed cultures, attitudinal alignment between companies and universities remains problematic (Perkmann & Walsh, 2007). Mitev and Venters (2009) argue that business circumstances appear to influence CoP members’ commitment in that the timescales of companies differ from longer academic timetables; companies become impatient with university hierarchies and priorities, and academic output is sometimes seen as underdeveloped, going in circles and even inferior. To achieve successful collaboration in CoPs, Perkmann and Walsh (2007) recommend that companies in an academia–industry collaboration look to capacity building rather than tangible outcomes; the authors add that many innovative ideas start too small to be interesting to large companies, and shared governance creates trust as well as adjustments to changes in the project environment in a mutually agreed and coordinated manner (Bstieler et al., 2015). It takes time and smaller projects in the beginning to build trust and commitment over time (Schubert & Bjørn-Andersen, 2012), and managers’ support must strongly promote it (Bstieler et al., 2015).

From the industry perspective, we conclude that there are a number of CoP attributes in an academia–industry collaboration that can provide the following significant benefits:

- New knowledge for innovations (Ramos-Vielba et al, 2010)
- Open forum for discussion (Nonaka and Takeuchi, 1995; Schenkel and Teigland, 2008)
- Efficient problem solving tool (Wenger and Snyder, 2000)
- Source of best practices and lessons learned (Nonaka and Takeuchi, 1995)
- Virtual learning communities (Ardichvili, et al, 2003; Du, 2008)
- Economic effects, such as knowledge creation, human capital creation, transfer of existing know-how, research-led technological innovation, capital investment and regional leadership (Drucker and Goldstein, 2007; Jaffe, 1989; Salter and Martin, 2001)

From the academia perspective, we conclude that an academia–industry collaboration can provide at least the following benefits to the universities:

- Increasing R&D funding (Ramos-Vielba et al, 2010; Santoro and Chakrabati, 2001)
- Exposing students and staff members to practical problems (Santoro and Chakrabati, 2001)
- Testing theory and gain access to applied technologies (Santoro and Chakrabati 2001)
- Higher scholarly productivity and higher quality rankings (Siegel et al, 2004; Van Looy et al, 2004)
- Impact on the regional milieu and support for knowledge infrastructure (Salter and Martin, 2001)

3. The context and methodological choices

This case study was conducted within the NRIP, the university-led CoP developed in 2009–2012 in northern Finland to intensify academia–industry collaboration. Besides two universities, research is conducted in three university regional units/consortiums, five universities of applied sciences, six university research stations, nine national research institutes and several industrial R&D units and departments. Northern Finland is a rural, sparsely populated area where all scarce actors in the innovation system need to participate in the innovation process. The NRIP provides direct access to community members by arranging face-to-face events and an infrastructure for virtual communication and international networking.

The NRIP was based on the idea of knowledge sharing through mutual learning (learning by doing), following the development framework of Wenger (2000; see Iskanius & Pohjola, 2016). First, the R&D actors in the field were identified, discussions with potential members were held and motivation issues for CoP development were mapped. Based on the face-to-face meetings and negotiations, potential members were invited to the kick-off meeting designed to activate and motivate people in the joint project development of the NRIP. Fifty experts participated. Workshop attendees built trust, explored connectedness and defined joint rules and practices. Three brainstorming sessions were arranged to gather members together to recognise the potential of the NRIP. Between sessions, individual exercises were held to gather information for its development. In the workshops, members examined and made forecasts concerning developmental trends, guided by leading Finnish futurists. They analysed ways in which the regions should prepare for possible future developments, focus and integrate activities and develop research and infrastructure. Based on the workshop process, discussions and exercises, the content, future research needs and cooperation methods as well as the vision, strategy, research agenda and joint operational program of the NRIP community were formulated. Ninety experts participated in the workshops. Afterwards, the aim was to engage in joint activities, create artefacts, adapt to changing circumstances and renew interests, commitment and relationships. Four workshops were arranged where small thematic groups developed R&D projects independently. First, thematic research fields were selected, and small interest groups were established. As a result, 300 joint R&D ideas were identified, and eight R&D projects were initiated. Members engaged in developing practices and started to trust each other; many informal contacts were created. The material generated during the development process was published in five reports. A high-level seminar was also arranged to provide the results to local and national policymakers and industrial directors.

To conduct this study, we chose a qualitative case study as our research strategy (Creswell, 1994; Stake, 1995; Yin, 2003) with the aim of understanding the target phenomenon by analysing textual data. Creswell (1994, p. 12) states that a case study approach is typical for exploring a single entity or phenomenon bounded by time and activity. The researcher also ‘collects detailed information by using a variety of data collection procedures during a sustained period of time’. We collected the empirical data in two stages. First, we sent a questionnaire to the key NRIP members with the following questions: What were the reasons why you participated in the forum? What kind of expectations

did you have? Describe the workshops in your own words. How has your organisation benefited from your participation? Describe the mechanisms in your organisation to capitalise on the new knowledge gained/learned.

We received 13 responses from the representatives of the organisations; 5 from academia, 4 from other public actors and 4 from industry. After a qualitative content analysis, we used the conclusions as a basis for subsequent data collection via personal interviews. Thus, the second stage of data collection involved conducting personal interviews with seven key NRIP members, using a focused interview method. Three interviewees were from research organisations, and four were from companies. All interviewees belonged to the core group of the NRIP (see Wenger et al., 2002, p. 4), which actively participated in discussions and guided the community along its learning agenda. This group was the heart of the community (Wenger et al., 2002, p. 56). The core group takes on much of the community's leadership, its members becoming auxiliaries to the community coordinator and this group is usually rather small, only 10 to 15 percent of the whole community (Wenger et al. 2002, p. 4). Since the interviewees included representatives from academia, other public organisations and private companies, we used a dimensional sampling method to choose the interviewees (Arnold, 1970). The interviews were transcribed and analysed using a qualitative content analysis method (Cavanagh, 1997).

4. Empirical findings

To start making sense and finding core discussions, we identified certain themes categorised below. Based on the interviews, we noticed that the CoP members entertained many different kinds of goals and expectations, because the CoP was heterogeneous in nature, and according to our analysis, members can hold stereotypical images of the others. Industrial members viewed universities as too theoretical, abstract and lofty, while academic members viewed industrial members as being only focused on short-term gain and controlling the operation solely for money.

To clarify the empirical content, comments are divided into academia (A), other public actors (O) and industry (I) categories.

4.1 NRIP Participants

Participants came from different scientific and industrial fields, different regions in northern Finland and different companies, universities, financiers and other public development organisations. Thus, the fundamental difference between participants involved their professional backgrounds. The analysis reveals that they were a heterogeneous group of people with different kinds of expectations of and motivations to participate in the NRIP. Based on the interviews, a stronger participation of companies was requested.

Generally speaking, there was the same situation as in many other such events. Companies/Business people do not participate in/come very often to such events. So, in there was quite a lot of academics and representatives of development organisations (A).

The value of participation was recognised and viewed as an antecedent of presence, as important as the potential benefits and networking. Through participation, members received access to the community's knowledge resources. Some members even expressed the idea that such open, informal forums are a necessity.

In that type of cooperation, in my view, the developers need to participate/go. One person is able to handle only a small part of this world. However, the new innovative things can usually found together with other people (O).

We also conclude that the participants were heterogeneous, with varying expectations resulting from a lack of the same kind of background knowledge about the objectives of the workshops, contents, activities and procedures. SME participants also felt themselves to be small, with limited resources. On the other hand, public sector participants have similar practices, and these types of activities are a natural part of their work and working culture. Organisers were from different backgrounds, with organisations varying in size, interests and situations.

4.2 Motivations and expectations of the NRIP

To understand what motivated participants, we identified different expectations, categorised under four themes: (1) potential collaboration, which consisted of the sub-themes of participation and networking, (2) increasing overall and specific knowledge, (3) dialogue from a business point of view and (4) strong regional relevance.

4.2.1 Potential collaboration

Industrial members highlighted that it is important to have a neutral discussion arena where it is possible to meet other people to collaborate and have access to the community's knowledge resources.

Well, when you live here on the rural area, so is it the advantage that it is a forum to meet with old friends and partners but also to find new potential partners (I).

Yes, I had several, and perhaps a bit too even high expectations towards all, and how we find good opportunities for cooperation (A).

Academic members had clear, concrete goals regarding how to benefit from the NRIP. Industrial members also appreciated the NRIP as an important source of useful and interesting first-hand knowledge. Workshops were therefore perceived, in principle, as a form of cooperation. The members were not affected by the fact that the idea of the workshops was to generate useful new knowledge or skills; instead, each member seemed to move according to their own motives based on their own personal benefits.

4.2.2 Increasing overall and specific knowledge

The motivation for participation in the NRIP was a common interest in developing and prospering the field of environment, energy and natural resources. Members had different perspectives on the topic, with respect to the business, R&D or financing views; however, they shared a joint interest in increasing their knowledge in the field. If the joint interest was concrete or particularly topical, it was found to be interesting. Industrial members gained new topic-specific knowledge for innovations, and they described this as follows:

Knowledge is increasing, but rather it was nice to know, very few felt they had received precise or directly utilisable information or know-how. It was seen as valuable, that we were able to hear the new perspectives to familiar things (I).

During the workshops, members became familiar with others, developed trust and obtained a better overall picture of other participants' skills and the potential of joint collaborative actions. At some events, while the core topic was not particularly relevant, members stated that their overall knowledge increased; however, they considered such knowledge as just 'nice to know'.

4.2.3 Dialogue from a business point of view

The company representatives stated that it was important to bring the commercial point of view into the CoP discussions. According to industrial members, universities didn't always consider economic realities such as the implementation and evaluation of production costs or identifying who would ultimately pay. Therefore, it was interpreted by all that while the angles varied, both parties' views were complementary.

In that sense, business people need to be involved with the researchers and the authorities, because the open cooperation produce the best results (I).

4.2.4 Strong regional relevance

A regional point of view was clearly evident in the data. It was collectively interpreted that cooperation is a key resource factor and an opportunity, particularly in areas that are not obviously attractive growth centres. It seems natural that public actors (O) such as development and funding organisations are looking for regional advantages.

And, small area with limited resources, means that when we have projects and other businesses together, we are more reliable and we will be taken seriously as an area (O).

4.3 Content of the NRIP

The domain that gathered people into the NRIP was the common emphasis of R&D issues related to Arctic research. Industrial members in particular highlighted that it is important to have the possibility of meeting and collaborating with other enthusiasts in the field. In the workshops, a variety of methods such as thematic workgroups and virtual activities via the Internet helped with idea collection and helped with these ideas' further processing. In particular, participatory methods were mentioned positively.

Traditional lectures were held as examples of concrete benefits; therefore, a subject was given to a participant, and they could contribute to that subject from their own work. Participants indicated that they got necessary information from the lectures which they could quote afterwards.

But then, there was also a very good lectures, which were stick in the mind and which I have myself summarised in my own presentations many times after that (O).

The interviews also highlighted the central role of a workshop facilitator as well as the arrangements of the workshops.

It very much depends on that how creative and how inspiring they are. The fact that the participants will be active when facilitator has social skills and in-depth know-how (O).

So, essentially, they were well designed. I have planned quite a lot this kind events, and I know that it will take a lot of time, that everything runs smoothly. I noticed right away that this is a very well designed, as all went well (A).

4.4 NRIP forum and working processes

NRIP members from both academia and industry had positive attitudes towards community collaboration. We explored different experiences in the NRIP and how members used their new knowledge in their own organisations as well as what kind of working methods and processes were available to allow them to take advantage of it.

Yes, this is in our action plan and it is ideal when we participate in such networks, and activate our cooperation. That's exactly what I need to do for a living (O).

Well there was a really good atmosphere and informal activities and I think that it was due to the fact that a large majority of participants were there as individuals and were used to working in these types of sessions (I).

4.5 NRIP benefits

We analysed what kinds of benefits participants gained in the community work. Participants in the study maintained that events took place primarily to serve the university's own targets, although the promotion of cooperation with the companies was mentioned in the interviews. The participants saw benefits in different ways. Those from academia and other public actors said that they benefited more than the representatives of the companies. Company representatives were satisfied, on the whole, but strongly expressed the lack of tangible results.

That which now has been more important to us is that it offered ideas to reflect our new studies or new projects. Through these contacts gained in the events it is utilized and invited to join in your own projects ... However, contacts which were born there has been used a number of our own project plans (A).

Other public actors benefitted more from the results of the community work.

Well, yes, I got on a broader view because there was other people than usual in cooperation events. In addition, we made things interacting together, so we exported ideas from this region and the provinces to our headquarters in Helsinki (O).

In the interviews, company representatives described the benefits and disadvantages as follows.

Yeah, and then again the businesses would like to have concrete result and rather immediately (I).

Personally and through my own business, it has not materialised in any way. Straight out, no way (I).

4.6 Knowledge transfer and anchoring

We analysed what kinds of benefits participants gained and how they used their new knowledge in their own organisations. We also analysed what kinds of working methods and processes were available in participants' organisations to allow them take advantage of their new knowledge. Based on the data, it seems that the ability to utilise the results of the workshops was affected by the companies' size and resources and by the availability of mechanisms and practices by which they could process, refine and transfer the gained individual knowledge to organisation-level knowledge. A big difference between participants was seen in the capability of implementing the acquired knowledge in the community. For public organisations such as universities and state research institutes, the implementation of knowledge is part of their regular processes and of their organisational culture. According to our

interviews, by comparison, private companies do not have practices or processes for implementation of lessons learned in community work, even though they took advantage of that knowledge.

There have been found many new ideas and then really well, in my opinion, information about what was collected during this project has been also shared (O).

Such things, which can be applied immediately to the company's operations, especially some related to the environmental side of things, will take place immediately through the company's employees (I).

So, my business is such a small scale, that there's not resources to handle this kind of things (I).

Community work also resulted in concrete action. University and research organisations centralised many organisations in the same building and created a great foundation for knowledge transfer and collaboration.

There is one important thing that after this has occurred, or in those same times, that an Environmental Information – building emerged. Various research institute representatives moved physically in the same place. It gave one the opportunity to strengthen this network. And, in addition to this further established innovation centers ... (O)

5. Discussion

The most prominent issue of the NRIP was the involvement of a wide range of different actors such as universities, public actors, corporations, SME's and entrepreneurs as individuals, embedded with their tacit knowledge in this open innovation community (Dodgson et al., 2006; Kitagawa, 2009). Kauppila (2015) argue that the most prominent themes in academia–industry collaboration relate to organisational culture, aligning interests and operating systematically and transparently.

The downside, from the companies' viewpoint, was that the knowledge transfer did not work in both directions (Audretsch & Keilbach, 2004; Kitagawa, 2009; Muller, 2006; Ramos-Vielba et al., 2010). According to the interviews, the knowledge provided to companies was too general and was difficult to implement in their businesses. Also, the open nature of universities contrasts with the more closed and protective approach of industry (Perkmann & Walsh, 2007); companies were seen as more adaptive and absorptive of new knowledge while universities tried to benefit from new projects.

The representatives of the companies sought a competitive advantage through responsiveness and rapid and flexible product innovation (see Teece & Pisano, 1994). However, they were unable to coordinate and redeploy their internal and external competences in the community, even when a university offered new methods and models to transform research results, research-generated ideas and inventions into commercial use (Bjerregaard, 2010; Boardman & Ponomariov, 2009; Kale & Singh, 2007).

We did not find similarity with Audretsch and Keilbach (2004), Kitagawa (2009), Muller, (2006) or Ramos-Vielba et al. (2010), in which this community of academia–industry collaboration allowed knowledge transfer in both directions and significantly stimulated regional economic growth by increasing the rate of innovation. Based on this study, it was clear that this interaction facilitates knowledge transfer and interaction between academia and industry, as Kale and Singh (2007) suggested, but the positive effects on industrial innovativeness were not so clear. Nor did we find evidence that scientific involvement in community work directly resulted in innovations, as Cooke (2005) suggested.

6. Conclusion

This study contributes to the research on CoPs in an academy–industry collaboration. Our article provides new empirical evidence on the potential of working in a CoP to create dynamic capability. We have identified preconditions which have an influence on the success of this kind of community's ability to create dynamic capabilities for the organisations working in the CoPs . In this case, we found that these preconditions were not optimal; therefore, results from this community did not clearly develop the dynamic capability of the organisation. Table 1, below, shows the founded dimensions of the antecedents of successful academia–industry collaboration.

Participants	Motivation to participate	Topic	Processes	Utilisation mechanisms
WHO	WHY	WHAT	HOW	KM

Table 1: Antecedents of successful academia–industry collaboration

The work in the NRIP functioned moderately, even though there were many things which needed improvement. The following differences and equalities were found during the empirical analysis in comparison to the theoretical approach. The CoP as a collaboration forum for the parties worked quite well, even though the participants (WHO) had such heterogeneous backgrounds and their expectations varied widely. The motivations and expectations (WHY) of the CoP members differed, which hindered the effective utilisation of gained knowledge for the benefit of the businesses. We evaluated many challenges with the content (WHAT), because it seemed that the university as a CoP organiser ran the event based on its own interests, and therefore, the NRIP was more or less designed to be science-oriented rather than business-oriented. The forum was mainly characterised in a positive way, but the companies lacked the knowledge implementation processes (HOW) to take advantage of the gained knowledge. Companies were starving for resources and methods by which to implement this knowledge, and our interpretation is that the universities and other public actors were not trying to improve their dynamic capability but were trying to take advantage of new projects and public funding.

Participation and presence in a CoP itself were seen as very useful, and no one doubted that their knowledge and skills increased in the CoP. Additionally, companies’ participation helped their point of view gain visibility in collaborative activities. However, companies did not have the mechanisms or practices by which to take advantage of the new knowledge and utilise it to enhance their own dynamic capability. While universities and public organisations discussed matters at an abstract level, companies emphasised concrete tasks and measureable results. However, this data clearly shows that cooperation is considered an opportunity and a key resource factor, particularly in regions which are not obviously attractive growth centres. Cooperation is therefore considered important to the vitality of rural areas’ development.

Thus, we argue that while open forums, such as NRIP, have a lot of potential, their full potential remains unexploited. We conclude that the shared objectives, relevant topics, suitable working methods and composition of the group are antecedents of collaboration that are key to refining knowledge created in each event. We suggest that these antecedents should be studied further. Finally, we conclude that companies should acknowledge the potentially strategic value of information gained from such forums and therefore build established and effective mechanisms to capitalise on the new knowledge.

References

Acha, V., & Cusumano, L. (2005). Governance and co-ordination of distributed innovation processes: Patterns of R&D co-operation in the upstream petroleum industry. *Economics of Innovation and New Technology*, 14(1–2), 1–21.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.

Alegre, J., Sengupta, K., & Lapedra, R. (2013). Knowledge management and innovation performance in a high-tech SMEs industry. *International Small Business Journal*, 31(4), 454–470.

Amin A., & Roberts, J. (2008). Knowing in action: Beyond communities of practice. *Research Policy*, 37(2), 353–369.

Arnold, D. O. (1970). Dimensional sampling: An approach for studying a small number of cases. *The American Sociologist*, 5(2), 147–150.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7(1), 64–77.

Audretsch, D. B., & Keilbach, M. (2004). Entrepreneurship and regional growth: An evolutionary interpretation. *Journal of Evolutionary Economics*, 14(5), 605–616.

Baldwin, C., & von Hippel, E. (2011). Modeling a paradigm shift: From producer innovation to user and open collaborative innovation. *Organization Science*, 22(6), 1399–1417.

Bessant, J., & Phillips, W. (2013). Innovation management and dynamic capability. *The SAGE Handbook of Strategic Supply Management*. Sage Publishing.

Bjerregaard, T. (2010). Industry and academia in convergence: Micro-institutional dimensions of R&D collaboration. *Technovation*, 30(2), 100–108.

Boardman, P. C., & Ponomariov, B. L. (2009). University researchers working with private companies. *Technovation*, 29(2), 142–153.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2(1), 40–57.

- Bstieler, L., Hemmert, M., & Barczak, G. (2015). Trust formation in university–industry collaborations in the US biotechnology industry: IP policies, shared governance, and champions. *Journal of Product Innovation Management*, 32(1), 111–121.
- Cavanagh, S. (1997). Content analysis: Concepts, method and applications. *Nurse Researcher*, 2(3), 5–16.
- Chesbrough, H. (2003). The logic of open innovation: Managing intellectual property. *California Management Review*, 45(3), 33–58.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 128–152.
- Cooke, P. (2005). Regionally asymmetric knowledge capabilities and open innovation: Exploring ‘globalisation 2’—a new model of industry organisation. *Research Policy*, 34, 1128–1149.
- Creswell, J. W. (1994). *Research Design*. Thousand Oaks, CA: Sage.
- Dasgupta, P., & David, P. (1994). Towards a new economics of science. *Research Policy*, 23, 487–522.
- Davenport, T. H., De Long, D. W., & Beers, M. C. (1998). Successful knowledge management projects. *MIT Sloan Management Review*, 39(2), 43.
- Dodgson, M., Gann, D., & Salter, A. (2006). The role of technology in the shift towards open innovation: The case of Procter&Gamble. *R&D Management*, 36, 333–346.
- Dooley, L., & Kirk, D. (2007). University–industry collaboration: Grafting the entrepreneurial paradigm onto academic structures. *European Journal of Innovation Management*, 10(3), 316–332.
- Drucker, J., & Goldstein, H. (2007). Assessing the regional economic development impacts of universities: A review of current approaches. *International Regional Science Review*, 30(1), 20–46.
- Franke, N., & Shah, S. (2003). How communities support innovative activities: An exploration of assistance and sharing among end-users. *Research Policy*, 32(1), 157–178.
- Gassmann, O. (2006). Opening up the innovation process: Towards an agenda. *R&D Management*, 36(3), 223–228.
- Gertner, D., Roberts, J., & Charles, D. (2011). University–industry collaboration: A cops approach to ktps. *Journal of Knowledge Management*, 15(4), 625–647.
- Giannopoulou, E., Yström, A., & Ollila, S. (2011). Turning open innovation into practice: Open innovation research through the lens of managers. *International Journal of Innovation Management*, 15(3), 505–524.
- Gloersen, E., Dubois, A., Copus, A., & Schürmann, C. (2006). Northern peripheral sparsely populated regions in the European Union and in Norway. *Nordregio Report*, 2, 183.
- Gustavsen, B., Finne, H., & Oscarsson, B. (Eds.). (2001). *Creating connectedness: The role of social research in innovation policy* (Vol. 13). John Benjamins Publishing.
- Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.
- Herkema, S. (2003). A complex adaptive perspective on learning within innovation projects. *The Learning Organization*, 10(6), 340–346.
- Iskanius, P., & Pohjola, I. (2016). Leveraging communities of practice in university–industry collaboration: a case study on Arctic research. *International Journal of Business Innovation and Research*, 10(2/3), 283.
- Kale, P., & Singh, H. (2007). Building firm capabilities through learning: The role of the alliance learning process in alliance capability and firm-level alliance success. *Strategic Management Journal*, 28(10), 981–1000.
- Kaupilla, O., Mursula, A., Harkonen, J., & Kujala, J. (2015). Evaluating university–industry collaboration: The European foundation of Quality Management excellence model-based evaluation of university–industry collaboration. *Tertiary Education and Management*, 21(3), 229–244.
- Kitagawa, F. (2009). Universities–industry links and regional development in Japan connecting excellence and Relevance? *Science Technology & Society*, 14(1), 1–33.
- Kline, J., & Barker, T. (2012). Negotiating professional consciousness in technical communication: A community of practice approach. *Technical Communication*, 59(1), 32–48.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Laursen, K., & Salter, A. (2006). Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131–150.
- Lichtenthaler, U., & Lichtenthaler, E. (2009). A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity. *Journal of Management Studies*, 46(8), 1315–1338.
- Lindkvist, L. (2005). Knowledge communities and knowledge collectivities: A typology of knowledgework in groups. *Journal of Management Studies*, 42(6), 1189–1210.
- Lundberg, H. (2013). Triple helix in practice: The key role of boundary spanners. *European Journal of Innovation Management*, 16(2), 211–226.
- Malhotra, A., Gosain, S., & Sawy, O. A. E. (2005). Absorptive capacity configurations in supply chains: Gearing for partner-enabled market knowledge creation. *MIS Quarterly*, 145–187.
- Mitev, N., & Venters, W. (2009). Reflexive evaluation of an academic–industry research collaboration: Can mode 2 management research be achieved? *Journal of Management Studies*, 46(5), 733–754.
- Moore, J. F. (1993). Predators and prey: A new ecology of competition. *Harvard business review*, 71(3), p. 75.
- Moore, J.F. (1996). *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*, Harper Collins Publishers, New York, NY.
- Morgan, R. E., & Berthon, P. (2008). Market orientation, generative learning, innovation strategy and business performance inter-relationships in bioscience firms. *Journal of Management Studies*, 45(8), 1329–1353.

- Muller, P. (2006). Exploring the knowledge filter: How entrepreneurship and university–industry relationships drive economic growth. *Research Policy*, 35(10), 1499–1508.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford University Press.
- Ollila, S., & Elmquist, M. (2011). Managing open innovation: Exploring challenges at the interfaces of an open innovation arena. *Creativity and Innovation Management*, 20(4), 273–283.
- O’Mahony, S., & Lakhani, K.R. (2011). Organizations in the shadow of communities. *Research in the Sociology of Organizations*, 33, 3–36.
- Padilla-Meléndez, A., & Garrido-Moreno, A. (2012). Open innovation in universities: What motivates researchers to engage in knowledge transfer exchanges? *International Journal of Entrepreneurial Behavior & Research*, 18(4), 417–439.
- Pattinson, S., & Preece, D. (2014). Communities of practice, knowledge acquisition and innovation: A case study of science-based SMEs. *Journal of Knowledge Management*, 18(1), 107–120.
- Perkmann, M., & Salter, A. (2012). How to create productive partnerships with universities. *MIT Sloan Management Review*, 53(4), 79.
- Perkmann, M., & Walsh, K. (2007). University–industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews*, 9(4), 259–280.
- Peteraf, M., Di Stefano, G., & Verona, G. (2013). The elephant in the room of dynamic capabilities: Bringing two diverging conversations together. *Strategic Management Journal*, 34(12), 1389–1410.
- Philbin, S. P. (2011). Design and implementation of the Balanced Scorecard at a university institute. *Measuring Business Excellence*, 15(3), 34–45.
- Plattfaut, R., Niehaves, B., Voigt, M., Malsbender, A., Ortbach, K., & Poeppelbuss, J. (2015). Service innovation performance and information technology: An empirical analysis from the dynamic capability perspective. *International Journal of Innovation Management*, 19(04), 1550038.
- Porter, M. E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic Development Quarterly*, 14(1), 15–34.
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 116–145.
- Ramos-Vielba, I., Fernández-Esquinas, M., & Espinosa-de-los-Monteros, E. (2010). Measuring university–industry collaboration in a regional innovation system. *Scientometrics*, 84(3), 649–667.
- Salter, A. J., & Martin, B. R. (2001). The economic benefits of publicly funded basic research: A critical review. *Research Policy*, 30(3), 509–532.
- Santoro, M. D., & Chakrabarti, A. K. (2001). Corporate strategic objectives for establishing relationships with university research centers. *Engineering Management, IEEE Transactions*, 48(2), 157–163.
- Schenkel, A., & Teigland, R. (2008). Improved organizational performance through communities of practice. *Journal of Knowledge Management*, 12(1), 106–118.
- Schubert, P., & Bjørn-Andersen, N. (2012). University–industry collaboration in IS research: An investigation of successful collaboration models. In *Proceedings of the International Bled Conference 2012* (pp. 109–126).
- Siegel, D. S., Waldman, D. A., Atwater, L. E., & Link, A. N. (2004). Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: Qualitative evidence from the commercialization of university technologies. *Journal of Engineering and Technology Management*, 21(1), 115–142.
- Simplican, S. C., Leader, G., Kosciulek, J., & Leahy, M. (2015). Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Research in developmental disabilities*, 38, 18–29.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Strambach, S. (2008). Knowledge-intensive business services (KIBS) as drivers of multilevel knowledge dynamics. *International Journal of Services Technology and Management*, 10(2–4), 152–174.
- Strambach, S., & Klement, B. (2013). Exploring plasticity in the development path of the automotive industry in Baden-Württemberg: The role of combinatorial knowledge dynamics. *Zeitschrift für Wirtschaftsgeographie*, 57(1–2), 67–82.
- Swan, J., Scarborough, H., & Robertson, M. (2002). The construction of ‘communities of practice’ in the management of innovation. *Management Learning*, 33(4), 477–496.
- Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350.
- Teece, D., & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change*, 3(3), 537–556.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Tether, B. S., & Tajar, A. (2008). Beyond industry–university links: Sourcing knowledge for innovation from consultants, private research organisations and the public science-base. *Research Policy*, 37(6), 1079–1095.
- Thune, T. (2011). Success factors in higher education–industry collaboration: A case study of collaboration in the engineering field. *Tertiary Education and Management*, 17(1), 31–50.
- Tsai, H. T., Huang, H. C., & Chiu, Y. L. (2012). Brand community participation in Taiwan: Examining the roles of individual-, group-, and relationship-level antecedents. *Journal of Business Research*, 65(5), 676–684.
- Vanhaverbeke, W. (2006). The interorganizational context of open innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *Open innovation: Researching a new paradigm* (pp. 205–219). Oxford University Press.

- Vanhaverbeke, W., Chesbrough, H., & West, J. (2014). Surfing the new wave of open innovation research. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *New frontiers in open innovation*. Oxford University Press.
- Van Looy, B., Ranga, M., Callaert, J., Debackere, K., & Zimmermann, E. (2004). Combining entrepreneurial and scientific performance in academia: Towards a compounded and reciprocal Matthew-effect? *Research Policy*, 33(3), 425–441.
- Von Hippel, E. (2007). Horizontal innovation networks—by and for users. *Industrial and Corporate Change*, 16(2), 293–315.
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7, 225–246.
- Wenger, E., McDermott, R. A., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business School Press.
- Wenger, E., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review*, 78(1), 139–146.
- Wenger, E., McDermott, R.A., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business Press.
- West, J., & Lakhani, K. R. (2008). Getting clear about communities in open innovation. *Industry & Innovation*, 15, 223–261.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185–203.
- Zimmerman, M. A., & Zeitz, G. J. (2002). Beyond survival: Achieving new venture growth by building legitimacy. *Academy of Management Review*, 27(3), 414–431.