BENCHMARKING OF GOVERNMENTAL SUPPORT MEASURES FOR UNIVERSITY-INDUSTRY COOPERATION[1]

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Abstract

This paper aims to benchmark Estonian governmental support measures targeted toward enhancing university-industry collaboration to European best practice and make suggestions for the development of these measures. The intensity and scope of university-industry cooperation support measures varies heavily in Europe. The survey of European University-Business Cooperation, Pro Inno Europe and Erawatch database of policy measures, and Community Innovation Survey reveal that Finnish, German and Austrian support systems are best balanced and provide good university-industry cooperation intensity. The cooperation measures in Estonia are weak and improvement should be made by increasing the Estonian governmental funding, mandatory cooperation in support measures, networking and applied research in universities, on-going application possibilities, reducing the bureaucracy, and improving the timing of measures.

Keywords: support measures, university-industry cooperation, policy making

JEL Classification: I23, I28, O38, O52

Introduction

The role of knowledge in generating the competitive advantage of nations has been steadily increasing over time. The ability to generate new knowledge requires functioning of the knowledge-based system of innovation, which combines a well functioning government with strong universities and an active business sector. Within the last couple of decades different models have been proposed for the study of knowledge production process and innovation systems (Mode 2; national innovation systems, Triple Helix). Behind these models is the understanding about the second revolution in academic life and the changing role of universities in the national system of innovation.

The authors of Mode 2 argued that post-modern development has led to the so-called de-differentiation of the relationship between science, technology and society (Gibbons *et al*. 1994). Knowledge is increasingly being produced in "the context of application", that is, with societal needs having a direct impact on the knowledge production from the early stages of investigative projects. The national innovation

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system approach was proposed by evolutionary economists and centres around the idea of the need for a systemic approach, which integrates institutions to create, store, and transfer the knowledge, skills and artefacts (OECD 1999).

Etzkowitz and Leydesdorff proposed a Triple Helix model, where the fundamental idea is the interaction between university, industry and government. It is this interaction that is the most important factor facilitating conditions for innovation in a knowledge-based society (Leydesdorff, Etzkowitz 1996 and 1998). In the Triple Helix model university, industry and government perform the roles of others in addition to their traditional functions. "Thus universities take on entrepreneurial tasks like marketing knowledge and creating companies, while firms develop academic dimension, sharing knowledge among each other and training employees at ever higher skill levels" (Leydesdorff, Etzkowitz 1998: 198).

During the last decade many countries have paid a lot of attention to the creation and implementation of the support measure system, which is targeted toward facilitation of cooperation between the business sector and institutions of higher education (HEIs). The above presented ideas about building competitive advantage based on well functioning cooperation between firms and universities has been followed by many countries in building their different support measures systems. There exists a wide variety of support policies among countries.

The aim of the following paper is to benchmark the governmental support measures, which goal is to enhance directly university-industry collaboration in Europe and based on that make suggestions for development of Estonian support measures.

In order to fulfil the aim, the paper is structured as follows. The first section is devoted to the presentation of a short overview about the role of government in supporting the university-industry cooperation. The second section describes the major sources of data used and provides some descriptive information about the cooperation between universities and the business sector. The third section is devoted to the analysis of support measures, which are directed toward facilitation of cooperation between HEIs and the business sector in Europe. The last section concludes and provides some policy recommendations for Estonia.

The role of government in university-industry cooperation

The institutional triad of university, industry and government is characterised by the Triple Helix model. In this model all the parties should be equal partners by competing and cooperating simultaneously. If the government encompasses university and industry by taking the lead in coordinating and control of activities (the statist version of Triple Helix), the university has only the role of teaching and doing research for the local technological industry (Varblane et al. 2008). The alternative version of Triple Helix is laissez-faire Triple Helix, in which the university, industry and government are expected to act separately in their own sphere and not cooperate with each other. The role of university is to provide basic research and trained persons. The knowledge is transferred from university to

industry through publications and graduates. The role of the government in this case is very limited. Also, the interaction between the parties from different spheres is very limited and if it takes place then it is through an intermediary (Etzkowitz 2003).

In the ideal Triple Helix model, the partners are equal and enter into interactive relationships with each other, and try to enhance the performance of the other. At first, the partners act usually according to their traditional roles in society, but over time, also take the role of the other partner. The primary roles remain the same, but, for example, the university takes on some business function (e.g. establishing new enterprises, knowledge commercialisation). Industry continues to produce goods and services, but also does research or provides training in their area of expertise. The government can take the role of industry through establishing funding programs and changing the regulatory environment (Leydesdorff, Etzkowitz 2001; Etzkowitz 2003). Through these kinds of action active cooperation between universities, industry and also government takes place.

Polt et al. (2001) define the model of industry-science relations (see Figure 1). The government tries to reduce the market failures by removing the barriers to knowledge transfer and cooperation between universities and industry. The incentives and barriers for university-industry relations are directly influenced through the policy-related framework conditions such as legislation and regulation, promotion programmes, institutional setting, and intermediary structures.

The framework conditions can act as incentives, but in some cases also as barriers for the university-industry interaction. In the current paper the focus is on the promotion programmes, which are developed by governments for reducing the market failures in knowledge transfer between universities and industry, but also for raising awareness and changing the behaviour of individual actors towards the university-industry cooperation.

The companies under-invest in research and thereby also in the collaboration with universities because the returns cannot be fully captured, often due to spillovers. In addition to the inappropriability, uncertainty, path-dependency and irreversibility of decisions or actions also lower the rate of return for the companies (Cozzarin 2008). R&D also involves uncertainties of technological success, commercial success, and competitor behaviour. If these uncertainties are high then enterprises do not want to invest in R&D (Nishimura, Okamuro 2011). Government intervention and supporting programmes can reduce the risks and increase the rate of return for the company and thus encourage the companies' cooperation with universities.

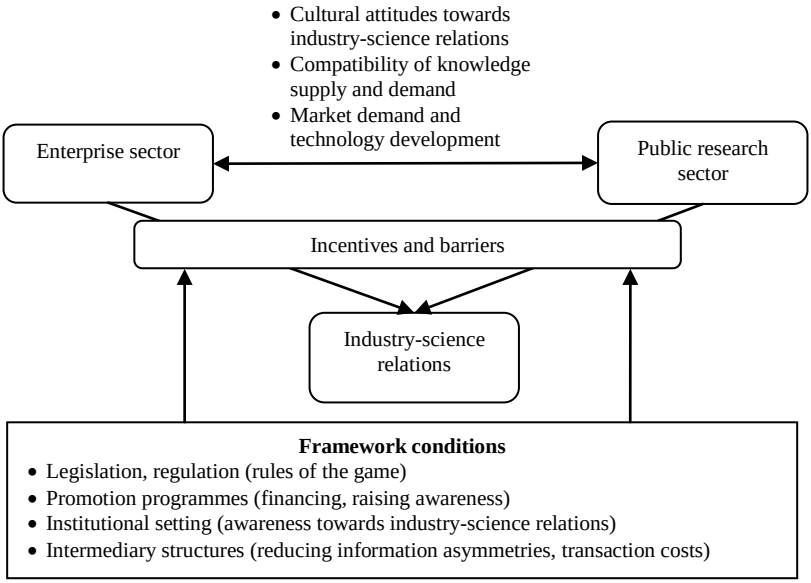

Figure 1. The model for analysing industry-science relations (Polt et al. 2001: 249 with modifications by the authors).

Research by Busom and Fernandez-Ribas (2008) showed that public support significantly increases the possibility that a company will undertake R&D cooperation with a public research organisation. Also, Bozeman and Gaughan (2007) have found that grants and contracts have a positive impact on academic researchers' interaction with industry. However, thereat the funding from industry is more influential than federally-sponsored grants, which also increase scientists' interaction with industry, but in a more moderate way.

Nishimura and Okamuro (2011) found that, for example, in the case of cluster programs the positive effect of coordination or networking support was much stronger than the effect of direct R&D support.

Through the policies and support measures the government has the possibility to remove the barriers of university-industry cooperation and increase the incentives for collaboration. Various promotional programmes are an important way for improving the framework conditions and thereby increase university-industry cooperation by the government.

Methodology and data

The following analysis and discussion is based on secondary data, which open views of universities and business sector about the cooperation between universities and

industry. In this paper, the authors use the approach of benchmarking (Polt et al. 2001): best practices of university-industry cooperation are used and their supporting measures are analyzed to compare the situation in well-performing (in terms of university-industry cooperation) countries to Estonia. Based on the comparative analysis, the aim of the paper is to give policy suggestions for Estonia.

The main databases used in this paper are Pro Inno Europe and Erawatch (INNO-Policy TrendChart, Policy Measures 2012, Country Pages 2012). Data in these databases are unique: they provide in-depth overviews (national information and documentation on policies, measures and programmes) about policy measures across European countries and also for countries outside Europe. However, there are also some limitations related to this data: only research and innovation policy are considered.

Best practices are chosen from the recent study of European University-Business Cooperation, which was executed between 2010 and 2011 by the Science-to-Business Marketing Research Centre in Münster, Germany (Davey et al. 2011). Data for the above mentioned study was collected by in-depth qualitative interviews with industry experts and a major quantitative survey. The respondents of the survey were representatives of HEIs and academics in Europe. Due to the limitation of data in Pro Inno Europe and Erawatch, the authors chose two fields of cooperation out of eight from the European University-Business Cooperation study: R&D collaboration and commercialisation of R&D results. Countries with the highest score in these two fields were chosen as best practices. In this paper the authors use the answers of representatives of HEIs.

In the Pro Inno Europe database the following data is available (concerning this paper): policy priorities, starting and ending date of the measure, eligible applicants, whether cooperation is mandatory or optional, target activities, budget of the measure and information about co-financing. In some cases information is taken from homepages of the implementing units or the measures of the countries included in this paper (especially for budgets and starting-ending date). The role of the authors consists of searching the data, defining and choosing the university-industry supporting measures, aggregating data over several measures, and calculating different proportions over several measures based on data available in the Pro Inno Europe database.

The university-industry relations are influenced by the wide framework conditions of the country, but in the current study we focus on the support measures which are directly aimed at stimulating university-industry cooperation. Technically, it means that only those measures were taken into analysis where the cooperation between university and industry was clearly formulated among the aims of the programme. The authors acknowledge that there may be measures which support university-industry cooperation, but do not state it in the aim of the measure and support the cooperation indirectly. However, there is no additional data about the influence of these measures on university-industry cooperation.

To provide insightful policy suggestions, different viewpoints must be included in the analysis. Therefore, data from Community Innovation Survey (Eurostat 2012) is used to provide the viewpoint of industries about the university-industry cooperation. In addition, some previous research results from studies in Estonia are also used: The mid-term evaluation of the implementation of measures in favour of R&D and higher education in the framework of the EU co-financed Structural Funds during the period 2007-2013 by the Institute of Baltic Studies, Technopolis Group and Praxis in 2011 (The mid-term evaluation … 2011), the study of foreign direct investments in Estonia (Varblane et al. 2010), and Estonian engineering industry (Varblane et al. 2011).

Table 1. The extent of cooperation in collaborative R&D and commercialisation of R&D results per country[2]

Country	Extent of cooperation (min 1 … max 10)	
	Collaboration in R&D	Commercialisation of R&D results
Ireland	7.9	7.7
United Kingdom	7.6	7.4
Sweden	7.0	6.2
Germany	7.2	5.9
Spain	6.9	6.1
Finland	7.4	5.4
Romania	6.8	5.5
Austria	6.7	5.5
France	6.8	5.2
Belgium	6.3	5.6
Netherlands	6.4	5.4
Denmark	6.3	5.4
Norway	6.5	4.7
Hungary	6.4	4.7
Czech Republic	6.1	5.0
Latvia	6.4	4.4
Portugal	6.0	4.8
Italy	5.8	5.0
Bulgaria	5.4	4.8
Turkey	5.6	4.5
Estonia	5.1	4.7
Slovakia	5.1	4.4
Lithuania	4.9	4.4
Poland	4.9	4.0

Source: Davey et al. 2011: 62.

According to the European University-Business Cooperation study, in both areas – collaboration in R&D as well as in commercialisation – the most intensive

[2] Data in Table 1 represent subjective evaluation from the side of universities outspoken by the sample population of 2157 higher education institution representatives.

cooperation between universities and business sector is in Ireland and UK, representatives of the Anglo-American system of higher education (see Table 1).

Scandinavian countries (Sweden and Finland) are very strong in collaboration in R&D as well, but cooperation in R&D results commercialisation is weaker. Germany, Spain, Romania, Austria and France are also in a strong position in this European comparison. As the aim of this study is to make policy suggestions for Estonia, the nine best performing countries (marked in grey in Table 1) and their support measures for university-industry cooperation have been chosen for the following benchmarking for Estonia and will be the object of further detailed analysis.

Analysis of support measures

As the next step of the analysis, an inventory about the support systems targeted on the university-industry cooperation in Europe will be executed. Before focusing on the support measures in specific countries, there is a short overview of the strengths and weaknesses of the innovation policy support systems in these countries based on country reports from the Pro Inno Europe database.

The German system is described as a balanced and evidence-based system that responds to the key challenges. In Austria there is a mix of direct and indirect R&D funding, at the same time, a lack of indirect measures is one of the weaknesses in German system. The strengths of Austria are also the co-ordinated adjustments of incentive systems, but the system has many weaknesses as well: the lack of a joint, content-based vision at governmental level, lack of coordination and lack of guidelines for evaluating different programmes.

Finland has strong support for cooperation between research organisations and companies, but not all the aspects of the innovation process have been considered. Compared to Finland, France also supports cooperation, focusing more on linkages between public and private research. In the case of France, other positive elements of the system are the overall good coverage, measures in line with challenges, but on the other hand, there are some negative aspects as well: the funding of innovation is too complex and redundancy of instruments exists.

In Estonia, the case is the following: a set of policies and instruments are based on the needs of the innovation system and programmes have been launched in order to tackle specific weaknesses. A too limited number of instruments and fields covered can be seen as a weakness of the Estonian system.

The UK is struggling with turning research ideas/concepts into commercially successful innovation and it also has a low R&D expenditure, while Ireland needs to improve the linkages between the third-level sector and industry and the volume of venture capital, also some additional innovative measures are needed. Even though some new measures are needed, Ireland has a reasonable set of measures to stimulate company R&D and to encourage young people to take up careers in computing,

science and engineering. Compared to Ireland, Sweden has a well-developed venture capital market, in addition, Sweden has strong infrastructure investments and a good level of interaction between public sector users and private industry. There are also some disadvantages in the Swedish system, for example no institutional settings to handle a joint coherent innovation policy, and the needs of new, fast growing businesses have not been a high priority for policymakers.

Within our selection of countries Spain and Romania have the weakest innovation policy support systems, where the weaknesses overwhelm the strengths of the system. The strength of the Spanish support system is a good private-public investment ratio, good development of the Information Society, and cooperation between companies. At the same time the following weaknesses exist: a lack of cooperation between universities and enterprises, a non-structured science-technology-enterprise system, a lack of qualified personnel dedicated to RDI in enterprises, and difficulties in creating and consolidating new technology-based firms and spin-offs. In Romania, some of the weakest points are a poor capacity to prepare quality projects to attract funding and implement European projects, little awareness of the funding opportunities for innovative enterprises, shortage of qualified personnel and poor technology transfer and innovation infrastructure.

The following analysis is based on policy measures directly supporting the university-industry cooperation. A complete list of analyzed measures is given in Appendix 1.

Table 2. The importance of measures supporting cooperation between higher education institutions (HEI) and industry in selected countries

Country	Number of measures supporting cooperation between HEI and industry	Number of all measures	The share of cooperation supporting measures from all
Sweden	25	38	65.79%
Romania	8	13	61.54%
Germany	24	41	58.54%
Austria	24	51	49.02%
Estonia	10	21	47.62%
UK	21	48	43.75%
Spain	16	51	31.37%
France	13	46	28.26%
Ireland	9	33	27.27%
Finland	15	61	24.59%

Source: composed by authors based on Policy Measures 2012, calculations of authors.

The relative importance of measures supporting university-industry cooperation varies across the countries. The highest is the share of cooperation supporting measures in Sweden (see Table 2), where 25 out of 38 measures support the

cooperation between universities or other HEIs and industry. Most of these measures support collaborative R&D.

Collaborative research and development are the most commonly supported fields in all selected countries, except for France, where knowledge transfer is the most supported field (see more detailed information in Appendix 2). Surprisingly low is the relative share of HEI and industry cooperation oriented support measures in Finland. At this point, it is important to highlight that a large share of Finland's support measures belong to the Tekes programme (24, that is over 39% of all the measures and general budget of approx €2,978 million[3]). The Tekes programme consists of multiple projects in a selected theme or technology area and is, in principle, implemented in cooperation by companies and research units – that is both the parties can apply for the funding. While the cooperation between universities and industries was formulated only in 10 projects from this programme, the others were left out from the cooperation oriented measures. However, the description and principle of the programme is a clear indication of high awareness about the importance of university-industry cooperation in Finland.

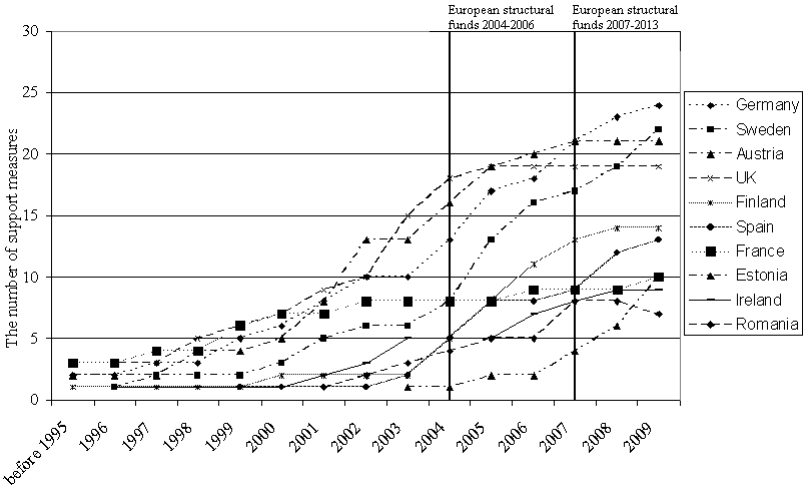

Figure 2. Number of measures supporting university-industry cooperation (Composed by the authors based on Policy Measures 2012).

It is also interesting to have a look at the dynamics of the number of support measures directed to cooperation. In Figure 2, the number of cooperation supporting measures is shown between 1995 and 2009. In EU-15 countries some measures oriented toward university-industry cooperation support started already before 1995 (based on Pro Inno Europe database, Policy Measures 2012). Within the whole

[3] Calculations of authors based on Policy Measures 2012.

period a clear growing trend of measures becomes evident. The growth of those measures in Sweden, Germany and Austria is extremely remarkable.

A real spurt in the number of support measures happened during the last two periods of implementing European structural funds between 2004-2006 and 2007-2013. This is especially apparent in the new EU member states, such as Estonia, where the first measures to support cooperation were launched just at the beginning of the first structural funds period in 2004.

All of the countries analyzed in this paper have used EU structural fund's support to finance some of the cooperation supporting measures. In the case of Estonia, all the measures are co-financed by the structural funds (see Appendix 3). Hence, we could conclude that central EU level policy has been rather strong motivating factor in creating support measures for university-industry cooperation.

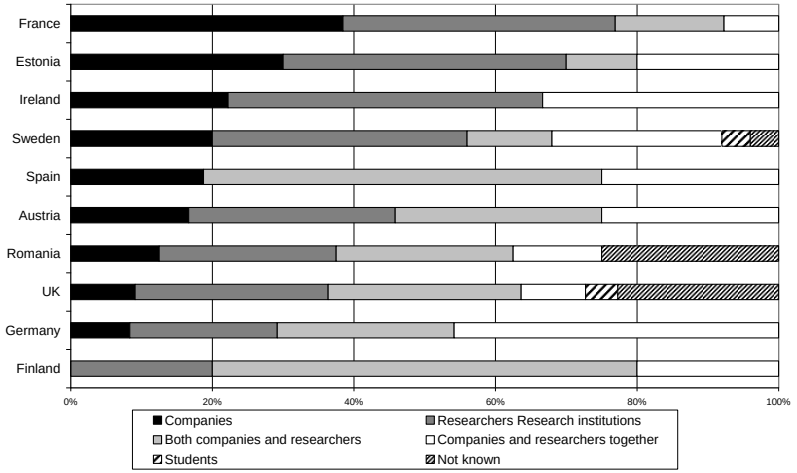

Figure 3. The target groups which can apply for the measure (Composed by the authors based on Policy Measures 2012, calculations of authors).

Even though the measures are supporting collaboration between university and industry, in most of the cases, only one party (either HEI or industry) can apply for the measure. As seen in Figure 3, a rather mixed situation exists about the eligibility for funding. Overall, researchers and research institutes can apply for 45 different measures. Spain is an example where cooperation measures, which are available only for research institutions, do not exist. Research institutions can apply for the same measures as companies and also together with companies. Overall, there are 45 measures available for both companies and research units; the share of measures available for both is the highest in Spain and Finland. There are also measures that can only be applied for together (research institutions and companies together). Joint

applications are used most widely in Germany. Measures targeted only for companies have the highest share in France. Finland is the opposite: there are no such measures in Finland at all. Students may apply for the cooperation measures in two cases, in the UK and Sweden.

In addition, it is important to know whether the cooperation between HEI and industry has been set as a mandatory requirement in order to get governmental support. Here is a really mixed situation (see Appendix 4). In two neighbouring countries, Sweden and Finland, completely different systems prevail. In Sweden, approximately 80% of measures targeted at cooperation between HEI and industry require mandatory cooperation. Conversely, Finland has set mandatory cooperation as prerequisite, obtaining support only for 27% of all cooperation targeted measures. In Estonia as well as in Romania, half of the supporting measures require cooperation.

On the basis of the mixed policy of governments toward the regulation of university-industry support measures, Figure 4 was constructed, on which the number of measures supporting university-industry cooperation is shown on the left hand scale. The lower part of the bar shows measures which require cooperation and the upper part consists of measures where cooperation is optional.

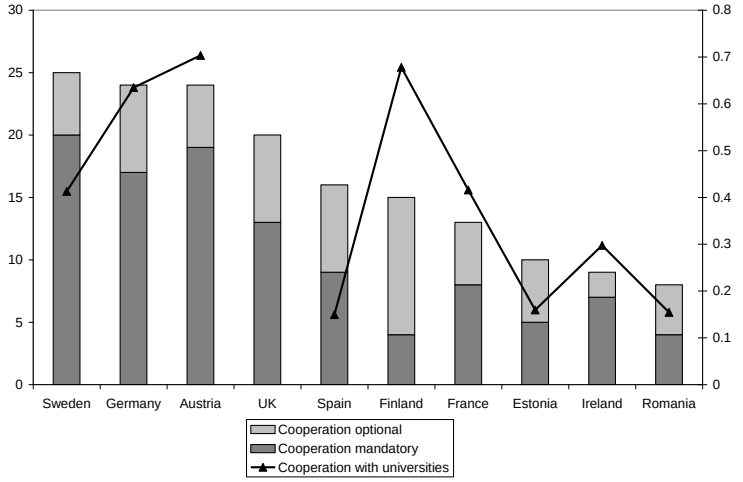

Figure 4. The number of cooperation supporting measures compared to the enterprises' cooperation level with universities (Policy Measures 2012; CIS 2008; calculations of authors).

The figures on the right hand scale show the activity of university-industry cooperation. The data concerning the activity are calculated from the Community Innovation Survey (CIS) 2006-2008 (Eurostat 2012). The CIS cooperation activity

indicator shows the share of enterprises that have used universities or other HEIs as their innovation partners. It is presented as a percentage of all responding firms. Unfortunately, data were available only for enterprises which have executed technological innovation between 2006 and 2008. Hence the sample is biased in favour of firms which could be technologically more sophisticated and their interest toward cooperation with HEIs may be bigger than by firms from the sample of all firms. On the other hand, all countries are represented by the group of firms which have executed technological innovations and therefore cross country comparison is possible. CIS does not provide such information about the UK and therefore UK is not ranked in Figure 4.

The broad conclusion based on Figure 4 could be that implementation of more measures which are targeted toward cooperation between firms and HEIs is positively related to the intensity of cooperation measured in CIS.

Sweden, Germany and Austria are the top countries by number of cooperation measures, and the share of firms which reported the actual cooperation with universities is also higher in those countries. Estonia, Ireland and Romania have a small number of cooperation measures and the real cooperation from firm's side is also weaker. An outlier is Finland, where cooperation is very active, but the number of directly targeted measures is at an average level in our sample of countries. Another interesting feature of Finland is the very low relative share of mandatory measures among all cooperation targeted measures. It reveals that Finland has used other policy tools so well combined, that despite a very liberal attitude toward university and industry cooperation oriented tools, those measures are working extremely well and provide real cooperation. Another outlier is Spain, but in the other direction. It has a similar number of cooperation oriented measures to Finland, but firms use HEIs as cooperation partners seven times less.

As the last step in our analysis, we intend to combine two different viewpoints about the university-industry cooperation. For that purpose Figure 5 was constructed.

On the vertical axis, data from Community Innovation Survey is used to evaluate the extent of university-industry cooperation[4], which represents the viewpoint of entrepreneurs. On the horizontal axis, the viewpoint of HEIs is shown. Data about HEIs stem from the previously mentioned study of European University-Business Cooperation (Davey et al. 2011). On the horizontal axis is presented a sum of answers to the two questions about the intensity of cooperation in collaborative R&D and commercialisation of R&D results. As the maximum score for both types of cooperation in this survey was 10, the maximum value the intensity of university-industry cooperation could be is 20.

[4] The cooperation activity shows the share of enterprises that have used universities or other HEIs as their innovation partners (data available only for enterprises with technological innovation). There is no information about the UK.

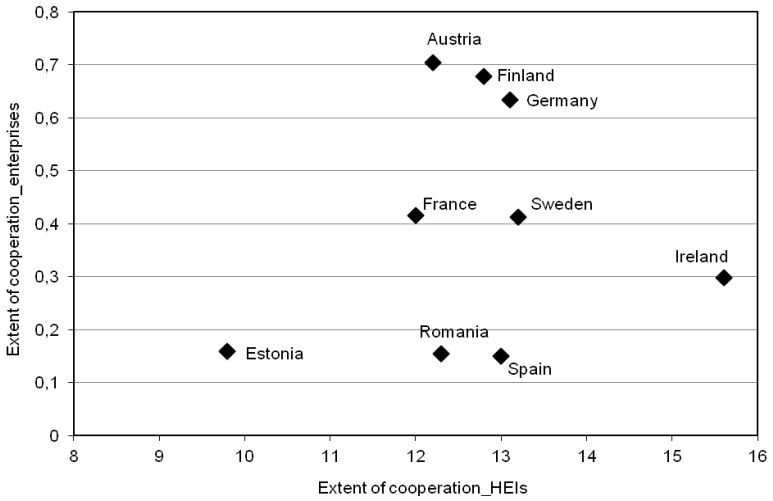

Figure 5. The extent of university-industry cooperation from the viewpoint of enterprises (vertical scale) and universities (horizontal scale). Calculations of authors from Davey et al. 2011 and Community Innovation Survey 2006-2008.

Figure 5 allows us to analyse the intensity of cooperation between firms and HEIs. Countries located close to the beginning of horizontal and vertical axis are weak in cooperation. In the current study, Estonia has the weakest university-industry cooperation, which in this case is also understandable as countries where the university-industry cooperation should be better were selected for benchmarking. The cooperation in Estonia is weak from the point of view of universities as well as from the viewpoint of business people, which allows us to evaluate the situations as a balanced weakness. The support measures have not succeeded to activate cooperation so far. Although Romania and Spain have a higher estimation of cooperation from the viewpoint of universities, the extent of cooperation from the viewpoint of enterprises is quite low.

Another group of countries are France and Sweden with good cooperation intensity, which is also balanced – the university and business side evaluate cooperation in the same way. Austria, Germany and Finland are countries where cooperation is very good, particularly from the side of businesses. Ireland also represents very good cooperation, but only from the point of view of universities. Firms do not cooperate with Irish universities, but universities claim that they cooperate. How could this be? In order to answer that question, Figure 6 was compiled using Erawatch and Pro Inno Europe data and presenting the structure of university-industry cooperation support measures by the type of activities targeted.

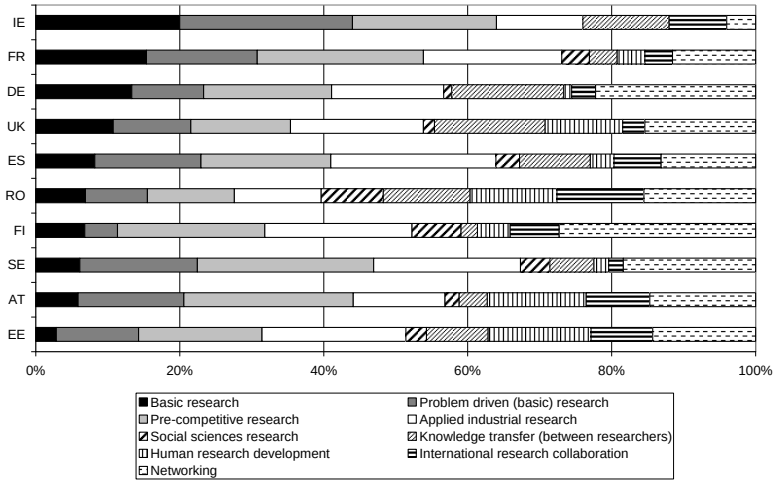

Figure 6. Type of research activity targeted[5] (Based on Policy Measures 2012).

In the case of Ireland almost two-thirds of all university-industry cooperation oriented measures are targeted toward basic research, problem driven basic research as well as pre-competitive research. In the case of Finland, their share is only one-third and much more importance is given to the knowledge transfer, networking and applied industrial research. Consequently, the Irish university-industry cooperation support measures have been strongly biased toward basic research and hence toward academia. This is clearly revealed in Figure 5, where people in academia are very satisfied with the cooperation, but the business sector does not report about the close cooperation with universities. Finnish, but also German and Austrian support systems are much better balanced and provide a good cooperation level from both sides. This could serve as the model for Estonia as well other EU new member countries.

Discussion and policy suggestions for Estonia

Within the period 1995-2009 a clear growing trend of measures is evident, with fastest growth in Sweden, Germany and Austria. All countries have used EU structural fund's support to finance some of the cooperation supporting measures. A real spurt in the number of support measures happened during the last two periods of implementing European structural funds, between 2004-2006 and 2007-2013. This is especially apparent in the new EU member states, such as Estonia, where the first measures to support cooperation were launched just at the beginning of the first structural funds period in 2004. The Estonian system of supporting cooperation is heavily dependent on the co-financing of European structural funds. Therefore, the

[5] One measure can target several activities.

requirements and focus of support measures are also derived from the European structural funds. This makes the measures and also the implementation of these measures less flexible. This inflexibility is expressed also by quite bureaucratic implementation of programmes, which discourages both the universities but especially enterprises from using the support measures more effectively.

The "red-tape" is also evident in the case of eligible costs, which in Estonia are even more restricted than the European Commission requires. This reduces the flexibility of the measures even more.

Our analysis includes policy measures implemented up to 2009. All the new cooperation supporting measures are also co-financed by European structural funds, such as all the measures until 2009. The new measures launched after 2009 are, for example, supporting R&D in biotechnology, in material technology, in environment technology and in energy technology. Only research institutions are eligible to apply for these measures and cooperation in these cases is optional.

Enterprise Estonia and SA Archimedes are the implementing units of the European structural funds in Estonia. Most of the European structural funds measures belong to the Operational Programme for the Development of Economic Environment, two measures belong to the Operational Programme for Human Resource Development (support for the involvement of innovation staff, development of collaboration and innovation in HEIs) and one measure belongs to the Operational Programme for the Development of Living Environment (the new programme of competence centres).

Most of the measures can be applied for only during announced calls for proposals by Enterprise Estonia or Archimedes Foundation (depending on the measure). There are only a few exceptions, where applications are accepted on an on-going basis (received continuously). For example, the innovation voucher grant, support for the involvement of innovation staff, and cluster development programme. Special calls for proposals set a timeline for applying for the measures, but that is not always in accordance with the needs of companies.

In general the implementation of more measures targeted toward cooperation between firms and HEIs is positively related to the intensity of cooperation of firms with universities measured in the Community Innovation Survey. Sweden, Germany and Austria are the top countries by number of cooperation measures, and the share of companies which reported the actual cooperation with universities is also higher in those countries. Estonia, together with Ireland and Romania are at the other end of the scale, having a small number of cooperation measures and the real cooperation from firms' side is also weaker. There are two outliers in this case – Spain and Finland. They both have a similar amount of supporting measures, but in Spain the companies use universities as cooperation partners seven times less than in Finland. In Finland the cooperation is very active, but the number of directly targeted measures is at an average level in our sample of countries. Another interesting feature of Finland is the very low relative share of measures with mandatory university-industry cooperation among all cooperation targeted measures. It reveals

that Finland has used other policy tools so well combined, that despite a very liberal attitude toward university and industry cooperation oriented tools those measures are working extremely well and provide real cooperation.

Analysing the benchmarked countries, the reasonable amount of mandatory cooperation in the support measures seems to be around 70-80%. At the same time, it is necessary to analyse the Finnish system more deeply in the future – what are the other tools around the directly university-academia cooperation targeted measures, which work with such a good efficiency.

In the earlier studies about supporting measures (The mid-term evaluation … 2011) some more problems about the current system of measures occur. For example, the timing of the calls for proposals. In many cases, the measure is opened for calls later than initially planned and therefore a lot of measures start in the last years of the programme period. This means that there are many measures (such as the ones mentioned before, which started after 2009) that are launched in 2011 or 2012. Companies cannot apply (turn their ideas and plans into applications) for many measures at the same time. This is also one reason why the budget of the measures will not be fully used. Almost all the measures require companies' own contribution and when they are launched at the same time, companies will not have enough finances to contribute to more than one measure at a time.

In the study conducted among foreign investors in Estonia (Varblane et al. 2010), the foreign owned enterprises reported that the most important problem for cooperating with universities and other R&D service providers is the lack of suppliers with necessary knowledge. Another important problem is the fact that the firms do not see the value or necessity of these institutions for themselves. This is also revealed in the study about the Estonian engineering industry (Varblane et al. 2011). Less important, but still problematic, is the little interest for cooperation from the universities' side and lack of information about the research fields of universities from the enterprises' side. The lack of information is also a problem for enterprises in the engineering industry. These study results support the need for developing support measures which would increase the market and demand-driven knowledge and research development in universities. There is also a need for measures which would support more effective knowledge transfer between universities and industry.

In analysing and comparing the viewpoints of representatives from universities and business sector about the intensity of the university-industry cooperation, it turns out that Estonia has the weakest cooperation, followed by Romania. The cooperation in Estonia is weak from the point of view of universities as well from the viewpoint of business people, which allows us to evaluate the situations as a balanced weakness. It seems that the support measures have not succeeded in activating cooperation. Another group of countries, France and Sweden, have good cooperation intensity, which is also balanced – the university and business side evaluate cooperation in the same way. Austria, Germany and Finland are countries where cooperation is very good, particularly from the side of businesses. Finnish, German and Austrian

support systems were also the best balanced. Ireland also represents very good cooperation, but only from the point of view of universities.

The comparison of viewpoints from universities and industry about their cooperation shows that in Estonia both parties have a similar view on the current situation – the cooperation between universities and industry is low. The results from previous studies show that there is also a problem that the enterprises do not see the value from cooperating with universities. Therefore, it is also important to shape the positive attitudes towards university-industry cooperation, and also show and explain more to the parties about benefits which may occur from the collaboration.

Looking at the structure of university-industry cooperation support measures by the type of activities targeted, it can be seen that Irish support measures are strongly biased toward basic research. The cooperation measures in Estonia and in other new EU members are weak and improvement should be made in keeping a balance between measures directed to problem solving basic research and networking and applied research.

The policy suggestions made for Estonia can be divided into two groups: strategic and operational changes. Based on previous discussions, the authors recommend the following policy suggestions at strategic level for Estonia:

- The current system of financing university and industry cooperation is unbalanced – heavily in favour of funding from EU structural funds, which use is overregulated and too fragmented. In order to reduce the current unbalance in the financing of the support measures, programmes with Estonian governmental financing should be created and developed, which enable to focus on aspects not eligible for funding from EU structural funds. In benchmarked countries the majority of their measures are co-financed by sources other than European structural funds.
- The mandatory cooperation of universities and enterprises should be required more in the support measures. The prevailing experiences of analysed countries show that the mandatory cooperation is positively related to the university-industry cooperation.
- There is need for support measures which would increase the market and demand-driven knowledge and research development in universities.
- The policy measures should also support more effective knowledge transfer between universities and enterprises.

At operational level, the following policy suggestions can be defined:

- The rules in implementation of the support programmes are overregulated in Estonia. This means that all the risk is put on the applicants. In the implementation of support programmes, the “red-tape” should be definitely reduced. On one hand this would make the support measures more effective, and on other hand this would encourage more enterprises and also universities to apply and use these measures.

- There should be more support measures with ongoing application possibilities. This would be more suitable for enterprises which may not have the possibility to wait for the call for proposals, or on the contrary are not yet ready for the application for the needed time.
- The timing of the calls for proposals should be improved and avoid the situation where measures start in the last years of the programme period.

Of course, it is important to remember that the cooperation is not supported only by the different support programmes and measures, but other governmental activities and programmes are also indirectly influencing the university-industry cooperation. Therefore, it is important to develop other programmes which support the collaboration of enterprises and universities indirectly. Even more broadly – in Estonia there is a strong need to develop a positive attitude towards the university-industry collaboration. For increasing the cooperation between enterprises and universities, it is important that the two parties would see the value from this collaboration.

Conclusion

The focus of current paper is on benchmarking the governmental support measures targeted toward enhancing university-industry collaboration in Europe and from that analysis make suggestions for development of Estonian support measures. The intensity and scope of support measures toward university-industry cooperation varies heavily in Europe. The highest is the share of cooperation supporting measures in Sweden. Collaborative research and development are the most commonly supported fields in all selected countries, except for France, where knowledge transfer is the most supported field.

From the benchmarked countries Germany, Finland and Austria are good examples where the university-industry cooperation is high both from the viewpoint of universities and also from industry side. There are different lessons which Estonia can learn from the experience of those countries. For Estonia the most important changes are the need to increase Estonian governmental funding, increase mandatory cooperation in the support measures, increase the market and demand-driven knowledge and research development in universities, support more effective knowledge transfer between universities and enterprises, reduce the "red-tape" in the implementation of programmes, increase the on-going application possibilities, and improve the timing of the calls for proposals.

The limitations of this study relate to the available data of university-industry cooperation evaluation, as the results in the European study of university-business cooperation are based on the self-estimations of universities. Therefore, it is important to remember that the cooperation evaluation based on this study reflects the view of universities. Another limitation is that in the current study only the narrow and very direct approach to the measures supporting university-industry cooperation is used.

In future research, measures which also indirectly encourage the interaction of universities and enterprises should be taken into account. In the future more countries and indicators of cooperation could be analysed in similar research. It will also be important to study the political and institutional background of the countries in order to obtain useful information for more grounded political recommendations.

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Appendix 1. The policy measures supporting directly the university-industry cooperation

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
Austria	FFG General Programmes															213	
	Christian Doppler Research Association (CDG)															15.3	
						Feasibility Studies										appr. 2,1	
							GEN-AU - Genome Research in Austria									100	
							FIT-IT									24	(until 2005)
								ASAPv2 - Austrian Space Application Programme								47.1	
								TAKE OFF - The Austrian Aeronautics Programme								30	
								FFORTE Women in Research and Technology								n.a.	
										Austrian NANO Initiative						50	
										BRIDGE Initiative						21.86	
									The Biotechnology Impulse Programme		AWS: Life Science Austria (LIS					3.5	(per year)
											proVISION for nature and socie					7.4	
				Industrial Competence Centers and Networks (K-ind/K-net)												57	
												COMET - Competence				500	
												Centres for Excellent					
				K plus												2,5-5	(per centre)
								Intelligent Transport Systems and Services (42)				IV2Splus				20.97	
												Innovation Voucher Austria				5	
								Wachstumsfoerderung		PROKIS					COIN	9.3	
							AplusB - Academia plus Business									77	
								FHplus								18.1	
	CIRCE Cooperation in Innovation and Research with Central and Eastern Europe (CIR-CE)															2.1	

Notes: a – in the „Comments“ column, the period for the given budget is shown, if there is no information about the overall budget.

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
AT					*REGplus/protec 2002+/protec-NET plus*										IN - Cooperation & Innovation	170	
															Research Studios Austria	378.4	
Estonia															The Centres of Excellence of the Estonian Science Programme	44.7	
															The SPINNO Programme	5.75	
															Doctoral Studies and Internationalisation Programme "DoRa"	32.3	
															Support for the Involvement of Innovation Staff	13.42	
															Cluster development programme	4.5	
															Supporting the investments of infrastructure of test and semi-industrial laboratories	3.94	
															Competence centre programme	9.11	
															Competence Centres	83	
															Innovation vouchers	0.97	
															Development of collaboration and innovation in HEIs	16.35	
Finland	Centre of Expertise Programme (OSKE)															60.75	
						Venture Cup Finland										0	
															Research Programme on Health Services Research (TERTTU) 2004-2007	7.4	
															Tekes: NewPro - Advanced Metals Technology - New Products 2004 - 2009	45	
															Tekes: The Finnish Workplace Development Programme Tykes	87	
															Tekes: MASI - Modeling and simulation 2005-2009	92.4	
															Tekes: GIGA Converting Networks 2005 -2010	240	
															Finnish Innovation Centres - FinNode	0	
															The Research Programme on Nutrition, Foods and Health (ELVIRA) 2006-2010	7	
															Tekes: Liito - Innovative Business Competence and Management 2006-2010	80	
															Tekes: Serve - Pioneers of Service Business 2006-2013	100	
															Tekes: Functioning Materials 2007 -2013	215.1	
															Tekes: Fuel Cell 2007 -2013	144	

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
FI														Tekes: Boat Programme 2008 -2011		25	
						Tekes: Innovations in social and healthcare services 2008-2015										240	
France	Support to the recruitment of PhD candidates on an applied research project within an enterprise (C															262.8	
	Technological Development Networks															45	
	CNRS PhD grants for engineers															0	
			Research and Technological Innovation Networks													150	
					Regional incubators structures											59	
					Seed-capital funds											22.87	
						Technology Platforms (PFT)										20	
								Industrial and Commercial Activities Services								0.15	
												"Carnot award"				300	
						Competitiveness clusters policy									npetitiveness clusters policy 2.0	1500	
Germany	Methods to replace animal experiments															84.1	(until 2003)
	IGF - Promotion of Joint Industrial Research (incl. ZUTECH)															130	
			EXIST - Start-ups from Science													80	
					Networks of Competence											max 1	
		Production 2000			Framework Concept for the Production of Tomorrow											403	
		Health Research 2000				Health Research: Scientific Research for the people										800	
	InnoRegio-innovative networks in E.-Ger						Innovative Regional Growth Poles									40	
																800	
								Framework Programme "Biotechnology - Using and Shaping its Opportunities"									
								Optical Technology								279.5	
								IT Research 2006								1500	
										GeoTechnologies						75	
		Microsystems technology 2000+						Framework		Programme Microsystems 2004-2009						180.5	
	MatFo (-1993)/MaTech (-2003)							/ork Programme: Materials Innovations for Industry and Society								n.a.	

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
Germany	*Research for the environm. (1997-2002)*										Framework Programme "Research for Sustainability"					800	
											Megacities of Tomorrow					65	
											Economic Sciences for Sustainal					10	
	Genome Research on Micro-organisms (GenoMik) initiative (2001-2004)											GenoMik Plus				20	
													Top Cluster Competition			600	
													Research for Civil Security			123	
														Research Bonus		125	
											IT 2006		ICT 2020			1900	
									SIGNO - Protection of Ideas for Commercial Use							5	
					PRO INNO II/NEMO/innoNET					Central Innovation Programme SME						300	
															Innovation Alliances	600	
Ireland		Business Incubation Centre programme														47	
		Applied Research Grants Scheme					Innovation Partnership Initiative									8.5	(per year)
								Centres for Science, Engineering and Technology								152	
						Science Foundation Ireland (SFI) Workshops and Conferences Grants										0.05	(per each)
									Industrial Partnership Research Supplements							22.66	
										US-Ireland R&D Partnership Programme						0.05-1	(per year)
										Strategic Research Cluster Programme						21.019	
									US-Ireland R&D Partnership Planning Grant							0.005	
									INNOVA Collaborative R& D Programme							11	
Romania							Legislation on industrial and S&T Parks									n.a.	
								UNISO - University for Society Programme								n.a.	
									Core R&D Programmes							40	
										Sectoral R&D Programmes						5.8	
										'Research of Excellence' Programme'						231	

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
RO						*1999-2006 National RDI Plan*					2007-2013 National RDI Plan					4700	
																646.26	
																0.71	
Spain					PROFIT - Programme to Encourage Technical Research											494	(2005)
	National Plan for R&D				bprog. in support of the transfer function of the research organisations											29	(2007-2009)
			Spanish National R&D&i Plan 2000-2003							panish National RDI Plan				bal RDI Plan		47745	(2008-2011)
	Prom. of Tec.Research for Singular Scientific and Tec. Projects with Strategic Nature															138	(2007)
	Technological cooperation between SMEs and universities or public R&D centres															70	
											Ingenio 2010 Plan					7000	
			Spanish National R&D&i Plan 2000-2003							Torres Quevedo						196.6	
										CENIT National Strategic Consortia for Technical Research						1160	
												AVANZ@		Avanza2		1490	
													Innovative Companies Associations and Clusters (AEI) Programme			19.889	(2007-2009)
													CEIPAR Programme			15	(2007-2008)
		Spanish National Plan for R&D												National Programme Experimental Development Projects		1248.8	
		PETRI														20	(2008-2009)
	Subprogramme for public-private partnership projects in the fields of transport and infrastructure															140	(2008-2009)
																72	(2008-2009)
Sweden		Company graduate schools														45	
			Research profiles													3.3	per profile
						Competence development in industry										6.4	
						Nutek	Innovation in food									14.04	
							Company/university research profiles									30	
					VINNVÄXT - Regional growth through dynamic innovation systems											32	
										Regional Development Programme						n.a.	

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
Sweden		*The Swedish Competence Centres Programme*								VINN Excellence Centre						23	
											Cluster Programme					7.924	
						VINNKUBATOR programme					The National Incubator Program					16.6	
											Berzelii Centres					77	
											Research & grow					45	
											Berzelius Centres					18.40	
												VINNPRO				12	
												Strategic Research Centre				91	
												The Key Actor's Program				22	
													Industrial Biotechnology			5	
														ProEnviro		6	
							Global Links for Strong Research and Innovation Milieus									1	
														Green Nano		4	
				Vehicle and traffic safety 1st round						Vehicle and traffic safety 2nd round						96	
		National Aeronautical Research Program						National Aeronautical Research Program 5th round								40	
											Environment-driven markets					5.9	
UK	Cooperative Awards in Science and Engineering (CASE)															n.a.	
	LINK															21.5	(2011)
				Learndirect												14460	
				Faraday Partnerships												16.8	
										Knowledge Transfer Networks						385.5	
						E-Science Programme										256.6	
			HEROBC	HEIF		Higher Education Innovation Fund (HEIF) several sequent										746	
						Public Sector Research Exploitation Fund										36.56	
								Science and Engineering Ambassadors Scheme								6.51	

Country	Bef 1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Budget (M €)	Comments[a]
UK									Micro and Nanotechnology Manufacturing In							328.68	
				Teaching Companies Scheme					Knowledge Transfer Partnerships (KTP)							135	
	Towards a Sustainable Energy Economy programme								Energy							144	(2008-2009)
									Knowledge Transfer Partnership							48.6	
									Foresight Programme							3.2	
										Web-based Toolkit						n.a.	
										Collaborative Research and Developm						1462.3	
										Technology Programme						468	
										Knowledge Transfer Networks						468	
											Innovation Platforms					200	
									Economic Challenge Investment Fund (ECIF)							60	

Source: Cunningham et al. 2011; Eljas-Taal 2011; Martin 2011; Melin et al. 2011; Rammer 2011; Ranga 2011; Schuch 2011; Zaparucha et al. 2011; Country Pages 2012; Policy Measures 2012; Public Sector Research Exploitation Fund 2012; Collaborative Research and Development 2012; The Faraday Partnership 2012.

Appendix 2. Fields of university-industry cooperation[1]

Country	R&D	Training	Regional develop-ment	Know-ledge creation and/or transfer	Commercialising research or innovation
Austria	19/24	–	–	12/24	1/24
Estonia	8/10	2/10	–	3/10	1/10
Finland	12/15	4/15	1/15	10/15	8/15
France	3/13	1/13	–	10/13	–
Germany	20/24	1/24	–	9/24	1/24
Ireland	8/9	–	–	–	1/9
Romania	4/8	–	1/8	–	–
Spain	11/16	1/16	1/16	11/16	5/16
Sweden	18/25	1/25	1/25	2/25	3/25
UK	14/21	7/21	–	1/21	–

Source: Policy Measures 2012.

Appendix 3. Number of measures supporting university-industry cooperation sorted by the sources of financing[2]

Country	Co-fin. by private sector	Co-fin. by foundations or charities	Co-fin. by the EU structural funds	Other co-fin.	The source is not known	Total number of measures
Austria	11	–	2	12	4	24
Estonia	8	1	10	–	–	10
Finland	11	2	1	3	–	15
France	5	–	5	5	3	13
Germany	10	–	1	5	8	24
Ireland	2	–	1	2	4	9
Romania[3]	1	–	2	1	4	8
Spain	7	2	7	3	4	17
Sweden	17	–	2	–	7	25
UK	8	6	1	5	6	21

Source: composed by the authors based on Policy Measures 2012.

[1] One measure can have different fields of cooperation.
[2] One measure can be financed by several sources. Sources other than national financing are shown in the table.
[3] In some cases it can be dependent on the subprogramme.

Appendix 4. The number and share of measures, where cooperation is mandatory

Country	Cooperation mandatory	
	Number of measures	Share from the total cooperation measures
Sweden	20	80%
Austria	19	79%
Ireland	7	78%
UK	13	76%
Germany	17	71%
France	8	62%
Spain	9	56%
Estonia	5	50%
Romania	4	50%
Finland	4	27%

Source: Policy Measures 2012.

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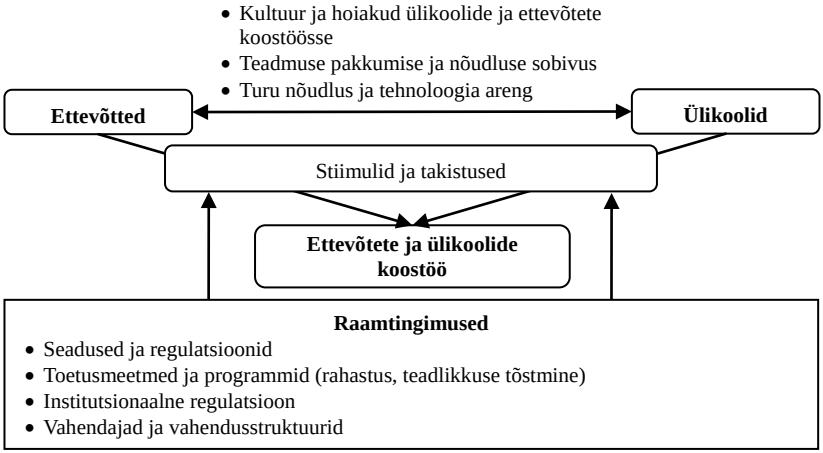
Teadmuse roll konkurentsieelise loomisel on järjest kasvanud. Uue teadmuse loomise võime nõuab funktsioneerivat teadmistepõhist innovatsioonisüsteemi, mis kombineerib hästi toimiva valitsuse tugevate ülikoolide ja aktiivsete ettevõtetega. Viimastel kümnenditel on välja pakutud mitmeid erinevaid mudeleid teadmiste loomise protsessi ja innovatsioonisüsteemi kohta (*Mode 2*, riigi innovatsioonisüsteem, *Triple Helix*). Kõik need mudelid sisaldavad muutunud arusaamist akadeemilise elu ja ülikooli rollist riigi innovatsioonisüsteemis.

Mode 2 käsitluses toimub teadmuse loomine rakenduse käigus ning võrreldes varasemaga on vähenenud teoreetilise ning ülikoolidest tuleva teadmuse ülemvõim. Teadmust luuakse järjest enam rakendamise kontekstis, kus ühiskondlikud vajadused omavad otsest mõju teadmuse loomisele juba projektide varases algstaadiumis. Riigi innovatsioonisüsteemi käsitlus toodi välja evolutsioonilise koolkonna majandusteadlaste poolt ning põhineb arusaamal, et vaja on süsteemset lähenemist, mis ühendaks erinevaid institutsioone teadmuse ja oskuste loomisel, säilitamisel ja edasi kandmisel.

Etzkowitz ja Leydesdorff pakuvad välja *Triple Helixi* mudeli, kus peamiseks ideeks on ülikoolide, ettevõtete ja valitsuse vaheline tihe koostöö. Kolme osapoole koostöö on kõige olulisem tegur loomaks soodsaid tingimusi innovatsiooniks teadmistepõhises ühiskonnas (Leydesdorff, Etzkowitz 1996 ja 1998). *Triple Helixi* mudeli korral võtavad nii ülikool, ettevõtted kui valitsus lisaks oma tavapärasele rollile aeg-ajalt üle ka teiste osapoolte rolle. Ülikoolid tegelevad ettevõtluse ülesannetega, nagu teadmuse turundus ja ettevõtete loomine, sama ajal arendavad ettevõtted akadeemilist dimensiooni, jagavad omavahel teadmisi ja koolitavad töötajaid. (Leydesdorff, Etzkowitz 1998)

Polt *et al.* (2001) on kirjeldanud ülikoolide ja ettevõtete koostöö hindamiseks sobivat mudelit, kus on välja toodud koostööd mõjutavad olulised tegurid, sh. keskkonna raamtingimused (vt. joonis 1). Riigi eesmärgiks on vähendada turutõrkeid püüdes eemaldada takistusi ettevõtete ja ülikoolide koostööks. Riiklikul tasandil on võimalik läbi erinevate poliitikate kujundamise otseselt mõjutada koostöö stiimuleid ja takistusi. Läbi seaduste ja regulatsioonide, toetusmeetmete, institutsionaalse regulatsiooni ning vahendajate ja vahendusstruktuuride kujundamise kaudu on riigil võimalik toetada ettevõtete ja ülikoolide koostööd. Samas võivad needsamad raamtingimused olla mõningatel juhtudel ka hoopiski koostöö takistajateks.



Joonis 1. Mudel ülikoolide ja ettevõtete koostöö analüüsimiseks (autorite koostatud Polt *et al.* 2001: 249 alusel).

Viimastel aastakümnetel on paljud riigid pööranud suurt tähelepanu sellise toetusmeetmestike süsteemi loomisele ja rakendamisele, mis on suunatud ettevõtete ja ülikoolide koostöö parandamisele. Riigiti on toetusmeetmestikud väga erinevad.

Käesoleva artikli eesmärk on võrrelda ülikoolide-ettevõtete koostöö parandamisele suunatud meetmeid Euroopa riikides ning anda Eestile soovitusi vastavate koostöömeetmete arendamiseks. Koostöömeetmetena käsitletakse antud juhul meetmeid, mis on otseselt suunatud ülikoolide-ettevõtete koostöö parandamiseks.

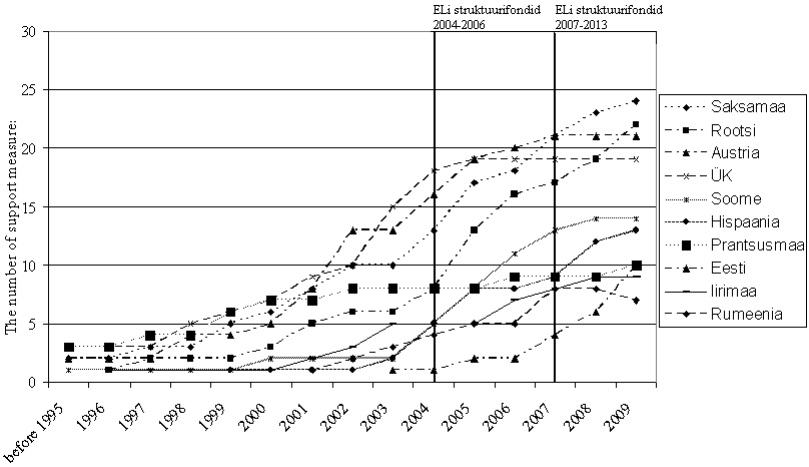
Hindamaks ülikoolide-ettevõtete koostöö intensiivsust ülikoolide seisukohast lähtudes, kasutatakse andmeid Euroopa ülikoolide-ettevõtete koostööd kajastavast uuringust (European University-Business Cooperation (Davey et al. 2011)), mis viidi läbi aastatel 2010 ja 2011. Informatsioon koostöömeetmete kohta pärineb poliitikameetmete andmebaasidest Pro Inno Europe ja Erawatch (INNO-Policy TrendChart, Policy Measures 2012, Country Pages 2012). Iseloomustamaks ettevõtete seisukohta ülikoolidega koostöö vallas kasutatakse antud artiklis ka innovatsiooniuuringu (Community Innovation Survey, Eurostat 2012) 2006-2008 andmeid. Sisukamate poliitikasoovituste andmiseks on lisaks kasutatud ka Eestis varem läbiviidud otseste välisinvesteeringute (Varblane *et al.* 2010) ja Eesti masinatööstuse (Varblane *et al.* 2011) uuringute tulemusi ning Euroopa Liidu tõukefondide perioodi 2007-2013 teadus- ja arendustegevuse ning kõrghariduse meetmete rakendamise vahehindamise tulemusi.

Võrdlevanalüüsiks on välja valitud ülikoolide-ettevõtete koostööd kajastavas uuringus kõrgeimate hinnangutega riigid: Iirimaa, Ühendkuningriik, Rootsi, Saksamaa, Hispaania, Soome, Rumeenia, Austria, Prantsusmaa, millega

kõrvutatakse Eesti tulemusi. Uuringu tulemused baseeruvad ülikoolide poolt antud hinnangul – kui suurel määral tehakse koostööd ettevõtetega. Antud töös võtsid autorid vaatluse alla need riigid, kelle punktisumma oli kõrgeim järgmistes koostöö valdkondades: ühine teadus- ja arendustegevus (T&A) ning T&A tulemuste kommertsialiseerimine.

Ülikoolide-ettevõtete koostöömeetmete intensiivsus ja ulatus varieerub Euroopa riikides suurel määral. Kõige suurem on koostöömeetmete osakaal Rootsis, kus peamiselt toetatakse koostööd T&A raames. T&A on käsitluse all olevates Euroopa riikides kõige enam toetatud valdkond, välja arvatud Prantsusmaal, kus kõige suuremat tähelepanu koostöömeetmete puhul pööratakse teadmussiirdele. Ehkki meetmed on suunatud ülikoolide-ettevõtete koostöö parandamisele, saab enamikul juhtudest toetust taotleda vaid üks osapool (kas ülikool või ettevõte).

Perioodil 1995-2009 on näha selget kasvutrendi koostöömeetmete arvus (vt. joonis 2). Suurim on meetmete arvu kasv olnud Rootsis, Saksamaal ja Austrias. Meetmete arvu kiirem kasv on seotud EL-i struktuurifondide rakendusperioodidega 2004-2006 ja 2007-2013. Eriti kehtib see uute liikmesriikide kohta. Näiteks alustati Eestis koostöömeetmete rakendamist koos struktuurifondide perioodiga 2004-2006.



Joonis 2. Ülikoolide-ettevõtete koostööd soodustavate meetmete arv (autorite koostatud andmebaasi Policy Measures 2012 alusel).

Rootsis, Saksamaal ja Austrias on koostöömeetmeid kõige rohkem, samuti tehakse nendes riikides ülikoolide-ettevõtete vahel rohkem koostööd (toetudes CIS 2006-2008 andmetele). Eestis, Iirimaal ja Rumeenias on koostöömeetmeid valitud riikidest kõige vähem ning samuti on madalam ka ettevõtete hinnang ülikoolide-ettevõtete koostööle. Siinkohal on erandiks Soome, kus tehakse aktiivselt koostööd ülikoolide ja ettevõtete vahel, kuid kus koostöömeetmete arv teiste riikidega

võrreldes on keskmine. Teine huvitav aspekt Soome koostöömeetmete puhul on kohustusliku koostööga meetmete madal osakaal. See annab märku sellest, et Soome on väga hästi kasutanud teisi poliitika instrumente, mis ei ole otseselt suunatud ülikoolide-ettevõtete koostööle, kuid mis on parandanud ülikoolide ja ettevõtete koostööd.

Innovatsiooniuuringu ning ülikoolide-ettevõtete koostöö uuringu andmete kombineerimine võimaldab vaadelda ülikoolide-ettevõtete koostööd mõlema osapoole seisukohast lähtudes. Käesolevas võrdluses on Eestis ülikoolide ja ettevõtetevaheline koostöö nõrk nii ülikoolide kui ka ettevõtete nägemuses. Siit võib järeldada, et koostöömeetmed ei ole siiani ülikoolide-ettevõtete koostöö parandamisel edukad olnud. Kuigi Rumeenias ja Hispaanias hindavad ülikoolid oma koostööd ettevõtetega kõrgemaks, siis ettevõtete nägemuses on ka seal koostöö nimetatud osapoolte vahel madal. Eraldi riikidegrupi moodustavad Prantsusmaa ja Rootsi, kellel on samuti head koostöö näitajad. Austria, Saksamaa ja Soome puhul on koostöö näitajad väga head, eriti ettevõtete poolt vaadates. Samuti on Iirimaal head koostöö näitajad, kuid seda siiski ainult ülikoolide vaatepunktist.

Vaadeldes täpsemalt toetusmeetmete struktuuri tegevuste kohta, mida nende meetmetega toetatakse, siis on näha, et Iirimaa toetusmeetmestik on tugevalt kallutatud alusuuringute poole. Soome, Saksamaa ja Austria toetusmeetmestikud on kõige paremini tasakaalus – ka eelpool välja toodud tulemused näitavad, et ühest küljest hindavad ülikoolid koostööd kõrgeks ning teisalt näitavad innovatsiooni uuringu andmed, et nendes riikides tehakse ülikoolide-ettevõtete vahel aktiivselt koostööd. Eestis on koostöömeetmed aga pigem nõrgad. Koostöömeetmete parandamisel tuleks hoida tasakaalu probleemi lahendamisele orienteeritud alusuuringute ning võrgustikele ja rakendusuuringutele suunatud meetmete vahel.

Analüüsitud andmete ja varasemate uuringutulemuste põhjal võib Eesti jaoks soovitatavad toetusmeetmete arengusuunad jagada kaheks: strateegilised ja operatiivsed. Artiklis esitatud diskussiooni põhjal võib välja tuua järgmised strateegilise tasandi poliitikasoovitused Eestile:

- Selleks, et vähendada praegust tasakaalustamatust toetusmeetmete finantseeringus, tuleks vähendada sõltuvust Euroopa Liidu struktuurifondidest. Oluline on luua ja arendada programme ka Eesti enda vahendite põhjal, mis võimaldab võtta fookusesse aspektid, mis tulenevad Eesti arenguvajadustest. Ka teistes võrdlusalustes riikides on enamus toetusmeetmetest kaasfinantseeritud muudest, mitte Euroopa struktuurifondide, vahenditest.
- Koostöömeetmetes peaks ettevõtete ja ülikoolide koostöö olema rohkematel juhtudel kohustuslik. Enamuse analüüsitud riikide kogemus näitab, et kohustuslik koostöö on positiivselt seotud ülikoolide ja ettevõtete koostööga ka praktikas. Analüüsides võrdlusaluseid riike, siis näib, et kogu koostöömeetmete arvust võiks umbes 70-80% olla nende meetmete osakaal, kus koostöö on kohustuslik. Samas on tulevikus oluline uurida Soome süsteemi põhjalikumalt, et selgitada välja teised meetmed, mis ei ole otseselt suunatud koostööle, kuid mis tagavad efektiivse koostöö ülikoolide ja ettevõtete vahel.

- Oluline on luua ja arendada toetusmeetmeid, mis suurendaksid ülikoolides turust ja nõudlusest tuleneva teadmuse ning arendustöö hulka.
- Poliitikameetmed peaksid rohkem toetama ka efektiivset teadmuse liikumist ja ülekannet ülikoolide ja ettevõtete vahel.

Operatiivsel tasandil saab välja tuua järgmised soovitused poliitikameetmete kujundamiseks:

- Eestis on toetusmeetmete rakendamine ülereguleeritud. See tähendab, et kogu toetatavast tegevusest tulenev risk on kantud raha taotlejatele. Toetusmeetmete rakendamisel tuleks kindlasti vähendada bürokraatiat, mis isegi Euroopa Liidu finantseeringute puhul on suurem kui Euroopa Liit tegelikult nõuab. Ühelt poolt muudab bürokraatia ja ülereguleerituse vähendamine toetusmeetmeid efektiivsemaks ning teiselt poolt soodustab see ka rohkem ettevõtteid ning ka ülikoole oma tegevusi soovitud suunas planeerima, toetusi taotlema ning kasutama.
- Rohkem peaks olema toetusmeetmeid, mille puhul võetakse taotlusi vastu jooksvalt, mitte ainult taotlusvoorude jooksul. Selline taotlusprotsess oleks ettevõtetele sobivam, sest alati pole võimalus oodata taotlusvooru väljakuulutamist või vastupidi, pole ettevõte veel valmis esitama taotlust nõutud aja jooksul. Selleks, et soodustada ettevõtetepoolset kaasatust ning aktiivsust soovitud tegevuses, tuleks kohandada ka taotlusprotsesse ettevõtetele sobivamaks.
- Kindlasti on oluline parandada toetusmeetmete rakendamise ajastust. Tuleks vältida situatsiooni, kus meedet hakatakse ellu viima alles programmi viimastel aastatel, mille puhul jääb eelarve täies ulatuses kasutamata või ei suuda ettevõtted piiratud omafinantseeringu võime tõttu osaleda rohkem kui ühes toetatavas projektis.

Oluline on meeles pidada, et ülikoolide ja ettevõtete koostööd ei toeta ainult spetsiaalsed koostöömeetmed, vaid ka muu riigipoolne tegevus. Ka programmid, mis toetavad ülikoolide ja ettevõtete koostööd kaudselt, on Eesti jaoks väga olulised. Samuti on Eestis väga oluline kujundada positiivset suhtumist ülikoolide ja ettevõtete koostöösse. Selleks, et suurendada nende omavahelist koostööd, on oluline, et osapooled teaksid ning näeksid võimalikke kasusid, mis ühisest koostööst tulla võivad.

Antud uuringu piiranguks võib pidada seda, et nii innovatsiooniuuring kui ka Euroopa ülikoolide-ettevõtete koostöö uuring põhinevad enesehinnangutel. Samuti on antud töös vaadeldud vaid kitsast lähenemist koostöömeetmetele. Antud uuringut saab edasi arendada kaasates analüüsi ka need meetmed, mis toetavad ülikoolide-ettevõtete koostööd kaudselt. Samuti saaks edaspidi analüüsida ka madalama koostöötasemega riike ning nendes rakendatavaid toetusmeetmeid, et saada veelgi parem ülevaade koostöömeetmetest ning nende mõjust ülikoolide ja ettevõtete koostööle praktikas.