



Paper to be presented at DRUID19  
Copenhagen Business School, Copenhagen, Denmark  
June 19-21, 2019

Creating, Maintaining and Dismantling a Hybrid Space for Sustainability Research:  
Exploring the practices of academic engagement in a university-industry centre

**Rani J. Dang**

University of Gothenburg  
Institute of Innovation and Entrepreneurship  
rani.dang@gredeg.cnrs.fr

**Maureen Mckelvey**

University of Gothenburg  
Innovation and Entrepreneurship  
maureen.mckelvey@handels.gu.se

**Olof Zaring**

University of Gothenburg  
Institute of Innovation and Entrepreneurship  
olof.zaring@handels.gu.se

## **Abstract**

Drawing on a four-year qualitative field study, we explore the practise of academic engagement as institutionalized in a university-industry centre. We define this as a hybrid space, designed to allow interactions between commercial and academic logics. Our analysis identifies two phases: The first phase is creating the centre, through developing a formal organizational structure, which relies on pre-existing knowledge networks. The second phase is maintaining and dismantling the centre, which is constituted through micro-level activities. Difficulties arise with hybridizing the logics. We interpret that placing too much focus on 'becoming an entrepreneurial university' through a formal organizational structure can take too much time away from the on-going activities. The 'commercial logic' is interpreted differently by each industrial partner, which causes difficulties in deciding about research, due to the uncertain nature of science per se. We describe a new type of 'societal engagement logic', in this case related to sustainability.

# **Creating, Maintaining and Dismantling a Hybrid Space for Sustainability Research: Exploring the practices of academic engagement in a university- industry centre**

**Key words:** University-Industry relations; Hybrid space; Institutional logics; micro-level practises

## **Abstract**

Drawing on a four-year qualitative field study, we explore the practise of academic engagement as institutionalized in a university-industry centre. We define this as a hybrid space, designed to allow interactions between commercial and academic logics. Our analysis identifies two phases: The first phase is creating the centre, through developing a formal organizational structure, which relies on pre-existing knowledge networks. The second phase is maintaining and dismantling the centre, which is constituted through micro-level activities. Difficulties arise with hybridizing the logics. We interpret that placing too much focus on ‘becoming an entrepreneurial university’ through a formal organizational structure can take too much time away from the on-going activities. The ‘commercial logic’ is interpreted differently by each industrial partner, which causes difficulties in deciding about research, due to the uncertain nature of science per se. We describe a new type of ‘societal engagement logic’, in this case related to sustainability.

## **1. Introduction**

An expanding literature argues that universities should become more entrepreneurial, and specifies different ways in which such new entrepreneurial behaviours of universities impact economic growth by stimulating innovations (Audretsch 2014; Audretsch et al 2014). Public policy has also changed the institutional context, with the aim to encourage entrepreneurial universities (Etzkowitz et al 2000; Etzkowitz

and Leydesdorff 2000), leading also to critiques of academic capitalism (Slaughter and Leslie 1997). Over time, this aim of universities becoming more entrepreneurial has led to changes in their internal organization and practices, such as changes in IPR regimes and the development of technology transfer offices (Welsh et al 2008; Grimaldi et al 2011; Kenney and Mowery 2014). Specifically, the concept of academic engagement refers to a mode of collaborative research between university and industry, driven by individual scientists, and involving knowledge networks and multiple interactions across many activities to generate new knowledge (Perkmann et al 2013). This literature proposes that knowledge networks are more important to understand how universities become entrepreneurial than are the formal organizational structures related to commercialization, e.g. academic patents and start-up firms (Perkmann et al 2013). So how can university and industry collaborate to reach societal goals, given the differing institutional logics (Dasgupta and David 1994). – essentially, that universities are primarily interested in science, whereas companies are primarily interested in making profits? Despite differing institutional logics, empirical work indicates different ways in which universities and industry collaborate, and try to solve the tensions between the two logics (Styhre and Lind 2010; Berggren and Karabag 2019). One concept recently developed in the organizational theory literature is that of ‘hybrid spaces’. Perkmann et al (2018) propose a specific model for maintaining hybrid space between the two institutional logics of academia and corporate logic. Drawing on a four-year qualitative study of micro-level activities inside one university-industry centre, we explore the practices of academic engagement with industry.

The purpose of this article is thus to explore how these practises, by examining combination of organizational structure and micro-level activities underlie the practise of creating and maintaining the hybrid space in a university-industry

centre for sustainability. We contribute, as compared to extant literature, by further developing the analysis of the processes of creating and dismantling a hybrid space for sustainability research. In doing so, we provide a specific definition of the university-industry centre as well as an analysis of processes, given that centres are a temporary organizational form, designed to start but also end. For the university-industry centre that we study, the aim is to promote collaborative research to develop new scientific and technological knowledge. The rationale for the centre comes from public policy to promote new knowledge which can address what they state are the grand societal challenge of achieving sustainability goals, whereas financing comes from public policy, companies and the university.

Section 2 develops our conceptual framework, designed to explore the practise of academic engagement as institutionalized in university-industry centres. We review relevant concepts from extant theory, in order to provide definitions and further interpretations for our conceptual framework. Relative to the theoretical issues, we explain what we mean by processes of creating, maintaining and dismantling a hybrid space in terms organizational structures and micro-level activities.

Section 3 specifies the research design and introduces the empirical context. We have chosen to follow one university-industry centre over four years, and so our qualitative research relies upon repeat annual interviews and archival evidence, analysed through an abductive approach. Section 4 presents the findings. We focus upon the processes at the interplay between the development of an organizational structure in the first phase, with the micro-level activities to maintain and dismantle the centre in the second phase. The centre studied had very high ambitions, to simultaneously promote excellent science, industrial relevance, and tackle goals of sustainability.

Section 5 provides the discussion of the results. We used our definition of a

university-industry centre, as a hybrid space, designed as institutionalized form of academic engagement between university and industry. In creating the centre, the participants followed a set of design-principles, which should mediate the tensions between academic and commercial logics. However, we find that hybridizing the dominant logic was insufficient, which meant that the objectives of industrial partners, as external constituents, were not satisfied with some decisions about specific research to conduct inside the centre. Section 6 focuses upon a discussion and directions for future research. One stream of future research should explore the two phases of creating an organizational structure and of maintaining and dismantling the hybrid space. We propose that there seems to be multiple ‘commercial logics’ and also propose a new type of societal logics (such as sustainability) as a separate type of institutional logic. Future research could thus study sustainability as a separate type of societal engagement, in addition to the academic and commercial logics.

## **2. Conceptualization of exploring academic engagement in practice**

Many different, and only partially overlapping fields, address topics relevant to understanding the entrepreneurial university. Our ambition is not to make a complete overview of this extensive, and expanding literature. Instead, our ambition is to use selected literature, in order to reason about three key elements for our analysis – namely 1) university-industry interactions, 2) institutional logics and hybrid spaces and 3) sustainability in relation to societal engagement. Our proposed perspective is to use these elements, in order to analyse the processes, whereby the duality of the organizational structure and micro-level activities interact in the hybrid space of a university-industry centre.

### *2.1) University-industry interactions*

One recurrent finding in the extant research on university-industry interactions is the changing nature of the entrepreneurial university, over time and space. Research streams on academic entrepreneurship per se as well as comparative studies of the university sector over time-periods and countries, have demonstrated fundamental changes in goals and practises, and these changes arise as the universities respond to demands from public policy and stakeholders that universities should contribute more to societal goals (Genua 2001 ; Grimaldi et al 2011; Kenney and Mowery 2014 ). Many of these studies identify and examine new organizational structures, such as technology transfer offices and the impact of institutions similar to the Bayh-Dole, which gave the university the right to patent. More abstractly, we mean that a university-industry centre is relevant to understanding the shift to an entrepreneurial university over time, whereby universities become strategic actors (Deiaco et al 2012).

Universities have developed a new organizational form, called the university-industry centre, as one way to respond to the demand to become more entrepreneurial. Thune and Gulbrandsen (2011) define a centre as the institutionalisation of interactions, designed to enable collaboration between multiple actors, and which leads over time to new scientific knowledge and innovations. Freitas and Verspagen (2017) demonstrate that there is a need to align the organizations and the surrounding institutions involved in collaborative research, and a centre is one way of doing so. Moreover, despite differing logics, they argue that alignment between logics can occur in such settings, because the university and industry motivations are malleable variables. McKelvey et al (2015) delve into the economic impacts of centres in relation to innovation amongst participants. They propose that university-industry centres can be conceptualized, from an evolutionary economic perspective, as either creating technological or market opportunities, and examine the interests of large,

respective small, firms. They argue that a centre enables the participating organizations either to create technological opportunities (involving the creation and selection of new scientific and advanced technological knowledge) and/or market opportunities (involving using that knowledge for economic returns). In the centre they studied empirically, large firms were primarily interested in technological opportunities while small firms were primarily interested in market opportunities, and specifically accessing the large firms through the centre. McKelvey et al (2018) analyse a centre as a collective action problem involving the build-up of a common resource pool as well as mechanisms to distribute participants' access to the knowledge infrastructure.

From this literature, we conceptualize a university-industry centre as designed to institutionalize a specific form of academic engagement between university and industry. Moreover, we derive the importance of understanding the formal organizational structure of collaborative research in a centre, in response to internal and external pressures. We will therefore analyse the process of creating this university-industry centre in terms of the organizational structure e.g. modes of collaboration, as well as specific agreements, decision-making rules and policies.

## *2.2) Institutional logics and hybrid spaces*

On related topics, there is an extensive literature from economics of science and from organizational theory, which analyses on-going activities, with our focus here upon the concepts of institutional logics and hybrid space.

One theme in this research is that actually engaging in collaborative research may be difficult, due to the conflicting incentives of the participating organizations (Dasguthpa and David 1994). In understanding the relationship between science, technology and innovation, the underlying argument for differences is that public

actors like universities invest into research to develop knowledge which is more fundamental and more widely available, whereas private actors invest in technology which is useful for commercial purposes and may be kept secret and exploited for commercial purposes (McKelvey 2014). Therefore, the difficulties involved in collaboration can be attributed to the differing incentives, capabilities and logics of organizations which must collaborate (Ankrah and Al-Tabbaa 2015). Ambos et al (2008) argue that the university creates dual structures to allow the traditional role of the university to interact with commercial logics, and thereby also differentiates individuals into specialized tasks, in order to solve tensions.

Further expanding upon the notion of tensions between these logics introduced above, Sauermann and Stephan (2013) identify four main differences: 1) Academic research tends to be more basic as compared to commercial research, which aims for practically-oriented research; 2) Academics have more freedom as compared to industry's large-scale projects; 3) Academics focus upon challenging received wisdom whereas industry should focus upon developing profitable technologies; and 4) Academics wish to widely disseminate their knowledge whereas secrecy and intellectual property rights are more important in firms.

In this article, we are specifically interested in further developing one theoretical contribution in the institutional logic literature, namely the notion of hybrid space. Hybrid spaces as a concept is related to a long line of literature, not reviewed here. We draw explicitly upon the definitions and model in Perkmann et al (2018), which conceptualize hybrid space as being between a dominant and minority logic, using the phenomena of university-industry centres. They use institutional theory to conceptualize hybrid space as a set of micro-level practices which can incorporate both the dominant and minority logics. Hence, we here follow the definition that hybrid spaces are defined as integrating both logics, within a bounded



space of organization, and have as their two main challenges to manage local tensions within the hybrid space as well as to manage integration with the mainstream organization. More explicitly, Perkmann et al (2018) propose a model, where three elements are key to maintaining that hybrid space, e.g. leveraging the dominant logic, hybridizing the dominant logic, and bolstering the dominant logic. These elements require ‘work’ by actors to maintain the hybrid space: 1) Leveraging, where dominant logic practices are drawn on to achieve minority logic objectives. An example is defining collaborative projects in a topic where the university can publish and the firm also has an incentive to publish to achieve publicity. 2) Hybridizing, where the practices inside the space are modified to allow engagement with the minority logic. Two examples are to design confidentiality agreements about procedures before publishing articles and to do research which emphasizes practical experiments. 3) Bolstering, where the practices inside the space is shielded against excessive minority logic influence and anchored to the organization. This is enforced, for example, through senior university academics occupying the position of centre director, and the involvement of researchers aiming to obtain their PhD degree at the university. These authors do not explicitly study the dynamics of processes, but their proposition from the model is that if these three activities are not maintained, then the hybrid space will be dismantled.

Hence, from this literature, we derive that a key characteristic of university-industry centres is how they engage in ‘work’ to develop a hybrid space, which can mediate tensions between academic and commercial logics. Moreover, we take forward the importance of focusing upon the actual work, or what we call, micro-level activities, and study dynamics over time of creating and dismantling a hybrid space. We also propose this definition of a university-industry centre:

*We define university-industry centres as a hybrid spaces, designed to*

*institutionalize a specific form of academic engagement between university and industry.*

### *2.3) Sustainability in relation to societal engagement*

Theoretical insights about sustainability in relation to societal engagement are also necessary, due to the empirical setting. We have chosen a university-industry centre in sustainability, in order to further explore the finding by McKelvey and Zaring (2017) that universities can also organize university-industry interactions also with other actors, and with the goal to promote societal engagement.

Our interpretation of the literature on sustainability, innovation policy, and system transitions is that the key message is to offer four broad design principles for policy to promote research, specifically: e.g. sustainability research should follow the design principles of inclusive, collaborative, public-private partnerships and multi-disciplinary (Schot and Steinmueller 2018; Mazzucato 2017; Rennings 2000; Elzen et al 2004; Kemp 2010 ; Geels and Schot 2007). This literature tends to be at a high level of abstraction, and therefore, by exploring the practises of academic engagement, we can see how these processes play out in practise.

We propose that a relevant understanding of how to reach sustainability goals can be developed by analysing it as a social goal, or social innovation (Doherty et al 2014), often conceived as solutions to grand societal challenges. Pol and Ville (2009) advocate that this type of innovation includes activities and services, aimed to serve a social need and are predominantly developed and diffused through social organizations. Moulaert et al. (2013:2) focus on innovation in social relations, e.g. “not just to particular actions but also to the mobilization-participation processes and to the outcome of actions which lead to the improvements in social relations, structures of governance, greater collective empowerment and so on”. McKelvey and

Zaring (2017) define social innovation in terms of three characteristics: 1) The primary purpose and motif behind social innovation lies in social change rather than profit maximization; 2) Social innovations result in an increase in welfare, quality / quantity of life or improvements of social relations; 3) Social innovation is system-changing, e.g. alters perceptions, behaviour and structures, resulting in profound social change. We define societal engagement goal through sustainability as these three elements.

In summary, our conceptual framework is composed of the following definitions and analysis:

1) *University-industry centres*. We define university-industry centres as hybrid spaces, designed as institutionalized form of academic engagement between university and industry. We analyse the process of creating a university-industry centre through the organizational structure e.g. modes of collaboration, as well as specific agreements, decision-making rules and policies. We analyse the processes of maintaining and dismantling through micro-level activities, within the model of hybrid spaces.

2) *Sustainability in relation to societal engagement*. We have identified that public policy and transition literature proposes four design principles for public policy for sustainability, namely inclusive, collaborative, public-private partnerships and multi-disciplinary. These are present in our empirical context. We define societal engagement in the context of the university as having goals of social change (instead of profit), which benefits society, and changes the overall system such as perceptions and behaviour. Therefore, using these conceptualizations, we suggest that reaching the goal of sustainability within a university-industry centre may introduce an additional element of societal engagement into the hybrid space.

### **3. Research design, Empirical Material and Methods**

Our research has taken place through several steps, in an abductive approach, linking qualitative research to theory (Eisenhardt and Graebner 2007 ; Giola et al 2012 ; Gehman et al 2016). Based upon these insights, we have developed our detailed approach to moving between theory and empirical material.

We deem that an exploratory research design for qualitative research is suitable to better understand the processes of interest here. The analysis in this article relies upon a four-year qualitative field study, chosen to explore and analyse a relevant empirical context, which in turn can help inform our conceptual understanding of the phenomenon. The empirical context is a university-industry centre for collaborative research to reach goals of excellent science, commercially relevant technology, and sustainability. The phenomenon studied is academic engagement with industry in practice. Our theoretical interpretation focuses upon the creation and dismantling of a hybrid space, analysed first through the processes of creating the organizational structure and second through the process of maintaining and dismantling the centre, analysed through micro-level activities.

#### **3.1 Empirical context**

The empirical context is a European university-industry centre in engineering and natural sciences, designed to develop new knowledge for sustainability. Multiple actors have mobilized and already agreed to apply for funding for collaborative research and make initial decisions after funding. Note that perhaps contrary to expectations, many decisions about which projects to fund, and why, are taken after the centre is started. The collaborating partners– as well as the goal of the public policy – have the explicit goals to promote research excellence and industrial

competitiveness, as well as sustainability.

The planned research is designed to renew traditional industries. McKelvey and Ljungberg (2017) propose that collaborative research can renew firm capabilities in traditional industries. Much previous empirical research tends to focus upon science-driven areas and especially biotechnology and medicine (Owen-Smith and Powell 2004; Gittelman 2006). In contrast, Rosenberg and Steinmueller (2013) propose that engineering knowledge differs from scientific knowledge in its focus upon useful and applied technology, for problem solving. A few previous studies have explicitly studied engineering departments and university-industry centres, partly because engineering departments have a long experience of interacting with industry (Kenney and Goe 2004; Kenney and Patton, 2011; Bourellos et al 2012; McKelvey et al 2015). Hence, the fact that engineering has a practical orientation helps motivate our choice of studying collaborative research within advanced engineering research, in a centre involving multiple disciplines.

**Limitations.** Our study is limited to one university-industry centre. Even though this enables the opportunity for a detailed empirical study, our results are limited to one area of technology, one geographical location, and one time period.

### **3.1 Collection and analysis of empirical material**

Our aim is to make qualitative research relevant for theory. Empirical material has been collected through a long-time interaction of the three authors with the centre, including meetings, interviews, power point presentations, student reports, applications, contract, and additional archival material.

The first as well as fifth step is the collection of relevant theoretical material, to frame our understanding of university-industry interactions, academic engagement,

and sustainability and to help identify our conceptual contributions relative to literature. This return to theoretical construct step was repeated.

The second step was to understand the empirical setting of the centre and the industries involved more broadly, through document analysis and major stakeholder reports. This enabled us to develop contextual understanding, in order to ask why the companies in a traditional industry interact with engineering at universities.

The third step was iteratively carried out each year over the four-years, for the specific university-industry centre. The authors have all participated in centre meetings, which enabled us to meet the involved participants as well as observe interactions, as well as obtain data and written material. We collected a series of documents (written and electronic) material over the years. These mainly comprise of notes from our participation to the centres' main meetings as well as secondary data in the form of information drawn from relevant websites, and internal documents (presentation materials from meetings, doctoral theses).

Moreover, we iteratively interviewed the university researchers as well as the company representatives involved in the centre. One of the authors plus associated students have conducted a total of 22 semi-structured interviews, with annual repeat interviews of persons in the same positions during the period. To maintain confidentiality, we have omitted the identities of the interviewees and their organizations. All interviews were carried out through face-to-face meetings or phone conversations. The interviews were recorded for transcription and analysis. We organized the data gathered from interviews (by date and informant) and also coded from original transcribed interviews. In the identifying tags below, "A" stands for academic; "IP" for industrial partner; and "N" for centre or network.

An overview of field data is provided in Table 1.

< INSERT TABLE 1 HERE >

The fourth step was to initiate to code and analyse the data by all three authors, relative to our analysis, and this step has been conducted in parallel with the above step over the years.

For the initial coding, we used the lens of analysis for exploring the three themes identified above as university-industry interactions, institutional logics and hybrid spaces, and sustainability as societal engagement. In relation to them, a finer grain level of coding emerged, specifically related to these topics: university as a neutral intermediary; importance of coalitions and larger networks; problem of integration of networks; market and technological opportunities; tensions; and wider problem of framing and sensitization of social innovations.

As a result of our analysis and in relation to the fifth step of returning to the literature, we wrote up our analysis and conclusions. We were able to identified two phases, which we then used to structure the presentation of our results, as well as a new taxonomy for analysing university-industry centres as hybrid spaces.

#### **4. How does Academic Engagement work in Practice?**

As a result of the combination of our conceptual framework and analysis of our qualitative research, we have been able to identify that there are two quite different phases of the centre. The first phase is the process of creating the centre, which encompasses a pre-history of previous interactions amongst partners followed by setting-up the formal organizational structure of the centre. The second phase is that of engaging in activities, which uses micro activities which initially maintain and then dismantle the centre. Therefore, we use these two phases to structure the presentation of the qualitative research.

#### **4.1 Phase 1: The Process of Creating the Centre**

The first phase is the process of creating this centre. This industry-research centre had a very explicit goal related to sustainability by developing natural materials. The grant application included the grand societal challenge of promoting sustainability, and reaching the goal would be channelled by producing new knowledge to reduce dependency on carbon-based materials. More specifically, they tackle one global challenge, namely to replace fossil-based materials with renewable alternatives in order to lower CO<sub>2</sub> emissions. Reducing waste and pollution would be one result of the collaborative research.

In writing the application to start the centre, there had to be a set of pre-existing agreements about financing of the collaborative research such as financing, goals, etc. To ensure collaboration, the public policy initiative demanded that in order to obtain the government grant, both private and public actors had to be involved and partially finance the centre.

##### *4.1.1 Pre-existing knowledge networks between individuals*

Pre-existing knowledge networks existed between individuals (30 at time of application), who were working at different organizations. The industrial scientists work in different industries in a value chain for a traditional industry, including large multinational corporations as well as small entrepreneurial firms. The academic scientists involved work at a variety of departments in natural sciences and engineering in universities in Europe. In order to meet the goals of the centre, they identified the need to draw primarily from engineering, but also include many related experimental and practical-oriented research in natural science fields, such as chemistry, physics, and material sciences.



At the time when the centre was started, 22 of the 30 individual members of the centre had either studied together or previously worked together on collaborative research projects, and 12 had been members in one specific preceding university-industry centre. The preceding centre has codified its ways of interacting into written documentation, and their approach was to have a strong emphasis upon communication, shared values, and combining exploration through scientific excellence with exploitation through industrial relevance. The preceding university-industry centre is coded as (N1).

Table 2 describes how different types of partners interpret the value of previous collaborative research.

< INSERT TABLE 2 HERE >

The quotes in Table 2 are indicative of the vital role played by individual ties in previous collaborative research, specifically a different centre. Interviews from both firms and universities said that their previous experience together helped create an informal atmosphere at the centre, which stimulated them to share ideas and knowledge.

Our interpretation is that the pre-existing networks between individuals facilitated the initiation of the collaborative research in the studied university-industry centre. They could then jointly write an application to a competitive grant process, and the grant was successful. Conditions of the grant specify that in addition to public financing, both industrial and university partners must contribute through additional finances and/or through in-kind financing, such as financing of wages for individuals.

#### *4.1.2 Creating an organizational structure for the centre*

Having received the external grant from public policy, then the participants set up a formal organizational structure. The host university had many similar centres, and a standardized contract to formalize the structure, thereafter partners to this centre could add minor amendments.

After being selected, this centre was granted a total of 2,6 million € by a European research council. In addition, the university as well as the participating firms were obligated to contribute financially and with in-kind resources, such as staff time. To take part in the centre, the participants in the centre – with advice from the university – decided that the fee for participation is: 21K€ per year for large companies; 10K€ per year for small and medium sized companies; and 5,2K€ per year for micro companies. This was stated in the contract regulating the centre.

The university had also set up a series of contracts and routine to handle this type of formal agreements with companies, also in relation to invention, secrecy, publications, and intellectual property. These contracts also became part of the formal organizational structure of this centre.

The consortium agreement includes clausal regulating secrecy, as well as defines a process for obtaining approval of publications and research resulting from the collaborative research. Publications are allowed – unless they have previously been defined as confidential by a partner – but must go through a screening process, with submission at least 45 days before submission to a conference or journal. The consortium agreement specifies agreements and statements to regulate intellectual property, and sharing of the returns, including that “patents shall be communally owned in equal parts by all the Parties to the Centre” and “Licensing of all results requires the consent of all joint owners”. Interestingly, the contract states that a university employee contributing to an invention (e.g. a patent) should be

remunerated under similar terms and conditions as a firm employee, which after evaluation should send the money to the university, which in turn pays the scientist.

The contract also included a formal decision-making structure, including specifying the roles, types of decisions, and timing for meetings required within the centre. Although the grant application included a general definition of areas and specific projects, the centre also wanted leeway in choose between different projects, and even finance new projects over time. Therefore, when the centre was started, the processes of decision-making were largely organised around these decision-making entities:

- Director of Centre and Project Leaders. The director is appointed by the main academic partner. This person is the coordinator of the project, reports to financiers, and is expected to provide neutrality, as academics do not have their main concern to use the results for business purposes. The project leaders should entail that specific lines of research are carried out.
- The Supervisory board, elected at the General Assembly of the centre. They have a mandate to promote the mutual interests of all parties. They focus upon decisions, monitoring, handling partners who enter or leave the centre, etc.

The timing of annual meetings and project meets are also defined, as a way to reach mutual goals. Thus, the contract defines a specific structure for overall decision-making, which enabled the participation of both public and private actors to agree upon goals, etc., as the centre change focus over time.

Finally, there were external demands to obtain other types of goals as well as specific performance indicators. According to the public policy initiative, the overall vision of the centre should be openness, collaborative and sharing among all partners. Moreover, the public policy agency also announced in advance that they would monitor specific achievements of the centre through measurements of collaboration,

research results, and commercialization. Key performance indicators included financing by participants, company involvements, patents, product innovations, publications, conference papers, and theses by Masters and PhD students.

Our interpretation of the first phase is that the formal organizational structure was designed to support the three elements in the Perkmann et al (2018) model. Leveraging, where dominant logic practices are drawn on to achieve minority logic objectives, is present, because by definition, they agreed to collaborative research. As to hybridizing, where the practices inside the space are modified to allow engagement with the minority logic, the centre developed a very detailed structure through agreements including confidentiality agreements, IPR, etc. Bolstering, where the practices inside the space is shielded against excessive minority logic influence and anchored to the organization, is also present. The centre director was appointed at the university, and both students and senior academics are active.

#### **4.2 Phase 2: Activities of maintaining and dismantling the hybrid space**

The second phase is that of engaging in activities, which we analyse as micro-level activities which initially maintain and then dismantle the centre. In line with the model of hybrid spaces, there were often tensions between the differing institutional logics, which had to be addressed in different ways.

Quite soon after the formal centre was set-up, members decided that more needed to be done to link decision-making for collaborative research to communication activities, especially amongst members of the centre. Therefore, the centre organised three types of meetings: the management team meeting held monthly mainly to debrief about the progression of research and about actors' perception of the progression; a project update two times per year inviting all participants in specific sub-projects; and a general centre update meeting (open for all), organized once a

year. All partners were expected to attend the annual meeting. This change was in response to initial criticism and debates.

Going into more detail about the perceptions of the actors reflecting, respectively commercial and academic logic, helps us better understand the tensions involved.

#### *4.2.1 The commercial logic*

Because the centre focuses on research to develop material derived from organic material, the industry partners are primarily companies operating in organic production in industry, as well as upstream or downstream partners to this industry.

In the short to medium term, the industrial partners were searching, depending on their type of activity, for specific renewable materials that would render their products more competitive. The types of benefits that they reported in this range include:

“I expect that we will stop on a generic level and it is up to the partners to develop the applications for themselves depending on the characteristics of the materials that we are able to produce. That would be the way to go forward. We are noncompeting companies from different segments of the industry. I don't think that any of the partners has the intention to go outside their current business. They would rather expect to use the characteristics within their current activities.... We as a company have a two-fold interest - we might use the material for our own products or we might be a potential producer extracting material from organic matter, for example. If there are other applications than the ones we could embed in our own products, that gives us another opportunity that might be interesting.” (IP10)

In addition, the main industrial partners stressed that the conditions in their industry is very rapidly changing, and the centre should also help them move to new areas of product innovation in the long term:

“We have a long history of good profits, stable finances and high productivity. However, in the last decade, some organic products are no longer used in the same way as before and the demand is changing in form and degree with a decreasing demand for our principal end product. What the industry has witnessed for some years, and what is now accelerating is a migration to digital solutions.” (N2).

“The competition in organic products has increased and shifted in the last 10 years, with increased competition from companies in South America...as the same time as they are improving their quality.” (IP8)

As indicated in the following quote, the development of new material as well as a new method for renewable materials was perceived as an opportunity to update the companies' own range of products.

“I would like to get at the end of the project are the characteristics of the organic source with potential to form new materials.... The prime result would be how to achieve them ... We are scouting rather widely but if they match the criteria of being applicable within other sectors too, then that is a clear advantage.... We need to take a multi-dimensional approach. We are trying to develop something from the raw material of plants or from nature directly and

we shouldn't rule out possibilities. If we narrow to just one application then we are missing potential usages.” (IP10).

Thus, from the perspective of the main industrial partners, they had both short-term and long-term rationale for engaging in the university-industry centre, but the industrial partners could also have different perspectives and preferences. Hence, we interpret that there was not one commercial logic at the micro-level but instead multiple commercial logics, when applied to actual decision-making about projects.

Note that the large companies especially argued that they had to influence the direction of research, as well as be involved in deciding which results could be widely disseminated (or not). The main industrial partners also removed some projects out of the centre, and brought them back into the product development projects inside the company.

Moreover, there were also benefits, but in a different way, to small entrepreneurial firms. An example is the case of IP5, which is a start-up company, providing full-scale industrial solutions for simultaneous material utilization and wastewater treatment at competitive prices against petroleum products. While the start-up company felt that their innovative solution had a clear added value, and market potential, they had difficulties developing a market before entering the centre. By participating in centre activities, they were able to integrate the renewable materials into their strategy. Specifically, by interacting with the larger firms, this small firm perceived that their solution could be sold within a niche sub-market, and they also identified how that fit into a complex product-service value-chain.

#### *4.2.2 The Academic logic*

As already decided in the first phase, and as compared to other types of research, the academic partners involved in this centre had already accepted many restrictions, such as secrecy agreements, publication approval, and IPR agreements. At the same time, they had positive benefits as well, because they could access financial resources, hire PhD students, engage Masters students, and also use equipment and material from other participants of the centre.

The academics were pragmatic about the differing requests from different companies, who were interested in studying different types of materials and industrial application areas.

“We have a number of companies that took part to this open brainstorming and defined the need for materials but from different points of view” (A1)

“The set up should be such that you are not endangering the results by competition. This non-competitive environment contributes to that. But the outcome may not be equally beneficial depending on the orientation chosen for the material.” (A3)

“The automobile industry needs a renewable material that would be emission free, for lasers it has to be compatible with skin, for packaging it should be harder and so on” (A4)

Later on, during this phase, some conflicts arose and some academics were felt that the blurred lines of the research direction could also threaten the scientific success as well:



“I am interested to create a bridge between industry and research, but today it is still not clear what they want and if it is not clear I cannot make a bridge. I can discuss with them and that is probably important but the two days meeting that we have known it is impossible. In order to reach goals, we need to have goals. In the past two days we didn’t specify any goals. It is very important to work openly, and as a team whatever the team might be - academic or industry. The essential is to have a goal and specified timeline. I do not think that we are there yet. (A3)

Our interpretation of what happened next was that the different partners continued to have differing opinions, leading to tensions around which type of research to engage in, as well as around the relative openness of results. However, the academics were convinced that the wider principles of academic logic of open diffusion and also social innovation should prevail.

#### *4.2.3 Hybrid spaces between commercial and academic logics*

Our analysis shows that tensions about decisions about research became evident during the actual running of the centre, and these conflicts had to do with different expectations and logics of the participating organizations in relation to what type of research should be conducted.

One aspect of tensions had to do with choosing which projects to actually fund, including biological samples and properties of the material, because commercial partners in different sectors were interested in, had knowledge about, and different applications and uses. Our qualitative research has identified the differences of opinions between partners, especially as related to different properties of the material.

These properties have important implications on the final use, in different types of industries and final products, as indicated in the following quotes:

“Soft material would be our main objective here because I do not see any application for hard material in other sectors.”(IP9)

“It is kind of fuzzy, because we have several industrial partners with their expectations. For example, IP9 has some requirements for their applications; we have the car industry and wound care, which have other requirements. I think it is important as a company to be clear with our expectations concerning the properties of the material quite early. The rest of the project members should know which company wants what and then make an agreement on properties that we all want or do not want. Then it will be easier to see a clear way forward or maybe several ways forward. (IP1)

One of the early workshops with brainstorming sessions indeed revealed that there was no consensus on desirable properties of the renewable material and that at least 10 application areas were discussed, each requiring a different set of properties to be developed.

Some industrial partners decided that since their preferences for materials were not chosen, they would exit the centre: IP7 exited 1 month after the start of the project and IP2 exited 3 months after the start of the project.

Other industrial partners hoped that the centre could resolve the issues, and also provide a forum to discuss, and conducting collaborative research:

“You start with an idea and you get into crossroads. Then you find different options. In universities, you take both options - then you get to new crossroads

and find new options and you explore the new options. Whereas in the industry we start with a problem and use different options to solve the problem. You need to converge to a solution. This project is very much an example of idea leading to different opportunities. I would be very pleased if we find an opportunity that we could use and put into product development projects. Nevertheless, those are two totally different approaches.” (IP11)

The companies also had different ideas about how knowledge would be useful to innovate in other industrial partners.

When I looked into your approach (IP9), I find that it is not dissimilar to the very old-fashioned way of innovation. It was very conventional. It might suit your needs but it means that you are never going for more than what I call "fight to survive" approach to innovation, rather than, fight to transform!" (IP10)

Signalling leads to a problem of revealing corporate strategy to competitors, as described by IP11:

“It is not necessarily positive to have signalling effect. If you are tracing what the company is involved with you can draw conclusions on the long-term strategy of the company. So, it is not necessarily a positive thing from the perspective of large companies.”

Hence, another aspect of tensions was between the academic and commercial logic, in terms of whether it was positive or negative to signal on-going research through publications.

#### **4.2.3 Sustainability**

The academics felt that they played a key broker role in ensuring that the centre remained focused on collaborative research for sustainability goals. They argued that

this was an additional goal, which could be used to decide between different options. This relates back to the centre's emphasis on communication, but now to the wider society. The academics explained sustainability in terms of new options, as follows:

“Our purpose as academician is also to convince that beyond each company's goal, there is the outcome for society, and the more we communicate all the along the process about our progress, the more some problems that were invisible to people will become visible and that will raise awareness.” (N2)

Finally, after several months of discussions about the direction of future research, two applications were selected. In both cases, reducing pollution was cited as a main reason for this choice. As an example, about the sustainability gains that could be met through this new knowledge and later innovations:

“What we don't know nowadays is that 30% of world pollution comes from the food industry: the huge waste of food is mainly due to inefficiencies in food conservation” (N3)

Also in the healthcare sector, against the backdrop of ageing populations, budget constraints and healthcare worker shortages, the other application chosen, also due to the high degree of its environmental impact. More particularly wound care with the single-use (surgical and wound care) products are currently products that imply pollution and waste:

“Our products are designed to be incinerated after use. If not contaminated, materials can and should be recycled. Total waste generated was 8 040 tons. That's 161 kg per produced ton of finished goods.” (IP9)

For both packaging and healthcare, the collaborative research should reduce waste

and pollution. Persons responsible for the formal decision-making within the centre argued that these two applications were chosen for the high degree of their social impact that they would have, in terms of reducing future environmental waste and pollution. Moreover, we note that the industrial applications corresponded to the interests of the main industrial partners, who were also active in the Management Team.

From an early stage, it became clear that the formal decision-making structure of the centre had difficulties to cope with tensions particularly amongst industrial partners, related to specific projects and patents. Our interpretation is that these tensions became logics visible, in discussions during project update meetings and annual meetings in this phase of organizing collaborative research. Therefore, the response of the Management Team in relation to this critique was to further stress and structure group discussions, which should be conducted in such a way as to enhance openness, inclusiveness and regularity. They hoped that having more project updates would help members to identify and capture the mutual benefits from the collaborative research. They also stressed the formal aspects, such as contracts. Rather than solving the tensions between commercial and academic logics, these discussions seemed to create even more disgruntlement, particularly when the largest companies benefitted disproportionally. Several companies left the centre. The centre will also be dismantled at the end of its grant.

## **5. Discussion**

Our analysis rests upon definition of a university-industry centre as a hybrid space, designed as institutionalized form of academic engagement between university and industry. The centre studied had very high ambitions, to simultaneously promote excellent science, industrial relevance, and tackle goals of sustainability.

In this qualitative research, we have identified two phases, one of creating a formal organizational structure, and one focused upon micro-level activities which lead to maintaining and dismantling that structure. However, our analysis also shows that there are always relationships between formal structure and activities, and we are aware that our categorization is about the relative focus on one or other, not the exclusion of the other.

Despite different potential logics of their organizations, the actual individuals involved had pre-existing knowledge networks, based on similar education and research backgrounds, and these networks in turn facilitated the initiation of the centre. We propose that this finding could be explored, in line with previous research on networks (Nahapiet, Goshal, 1998; Burt, 2000). A way forward is to explore how networks mobilise existing informal ties, based upon trust-based relationships and history of past exchange (Hurlbert et. al. 2000; McDonald and Westphal 2003). Another way forward is to examine whether a company's networks and experience from prior collaborative projects can help to overcome the two differing logics and improve a company's ability to generate innovations in collaboration with universities (Leiponen and Helfat, 2010). Somewhat unexpectedly, the centre also enabled a different type of network for invention to develop between the firms (e.g. without the academics), to exploit complementary market and technological opportunities, although in line with McKelvey et al (2015).

Subsequently upon obtaining the grant to create the centre, the host university and participating individuals followed a set of pre-existing design principles, to set up a decision-making structure, which should mediate the tensions between academic and commercial logics. We do not find a division of labour within the university, as proposed by Ambos et al (2008). In line with Freitas and Verspagen (2017), we consider this initial decision-making structure as their attempt to align industry and universities. More specifically, our interpretation is that the formal decision-making structure of the centre attempted to override pre-existing informal networks and also to use communication as a means to avoid, or overcome, differences of opinions. In terms of mediating between academic and commercial logics, we have identified

many occurrences of tensions between academic and commercial logics, in line with previous research (Styhre and Lind 2010).

In terms of the work needed to construct a hybrid structure as identified by Perkmann et al 2018), the tensions that we identified suggest that in this case, hybridizing the dominant logic was insufficient, which meant that the objectives of industrial partners, as external constituents, were not satisfied with the centre. The centre did engage in hybridizing, where the practices inside the space are modified to allow engagement with the minority logic. They clearly defined contracts and rules in creating the organizational structure, such as confidentiality agreements, patent rights, procedures to review articles and a focus upon practical experiments. However, some of the companies wanted even more specific returns and focus upon developments. We suggest that difficulties in maintaining hybridizing can be used to explain the exit of two partners, as well as the fact that the centre then made a re-alignment with the objectives of the main industrial partners, by choosing the materials and areas of applications.

In relation of sustainability, the centre defined itself that it would tackle a particular broad problem of sustainability (lower CO<sub>2</sub> emissions) that would be solved through their research. However, in contrast to the systems transition literature (Elzen et al 2004; Schot and Steinmeuller 2016), the initial idea for the centre was focused upon advanced technologies, and not upon promoting broader institutional and social change through their research. Moreover, we found that the centre management team used an argument about the social logic of sustainability in terms of reducing pollution as their rationale for only focusing upon two specific materials and industrial applications. These applications in business also corresponded to the main industrial partners, which lead to some criticism from other partners.

## 6. Conclusions

In our interpretation, the centre has been funded, in order to address a series of very grand societal goals, at the same time that the engineering scientists and natural scientists involved are mainly concerned with developing new knowledge. Three concluding remarks critically reflect on our results and discussion, and also propose directions for future research. As a result of our research, we have proposed two phases, which have different characteristics, as follows.

Firstly, as a result of our analysis, we have identified two fairly distinct phases in the centre. In creating the centre in the first period, the focus was on mobilizing the initial reliance upon informal networks, which became institutionalized into a formal organizational structure. Specifically, the characteristics that we found are that creating a university-industry centre relies on previous knowledge networks – which links individuals with similar educational backgrounds, many of whom had engaged in collaborative research. We suggest that these pre-existing knowledge networks may help overcome competing academic and commercial logics to enable the individuals – and also their organizations – to apply for the government grant and start the centre. Then, the centre quickly developed its own decision-making structure to facilitate and institutionalize interactions. In maintaining and dismantling the centre in the second phase, the focus was on the ‘work’ of institutionalization, and specifically the micro-level activities inside a hybrid space. Here, the balance goes over to the activities of the centre itself – through meetings, projects, reports, etc. – which provide the way to institutionalize the interactions. We propose that a hybrid space in this case actually opens up the centre for new partners to enter the knowledge network, and new connections to be made across partners. We find that setting up a decision-making structure for the centre in the previous phase does not resolve all the tensions between academic and commercial logics. Indeed, differing perceptions about time scale,



project objectives and the possibilities to work together are very much present. Some industrial partners leave. Still, broad agreement about which research to carry out (e.g. properties of the material ; applications) are resolved, by focusing upon the interests of the main industrial partners. This distinction of phases and specification of characteristics should be further explored in future research, given the limitations of our study. Future quantitative research could validate and extend our understanding of these two phases, including investigating the frequency of occurrence across many centres.

Secondly, there is a failure to do the ‘work’ necessary to maintain the hybrid space, which leads to partners leaving the centre, which is discussed above as a failure with hybridizing the logics. Our interpretation of this result is two-fold. One aspect is that much effort goes into defining and creating an organizational structure to address a general commercial logic, as indicated by the long and detailed contract agreements. Once created, though, this organizational structure does not seem able to promote research which is sufficiently novel to meet demands of both the commercial and academic logics. Possibly the reason is that the intended engineering and natural science research involves science, where by definition, the results are not completely known in advance, involves uncertainty, and difficult to calculate future returns. Hence, placing too much focus on ‘becoming an entrepreneurial university’ by developing an appropriate organizational structure may take too much attention away from the research per se. A related aspect is that we interpret that one reason for the difficulties is that commercial logic does not only mean profit-seeking in an abstract way. In the actual decision-making about the collaborative research, each company has different preferences regarding quite specific issues. The director of the centre therefore struggles with multiple commercial logics, which are expressed in very specific ways related to which research to conduct.

Finally, we also find that the goals of sustainability are used as an additional type of logic – to influence decision-making about collaborative research. Our qualitative research suggests that simply promoting the design principles of sustainability of inclusive, collaborative, public-private partnerships and multi-disciplinary is useful (Etzkowitz and Leydesdorff 2000; Schot and Steinmueller 2018; Mazzucato 2017; Rennings 2000; Elzen et al 2004; Kemp 2010 Geels and Schot 2007); however, it should be seen as a beginning, but is not enough. Mowery et al (2010) propose the need to rethink public policy to address sustainability. We have found a logic of societal engagement, which could be developed in relation to sustainability, system transition and innovation policy design principles. McKelvey and Zaring (2017) demonstrated one case where the university organizes and co-delivers knowledge-intensive services for social innovation. Therefore, we propose that future research should explore the concept of a « societal engagement logic », which we define would promote social innovation in terms of promoting social change; increase welfare and system-changing. Indeed, we have empirically demonstrated some points of tension and of conciliation between the goals of profitability (from the perspective of industrial partners), publishability (from the perspective of academic partners) and sustainability (from the perspective of the public policy goals and agreed upon by industrial and academic partners). Hence, future research should further explore societal engagement logic (including but not restricted to sustainability) as a unique form of institutional logic, in this specific empirical setting.

## References

Adner, R., and R. Kapoor. 2010. "Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations." *Strategic Management Journal* 31 (3): 306-333.

- Ambos, T.; Mäkelä, K. Birkinshaw, J. and D'Este, P. 2008. When does university research get commercialized? Creating ambidexterity in research institutions. *Journal of Management Studies*. 45(8) : 1424-1447
- Ankrah, S. and Al-Tabbaa, O. 2015. Universities-industry collaboration: A systemic review. *Scandinavian Journal of Management*. 31 (3): 387-408
- Audretsch, D. B. 2014. From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, 39(3): 313-321.
- Audretsch, D. B., Lehmann, E. E., & Wright, M. 2014. Technology transfer in a global economy. *The Journal of Technology Transfer*, 39(3): 301-312.
- Berggren, C. and Karabag, S. 2019. Scientific misconduct at an elite medical institution: the role of competing institutional logics and fragmented control. *Research Policy*. 48(2): 428-443.
- Bourellos, E. Magnusson, M. and McKelvey, M. 2012. Investigating the complexity facing academic entrepreneurs in science and engineering: The complementarities of research performance, networks and support structures in commercialization. *Cambridge Journal of Economics*. 36(3): 751-780
- Dasgupta, P and P. David. 1994. Towards a New Economics of Science. *Research Policy*, 23: 487-521.
- Deiaco, E., Hughes, A. and McKelvey, M. 2012. Universities as Strategic Actors in the Knowledge Economy. *Cambridge Journal of Economics*. 36 (3): 535-541.
- Doherty, B., Haugh, H., and Lyon, F. .2014. Social Enterprises as Hybrid Organizations: A Review and Research Agenda. *International Journal of Management Review*. 16 (4): 417-436
- Eisenhardt, K and Graebner, M .2007. Theory building from cases: Opportunities and challenges. *Academy of Management Journal*. 50(1): <https://doi.org/10.5465/amj.2007.24160888>
- Elzen, B., Geels, F. and Green, K. 2004. *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy*. Cheltenham, UK: Edward Elgar Publishers.
- Etzkowitz, H. and Leydesdorff, L. 2000. The dynamics of innovation: from national systems and mode 2 to a triple helix of university-industry-government relations. *Research Policy*. 29 (2) : 109-123.
- Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. 2000. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29(2): 313-330.

- Freitas, I.M.B. and Verspagen, B. 2017. The motivations, institutions and organization of university-industry collaborations in the Netherlands. *Research Policy*. 27(3): 379-412.
- Geels, F. and Schot, J. 2007. Typology of sociotechnical transition pathways. *Research Policy*. 36(3 ):399-417
- Gehman, J., Glaser, V., Eisenhardt, K., Gioia, D., Langley, A and Corley, K. 2016. Finding theory-method fit : A comparison of three qualitative approaches to theory building. *Journal of Management Inquiry*. 27(3): 284-300.
- Genua, A. 2001. The Changing Rationale for European University Research Funding: Are there negative unintended consequences? *Journal of Economic Issues*. 35 (2): 607-632.
- Gioia, D, Corley, K. and Hamilton, A. 2012. Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*. 16(1) :15-31.
- Gittelman, M. 2006. National institutions, public-private knowledge flows, and innovation performance: A comparative study of the biotechnology industry in the US and France. *Research Policy*. 35(7): 1052-1068.
- Grimaldi, R., Kenney, M., Siegel, D., and Wrigth, M. 2011. 30 years after Bayh-Dole: Reassessing academic entrepreneurship. *Research Policy* 40 (8): 1045-1057.
- Hurlbert, J., V.. Haines, and J. Beggs .2000. Core Networks and Tie Activation: What Kinds of Routine Networks Allocate Resources in Nonroutine Situations? *American Sociological Review*, (65):598-618.
- Kemp, R. 2010. Eco-innovation: Definition, Measurement and Open Research Issues. *Economia politica*. (3) :397-420
- Kenney, M., and Goe, W.R., 2004. The role of social embeddedness in professorial entrepreneurship: a comparison of electrical engineering and computer science at UC Berkeley and Stanford. *Research Policy* 33 (5) : 691–707.
- Kenney, M., and Patton, D. (2011) 'Does inventor ownership encourage university research-derived entrepreneurship? A six university comparison', *Research Policy* (40) :1100-12
- Kenny, M. and Mowery, D. 2014. Public policies and regional growth : Insights from the University of California
- Leiponen, A. and C.E. Helfat. 2010. Innovation objectives, knowledge sources, and the benefits of breadth. *Strategic Management Journal* 31:224-236.
- Mazzucato, M. 2017. From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation*. 23 (2): 140-156.

- McDonald, Michael L. and Westphal, James D. 2003 Getting by with the Advice of Their Friends: CEOs' Advice Networks and Firms' Strategic Responses to Poor Performance. *Administrative Science Quarterly*, Vol. 48, 2003; Ross School of Business Paper No. B009. SSRN: <https://ssrn.com/abstract=936733>
- McKelvey & Zaring 2017. Co-delivery of social innovations : exploring the university's role in academic engagement in society. *Industry and Innovation*. 25(6) : 594-611.
- McKelvey M, O Zaring and D Ljungberg (2015). Creating innovative opportunities through research collaboration: An evolutionary framework and empirical illustration in engineering. *Technovation*, (39-40)26-36
- McKelvey, M. (2014), 'Science, Technology, and Business Innovation', in M. Dodgson, D. Gann, and N. Phillips (eds.), *The Oxford Handbook of Innovation Management*. Oxford University Press: Oxford.
- McKelvey, M. and Ljungberg, D. (2017), How public policy can stimulate the capabilities of firms to innovate in a traditional industry through academic engagement: the case of the Swedish food industry. *R&D Management*. 47(4) : 499-669.
- McKelvey, M., Saemundsson, R. and Zaring, O. (2018). A Recent Crisis in Regenerative Medicine: Analyzing Governance in order to Identify Public Policy Issues. *Science and Public Policy*. 45(5): 608-620.
- Moulaert et al. (2013). "Social Innovation Intuition: Precept, Concept, Theory and Practice", in Moulaert et al, *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research*, Edward Elgar Publishers
- Mowery, D.. & Nelson, Richard R. & Martin, B., (2010) Technology policy and global warming: Why new policy models are needed (or why putting new wine in old bottles won't work). *Research Policy*, 39(8) :1011-1023.
- Owen-Smith, J. and Powell, W. (2004). Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organization Science*. 15(1), pp. 1-132
- Perkmann, M., McKelvey, M. and Phillips, N. (2019) Protecting Scientists from Gordon Gekko: How organizations use hybrid spaces to engage with multiple institutional logics. *Organization Science*, <https://doi.org/10.1287/orsc.2018.1228>
- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hugues, A. and Krabel, S., 2013. Academic engagement and commercialisation: A review of the literature on university–industry relations. *Research Policy*, 42(2) : 423-442.
- Pol, E., and Ville, S. 2009. Social innovation: Buzz word or enduring term? *The Journal of Socio-Economics*, 38 (6):878-885.

Radziwon, A., M. Bogers, and A. Bilberg. 2017. "Creating and capturing value in a regional innovation ecosystem: A study of how manufacturing SMEs develop collaborative solutions." *International Journal of Technology Management* 75(1-4): 73-96.

Rennings, K. 2000. Redefining innovation – eco-innovation research and the contribution from ecological economics. *Ecological Economics*. 32(2) :319-332.

Rosenberg, N and Steinmueller, E .2013. Engineering Knowledge. *Industrial and Corporate Change*. 22(5) :1129-1158

Sauermann, Henry and Paula E. Stephan .2013. Conflicting logics? A multidimensional view of industrial and academic science. *Organization Science*, 24(3)

Schot, Johan and Steinmueller, W Edward .2018. Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47 (9). pp. 1554-1567. ISSN 0048-7333

Slaughter, S. and Leslie, L. 1997. *Academic Capitalism: Politics, Policies, and the Entrepreneurial University*. John Hopkins Press.

Styhre, A. and Lind, F. 2010. ‘The softening bureaucracy : Accomodating new research opportunities in the entrepreneural university’ *Scandinavian Journal of Management*. 26 (2) : 107- 120.

Thune, T and Gulbrandsen, M. 2011. Institutionalization of university-industry interaction: an empirical study of the impact of formal structures on collaboration patterns. *Science and Public Policy*. 38 (2): 99-107

Welsh, R., Glenna, L, Lacy, W., and Biscotti, D. 2008. Close enough but not too far: Assessing the effects of university-industry research relationships and the rise of academic capitalism. *Research Policy*. 37(10): 1854-1864

## Appendix:

Table 1: Field data information

Number of interviews:	22	Data collection methods:	- Participation to main meetings (observation) - Single respondent interviews (face to face)
Total interviews collected:	25 hours record	Type of internal documents:	- Presentations of subgroups ‘work and updates

Total transcribed:	167 Pages transcribed	Observation and notes from meetings: - 127 pages
Data collection periods:	September 2013-June 2016	On site visits: 3

Table 2: Quotes about importance of previous centre

Type of partner	Value of previous collaborative research
Academic	N1 is concentrated on (specific technologies of relevance here)... and so we try to understand the basic concepts behind it that would serve in the current project as well" (Professor, A1)
Entrepreneurial start-up	"I think N1 is important because it is a network and many things have started from that network". (Founder and CEO, IP4)
Large company	"I think that is the key for good collaboration - the long-term relationships. N1 is a part of that, and maybe it will continue, although probably not with all partners. I see it as a long-term relationship that spans beyond the current centre" (IP1).