

# **Regional innovation policy and Public Private Partnerships: Evidence from Sweden**

Iryna Kristensen, University of Salzburg, Salzburg Centre for European Union Studies, Austria

Walter Scherrer, University of Salzburg, Department of Economics and Social Sciences, and Salzburg Centre for European Union Studies, Austria

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## **1. Introduction**

According to Schumpeter's concept (Schumpeter 1934, 66) innovation is the outcome of new combinations of factors of production which allow the introduction of a new good – that is one with which consumers are not yet familiar – or of a new quality of a good; the introduction of a new method of production, which has not yet been tested by the branch of manufacturing concerned; the opening of new market; the conquest of a new source of supply of raw materials or half-manufactured goods; or the carrying out of new organization of any industry. The focus of this paper is primarily on new goods, new production methods and new materials and therefore on technological innovation. Innovation activities can be organized differently at the sectoral level. In Schumpeter "Mark I" models entrepreneurs and new firms play a major role; "creative destruction" is possible with technological ease of entry. In Schumpeter Mark II models substantial barriers to entry for new innovators exist and large established firms dominate the innovation process; creative destruction turns into "creative accumulation" (Breschi, Malerba and Orsenigo 2000).

Public private partnerships (PPP) are relevant in both types of innovation modes. In general, PPP is "an agreement between the government and one or more private partners (which may include the operators and the financiers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners" (OECD 2008, 17). The choice of PPP can be guided either by microeconomic, by macroeconomic or by coordination motives (McQuaid and Scherrer 2010, 29). Microeconomic motivations aim at profit generation on the side of the private partners and tapping into the disciplines, incentives, skills and expertise that private sector firms have developed while releasing the full potential of the people, knowledge and assets in the public sector (UK Treasury, 2000). From a macroeconomic perspective PPP are motivated by the possibility to alleviate budgetary strain, to reduce the overall tax burden, and to implement deregulation and privatization of specific industries. Finally, PPP are motivated by their capacity to coordinate public and private agents by pursuing functional efficiency and the public sector's "willingness to share some forms of public authority with citizens and communities" (Considine 2005, 90) in a bottom-up approach of policy making.

The paper aims at describing the role of PPP in regional innovation policy along four interrelated dimensions. First, does the structure of PPPs matter? A PPP is either “contractual”-type when a partnership is solely based on contractual links between public and private agents, or it is “organizational”-type if partnership is manifested by establishing a jointly owned entity. Second, for what purposes are PPP used? Possible purposes of PPP in the field of innovation are to provide the organizational frame for generating innovation activities, for exploiting innovation or for a mix of both activities. Third, for what kinds of policy intervention are PPP used? PPP can be potentially used for providing innovation-related infrastructure and as a mode of program and project delivery in innovation policy. Fourth, what is the scope of PPP to perform systemic tasks of innovation policy and which systemic instruments are implemented? This is particularly relevant in a systemic perspective of the innovation process as PPP can be used in various ways to connect agents from the public and private sectors (which is inherent to *public-private-partnership*).

For finding answers to these questions a systematic analysis of the use of PPP for innovation policy ought to address agents who take their decisions on co-operating (or not co-operating) within a comparable legal, political, and institutional environment. This suggests an analysis of the use of PPP for innovation policy in one single country which is sufficiently large to yield a significant number of PPPs. Yet, there is only scattered empirical evidence on the role of PPP in regional innovation policy (SOURCES MISSING), and there is no comprehensive empirical survey or analysis of the use of PPP in regional innovation policy within a whole country. Sweden and Swedish municipalities are well suited for such an analysis as the Swedish society has been characterized by a long history of corporatist governance (and thus a long tradition in public-private cooperation) and a relatively long history of innovation policy activities. While overall innovation performance is favorable in international comparison innovation activity across regions differs markedly (EU 2012); agents in the innovation system can exert a high degree of autonomy. Therefore a variety of PPP uses for innovation policy purposes is supposed to exist in Sweden.

In a first step all 290 Swedish municipalities were contacted with a questionnaire. 63 municipalities or 21.7% responded, 21 municipalities reporting to have no PPPs in innovation policy. The remaining 42 municipalities reported 68 cases of public-private cooperation in innovation policy of which 50 cases meet the requirements of our understanding of PPP. In a second step six cases of PPP in regional innovation policy were selected for in depth-analysis. Survey results are reported in the next section, case studies are presented in section three, and conclusions are drawn in the final section.

## 2. An Overview of PPP use in Swedish Municipalities' Innovation Policy<sup>1</sup>

### 2.1. Organizational vs. contractual-type PPPs

The survey among Swedish municipalities produced a set of 68 cases of public-private cooperation. Municipalities reported a strong involvement of the public sector in innovation-related PPPs which included not only financial contributions but also one or several other functions like planning, design, or research and development activities. Some municipalities avoided the term 'partnership' but labeled public-private co-operations as 'association', 'cooperation project' or 'network'. This kind of labeling could be the result of either a mere communication problem or of a deliberate avoidance of the term "partnership" – a term which is often considered being imported from the European Union and thus having an unfavorable connotation. In any way this suggests that the phenomenon of "multiple grammars" of PPP (Linder 1999) exists; as in this survey the OECD-definition (see section 1) was applied such cases were counted as PPPs.

Some other respondents labeled cases as 'PPP' which involved some kind of cooperation between the public sector and private agents but which did not meet the definition of PPP. These cases are considered not as PPP in this study; in tables 1 and 2 they are referred to as "Non-PPP. The share of more than 26% of the total response being non-PPP suggests again, that the phenomenon of "multiple grammars" exists.

In total, 50 cases are in line with the OECD-definition of PPP, 22 of them being contractual-type and 28 being organizational-type PPPs. Contractual-type PPPs are often used for the provision and/or operation of infrastructures and services which are important for the general business environment, and thus also for innovation. Organizational-type PPPs are often used for the establishment and operation of enabling organizations, which provide common ground between the public, private and third sectors to promote innovation policies.

### 2.2. The purposes of PPP in regional innovation policy

One purpose of PPP in regional innovation is to provide an organizational frame for generating and exploiting innovation. As in some cases data did not allow a differentiation between these activities, or no clear emphasis is put on one of the two activities, a third category "generation *and* exploitation" was included into table 1. There is a predominance of organizational PPPs in innovation exploitation as well as in innovation generation and exploitation. Exploiting seems to require and to allow closer ties between partners like joint equity which go beyond merely contractual relationships.

Survey results indicate that PPPs which aim at **generating** innovation are considered a means to strengthen regional competitiveness and innovative capacity. Under *organizational-type* PPPs the tasks assigned to the private sector comprise a variety of tasks like operative tasks, research and development, and commercialization of the innovation. By contrast, in *contractual-type* PPPs there is a more clear-cut assignment of responsibilities to the partners: the public sector is actively engaged mostly in the early stages of cooperation (e.g. creation of conditions for innovation and R&D) while the private sector assumes the risk for

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<sup>1</sup> Parts of this section are based on Kristensen, McQuaid and Scherrer (forthcoming).

further development of the innovation outcome. A number of partners (e.g. chambers of commerce, employer association, NGOs, and EU) are not directly involved in tasks and activities but support cooperation. Several types of arrangements between public and private sector agents fall into a category ‘*other*’ or Non-PPP.

Table 1: Use of PPPs in regional innovation policy of Swedish municipalities by purpose

		<i>Regional Innovation Policy by Purpose/</i>			TOTAL
		GENERATOR	EXPLOITER	GENERATOR + EXPLOITER	
PPP	ORGANI- ZATIONAL	10	7	11	28
	CON- TRACTUAL	12	3	7	22
	TOTAL	22	10	18	50
NON-PPP	OTHER	6	5	7	18
TOTAL		28	15	25	68

PPPs which aim at **exploiting** innovations are primarily applied to utilize the innovative potential existing within the region. Under *organizational-type* PPPs public and private partners usually jointly execute operational functions (e.g. management, production planning etc.) while the private sector occasionally takes on the functions of testing and networking. Organizational PPPs usually are preferred over *contractual* ones. There are also some “other” arrangements between public and private agents in the field of innovation exploitation which could not be counted as PPPs.

Those PPPs which aim both at **generating and exploiting innovation** are formed to improve regional innovative capacity in some sectors and, to a lesser extent, to foster business development. In *organizational* PPPs – which form the majority of cases – operational functions are jointly executed by both sectors, in *contractual* PPPs the research and development function tends to be carried out jointly but operational and design tasks are assigned primarily to private partners.

### 2.3. PPP in regional innovation policy delivery

PPPs are used in regional innovation policy as a mode of providing innovation-related infrastructure and as a vehicle to deliver innovation policy programs and projects (see table 2). One fifth of PPPs in which responding Swedish municipalities are involved aim at providing innovation related infrastructure, four fifths have its focus on innovation programs and projects. As it is often difficult to distinguish empirically between the three possible uses (mostly because a PPP serves in some aspects two or even three uses) in table 2 PPPs are categorized according to their major focus with regard to the type of measure of innovation policy.

Table 2: Use of PPPs in regional innovation policy by Swedish municipalities by measure

		<i>Regional Innovation Policy Measures</i>			<i>TOTAL</i>
		<i>INFRASTRUCTURE</i>	<i>PROGRAMS</i>	<i>PROJECTS</i>	
<b>PPP</b>	<b>ORGANI-ZATIONAL</b>	<b>6</b>	<b>15</b>	<b>7</b>	<b>28</b>
	<b>CON-TRACTUAL</b>	<b>4</b>	<b>0</b>	<b>18</b>	<b>22</b>
	<b>TOTAL</b>	<b>10</b>	<b>15</b>	<b>25</b>	<b>50</b>
<b>NON-PPP</b>	<b>OTHER</b>	<b>6</b>	<b>8</b>	<b>4</b>	<b>18</b>
<b>TOTAL</b>		<b>16</b>	<b>23</b>	<b>29</b>	<b>68</b>

PPPs in ***innovation-related infrastructure*** are frequently used to provide and/or operate innovation-related infrastructures and services or infrastructures which are important for or for the general business environment. They are aimed at fostering the regional innovative capacity and improve regional competitiveness and business growth. Both organizational-type and contractual-type PPPs are reported, the numbers of cases (6 and 4 respectively) are similar. Cases that fall under the category ‘*other*’ are predominantly projects implemented in the framework of EU regional policy but which are not in line with the definition of PPP.

PPPs concerned with the delivery of innovation policy through ***innovation programs*** are rather complex and include a variety of agents. In addition to private firms and public sector agents from all levels of government (not only municipal), other agents which act as associate partners like chambers of commerce, employer associations and NGO’s are included. For strategy development and program delivery only organizational-type PPP are used, often as an instrument of cluster and related policies which aim at strengthening regional competitiveness and improving innovative capacity in certain economic sectors.

Operational tasks usually are jointly executed by public and private partners, the responsibilities of the private sector are widely scattered.

PPPs concerned with the delivery of innovation policy through *innovation project implementation* are mostly commercially-oriented. Research tasks fall mainly under the competence of the public partner(s) and commercial application of research results is assigned to the private partners. In the implementation phase tasks and responsibilities can usually be better specified and therefore it is relatively easy to assign them to partners compared to earlier phases; therefore contractual relations are an adequate means of structuring a project. The survey finds that a clear majority of PPPs in innovation projects are contractual-type ones (18 compared to 7 organizational-type PPPs).

#### **2.4. Systemic functions of PPPs in regional innovation policy**

To understand the functioning of PPPs in regional innovation policy, it is important to disclose the underlying systemic patterns of cooperation activities between the public and the private sector. Therefore it is analyzed if and to what degree PPPs used by Swedish municipalities for regional innovation policy purposes can be considered systemic instruments. This analysis is based on Smits and Kuhlmann (2004) who distinguished five categories of systemic instruments: Managing interfaces, innovation system building, providing a platform for learning and experimenting, infrastructure provision for strategic intelligence, and demand articulation, strategy and vision development. The distinction between the latter two categories was empirically difficult; therefore they were merged into one category 'Strategic intelligence, demand articulation, strategy and vision development'. Only those cases which were identified as PPPs are included (i.e. 50 cases) in the analysis.

**In total** 49 out of 50 PPPs perform at least one systemic function; the total number of systemic functions performed by these PPPs is 105 which means that on average one PPP meets approximately two (2.14) out of four possible systemic functions. Organizational PPPs tend to address a slightly higher number of systemic functions than contractual type PPPs do (2.29 vs. 1.95). 43 PPPs (or nearly 90%) contribute to innovation system building, 26 PPPs (more than 50%) contribute to managing interfaces, and 23 PPPs (46%) aim at developing strategic intelligence, demand articulation, strategy and vision development. 13 PPPs (approximately 26%) provide a platform for learning and experimenting. 43 systemic functions performed by PPPs (which is approximately 40%) are related to innovation system building, roughly a quarter of systemic functions are related to managing interfaces and strategic intelligence, demand articulation, strategy and vision development, each. Roughly 10% of systemic functions of PPPs are related to providing a platform for learning and development.

Table 3: Systemic functions of Swedish municipalities' PPP in the field of innovation policy

	INNOVATION PURPOSE			INNOVATION POLICY DELIVERY			TYPE OF PPP		TOTAL
	GENERATOR	EXPLOITER	GENERATOR + EXPLOITER	INFRASTRUCTURE	PROGRAM	PROJECT	ORGANIZATIONAL	CONTRACT-TYPE	
MANAGING INTERFACES	15	3	5	6	9	8	16	7	<b>23</b>
INNOVATION SYSTEM BUILDING	21	4	18	9	12	22	23	20	<b>43</b>
PLATFORM FOR LEARNING AND EXPERIMENTING	6	4	3	1	6	6	10	3	<b>13</b>
STRATEGIC INTELLIGENCE, DEMAND ARTICULATION, STRATEGY AND VISION DEVELOPMENT	12	6	8	7	11	8	15	11	<b>26</b>
<b>TOTAL</b>	<b>54</b>	<b>17</b>	<b>31</b>	<b>23</b>	<b>38</b>	<b>44</b>	<b>64</b>	<b>41</b>	<b>105</b>
NUMBER OF PPPS WITH SYSTEMIC FUNCTIONS	22	9	18	10	15	24	28	21	<b>49</b>
NUMBER OF SYSTEMIC FUNCTIONS PER PPP	<b>2.45</b>	<b>1.89</b>	<b>1.72</b>	<b>2.3</b>	<b>2.53</b>	<b>1.76</b>	<b>2.29</b>	<b>1.95</b>	<b>2.14</b>
<i>PPPs WITHOUT ANY SYSTEMIC FUNCTION</i>	-	1	-	-	-	1	-	1	<b>1</b>

**Results by purpose of PPPs** show that those PPPs which aim at generating innovation on average fulfill 2.45 out of four possible systemic functions. This is well above the results for PPPs aimed at exploiting innovation (where the small number of cases is small) and those combining generating and exploiting innovation. The reasons for these differing properties can be explained by considering different ways of private involvement and a degree of uncertainty inherited in every innovation process. For exploiting innovation raising the efficiency of interaction between the actors is a core issue, and the pursuit of such efficiency will considerably reduce the multiplicity of interfacing subsystems. This explains the minor importance of interface management in PPPs aimed at exploiting innovation (3 out of 9) and PPPs aimed at generating and exploiting PPPs (5 out of 18) compared to PPPs aimed at generating innovation (15 out of 22). PPPs aimed at generating *and* exploiting innovation have their focus on innovation system building. In these PPPs there is an overlap of partners who are involved both in innovation generating and in exploiting activities which might explain the low urgency to provide systemic functions (on average they fulfill only 1.72 systemic functions).

**Results by use of PPP as an instrument of innovation policy delivery** not surprisingly show that innovation program implementation tends to involve more systemic elements than the implementation of single projects. PPPs used for implementing innovation programs on average fulfill 2.53 out of four possible systemic functions compared to 1.76 for PPPs in innovation project implementation. PPPs in innovation programs are preferred when management of independent subsystems and facilitation of bargains between various stakeholders ought to be offered (9 out of 15). PPPs in innovation projects usually are commercially-oriented with a relatively small number of stakeholders and therefore a relatively low priority for managing interfaces. PPPs in innovation-related infrastructure on average fulfill 2.3 systemic functions, innovation system building and strategic intelligence, demand articulation and strategy development being the most important ones.

This quantitative overview of systemic elements' involvement in PPP through the survey results the case studies give more detailed qualitative information. Of particular interest is the relative importance of systemic instruments and how systemic elements are manifested by concrete structures and behavior of partners in a PPP.

### 3. PPPs in Swedish regional innovation policy: Six cases

Based on conceptual frameworks identified and outlined **Section 2**, this section provides more thorough descriptions of six cases according to the four previously mentioned characteristics/dimensions:

(1) General composition of a PPP: *a)* profile; *b)* partners involved; *c)* initiator(s); *d)* shared benefits; *e)* risk allocation.

(2) Purpose of PPP in regional innovation policy: *a)* focus of PPP activity; *b)* rationale for applying PPP in innovation creation; *c)* tasks assigned to partners.

(3) Mode of PPP in regional policy delivery: *a)* motivation/rationale for using PPP as a form of cooperation; *b)* tasks assigned to partners; *c)* government involvement in a PPP.

(4) Systemic functions of PPP in regional innovation policy: *a)* managing interfaces; *b)* building and organizing innovation system; *c)* platform for learning and experimenting; *d)* infrastructure for strategic intelligence, demand articulation, strategy and vision development.

Cases were selected by the following criteria:

*First*, cases from regions with developed innovation systems and well-functioning interaction between actors of the innovation process (“advanced” regions) and from more peripheral regions with strong research profiles but with little cooperation between public and private sectors are included.

*Second*, cases from economic sectors, which are considered to be major industries in these regions, are included.

*Third*, cases include PPPs being (co-) initiated on the public side by regional or municipal policy makers on the one hand and national policy on the other hand. Thus the potential impact of national level PPPs on innovation policy at the regional level can be captured.

*Fourth*, cases from similar/related industries are included pairwise by advanced and remote regions, i.e. from the same industry one case is taken from a peripheral and one from an advanced region.

The cases emanate from three Swedish regions, Skåne, Väster- and Norrbotten and highlight three industries: biotechnology/pharmaceuticals (Medicon Valley and Umeå Cluster), automotive (Center of Competence Combustion Processes, Center for Automotive Systems Technologies and Testing), and IT industry (VINNOVA Excellence Center System Design on Silicon, The Faste Laboratory). 16 interviews with major stakeholders of PPPs (6 representing private partners, 10 representing agents of the public side) were conducted with a semi-structured questionnaire in the first half of 2013; the average length of an interview was approximately 60 minutes.

Table 4 provides a summary of case characteristics.

### 3.1. Medicon Valley Cluster

Medicon Valley is a Danish-Swedish biotech cluster comprising the capital city, Copenhagen, and the Sjælland region on the Danish side and Skåne region, on the Swedish side. The concept of Medicon Valley first appeared in 1994 when public authorities on both sides agreed to market the Öresund region internationally to facilitate its competitive potential on the global scene. The political decision to build the Öresund Bridge has instigated the cooperation process and opened up new venues to exploit the immense bi-national potential in life science, which formerly has been locked in two separate national systems with. Since 1997 Copenhagen Capacity and its Swedish counterpart Invest in Skåne have been funding and branding the region internationally highlighting its strongholds within the life science sector: diabetes/metabolism, neuroscience, cancer, inflammation and allergy. Medicon Valley has currently approx. 100 biotech companies, 25 pharma companies and 100 biotech companies.

Medicon Valley Academy cluster organization representing life science in Öresund region (Medicon Valley) was established in 1997 by Lund and Copenhagen universities and the major pharmaceutical companies i.e. Novo Nordisk and Lundbeck (in 2007 it was renamed as Medicon Valley Alliance). The main mission of Medicon Valley Alliance is to facilitate economic growth and increase regional competitiveness within life science as well as to market cluster internationally and attract foreign stakeholders by building networks, organizing events and seminars, analyzing and proposing solutions etc. Research and innovation in life science cluster is marked by increasingly complex mix of actors, skills and competences implying that collaboration between research and business community should be structured and systematic to produce useful results (predominantly through fundamental research). Well-functioning web of interactions among public, private and academic stakeholders within the cluster has contributed to the establishment of a shared arena for interaction and innovation between the two sides of Medicon Valley enabling direct communication between Lund and Copenhagen (not through Stockholm as it was when just two separate national systems existed). The responsibility structure of the organization is shared between all partners with no a single stakeholder in the 'driver seat'. Private companies are usually involved in both R&D and commercialization, which primarily remains a prerogative of the private stakeholder though there are certain departments at the universities that also assist start-ups in commercialization of research e.g. LUIS (Lund University Innovation System) at Lund University or LUBio (a joint venture between Lund University and private investors to support research spin offs within life science with early financing).

Lifespan of the organization depends on the outcome value and the performance of actors involved in this partnership as well as availability of funds, which currently constitute 50% membership fees and 50% strategic project funding. EU involvement (predominantly in terms of funding) is rather limited due to its stiff frameworks and funding usually comes from regional or local sources. Personal health is one of the priority areas in regional governments on both sides of Medicon Valley meaning that there is a strong regional presence in the cluster i.e. the government of capital region of Denmark, the government of region Zealand and the government of region Skåne in Sweden. In Sweden, a significant amount of funds has been invested in basic research instead of partly being used to support collaboration with

industry and commercialization of research. This tendency is slowly changing as regional and municipal authorities (particularly Lund kommun) gain more understanding of innovation phenomenon and the relationship between research and business development in the innovation process. In addition, the presence of a shared business and research milieu with a number of the most innovative life science companies and excellent science infrastructure like e.g. Max Lab VI and ESS attracts new companies to settle/or establish themselves in the cluster.

Sometimes it might be a challenge to reach a point where each stakeholder sees collaboration as a win-win situation. Yet many employees from member companies have their background either from the Danish or Swedish universities meaning that they have access to well developed and set in place research network of contacts (often based on informal colleague-to-colleague interaction) what significantly adds to the riddance of perspective diversity and creation of a common consensus.

The scope and the credence of the cluster system of Medicon Valley offers space for raising awareness and undertaking lobbying activities to inform the politicians at regional and national levels about the challenges related to transforming research into business with life science and to advocate the solutions that will bridge this gap. For instance SwedenBio, SISP and other organizations within the cluster are working towards Swedish national policy and legislation that would enhance the volume of venture capital in life science by e.g. releasing public resources which are 'locked up' in different funds that cannot be consumed by the target sector. In addition, Medicon Valley became very visible in the press through numerous research publications and debate articles. This creates a positive image and places more 'weight' on the cluster when regional policy formation is concerned.

### **3.2. Umeå Cluster (Biotech Umeå)**

In 2005 Umeå municipality and the University of Umeå started the initiative to support growth of the biotech and medical technology industry in the Umeå region. Biotech Umeå started as a project jointly financed by EU structural and regional funds with the purpose to promote cluster, attract venture capital investments to the region and encourage the formation of partnerships between investors and local life science companies. Currently it functions under the umbrella of Uminova Innovation – Business Incubator and Technology Transfer Office - and is marketed both nationally and internationally as a biotech cluster. Areas in which the Biotech Umeå cluster excels include infectious disease research, plant and forest biotechnology at UPSC, oncology, biochemistry, the nervous system, metabolic diseases and medical technology. Initially, Biotech Umeå started as marketing and a network organization, which gradually also took over business development tasks e.g. management training. Biotech Umeå, taking upon itself this range of responsibilities, leaves more space for companies to focus on research-related activities.

The life science is set out as one of the priority areas in the Västerbotten region implying regional authorities i.e. the County Council of Västerbotten, County Administration of Västerbotten, Region Västerbotten. have been very positive to the life science cluster pushing university to be more commercially-oriented. Participating companies are not 'committed' partners (they are not legally bound) but rather act as beneficiaries or non-committed

partners contributing with their competence and providing feedbacks when necessary thereby strengthening cluster business profile. The majority of companies within the cluster are research-based spin-offs suggesting that scientists have a strong knowledge base and necessary research skills within a specific field of study but very often lack business and managerial competences. This is considered to be one of the challenges to achieving objectives of this cooperation.

Biotech Umeå uses public funds to pursue its objectives, which in its turn places an excessive bureaucratic burden on cluster organization, exposing it to substantial financial risk, and shifting focus away from its main activity – the development of a strong biotech sector in the region. The situation is further aggravated by the lack of private capital in the northern part of Sweden: international and national companies usually have limited knowledge of the life science research in this part of the country, little interaction with local university and often invest in the areas they know best. Biotech Umeå currently cooperates with Västerbotten Investment Agency to attract pharmaceutical companies and facilitate collaboration with local researchers, but thus far they've made little progress and local companies keep predominantly international market orientation.

Collaboration activities in Biotech Umeå are managed through conferences, investment days, various cluster initiatives e.g. DuBiotech, education, seminars etc. Biotech Umeå also works with companies to find out what needs do they have and how Biotech Umeå can meet those needs. This is also a way to establish a bridge between life science and ICT companies to see whether they have similar weaknesses and how these weaknesses can be eliminated in order to succeed on international scene. Having companies in close proximity certainly provides an opportunity for the companies to acquire necessary expertise within the limits. Courses and seminars organized by Biotech Umeå often become an excellent starting point for dialogue among companies, investors or other participants. Even though these regular interactions bring certain mutual benefit i.e. training yet this is not considered to be a real learning process in the full sense.

Biotech Umeå takes part in various regional and national groups to influence the decisions of policy makers in matters related to life science. There is a certain degree of lobbying activity being carried out though the effect of it is not very strong yet. Regional government representatives are also involved in the board of some organizations within the cluster and although they do not exercise much power, their presence facilitates the dialogue among partners which would not have been possible otherwise.

### **3.3. VINNOVA Excellence Center System Design on Silicon**

In 2008 VINNOVA<sup>2</sup> launched an Excellence Center System Design on Silicon at Lund University as 10 year project with the purpose to promote sustainable growth and strengthen Swedish competitiveness in wireless communication by bringing industry and research together. The main mission of the established Center is to develop novel architectures and circuit solutions for terminals in the area of wireless communication. Informally, this Center is some form of a continuation of the previous one - the Competence Center for Circuit Design – and heavily relies on continuous and long-term commitment of major IT players like

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<sup>2</sup> VINNOVA sets basic requirements for Excellence Center's set up e.g. to have a board but does not tell in what form the Centers should be established: as a physical entity or whether they should have more of a virtual presence at the University.

Ericsson, Sony Mobile and Sony (which are present in the region), reflecting essentially their interests and preferences.

The setting-up of the Center was realized without considerable involvement of regional policy makers and public involvement is carried out primarily through objective evolution of Center's performance by Sweden's Innovation Agency (VINNOVA). These favorable framework conditions have offered a platform for a close interaction between industry and academia bringing basic research closer to industrial needs thereby reducing the risk of project failure (e.g. many projects are defined in cooperation with Ericsson). IT companies are actively involved in research projects, contributing both in cash and in-kind e.g. service, competence etc. Some senior researchers and PhD students have been hired by the Center to conduct research and many of them work in close cooperation with industry. Funding comes in equal shares from three major partners: academia, other relevant public partners and private sector. The main objective of public-private interaction within the VINNOVA Excellence Center System Design on Silicon is to stimulate private investment in research commercialization and engineering education with the intention of knowledge, skills and competence upgrading necessary to carry out high-quality, industry-relevant research. Within the PPP framework, various stakeholders interact in a number of different ways: strategic workshops where company representatives and senior researchers are gathering to discuss future plans and strategies for cooperation; informal project meetings involving certain industries, active PhD students and senior researchers; open events to present and promote research results to participating industries; formal board meetings.

A long history of cooperation with Ericsson and other IT companies aids collaboration process and adds to mutual understanding between industry and the university. This form of public-private partnership provides necessary industry knowledge and contacts that strengthens Center's research profile and sets direction for the future research. Lund offers an attractive research environment (and the Center is a part of it) that draws companies to the region; and the university plays a key role in it since the Center is mainly producing research results not the knowledge or competence. At the same time, however, world-class research builds a solid base for high quality education and training. Putting it all together justifies companies' reason for settling in the region: to get access to competent specialists in the field of engineering and exploit the research milieu at the university en masse and not simply establish at the Center.

Participating companies differ in their competence and knowledge bases as some of them are more research-oriented e.g. Ericsson branch in Lund, hence has better understanding of what academic research is about, others are more product-oriented e.g. Sony Mobile, requiring different interaction approaches. Yet these differences can be somewhat modified in the course of cooperation and as results indicate, finding the right level of entry to the company is the key to efficient collaboration and consensus forming. The Center exercises small and indirect influence in regional policy formation through an industry driven triple helix initiative for mobile ecosystem enhancement where the companies and Region Skåne are involved.

### 3.4. The Faste Laboratory

The VINNOVA Excellence Center for Innovation in the Functional Product Area – the Faste Laboratory – was established at the Luleå University of Technology in 2007. Its major objective is to provide support to participating companies in doing business based on functional product innovations comprising hardware, software, a service support system and management of operation. The purpose is to improve the customer value by creating the capability to identify, model and stimulate offer components in the early phases of the development process, and to support a closer collaboration between value-chain partners. Research is driven by the needs of industry yet with complexity and ‘depth’ inherent in academic research.

The Center consists of public i.e. VINNOVA, which is mainly responsible for evaluation of cooperation and research progress, and private sector units i.e. LKAB, Gestamp HardTech, Sandvik Coromant, Volvo Construction Equipment, Bosch Rexroth and Infrafone, based at the Luleå University of Technology. Regional policy makers are not explicitly involved in the realization of the Center’s set up as the initiative came from the national government and aimed at enhancing interaction between research and industry towards producing tangible economic benefits and innovation. The partnership is set up as a physical entity for a stretch of 10 years, 2007-2016, facilitating a large degree of daily interaction. All participating companies are spread geographically with only one partner i.e. Gestamp HardTech located in close proximity to the Center. The partners share the responsibility for identification and assessment of industrial needs which enables development process based on simulation-driven design that includes distributed engineering methods and tools. Research projects are jointly carried out with the university leading research. There are three main sources of finance for the Center: 1/3 academia, 1/3 other public partners and 1/3 private participating companies both in-kind and in cash. The major risk in this PPP is that the Center might fail to meet the planned performance level according to the submitted program. Every second year the Sweden’s Innovation Agency (VINNOVA) evaluates work and research progress and makes decision whether or not to grant funding for another year. Considering that university receives actual cash from VINNOVA and participating companies, it is predominantly exposed to financial risk whereas the companies bear larger risk in a sense of results not being delivered.

Interactive activities in the Center are based upon 40-50 formal and informal meetings a year including annual partner meetings, internal follow-ups between the academics (2-4 times a year), individual meetings with companies etc. Findings indicate that the business concept and mode of cooperation introduced by the Center awoke interest of some companies: two companies have participated in both partnerships since 1995 i.e. Bosch Rexroth and Sandvik Coromant, a number of other companies also showed interest and became partners for a certain period of time e.g. Volvo Truck, Volvo Construction Equipment etc. However, despite the long-established tradition of inter-sectoral interaction, cooperation process occasionally gets challenged by differing objectives and preferences among the stakeholders as well as different approaches and levels of competence. These differences are modified in the course of cooperation as the Center tries to incorporate technical and business demands into Centers activity: to conduct research on hardware and gradually extend towards functional product development. Furthermore, participating companies come from a wide range of

sectors like mining, engineering, machinery etc., implying that they are not in competition with each other what aids significantly the cooperation and learning process.

The success of the former Excellence Center – the Polhem Laboratory (1995-2006) - raised regional awareness and generated new ways to contribute to the achievement of regional development objectives. For instance, a number of regionally funded projects –Polhemregion- were launched covering about 30 regional companies to introduce new technologies and new working methods. Ultimately, the Center was set-up without any regional government support yet launching a number of regionally funded projects indicate its indirect influence on cooperation facilitation. In addition, the Center has visible presence at the university enabling it to have an influence where regional policy formation is concerned. The director of the Faste Laboratory is a member of Swedish Engineering Academy and a former vice-president for industry collaboration at the university; a number of regional programs supported by EU called Innovation Action Program and some structural fund projects were formed with the Centers participation. This opened up opportunities for the Center to get engaged in regional policy formation through exercising its influence to enhance economic growth and change short-sighted public perspective on strategic issues related to industrial development in the region.

### **3.5. Center of Competence Combustion Processes**

The Center of Competence Combustion Processes started in 1995 with the purpose to build a better understanding of the combustion process in internal combustion engines. The main areas of interest are the combustion processes with low temperature to suppress formation of NO<sub>x</sub> and particulates, low temperature combustion, homogeneous charge compression ignition, HCCI. The rationale for the establishment of the Center is to strengthen the link between university research and industrial R&D, enhance business growth and regional competitiveness, and facilitate private participation in research in order to derive long-term benefits.

The Center's organization is based on the principle of 'triple helix' implying the involvement of three major partners and financiers (following 1/3 & 1/3 & 1/3 scheme): Lund University, Swedish Energy Agency and industry: Volvo Cars, Volvo Powertrain, Volvo Penta, Scania, Tozota, Caterpillar, Chevron, BorgWarner, Wärtsilä, Finnveden, Hoerbiger, Cargine, Swedish Gas Center, Loge and Swedish Biomimetics 3000. The Center does not receive any financial support from EU funding although research activities, carried out outside the Center, could be funded by Sweden's Innovation Agency (VINNOVA), EU or Nordic money. It is run on contractual basis, in 4 -year phases and since its inception in 1995, KCFP has completed a number of 4- year phases with a new contract signed upon completion of each phase. Based on mutual recognition that the building-up of world-class research might take up to 10 years, unlike the Faste Laboratory or VINNOVA Excellence Center System Design on Silicon, the Center continues beyond the 10-year timeframe. Most of Center's activities are carried out by the university while industries primarily pay leasing. Representatives from the Swedish Energy Agency participate in the board meeting but they are not official board members. This form of partnership involves a low risk related to scientific randomness and is mainly borne by the university; as the Center has a budget, there is no financial risk involved.

All major automotive manufacturers are located in Gothenburg and Stockholm (that's about 300 km and 600 km respectively, further north from Lund). Despite this geographical gap, the Center's activities are expanding as they spread the risk by cooperating not only with Volvo and Scania but also with Caterpillar, Nissan, Toyota etc. The Center also plays certain part in attracting innovative companies and skilled labour force to the region. For instance, a Volvo branch located in Malmö, probably wouldn't have been equally strong if the Center didn't contribute with knowledge and competence: 5 PhD students were generated from the group. Additionally, the Center expands its links and activities with local SMEs e.g. Cargine, specializing on active valve timing, equipped Center's lab with free valve technology, which is now promoted by the Center to the engine OEMs. By doing so, Cargine gets new connections and increases its sales. These activities help to strengthen local R&D companies that can serve as potential suppliers to large companies.

Interactive activities in the Center are based upon formal and informal meetings. Public and private partners, reference groups, meet regularly twice a year to report research progress that includes both formal discussions/presentations and informal mingling that helps partners to connect quicker, find common research interests and launch joint projects. The board meetings are held up to 6 times a year and are attended by professors and top management representatives from participating companies. These meetings are more of administrative/organizational nature and involve very little, if any, discussion on research results.

Different background knowledge, capacities and objectives pose a certain challenge for cooperation stability e.g. large companies usually have a variety of knowledge bases and a well-established dialogue model with the university whereas SMEs join the Center with a primer purpose to 'learn the language' and start developing a dialogue with large OEMs. Another challenge is to align commercial and business objectives with research strategy in support of overall cooperation efficiency. At the same time, these existing dissimilarities (often it is basic vs. applied research interests) stimulate effective discourse among all partners regarding the best solution possible.

The Center has an active feedback system enabling companies, particularly small ones, to express their needs and demands. It also has a working plan that covers research topics, types of studies, outcomes, PhD students etc. and serves as a 'backing tool' when trying to keep existing and attract new industrial partners. The Center is not involved in regional policy formation as it is not possible 'to serve two masters' i.e. it is a public-private partnership where private stakeholder is interested in making profit not any new laws that would increase production cost (e.g. to set new standards to reduce emissions from new cars and trucks).

### **3.6. Center for Automotive Systems Technologies and Testing**

The Center of Excellence, CASTT, founded by the university, has been set to run from 2005 with the purpose to meet the needs and support automotive industry in the north of Sweden. The initiative came from the national government yet not as a formal request but more like a guidance in the form of a 'press release' stating that the government will allot a certain amount of money for the university with the purpose to strengthen winter test automotive area and bridge the gap between traffic safety and environmental concerns in the increasingly competitive automotive testing business sector in the north of Sweden.

Participating companies recognize the importance of potential partnership benefits like regional development and competitiveness as well as configuration of value activities in winter test industry that would help companies to shape their international value chains.

Regional government actively supported setting up of the Center both in terms of publicity and funding thereby facilitating the establishment of a solid communication bridge between the Center and public authorities at all levels. Automotive testing companies, organized in Swedish Proving Ground Association, Test Site Sweden – a national source for demonstrations and validation of research results, - automobile and component manufacturers, Swedish Transport Organization and Luleå University of Technology constitute a partnership scheme of the Center. All participating testing companies are SMEs (the largest one has a turnover of about 40 million euro) implying that their major contribution to this partnership is made in kind e. g. by providing testing facilities with the purpose to develop new methods and use the university competence for their development processes. The companies do not have long-term commitment and their involvement is regulated by individual project-based agreements. Consequently, private partner does not bear any financial risk only performance risk when the results cannot be delivered. All responsibilities related to research and marketing are shared between participating partners.

The validity period of the press release issued by the government has already expired meaning that there is no public money going directly to CASTT. Some structural funds and a small share of funds coming from Sweden's Innovation Agency (VINNOVA) were granted to the Center to sustain its current operation but present level of funding is not sufficient hampering full-scale realization of all research initiatives. The situation is further aggravated by the existence of national automotive program FFI – Strategic Vehicle Research and Innovation – which is a partnership between the Swedish government and major automotive industries i.e. Volvo, Volvo PV, Scania and Fordonskomponentgruppen (FKG) for joint funding of research, innovation and development within environment, climate and safety. Therefore, the presence of big players may have a certain influence on the course of operation and fund-distribution.

There are two major types of risk in this partnership scheme: a) IPR (even though in the agreement it is clearly stated how IPR issues should be handled); b) challenges related to SMEs little understanding of how to work in a partnership, particularly when the university is involved. A number of participating SMEs lack practical experience in cooperation with academia, expecting the university to deliver solutions like consulting agency. In some cases, the companies are not even aware what deliverables should be expected upon the completion of a certain project. However, the creation of an enabling environment for effective and interactive learning between companies and academics helps to keep a proper balance between the partners' competences and limitations. Learning process takes place in different forms: through interaction with customers, cooperation with other partners on project basis, educational seminars etc. In this context partners learn from each other, develop new competences, skills, knowledge and make new connections in value chain. CASTT assists in building up the professional profile of the companies by opening up access to external expertise and knowledge necessary to provide right solutions. There are, of course, differences between large and small participating companies: large companies are usually characterized by a profusion of competence and education attainments varying from Master of Science to PhD holder employees aiding the understanding and communication between

the university and industry in terms of technology and business operations; whereas the absence of PhD and MSc competences at SMEs, at times causes certain low-level turbulence between partners. Eventually, the gap will be partially covered but not completely eliminated hence causing occasional turbulences.

The cooperation within the Center is organized predominantly around specific projects with a clear need for interaction in order to produce a solid result. Results produced during the implementation of the project activities usually are evaluated from both automobile and component manufacturer's and automotive testing entrepreneur's perspective to find out whether the results satisfies both parties interest (e.g. Interior Noise Vibration project). The board meetings are also a part of the interaction process enabling participating representatives to exercise some control of the cooperation process. CASTT certainly plays its part in bridging competitive angles of stakeholders by directing competitive efforts toward synergy generating to tackle issues that would benefit each partner in a long run. However, despite high hopes set for interaction process to act as a catalyst for production of tangible economic benefits, it is often a challenge to find the expected commercial value in the outcome (very few sellable outcomes were produced in the course of cooperation). Over the years a number of new test entrepreneurs have established themselves in the region and a few technology suppliers (communication technology) and automotive companies (customers) have been attracted to the region. Such contribution to innovation system building in the most northern part of Sweden, demonstrates CASTT significant achievement in successful marketing of the region both nationally and internationally.

Winter testing industry is one of the priority areas in Norrbotten implying high interest of local and regional authorities to the issues of automobile testing industry and its development. Participating companies maintain good and open relationship with the County Administrative Board of Norrbotten enabling them to raise their requests either directly or via CASTT. The biggest challenge in this partnership is to determine the potential commercial value of a new invention that can bring an actual benefit to the customer.

#### **4. Discussion**

(soon to follow)

#### **5. Conclusions**

(soon to follow)

**Table 4: Comprehensive summary of cases**

1. General composition						
Cases	a) Profile	b) Partners	c) Initiator(s)	d) Shared benefits	e) Risk allocation	Section summary
1. <i>Medicon Valley</i>	Biomedical/pharmaceutical, agro-food, environment	Biotech, medtech, pharma companies, public organizations (including hospitals), universities & business service providers	Local industry & universities	Increase regional capacity for international competition	Performance & financial risk	organizational
2. <i>Umeå Cluster (Biotech Umeå)</i>	Biomedical/pharmaceutical, agro-food	Life science companies, public authorities (regional & municipal), FOI, university, EU & Uminova Innovation	Municipal government & university	National/international marketing of local life science companies	Financial risk	organizational
3. <i>VINNOVA Excellence Center System Design on Silicon</i>	IT/engineering	VINNOVA, Ericsson, Infineon, Sony Mobile, former ST-Ericsson, associated partner Cadence, Lund university	Private interest & university research served as catalyst	Engineering education improvement & industry-relevant research	Financial + small research-related risk	contractual
4. <i>The Faste Laboratory</i>	Computer aided design/engineering	VINNOVA, Luleå university (and a couple of other research institutions/univeirsties); Sandvik Coromant, Gestamp HardTech, Hägglunds Drivers, Infracore, LKAB, Volvo Car Corporation, Volvo Construction Equipment	National initiative (former Excellence Center served as foundation for establishment)		Performance & financial risk	organizational
5. <i>Center of Competence Combustion Processes</i>	Combustion/engineering	Swedish Energy Agency, Scania, Volvo GTT, Volvo Cars, Volvo Penta, Toyota, Caterpillar, Chevron, BorgWarner, Wärtsilä, Finnveden, Hoerbiger, Cargine, Swedish Gas Center, Loge, Swedish Biomimetics 3000 & Lund University	Private interest & national initiative	Competence building & competitiveness	Low research- & competence-related risk	contractual
6. <i>Center for Automotive Systems Technologies and Testing</i>	Mechanical engineering	Test service providers, public authorities (mainly municipal), Luleå university of technology, some automotive manufacturers & system & component suppliers active in the winter test region	National initiative & university	Improvement of competitive positioning within winter test sector	Performance & IPR risk	organizational
2. Purpose in regional innovation policy						
Cases	a) Focus	b) Rationale	c) Tasks assigned to partners			Section summary
1. <i>Medicon Valley</i>	Predominantly fundamental but also strategic research	Attract talent & expand & sustain existing & vibrant industry	Joint R&D & commercialization; additionally public: investment & international promotion.			Joint
2. <i>Umeå Cluster (Biotech Umeå)</i>	Start-up/spin-offs formation & research commercialization	Attracting venture capital & skills; start-up formation	Private partner acts as beneficiary; joint elaboration of action plan; additionally public: marketing & networking & research			Joint
3. <i>VINNOVA Excellence Center System Design on Silicon</i>	'Useful' research & competence/knowledge supply	Generate broad pool of employees & strengthen research-industry links	Joint research obligations; private partner supports knowledge-transfer activities; further development/application of research results; additionally public: evaluation			Generator
4. <i>The Faste Laboratory</i>	Strategic research & competence supply	Stimulate & strengthen links between value-chain partners in functional product development	Joint gap analysis & need identification & research; additionally private partner does testing of methods & tools & public - evaluation.			Exploitation
5. <i>Center of Competence Combustion Processes</i>	Fundamental/strategic research & competence supply	Strengthen collaboration between industry & university; stimulate research by	Public: supervision & evaluation & research; private contributes			Generation

6.	<i>Center for Automotive Systems Technologies and Testing</i>	Strategic research & innovation	providing necessary equipment & competence to private partners Value chain formation & regional competitiveness	financially, industrial PhDs Private partner assists in research results testing ; public: marketing & funding & research	Generation
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### 3. Mode in regional policy delivery

Cases	a) Rationale	b) Tasks assigned to partners	c) Government involvement	Section summary
1. <i>Medicon Valley</i>	Increase regional competitiveness & strengthen life science sector in region	Private partner involved in research and commercialization together with university. Public is responsible for investment & marketing	Strong national & regional support of research & innovation. Limited EU involvement.	Program
2. <i>Umeå Cluster (Biotech Umeå)</i>	Increase employment development & growth of existing companies & regional competitiveness within life science sector	Private partner provides necessary feedback & competence. Public partner is responsible for marketing, networking & research.	Strong regional support as cluster is seen as tool to increase innovation capability & competitiveness. Partial EU funding.	Program
3. <i>VINNOVA Excellence Center System Design on Silicon</i>	Increase employment rates & ensure competitiveness of participating companies & Swedish industry	Private partner contributes in cash & in-kind & is actively involved in research projects; sponsors industrial PhDs and project trainees, responsible for further development/application of research results. Public partner carries out research & evaluation.	Weak: central government involvement through national innovation agency; regional (indirectly) - through networking. No EU involvement.	Project
4. <i>The Faste Laboratory</i>	Assist partner companies in businesses based on functional product innovations & exploiting available knowledge & competence	Private partner contributes in cash & in-kind, some are constantly involved in research; participates in need identification & gap analysis, sponsors industrial PhDs. Public partner does evaluation & research & gap analysis & need identification.	Weak: central government involvement through national innovation agency. Regional government involved through (follow-up) regionally funded projects.	Program
5. <i>Center of Competence Combustion Processes</i>	Foster regional innovative capacity & business growth	Private partner pays leasing. Activities are mainly carried out by public partner	Weak: central government involvement through national authority for energy policy issues. Regional government involved (indirectly) through triple-helix industrial initiative.	Infrastructure
6. <i>Center for Automotive Systems Technologies and Testing</i>	Support local automotive test entrepreneurs & their customers	Private partner contributes in kind i.e. providing facilities & assist in testing. Public partner is responsible for marketing & funding & research.	Strong regional support in terms of communication & funding. Partial EU funding.	Infrastructure + program

### 4. Systemic functions

Cases	a) Managing interfaces	b) Building & organizing innovation system	c) Platform for learning & experimenting	d) Infrastructure for strategic intelligence, demand articulation, strategy & vision development
1. <i>Medicon Valley</i>	Common arena for interaction: colleague-to-colleague & research groups, seminars.	Not as much cluster but availability of competitive infrastructure & strong research milieu attracts companies to the region.	Variety of knowledge bases & perspectives & expectations. Interests are poised through cluster organizations' activity in creating win-win situations.	Vision & strategies clearly set Number of cluster promotion activities is initiated: lobbying, press workshops, debate article publishing etc. Lobbying done by MVA carries more importance to SMEs rather than big private partners.
2. <i>Umeå Cluster (Biotech Umeå)</i>	Educational programs & PR activities, research groups, conferences & seminars.	Little success in attracting companies to the region; local companies work mainly internationally.	Communication difficulty: fundamental/strategic research talks vs. market-oriented talk. Not real learning process: seminars & other events stimulate to some extent 'implicit' learning process.	Short- & long-term vision & strategy formulated. Life science – priority area: simplifies communication process and demands articulation.
3. <i>VINNOVA Excellence Center System Design on Silicon</i>	Strategic workshops, informal research project meetings, open events.	Presence of strong university & research attracts companies. Center's producing primarily research results thereby adding to competence and knowledge building.	Differing perspectives: research- vs. product-oriented companies. Differences are harmonized by finding commercial interests & win-win situations.	Semi-annual reporting to national innovation agency & workshops: elaboration of strategies together with company representatives. Involved in industry driven triple helix initiative.
4. <i>The Faste Laboratory</i>	Place for ideas exchange: partner meetings, academic internal meetings & industry-	Attracted some attention of companies. No spin-offs.	Differing 'languages' used by partners, levels of competence & ways of thinking.	Teamwork in strategy & vision development. Active & influential on regional level: participation in EU regional

	<p>university meetings. Intense use of technology for distributed collaboration.</p>		<p>Narrow- vs. broad-minded. Well established platform for mutual learning (professional wording and business strategies) through presentations &amp; interviews.</p>	<p>programs &amp; structural fund projects. Lack of long-term perspective on strategic issues related to regional industrial development.</p>
5. <i>Center of Competence Combustion Processes</i>	<p>Recruitment of people from industry, reference group meetings, and informal feedbacks (often obtained over dinner). Not as close cooperation as if they were located closer to automotive manufacturers.</p>	<p>Key players located outside region. Knowledge &amp; competence contribution to local Volvo branch. Focus on SMEs promotion as potential suppliers to big companies.</p>	<p>Differing background knowledge require different styles of communication i.e. small vs. big development groups in companies; differing objectives i.e. car-size vs. truck-size companies or fundamental- vs. strategic research. Cost-sharing cooperation calls for many reasonable compromises.</p>	<p>Work plan generated for each phase and based on discussions and feedbacks between partners. No involvement in regional policy formation: private interests should be respected.</p>
6. <i>Center for Automotive Systems Technologies and Testing</i>	<p>Board meetings, project-based interaction (university-industry, industry-industry). Well established cooperation network – geographical proximity is not crucial.</p>	<p>Few winter test companies were established &amp; some automotive companies &amp; technology suppliers were attracted to region.</p>	<p>Large vs. small companies: wide range of competences &amp; education levels and reverse. Center acts as back-up unit for partnering companies: provides knowledge &amp; competences missing in individual companies (when they would act on their own).</p>	<p>Work plan is developed together with partners &amp; approved annually by the board. Priority area in region: university is involved in forming regional development plans. Center participates in open discussions on how these plans should look like. Companies exercise their influence either directly (via good relations with county administration board) or via CASTT.</p>

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