Universities Potential Role in Local and Regional Development

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Universities' Potential Role in Local and Regional Development

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ABSTRACT

Purpose:

The paper will describe experiences from Aalborg University in Denmark on ways to support cooperation between the University and regional civic/business.

Design/Methodology:

Regional development is exceedingly focused in the world; and as growth is dependent on specialised knowledge and highly skilled and competent staff, it could be anticipated that universities should play a key role in facilitating such growth and development. At Aalborg University, such cooperation is taking place, and this paper sums up the practices and experiences gained therefrom.

Findings:

Universities have been and maybe still are seen as bodies focusing on know-how; however, they are now focusing on technology transfer, knowledge transfer and knowledge exchange, and maybe also on co-designing. From such beginnings co-operation can, and in many cases has, further developed into formal partnerships and businesses. This correspondingly reflects the fact that some universities are moving towards more businesslike institutions. In short, a business approach to knowledge management has value.

Conclusions:

The paper gives an overview of the ways Aalborg University has participated and created ways to construct and implement networking activities between the university, the Region of North Denmark, its civic functions, industries and organisations.

Value:

The paper relies on the experiences from Aalborg University and the networks they have created and participated in. This may be of interest for others who may possibly be inspired to implement them in their own locality.

Keywords: *Aalborg University, regional development,*

INTRODUCTION

Throughout history universities have played a vital role in developing and forming societies and even the world. It is thus not sensible to suggest that universities are not already participating in regional development. Nonetheless, there might be some reality in the statement. There has been a tendency to judge universities as institutions that are working entirely within the comfort of their university compartments. Universities are certainly institutions of great knowledge, and create numerous research outcomes. Such outcomes could, given the right conditions, have potential for commercial businesses. But in order to make business, interaction must happen. If not, then the statement of compartmentalism might be true, at least in some situations, not as a desire on the part of any of the parties, but because the situations form it that way.

The role of innovation on economic development has been recognised since the beginning of the twentieth century. Schumpeter (Schumpeter, 1934) was one of the pioneers of innovation and development. During the nineties important contributions have linked science, technology, and education to innovation, (Romer, 1990); (Lundvall, 1992); (Nelson & Phelps, 1966). The role of the regional context for science, skills and innovation has been in evidence since about 2000 (Cooke, Uranga, & Etxebarria, 1997). Nowadays there is a general understanding that innovation is one of the most important keys to development, and that science, technology and education are its support. These facts make common the use of terms such as *knowledge economy* or *learning economy* (OECD, 1996).

This context increased the importance of, and also the demands on, universities.

The first universities, born in the Medieval Age in Europe (Perkin, 2007), were linked to the Church and to the King. They were spaces of diffusion of knowledge. So, the first mission of universities has been *teaching*. For centuries this was their most important mission. However, at the end of nineteenth century a new mission was added: *research*. In addition to teaching, the universities should also produce new knowledge. This evolution used to be attributed to the German model of universities, the *Humboldtian* University[1]. In the last two decades a further mission has been attributed to universities. This new mission, the third, is *contributing to promote the development of the society where they are located.* In short, a university at the beginning of the twenty-first century has three missions: teaching, research, and contributing to the development of their location. In fact, the mission of universities has always turned around these three activities, but for a long time the third one has been in the shadows[2]. Then the ascension of the knowledge economy demanded a rebirth of the third mission. However, in spite of consensus about the three missions of a university, there is great debate about what, in fact, the Third Mission means and how it could be monitored. (E3M - European Commission Lifelong Learning Programme, 2012).

[1] Due to the ideas of Wilhelm von Humboldt.

[2] The Third Mission could be also considered as a good way of achieving the two others (E3M - European Commission Lifelong Learning Programme, 2012).

It is clear that innovation is an interactive process that is facilitated by the proximity of those involved in such process. One can say from this that those regions with a university have an advantage. However, this is not always true. It depends on several conditions for a university to act as an engine for "its" region. (Arbo & Benneworth, 2007). Sometimes they could be much more an enclave rather than an engine for the region (OECD, 1999), (OECD, 2007).

The challenge for universities to be useful for these new times is to act. Several practices are in action (OECD, 2007), and some of them are likely to be benchmark candidates. The most hopeful are those that are trying to integrate the three missions as an indivisible way of working and, on the other hand, are embedded in a region with stakeholders engaged in this relationship.

Aalborg University (AAU) is a case where this target has been pursued with success. The authors hope an account of these experiences may help other colleagues around the world.

> *The major policy challenge is to recognise the essential role of universities in the innovation enterprise rather than view them, as is all too commonly the case, simply as providers of essential public goods. This requires a greater focus on policy makers on ensuring independence, competition, excellence, entrepreneurial spirit and flexibility in universities* (OECD, 2010).

This means also that the universities must be able to make changes in their curricula and to introduce more contemporary teaching and learning methods.

AALBORG UNIVERSITY AND NORTH DENMARK IN NUMBERS

Founded in 1974, Aalborg University's main objective was, and still is, to produce students with the highest knowledge and the ability to contribute to regional development. Since its formation the university has been based on problem-based learning with students working in teams. There are four faculties: Engineering and Natural Sciences, Humanities, Social Science, and Medicine.

Of Denmark's five regions, the region of North Denmark has a population of 580,000 inhabitants (DK 5,580,000), GDP[3] 36,600 USD (DK 56,202 USD). It has eleven municipalities and Aalborg is the capital.

[3] Gross domestic product (GDP) is the market value of all officially recognised final goods and services produced within a country in a given period of time (Wikipedia).

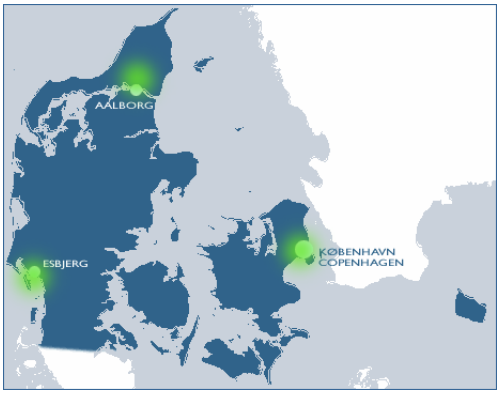

Figure 1: Map of Denmark and location of the three campuses

EDUCATION	HUM	SOC	MS	ES	Total
Full-time students	4,162	5,024	1,142	5,923	16,251
Intake at bachelor level	1,053	1,187	360	1,624	4,224
Intake at master level	867	861	124	1,013	2,865
Master graduates	379	584	98	761	1,822
Bachelor graduates	516	530	116	637	1,799
Outbound exchange students	209	144	28	143	524
Inbound exchange students	76	49	6	255	386
Foreign students	414	541	74	849	1,878

Figure 2: Student data for Aalborg University 2012 (Aalborg University, 2012)

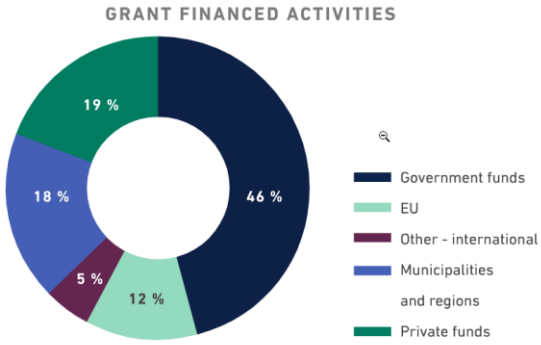

Figure 3: Grant financed activities, 2012 (Aalborg University, 2012)

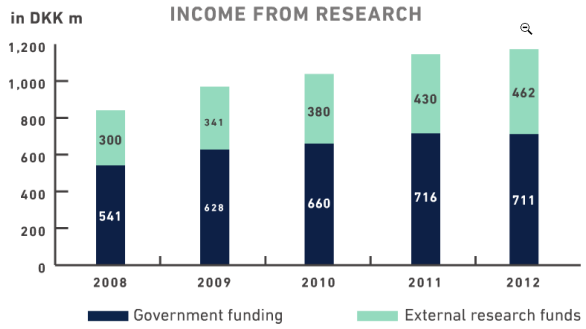

Figure 4: Income from research 2008–2012 (Aalborg University, 2012)

FROM TECHNOLOGY TRANSFER TO CO-DESIGN

In 1994 the now President of Aalborg University formulated this sentence: *"We have to face the fact that traditional methods are no longer always adequate. The answers are no longer to be found within the profession itself* (Kjaersdam, 1994).

But since 1994 we have progressed beyond the profession itself, so that it can be supplementary described as *"The solving of problems is not limited to the institution itself, but needs to be found through cooperative efforts linking education, research and practice. Further, the focus should not entirely be on teaching but on learning as well, which means that the set-up of such cooperative education must include activities in which such cooperative learning potentials can actually be experienced."* (Moesby E. , 2010).

The above statements point in two directions: externally beyond the university and internally to the university. However, as mentioned previously, universities should take part in regional development as these institutions are the custodians of great knowledge and create numerous research findings. Such outcomes could, in the right conditions, be the subject of activity by commercial businesses. But in order to create a business, contacts must be established. If not, the criticism of compartmentalism might be true, at least in some circumstances. This would not happen from a desire by any of the parties, but because the situations form it in such a way. On the internal side, the universities must offer not only contemporary learning and teaching settings to be aligned with external cooperative situations, but also have an organisation to support that integration.

In circumstances where there are desires to generate wider cooperation, somebody must take the initiative to create a situation where many shareholders are involved in a development process. Who takes the initiative might be insignificant. What is more essential is that it happens. The importance is to have a group of interested parties involved in order to write a vision and to make the first move toward bringing the envisioned future to fruition. Moreover governments and regional

partners must support such initiatives, most likely with considerable resources. This should be looked upon as an investment for the future.

If the universities take the initiative, the first university response or step may be in the form of Technology Transfer, TT. In this situation the university transfers technological practices and innovations from the university to external companies and organisations that are capable of using such technology. A reversed situation, however, could occur as well: that companies request new technology to be transferred to them for specific needs. Such technology transfers involve generally only two parties, the transferring party and the receiving party. This is not a complex situation and is rather simple to organise. Maybe this can even be done without the university administration needing to be involved. But the departments will be a part of the process even though it may occur through contacts made by an individual person at the university. In most situations, such transfer does not even involve any economical transactions, but happens out of interest or for idealistic reasons: *outreach*.

The second step can be Knowledge Transfer. KT. Here a development goes from technology hand-over to working together with knowledge as a developing factor. Handing over technology is in many ways a passive form of assistance whereas knowledge once transferred has the possibility to be further developed on location. Knowledge can create solutions on location. And it can lead into exchange of experiences between the parties.

The third step can be Knowledge Exchange, KE. This is a situation where parties are *sharing* knowledge, and in such an arrangement can benefit more from it and can contribute by developing new knowledge, which then again can be shared, and so on – ideally. Here it becomes clear that for such an exchange of knowledge to occur, there is a need for some multi-contributor organisation or committee that can organise such exchange, by constructing a complex way of cooperating.

The fourth step may be moving towards entering – or maybe already having entered – Co-Design (CD). Co-design is a situation where a university or universities work together with one or more institutions in designing something which none of the parties are able to do by themselves. And when working together in such a relationship, the co-design must likely be followed by co-financing and – as a consequence if successful – sharing overheads.

Related to this are intelligent investments in innovation, research and technology. These are the bases for further developments and to enable the promotion of growth, export and employment. This could mean that in order to plan for a future situation as well as regional or national developments, initiatives must be taken to establish an institution to define such areas and to coordinate investments and developments. Here there is a situation where a very high level of cooperation and organisation to sustain such a task is likely to be a national or regional unit. An example of such is the Danish Governments initiative (INNO+), which is charged to create a report that can form the basis for areas of interest or meeting the need for further development of the country. The Danish Government funds this programme by public investments. But a local initiative addressing the same areas with just a regional perspective could be funded by regional funds.

THE AALBORG UNIVERSITY AND REGIONAL STRATEGY

Nowadays more businesses address their strategy for the future and usually point out four key elements: Research, Seeding, Venture and Growth. Research, seeding and venture are elements that can open up for co-design projects. At the same time they strongly indicate that growth is based on the latter. And by participating in such co-design projects, there will be an *outcome* for the university as well.

The North Denmark Regional Council aims to be the leading region within Denmark in growth, entrepreneurship and innovation. To achieve this goal, InnovationX was created as cooperation between Aalborg University and the North Denmark Region. InnovationX is located at Aalborg University as a joint platform for those who initiate or take part in the organising of development of business in North Denmark, and is aiming to ensure synergy and development. The intentions of InnovationX are to create a framework that provides entrepreneurs with an overview of their possibilities, as well as to ensure optimal utilisation of relevant resources in the region.

Aalborg University is involved as a member in many such units in the region. Being represented in these units is itself a form of knowledge exchange. The university can contribute with elements to the unit and the unit can point out new directions to which the university may pay interest for the future and begin looking into how research can be established or expanded in these new areas. Sustainability, regional and national, has been one such focus that has led to strong research departments at Aalborg University.

One thing that additionally could be taken into consideration is to what degree the universities are able to generate innovators who will start new businesses and be able to create innovation areas where cooperation between former students is a natural built-in feature as a consequence of a well-designed university educational model. Such knowledge communities can be seen in the San Francisco area where knowledge appears to merge together and generate huge innovative cubes. The universities in the area, not least Stanford, contribute significantly by doing high-level research and by creating an innovative and creative environment at the university. Cooperation creates or generates new ideas.

The basic construction should be based on a strategy plan to back up a vision. Elements from such a strategic plan will be used in the following more practical perspectives. Aalborg University will be used as an example of how a cooperative construction can be established and developed further through time. It is a process that has been running over several years and with increasing complexity.

FROM OUTREACH TO OUTCOME

Figure 5 shows elements of the structures, which are an example of the situation at Aalborg University and their "outreach", meaning reaching out to its surroundings. You will find that in Figure 5 there is a progression from left to right and also that there are internal and external elements in the model. To some

extent, the two sides are linked. In the progression from left to right there is an increasing complexity in the cooperation structures.

The light blue bar stretching across Figure 5 relate to "users", which are examples of the types of businesses (widely) that can be involved and to whom the university can offer valuable involvement.

On the right hand side of Figure 5, on the internal side, there is a "spin-out" element. Going from left to right there is an increasing involvement of money and funding. Furthermore, of course, an income from such activities as patents and Co-Design is foreseen.

On the outer left side can be seen elements that are typical for some universities. This was the general situation years ago for more universities, at least in Denmark, producing publications and popular articles and maybe participating in public debates. Practitioners who had access to the publications could use the research results for free, but this was not formalised.

Finally there are added the words "outreach" and "outcome" to further illustrate the change in goals or ambitions through time. However, there has also been a change in culture and governmental ambitions for moving in the same commercialisation direction, which has influenced the development as well.

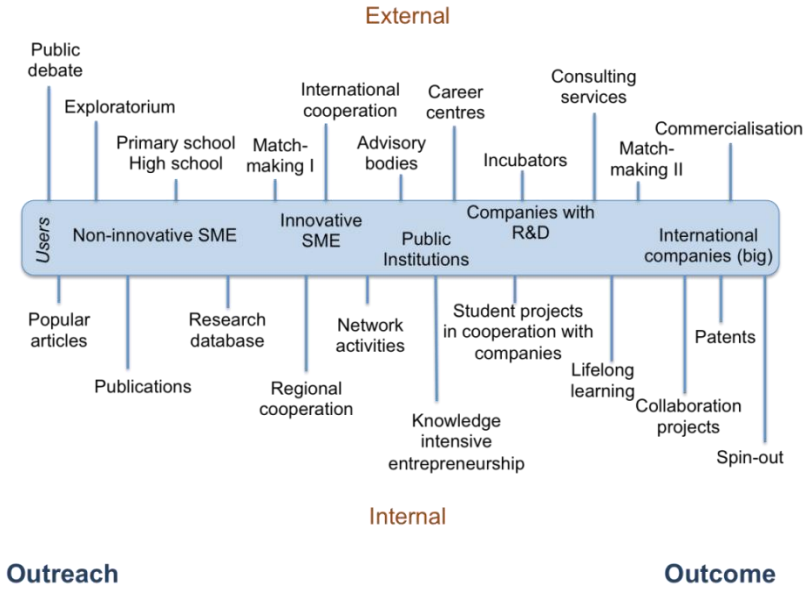

Figure 5: From outreach to outcome. Internal and external elements in a potential strategy plan for a university. Based on (Aalborg University, 2011)

THE PRACTICAL APPROACH

If a university is aiming to set up a strategic plan for taking a greater part in regional development, they could focus on some of the elements in the first plan. The first step is to know which level, or maybe even which different levels, of contact it is possible to establish under the given circumstances. As mentioned there are several levels: TT, KT, KE and CD. Having investigated such level or levels, the strategy can then be made. But it is likely that all elements will be found.

Elements could be, for example:

- To establish strategic partnerships – regional, sub-regional and local;
- To establish contact councils;
- To increase interaction with business, institutions and local official offices;
- To decide which type of business contacts are possible, e.g. small and medium size enterprises – SMEs;
- To decide which local and regional councils to contact;
- To look into perspectives regarding intellectual property rights – IPR;
- Planning on how to interact with secondary schools and high schools;
- Planning on how such undertakings can be administered.

None of the above mentioned elements are limited to focusing on small and medium size companies (SMEs), but also include organisations, governments, NGOs and international companies.

On the educational side there are issues that also need to be focused on:

- Is the existing educational model aligned with the vision and strategy of the university?
- Should there be a different approach to teaching and learning to sustain cooperation with business?
- Is research and education linked so that research can be part of education and thus be a joint bridge to cooperation with the outside through students working with real projects?
- Are there any inward barriers that need to be solved or at least focused upon?
- Do we have an organisational structure that can organise and sustain external cooperation on a larger scale?

The Education Side

Looking at the education side, a model needs to be created that makes it possible for students to participate in the university strategy for cooperation. Active learning methods, of which one of the more coherent is PBL, can be used to sustain the educational part of the strategy. Figure 6 shows an example of such a model. There are three elements surrounding a project in the centre. The project is where the students' learning takes place. They are cooperating with practice (widely) and bring in research and research results as well as applying the theoretical input they get from their lectures.

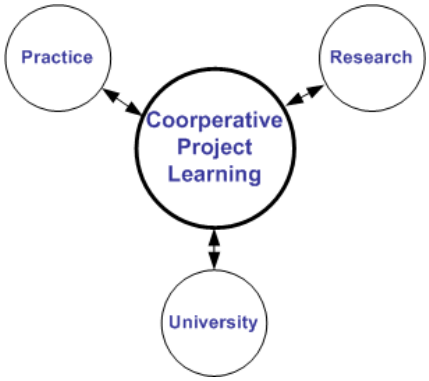

Figure 6: Cooperative project learning. The project is in the centre for learning (Moesby E. , 2013)

The cooperative learning is anticipated to take place in the centre of Figure 6. However, this does not mean that all of the work is done at the university. On the contrary, the students must be involved to some extent in practice by taking part in out-of-campus (OoC) activities and entering into the businesses during their studying. This can be done in many ways, and there is no right way. And there are also many ways in which the curricula can offer such OoC activities; however, this is a job for the educational planners to resolve.

In Figure 7 there is an example of how involvement with practice can appear over time and maybe even during a semester. But most likely educational planners will look at the model as a progression through the semesters, because as knowledge, skills, and competences grow, the more complex the cooperation can be.

Business places high value on such practice (reg lab, 2011). Moreover, having students working in the businesses bringing with them the newest knowledge, the businesses can also recruit future employees from amongst the students present. So here is a win-win situation.

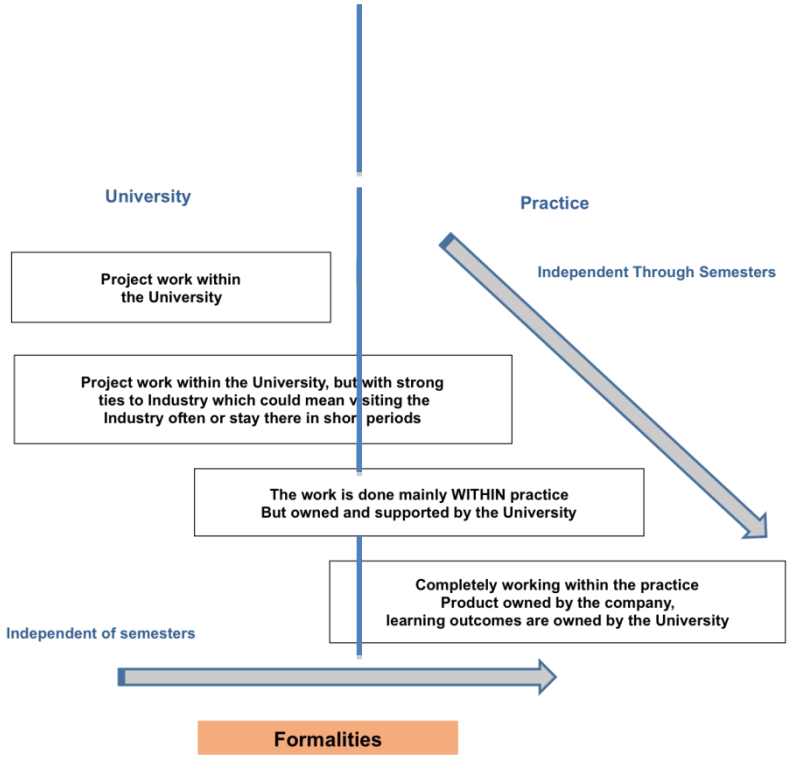

Figure 7: Examples of progression in cooperation with practice (Moesby E., 2006)

Figure 7 gives a visual impression of different ways that interaction with businesses can happen. There is the option of doing the projects at the university, but it is more likely that contacts are still needed with the outside so that students may become acquainted with the problems they should address in the project and maybe also for doing interviews etc. on location. However, the writing of the project report, the investigations and so on are done at the university, with the facilitators nearby.

The next phase could be the second block where the contact with practice is expanded. The main part of the work is still done at the university, but it is likely that, at this stage where knowledge, skills, and competences are developing, the students will be able to do actual work or do investigations within the businesses for shorter periods. Facilitation is mainly performed at the university but also, in the periods where students spend time at the company, it can be performed there.

Later the progression develops and more time can be, or needs to be, spent within the company, but still with the majority being done at the university. This situation is likely in the later semesters. The final block is a situation where almost all of the time is spent within the cooperating company, industry, council, etc.

The situation is likely to be found in the final semesters in a masters or even a Ph.D. study.

The red box in Figure 7 indicates that there are elements which it is very important to be aware of *before* having students working in business. Contracts with clear-cut agreements about product ownership and also - of considerable importance – agreements on the conditions for the IPR should be made. If such important issues are not addressed and clearly agreed upon, the students may have serious problems later in their careers if limited by, for example, being excluded from working within the field for a period of several years. Likewise, whether results can be published or not needs to be clarified and agreed. Finally, commercial prospects should be cleared before entering the project.

Examples of Aalborg University Setups for Cooperation with Practice

Aalborg University has established many units whose aims are to sustain regional development by giving easy access to university knowledge and research results. As a few examples out of many, the most relevant for this paper is:

Bridge-building to schools and high schools

Contact with primary schools and high schools has a direct impact externally. Such examples include renting a professor, open house/laboratory arrangements, and students participating in a small project at the university. The students at high school are prospective students for the university so an early interest could be seeded by these initiatives.

Matchmaking

One of the easiest and most non-committal ways to obtain access to new research-based knowledge is through the University's network activities. The wide variety of networks under the sponsorships of AAU is a platform for researchers and practitioners from business, organisations and the educational sector to meet. The philosophy behind the networks is that sharing of knowledge between businesses, and between researchers and businesses, is beneficial for all parties (Aalborg University, 2013).

The InnovationX initiative

This initiative has been described in detail previously. More details can be found at (Danish Government, 2013).

The Knowledge Exchange Office

The Knowledge Exchange Office can establish and coordinate activities that make the research results at the university visible for organisations, governments, NGOs and companies.

Regional contact boards

Aalborg University North Denmark Regional Contact Council is where representatives from the local municipalities, the region, business, and educational institutions meet to discuss regional development issues.

Patent and Commercialisation Office

To support the university's researchers and sometimes students' inventions, the Patent and Commercialisation Office was established, since there are many research results that have the potential to be commercialised and thereby help businesses to add value to their company. Businesses can get access to the latest research results through the Patent and Commercialisation Office.

More examples on, for example, http://www.en.match.aau.dk

A National Evaluation of Universities' Cooperation with Practice

In 2011 the Danish Government undertook a survey entitled *Universities cooperating with practice - A status for the developing of cooperation* (reg lab, 2011). In this survey, amongst many other things, they focus on good practices in practice cooperation and on barriers for practice cooperation.

Examples of good practices are:

Values:

- Mutual respect and balanced partnership is essential;
- Clearly defined expectations;
- Personal relations are essential – the most important factor in cooperation.

Organisation:

- The external matchmakers and "ambassadors" are important for creating contact and trust;
- Long-lasting cooperation.

Successes:

- Innovation networks and other joint platforms;
- Students working within the companies;
- Joint development agreements.

This survey shows that Danish universities in fact are very active in making effective cooperation with external partners. However, it also identified barriers:

Universities:

- Depending on the context, many universities are having difficulties giving clear-cut answers.
- At some universities there is a lack of managerial support for cooperation with practice;
- Lack of insight and coordination is a big challenge at the individual universities;
- Lack of culture and professionalism regarding cooperation;
- Lack of experiences and insight in good methods and tools;

- Lack of motivation for researchers for cooperation – and companies owned by researchers can be a challenge.

Companies:

- Companies have different needs and different cultures for cooperation;
- They lack motivation for working cooperatively with universities.

National level:

- Lack of support following discussions; reality differs from rhetoric, especially regarding operating funds.

This survey surprisingly found a significant lack of coordination, culture of coordination, and professionalism regarding cooperation, together with a lack of methods and motivation for cooperation. Regarding the latter, these topics are where the universities actually should have their strengths. However, it seems there is still a need for strong efforts to change these features into a well-founded culture of cooperation. This is a structural problem.

On the practice side, it seems that there is anticipation in businesses of having *the* answer, where the culture in universities may, by the authors' qualified guess, be more looking at a wider range of answers. And in the same field is the wish to have clearly defined expectations. In short, they are asking for the kind of rationality you expect to find in practice.

However, it is interesting that in the overall perspective the mentioned successes occur when students are involved.

The national level statement of lack of support following public statements is not an uncommon situation.

CONCLUSION

The authors are well aware that in many places such cooperation as described here already takes place. There are also many more things that could have been added, and input from many other locations could also have contributed fine examples. However, the authors believe that this description, although brief, may be very useful for those universities that are on the way to create local and regional cooperation.

The conclusion is that where there is an extensive cooperation between practice and universities there are great benefits to be gained for both parties. And as the wheel begins turning, it is likely to be a self-expanding growth where there will be more and more demands for cooperation. Regions where there is a university are in a good situation for having regional developments.

The steps of the various ways for parties to interact mentioned in the beginning of the paper show stages in a developing process. In reality things do not jump from one stage to the other but progress in a continuing process, and it is likely that all the steps are involved simultaneously. But the front-runner businesses are using

the newest of the steps. Such situations with more steps occurring simultaneously should not be considered a bad situation – on the contrary it can be a proof of continuous development and new businesses entering into the progression.

However, universities should not be seen as the absolute leader, as mentioned in the survey on cooperation (reg lab., 2011). Universities also need to rethink their teaching and learning styles and to consider if the university structures – management, administration, teachers and researchers – are adequately aligned with the cooperation culture anticipated.

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