gadget

Deliverable 2.1
Benchmarking Demand & Supply

Comparison Analysis
(Austria, Spain & the United Kingdom)

Author: GADGET Consortium, Higher Education Partners, 2013

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GADGET consortium:

Spain:
University of Alicante (co-ordinator)
Fundación Empresa Universidad de Alicante de la Comunidad Valencia
Idasa Sistemas

Austria:
FH JOANNEUM Gesellschaft mbH
Start-up & Service Centre Fürstenfeld
Rosendahl Maschinen GmbH

The United Kingdom:
Glasgow Caledonian University
Scottish Chambers of Commerce
AppleGreen Homes

Contact information:
Project co-ordinator (contact in Spain):
University of Alicante
Email: project.management@ua.es or info@gadget-project.eu
Project website: http://www.gadget-project.eu

Local contacts in Austria:
FH JOANNEUM Gesellschaft mbH: rene.wenzel@fh-joanneum.at or lisa.mahajan@fh-joanneum.at

Local contact in the UK:
Glasgow Caledonian University: mark.anderson@gcu.ac.uk

Lifelong Learning Programme

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GADGET project introduction

The **GADGET** project is a 2-year long pilot project running from October 2012 to September 2014, and is funded under the European Commission's Erasmus Lifelong Learning programme. It aims to link in with the European Commission's Erasmus objective of reinforcing "the contribution of higher education and advanced vocational training to the process of innovation". Echoing this, GADGET's overall objective is to conduct a pilot action in 3 countries for good practice for industry needs, training and exploitation of results in environmental and energy industries. The project focuses on these industries in particular, owing to the importance placed on societal challenges in current policy frameworks, and the increasing significance that such industry will have in future economic and social development. As a result, the linkages between research and innovation and innovative industries must be reinforced; there are noteworthy challenges in such linkages. These include the lack of current contacts and interaction, a mismatch of the strategic direction of both research and teaching with regard to innovative industries' needs, and the lack of preparation of both future and current employees. GADGET aims to put in place a pilot action for setting up sustainable, scalable and transferable linkages between university and industry. In the triple helix approach, the cornerstone of the theory is the equal interaction between government, industry and university. GADGET focuses principally on the interaction between the university and industry sides of

this approach, being respectively the "supply" and "demand" side for both knowledge and human resources. GADGET also incorporates a third actor, the intermediary, as a means to reaching a wider target audience of industries. GADGET aims to generate a methodology which will be applicable in all contexts (other industries) and levels of development (geographical, economic, etc.) using a three-step approach.

Step 1: Identification ***- determining weaknesses, current processes, knowledge gaps and good practices:*** GADGET examines 3 areas of cooperation: university-provided training for updating employee skills, the skills of future graduates, and participation of industry in research and teaching. An analysis of the state of the art in each of these areas will take place in three participating countries: Spain, UK and Austria.

Step 2: Implementation – ***establishing specific collaboration schemes:*** After matching up supply against demand, HEI partners and industry will establish a number of pilot cooperation schemes based on the areas of teaching, research and training. These include an invited lecturer scheme, lifelong learning training for employees, and research/industry matching. Such schemes will provide case studies and lessons learned.

Step 3: Exploitation ***- transferring good practice to relevant stakeholders:*** Focus will be on transferring good practice to other HEIs via platforms and social media. The project will culminate in a large-scale conference.

As such, GADGET will: stimulate linkages, define labour market needs, improve the skill set of graduates and employees, and improve knowledge exchange.

2

Executive Summary

The environmental and energy sectors are gaining a huge momentum and the establishment of relevant networks is becoming increasingly important. One seemingly obvious partner for businesses is a university as a vivid exchange of knowledge and expertise can be expected. Some forms of cooperation have already been established, however, it is still lagging behind other industries as the full potential has not been exploited yet. This matter has been the basis for the survey conducted with the aim to identify problem areas, create awareness and foster industry-university cooperation.

Four questionnaires have been developed and distributed among SMEs in the environmental and energy sector, intermediaries and HEI (Higher Education Institutions). Two were sent out to HEI to inquire about training needs as well as cooperation with companies.

The results revealed that many SMEs, who had worked with HEIs before, would recommend this institution to others and were mostly attracted by the availability of resources and access to additional infrastructure provided by the HEI. In contrast, the SMEs, who had never dealt with HEI before, overwhelmingly do not know what HEI can offer. This is a disturbing, yet interesting starting point for HEI to create alliances. Future possible cooperation is envisioned by SMEs in the fields of product development and technological innovations. Lastly, they attested university graduates a good mix of com-

petences needed to start working in the relevant sectors. Scientific and technical capabilities of graduates were well valued, whereas the onus on complementary training and skills was very much on the training plans and policies of companies.

HEI were asked to rate the level of R&D cooperation with businesses and to identify the priorities that need to be in place to guarantee a quality engagement. Quality of R&D, structured information and networking were ranked highly. The main intersection point between HEI and companies are intermediary organizations that facilitate R&D cooperation and knowledge transfer. They furthermore give support in a lot of different areas such as placement of specific expertise for projects, identification of financial assistance and support on IPR issues. Generally, they do not provide equipment, directly fund cooperation or give trainings. The lack of trainings provided by HEI has been particularly identified by intermediaries as a major weakness in the current scenario.

In conclusion, it can said that cooperation between SMEs in the environmental and energy sectors is off to a good start, but can be improved tremendously in certain areas to facilitate a better exchange of knowledge for the benefit of both parties.

The results of the three country reports were compared and contrasted. There were interesting parallels as well as deviations in practices between the three participating regions. One of the principal aims of the three-pronged approach to the analysis was to highlight where similarities exist and show important cultural and ideological contrasts.

Each of the country reports shows the perceptions of companies, Higher Education Institutions and intermediary actors in the knowledge triangle, in the field of university-enterprise relationships and, in particular, focused on the experiences in the energy and environment fields. Companies surveyed were to come from this field or be directly related to it (e.g. construction).

It is fair to say, like in most survey exercises, the analysis has had its difficulties and limitations. Not least of these, is the achievement of significant numbers

of respondents. GADGET aimed for a modest number of respondents, but even so some were lacking in the final analysis. The partners also agreed that in future and similar actions, in particular for SMEs incentivisation would be important to obtaining a better response rate. There is a great deal of survey fatigue amongst HEIs, companies and intermediaries. In addition, surveys must be kept concise whilst still managing to gather sufficient data. GADGET tried to keep the collection process as simple as possible by using online formats, etc. Even so, this aforementioned survey fatigue was definitely a factor. However, it has been possible to draw succinct, interesting and, above all, useful conclusions.

Supply Vs. Demand: Final conclusions

From the data obtained, anecdotal information and known statistics, it is clear that the GADGET hypothetical mismatch is a reality in all areas. There is a clear gap in the supply and demand stakes:

Skills and training

- Universities and companies are seeking similar outcomes with different approaches. However, there is a lack of clarity on what issues are really important, and the level of importance placed on technical skills still overshadows complementary skills.
- Graduates are valued as far as their scientific and technical capabilities. However, there are not enough 'leaders' being raised during the undergraduate stages, leaving the onus on future training to companies. At the same time, universities are not making use of the niche in the market for further training / lifelong learning. Private companies and consultancy firms are doing good business on the slow reaction of HEIs to an obvious gap.
- Interaction at learning level with 'real-life' and business is minimal. Graduates learn theory, but rarely see it in practice or have the opportunity to

see firsthand where their knowledge will be useful. More interaction, be it through initiated professor schemes or business fairs could be ideal.

- At planning and development level of curricula, companies or specific industry sectors are rarely considered. Specialization within specific programmes for certain industrial sectors would allow for a greater coherence with skills needed vs. skills obtained.

Research and University-industry interaction

- There is still a lack of tailor-made or targeted research for an identified need within industry. Basic research is fundamental, but applied research can be a provider of industrial solutions, provide income for the HEI and build relationships for future activities. Companies can benefit from access to better and more varied infrastructure.
- Intermediaries have a key role which is not exploited enough in some cases. It is even the case their role may be unclear or limited. Intermediaries are well placed to match contacts, through a thorough understanding of the HEIs' strengths and skills, and the needs of certain industries. A three-way dialogue could prevent many misunderstandings or lack of communication.
- Specific cooperation schemes with industry or sectors are few and far between. This includes research and teaching, as well as other actions like joint events / fairs, or training.

In general, one of the major gaps highlighted by the reports and analysis was a lack of knowledge regarding the needs and capabilities of the other party. Communication and interaction are a key element to combating this.

3

Background

Background: Austria

In the last few years, the Austrian government has put an emphasis on promoting so-called green jobs, which term employment in the environmental sector. According to the Lebensministerium[1], the whole sector generates about 11% of Austria's GDP and employs every 20th of the working population in the country. In the period from 2008 to 2011 the development of the environmental sector has been constantly rising. While the employment in the whole economy only rose for about 0,4%, the occupation in the environmental sector grew for 2,1%. The total turnover rose for 5,1 % to a level of 32,6 billion Euro. The most important segment is the management of energy resources with 37,1 % of employees and 49,9% of turnover of the whole environment economy. (Lebensministerium, 2013)

In so far, it is not surprising that several funding opportunities were made available to organizations working in this field. One of the most widely used one, is the so-called "Innovationsscheck[2]" (innovation cheque) given out by the FFG (Forschungsförderungsgesellschaft- a publicly owned research

1. Lebensministerium (2013). http://www.lebensministerium.at/umwelt/green-jobs/greenjobs.html
2. FFG (2013). http://www.ffg.at/innovationsscheck

funding agency). This funding offer aims at assisting small and medium-sized enterprises in Austria to start a continuous research and innovation activity. Developed by the ministry of traffic, innovation and technology, cheques of € 5000 and € 10.000 are given out after a careful evaluation of the businesses. (FFG, 2013)

Another successful tool that is already being implemented for 20 years in the Austrian business economy is the **"Cluster-Initiative**[3]**"**. This initiative is fostering the development of clusters in a number of sectors to help SMEs be competitive with large organizations, form cooperation networks and foster innovation. Clusters, however, do not only have an advantage for the companies, but also for the region these businesses decide to settle in as they increase the economic value of that particular region. In Austria, clusters are structured in a similar way as competence centres, which allows for a tight linkage between participating organizations. Currently seven clusters in the energy and environment sector are located in Austria. (Clement, Welbich-Macek, 2007)

The businesses in the environmental and energy sector are not only establishing networks among themselves, but are also slowly venturing into collaborations with universities. Such connections have clear advantages for both sides, as businesses gain access to innovative human capital that can foster the research activities, while universities can use the industry input for the education of the students. Some of the most popular initiatives taken to establish new relationships are networking events, guest lecture stints and the founding of development teams that concentrate on curricula development for the relevant study courses at universities and / or universities of applied sciences.

Although some programs and schemes for collaboration have been already established, a lot still needs to be done to be able to use the full potential

3. Clement, Welbich-Macek (2007). http://www.clusterplattform.at/fileadmin/user_upload/clusterbibliothek/75_Erfolgsgeschichte_15_Jahre_Clusterinitiativen_in_OE.pdf

from both sides and enable an active know- how and skills exchange to benefit the Austrian economy as a whole.

The following findings of the Austrian-wide study will give a clear insight into the current situation of university- industry cooperation and identify existing gaps and / or lack of knowledge that so far have hindered successful interaction. The results should then be used to create advantages for businesses and universities, which will make collaborations more attractive.

Background: Spain

Companies working in the environment and energy fields make up a lively and growing sector of the Spanish economy, accounting for 3.6% of GDP (1).

The "green" sector has seen a growth of around 213% between 1998 and 2009. In this sector in Spain, there are 7,780 companies, of which 20% are based in Catalonia, 13% in Madrid, 13% in Andalusia, and 13% in the Valencian Community. These four autonomous regions make up more than half of the sector.

In Spain, the green sector is of strategic importance, innovative, and going through an internationalisation process. There are some Spanish companies which are considered an example of worldwide importance for certain technologies and markets. The sector has a turnover of more than 40,000 million Euros per annum, and generates more than 530,000 direct jobs. Out of those, 26% are related to waste management, 21% to renewable energy and energy efficiency, 11% to the water cycle, and 10% from the public sector.

One of the characteristics of the environmental sector is the existence of large scale legal entities (both privately owned and share / investment-based) together with an important number of smaller entities.

According to a 2009 report, "EmployRES: The impact of renewable energy policy on economic growth and employment in the European Union", the EU will create 2.8 million jobs by 2020 if its target on renewable energy is reached: 20% of renewable energy usage by 2020. In real terms, this will mean 410,000

jobs for Spain, which will mean an additional 0.24% contribution to GDP. Employment in the environmental sector in Spain represents around 2.6% of working population, situating Spain on the European average. As previously mentioned regarding location, almost 57% of Green sector employment is concentrated in four autonomous communities: Catalonia, Andalusia, Madrid, and Valencian Community.

It is important to underline various weaknesses in the sector within Spain: There is a breakdown in capacity to generate employment in mature sectors such as waste and wastewater treatment; lack of involvement from the side of the private sector for funding R+D+I activities for environmental issues; an insufficient R+D system (patents, R+D projects, research not in line with the industry needs); demands for qualified professionals is growing at a faster rate than graduates, coupled with an insufficiently specialised workforce and graduates; a lack of a cooperative culture between companies makes activities such as regional clusters and the internationalisation of the sector particularly difficult; the absence of local SMEs (spin-offs and technologically oriented) to work together with large Spanish companies in global markets; absence of instruments to manage and reduce risk for the development of innovative companies; lack of clear image (identity) for the Spanish market and technology solutions to be able to compete internationally.

Regarding risks, we could cite: current economic crisis; lack of public resources to implement public policy in environmental issues; administrative control deficit; weak awareness and sensitive on environmental issues of both the general public and industry; financial cuts and a lack of credit, together with the suppression of fiscal benefits for renewable energy, hinders the transition towards a more diverse and international sector: the absence of a clear environmental policy oriented towards the creation of socio-economic value, joined with a lack of strategic planning; continuous changes at policy level for fiscal motivation; loss of position in global markets due to excessive technological dependency; loss of employment in certain SME sectors (engineering and consultancy, in the main) and the public sector (education, and environmental information).

As a consequence, we should face up to certain challenges in the coming years in this sector, resolving the lack of Spanish SMEs and spin-offs which may be able to accompany large companies and into multinational and external markets, a deficient R&D system and an absence of an industrial policy which is oriented towards the positioning of the environmental sector in world markets.

To do this, the following items are needed:

- Establish stable and long-term legal framework, stimulating innovative companies and entrepreneurs and being the starting point towards a sustainable economy which is efficient in terms of environmental factors. This sector bound by the framework should generate employment, socio-economic value, and contribute to an adequate management of climate change.
- Promote a vision of the sector as a knowledge industry with a relatively high potential to generate added value and employment, facilitating the integration of environmental policy with innovation policy, that of economy and competitiveness, employment, investment and location policy, all with the aim of generating an "ecological industrial policy".
- Create an appropriate setting for companies and entrepreneurs, with a specific, stable, coherent and enthusiastic sector, with determined medium and long-term objectives eliminating barriers and affording recognition to the most pro-active companies.
- Enhance the fundamental role that public administration has in the search for innovative solutions and, in this sense, set up new contracting policy and methods which favour innovation, as well as integrating innovation into public policy and planning.
- Finally, increase the internationalisation of companies by facilitating the creation of clusters and other cooperation methodologies, taking advantage of the pull factor of large Spanish companies, promoting a trilateral cooperation between Universities (research centres), companies and public administration / government bodies through the develop-

ment of specific instruments, enhance the creation of a techno-industrial sector which is fundamentally centred on SMEs with export capacity or potential.

Background: United Kingdom

The Energy and Environment sectors have become a major priority for the Scottish Government in recent years. By 2020, they aim to mitigate climate change through an ambitious programme to reduce its CO2 emissions by 42%. Renewable energy is seen as crucial to this policy and the objective is to generate 100% of Scotland's gross annual electricity consumption , the equivalent of 11% of Scotland's heat demand, through renewable sources and 500 MW of community and locally-owned renewable energy. As such the low carbon sector is expected to receive investment of £60-70 billion over the next ten years.

The move to a low carbon economy will be characterised by the development of low carbon goods and services, and by high levels of business resource efficiency. These can both generate economic wealth and create jobs for Scotland. Scotland's low carbon goods and services sector includes:

- Renewable energy
- Water supply and wastewater treatment
- Waste recovery and recycling
- Environmental monitoring and instrumentation
- Building technologies
- Sustainable transport

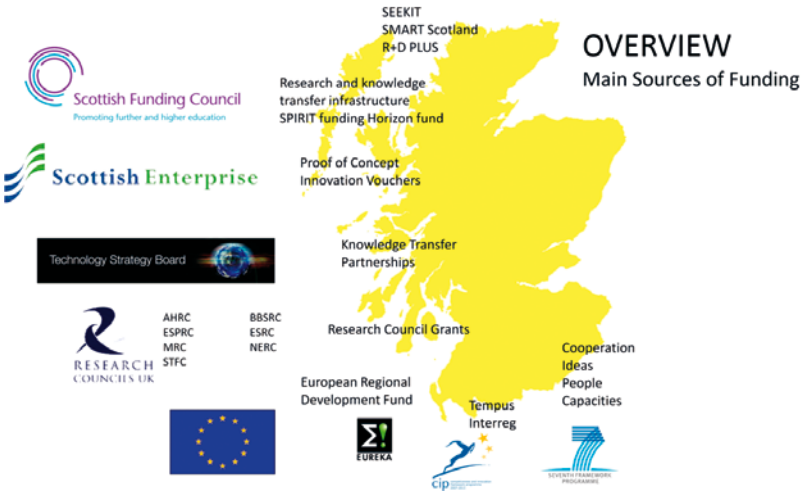
The current market value of the sector in Scotland is around £9 billion, with around 4,000 companies employing 73,950 people. With the sector expected to grow to around £12 billion by 2016, low carbon employment in Scotland

could increase to around 130,000. However, this is still a challenging and high risk market for investment which requires policy and regulatory certainty.

Sales in building technologies are projected to increase from £1.1 billion to around £1.9 billion in 2020. It is estimated that this sector alone could support 12,000 low carbon jobs in Scotland in areas like insulation and smart meter installation. The water supply and waste water sector has a market value in Scotland of £709 million and employs 6,200 people. Of this, engineering was worth £289 million and Scottish exports had a value of £94 million. The UK market for waste management is expected to grow from £11 billion in 2008 to £14 billion by 2014/15. Scotland has around 500 companies in waste management with the potential to generate a further 2,000 jobs. The area of environmental monitoring involves solutions for problems such as air, noise and marine pollution, land and water contamination, as well as activities such as environmental analysis and consultancy, and waste management and recycling. With a global market size of £904 billion, the sustainable transport sector presents a growing opportunity for the Scottish economy through electric vehicles and charging infrastructure and intelligent transport systems.

This burgeoning industry is reflected through the increasing development of large scale projects involving partnerships between Scottish Universities and the industry, including a large number of SMEs. For example, The Energy Technology Partnership (ETP) is an alliance of twelve independent Scottish Universities, engaged in world class related energy Research, Development and Demonstration (RD&D). It is the largest power and energy research partnership in Europe and promotes greater levels of collaboration between universities and industry to deliver unparalleled RD&D capability across a range of energy technologies. Another example is the Edinburgh Centre for Carbon Innovation. ECCI is a hub for the knowledge, innovation and skills required to create a low carbon economy, providing the place and space for 'low carbon leaders' and networks from business, finance and the public sector to work together to deliver a low carbon future. Hosted by the University of Edinburgh, in partnership with Heriot-Watt University and Edinburgh

Napier University, the Edinburgh Centre creates a unique platform for supporting Government policy implementation; enhancing business enterprise and innovation; and delivering professional skills training.



In terms of enablers of University-Industry engagement, Scotland has at its disposal a number of funding sources both within Scottish and the UK governments as well as the EU.

One of the principal intermediaries was established in 2005 by the Scottish Funding Council. Interface is a central hub connecting businesses from a wide variety of national and international industries to Scotland's 24 higher education and research institutes. Connecting businesses quickly and easily to Scotland's world class expertise, skills and research facilities, its unique service is designed to address the growing demand from organisations wanting to collaborate with academia. The service is free and impartial and aims to stimulate innovation and encourage companies to consider academic support to help solve their business challenges. Through Interface, Scottish businesses have been able to increase their competitiveness, develop new products, and exploit new market opportunities by connecting with academia.

Interface is also tasked with managing the Innovation Voucher Scheme, a programme aimed at building relationships between SMEs and HEIs in Scotland. The Scheme funds to the tune of up to £5000 collaborative projects leading to new products, services and processes that will benefit the business, the institution and the Scottish economy. They are specifically intended to encourage new partnerships that have not previously collaborated or jointly received funding from any source previously so as to build new links. In particular the vouchers aim to encourage a longer, sustained relationship between companies and HEIs rather than just offset the costs of the business purchasing a service from a HEI. The scheme is broad in nature and encompasses all disciplines of academia from science, engineering and technology to arts, creative industries, humanities and social sciences.

Another highly successful scheme is the Technology Strategy Board's Knowledge Transfer Partnerships. A relationship is formed between a company and an academic institution ('Knowledge Base' partner), which facilitates the transfer of knowledge, technology and skills to which the company partner currently has no access. Each partnership employs one or more recently qualified people (known as an Associate) to work in the company on a project of strategic importance to the business, whilst also being supervised by the Knowledge Base Partner. Projects vary in length between 12 and 36 months. The Associates are postgraduate researchers, university graduates, or individuals qualified to at least NVQ (Level 4) or equivalent.

Despite all the initiatives and programmes cited above there still remains some mismatch between the needs of the companies and the opportunities offered by collaboration with Universities. This study aims to identify these gaps and to try to identify ways in which they may be overcome.

4

Findings & Conclusions

4.1 Austria

The aim of the study was to detect the strengths and weaknesses of HEI-industry cooperation in the field of energy and environment in Austria. For this purpose, 4 surveys – one for companies, one for intermediaries and two for HEI- HEIs – were developed and distributed among the respective target groups. In total 39 representatives from companies, 7 representatives from intermediaries and 7 representatives from HEI responded. The sections below summarize the key findings of these surveys.

4.1.1 Companies

61% of the interviewed companies answered that they had cooperated with HEI in the past. All of the responding companies stated that they would recommend their HEI partner to other companies.

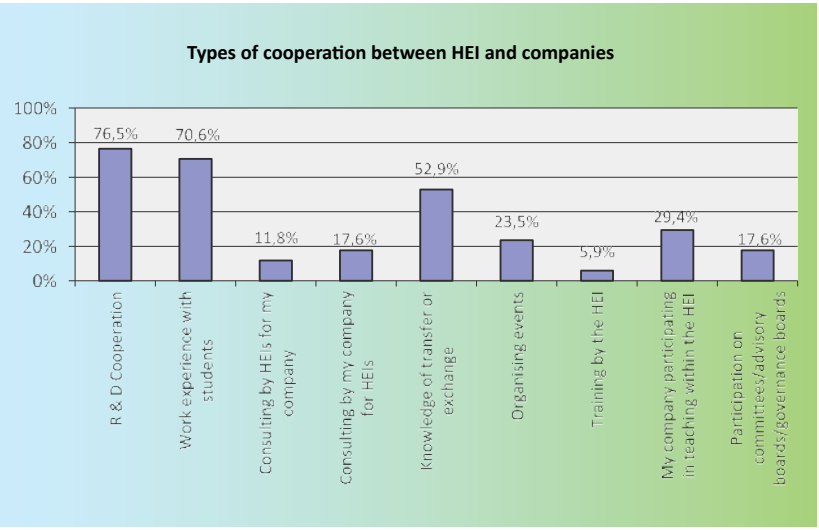


Diagram 1: Types of cooperation

Diagram 1 depicts the type of cooperation between the respondents and HEI. R&D cooperation (76,5%) is the main type of cooperation followed by work experience with students (70,6%) and knowledge transfer (52,9%). No other way of cooperation was chosen by more than 50% of the respondents. It is remarkable that only 5,9% stated that they had conducted trainings organized by HEIs and 11,8% had experienced consulting by HEIs.

As a next step, it was interesting to inquire how the cooperation between the companies and the HEI started and who initiated the contact, which can give valuable input into the course of action to be taken in the future.

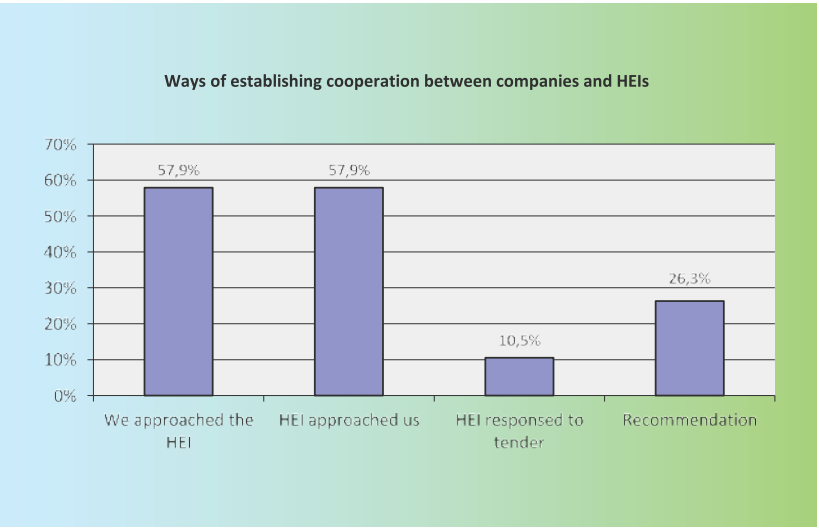


Diagram 2: Start of cooperation

Diagram 2 illustrates how cooperation had started. 58% each responded that either the HEI or the company had approached the cooperation partner, which shows that there are no apparent inhibitions from one side to approach the other. 26% stated that the HEI partner had been recommended by others. Only 10% answered that HEI responded to a tender.

The next logical follow-up question was to ask why companies choose to cooperate with HEI with the intention to identify the strengths and USPs (Unique Selling Proposition) of HEI compared to other service providers in the same industry.

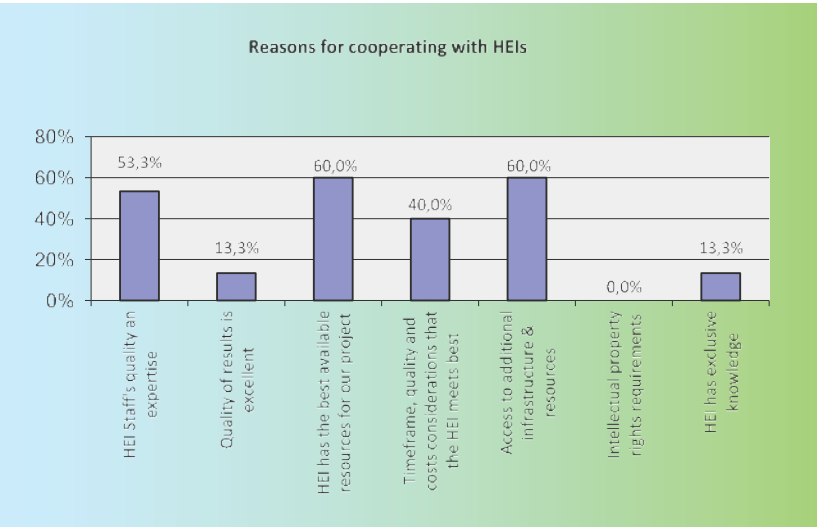


Diagram 3: Reasons for cooperation

Diagram 3 displays these reasons for cooperation. 60% each responded that HEI had the best available resources and that HEI offered access to additional infrastructure and resources. High quality of results and exclusive knowledge are a reason for cooperation for only 13% of all respondents. IPR requirements were no issue for the respondents. HEIs were evaluated positively in terms of competences of the HEI staff, quality of results, quality of available equipment, cost and timely delivery of results.

By implication, the reasons for non-collaboration of companies with HEI also needed to be examined in order to assess the weaknesses of HEI (whether they are real weaknesses or perceived weaknesses that have a negative impact on the image of the HEI).

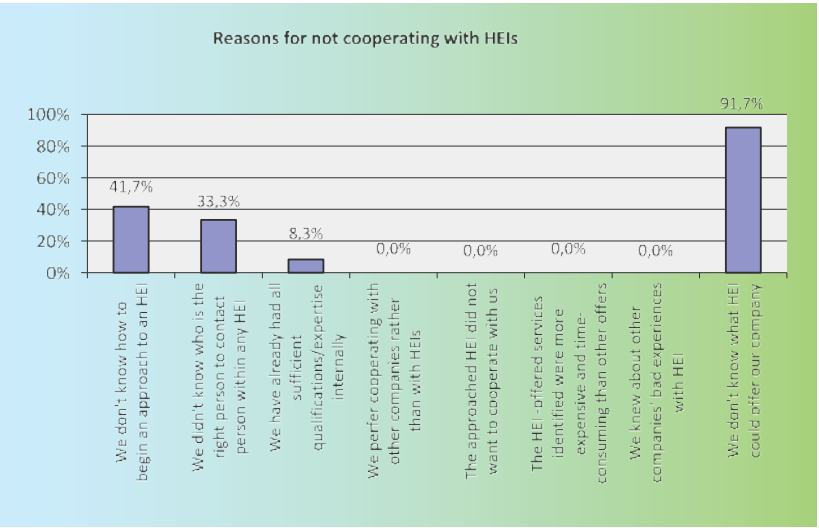


Diagram 4: Reasons for not cooperating

Diagram 4 illustrates the results. The main overwhelming reason was that companies do not know what HEI could offer them (92%). Other reasons were that companies did not know how to approach HEIs (42%) or how to identify the right contact persons in HEIs (33%). This already gives a clear picture of what HEI have to work on in the future.

Those companies that collaborate with HEI were asked to identify the areas of cooperation. With 83%, technological innovation and product development were the most frequently chosen types of activity of collaboration. Entrepreneurship and market entry studies were selected by 16,7% and internationalization by 8,3%. Local market expansion and product design on the other hand were not chosen.

Below, the preferred types of activity for collaboration from the companies' view are shown.

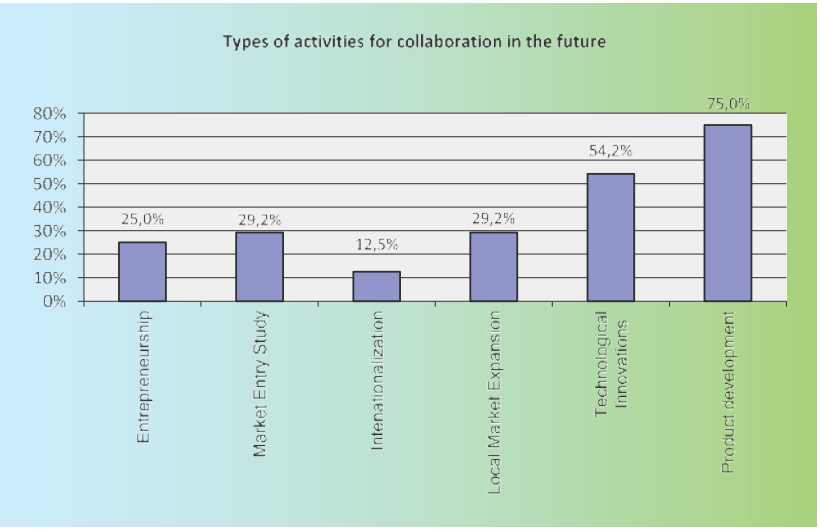


Diagram 5: Future types of activities

Diagram 5 displays companies' wishes of future types of activities. The majority of the respondents wish to cooperate in product development (75%) and technological innovations (54%). The other answer alternatives were only chosen by 12% to 29% of the interviewees.

A subsection of the companies' questionnaire dealt with the assessment of university graduates' capacities and their applicability in the job market.

How would you rate graduates' competences in your field of business in the following area?						
Answer Options	**Very Good**	**Good**	**Sufficient**	**Poor**	**Don't Know/ N/A**	**Response Count**
Quality Management	4,5%	40,9%	27,3%	4,5%	22,7%	22
Leadership competencies, including diversity	0,0%	9,1%	45,5%	27,3%	18,2%	22
Entrepreneurial competences (Networking, Strategic	0,0%	22,7%	54,5%	9,1%	13,6%	22
Project Management	4,5%	54,5%	13,6%	18,2%	9,1%	22
Innovation Management	4,5%	36,4%	36,4%	9,1%	13,6%	22
Communication Skills	13,6%	40,9%	36,4%	0,0%	9,1%	22
Intercultural Skills	9,1%	45,5%	27,3%	0,0%	18,2%	22
Foreign Languages Competences (English, German,	22,7%	59,1%	9,1%	0,0%	9,1%	22
Engineering and techonological competencies	23,8%	52,4%	9,5%	4,8%	9,5%	21
Science Competences	22,7%	40,9%	13,6%	9,1%	13,6%	22
Soft skills (Presentation, Negotiation, etc.)	13,6%	18,2%	50,0%	0,0%	18,2%	22
IT Skills	31,8%	36,4%	18,2%	0,0%	13,6%	22

Table 1: Graduates competences

Table 1 gives an overview of competences of graduates in the field of energy and environment. A quick analysis of the results gives the impression that graduates are well prepared. When going into detail one can see that some competences are lacking, such as leadership competences, soft skills and project management. These need to be taught more thoroughly at the HEI to give the graduates a better profile.

While asking the existing competences of graduates, companies were also asked to evaluate the importance of current and future employees.

How important do you consider the following competencies for your current and future emloyees contributing to corporate success?						
Answer Options	**Really Important**	**Important**	**Neutral**	**Not Important**	**Very unimportant**	**Response Count**
Quality Management	30,0%	45,0%	20,0%	5,0%	0,0%	20
Leadership competencies, including diversity	22,7%	50,0%	18,2%	4,5%	4,5%	22
Entreperneurial competencies (Networking, strategic	59,1%	27,3%	13,6%	0,0%	0,0%	22
Project Management	28,6%	57,1%	14,3%	0,0%	0,0%	21
Innovation Management	30,0%	55,0%	15,0%	0,0%	0,0%	20
Communication Skills	54,5%	27,3%	18,2%	0,0%	0,0%	22
Intercultural Skills	15,0%	30,0%	45,0%	5,0%	5,0%	20
Foreign languages competences (English, German,	22,7%	45,5%	27,3%	0,0%	4,5%	22
Technological Capabilities	38,1%	42,9%	9,5%	9,5%	0,0%	21
Scientific Skills	31,8%	22,7%	27,3%	13,6%	4,5%	22
Soft skills (Presentation,Negotiation, etc.)	38,1%	52,4%	4,8%	4,8%	0,0%	21
IT Skills	10,0%	55,0%	35,0%	0,0%	0,0%	20
Sustainability Management	19,0%	38,1%	23,8%	19,0%	0,0%	21

Table 2: Importance of competences for current and future employees

Table 2 shows the results of above-mentioned topic. On average, all of the depicted competences were seen as important, but some of them such as entrepreneurial competences and communication skills were rated exceptionally high. In contrast, scientific skills, intercultural skills and sustainability management were perceived as less important.

4.1.2 Higher Education Institutions

Two surveys were distributed among HEI to:

1. analyze R&D cooperation (4 respondents)
2. observe the training & education situation of the HEI (3 respondents)

HEI cooperation

Cooperation between HEI and companies seems to start mostly with an approach from both sides as indicated by 75% of respondents. 25% responded to a tender. It is interesting to note, that 100% of respondents were acting upon recommendations through personal contacts, networks, intermediaries or contact due to (former) students.

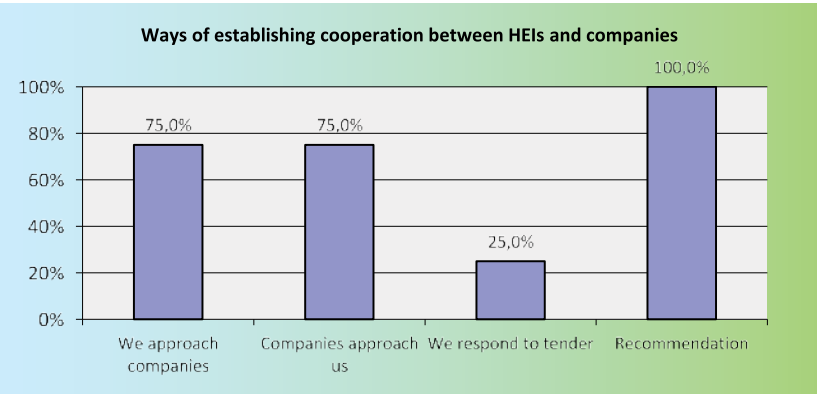


Diagram 6: Ways of establishing cooperation between HEIs and companies

In a next step, the level of satisfaction in regards to several items was enquired from HEIs. The general feedback was very good and tended to stay on the side of "satisfied" and "very satisfied".

The highest approval was given to the "knowledge transfer or exchange", followed by "R&D cooperation", "Work experience with students", "consulting by HEI for a company", "consulting by a company for HEI", "organizing events", "training by HEI" and "companies participating in teaching". HEI were mostly satisfied with the participation of companies on committees / advisory boards. Interesting to note is the divergence regarding the "training by my HEI", which was rated as either being "very satisfied" or "neutral".

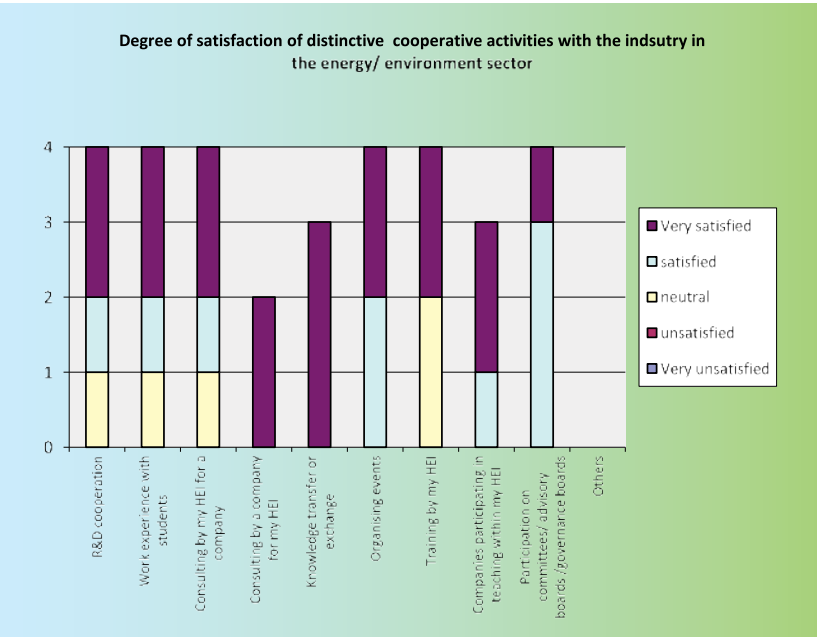


Diagram 7: Degree of satisfaction

When being asked about wishes for intensified cooperation, HEI gave very heterogeneous answers. On the positive side, an emphasis can be put on the items "R&D cooperation", "knowledge transfer and exchange", "training by my HEI", and "companies participating in teaching" with each 50% approval of "strongly agree". On the complete opposite of the spectrum, with "strongly disagree" and "partially disagree", one can find the items "R&D cooperation",

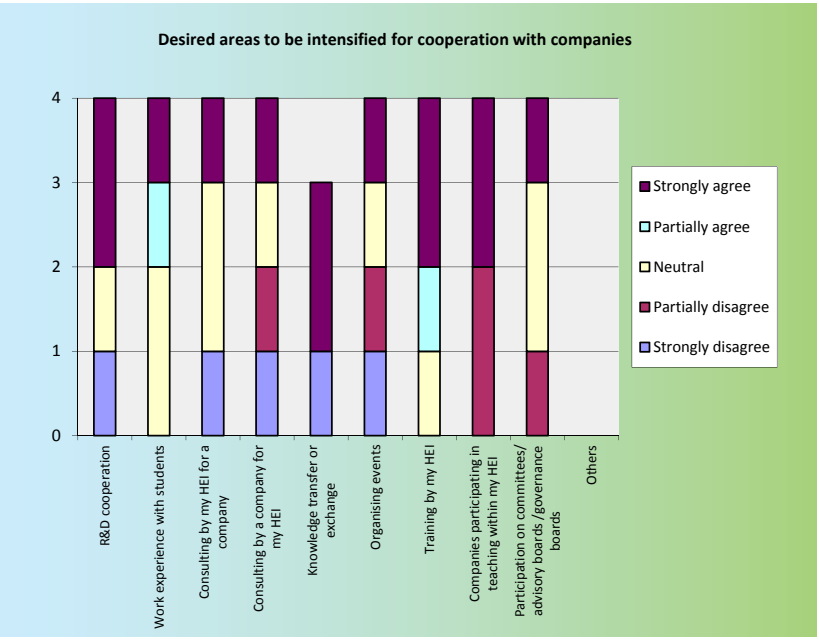


Diagram 8: Desired areas for intensified cooperation

"consulting by HEI", "consulting by company for HEI", "knowledge transfer and exchange", "organizing events" and "companies participating in teaching" with 25%- 50%. The absolute difference in opinion from the HEI is certainly noteworthy, but cannot be commented on, as any guess would be pure speculation.

The statement "I am satisfied with the number of international contacts of my HEI in the field of energy / environment" received the biggest agreement (75%) among respondents, which is a positive development for the sector. This is followed by "I am satisfied with the number of local / regional contacts", "... with the number of cooperation projects", "... with the composition of cooperation companies" and "cooperation projects normally take place smoothly" with a 50% approval rate. Only 25% rated the statement "I am satisfied with the number of cooperation projects" negatively, which might be due to internal acquisition problems.

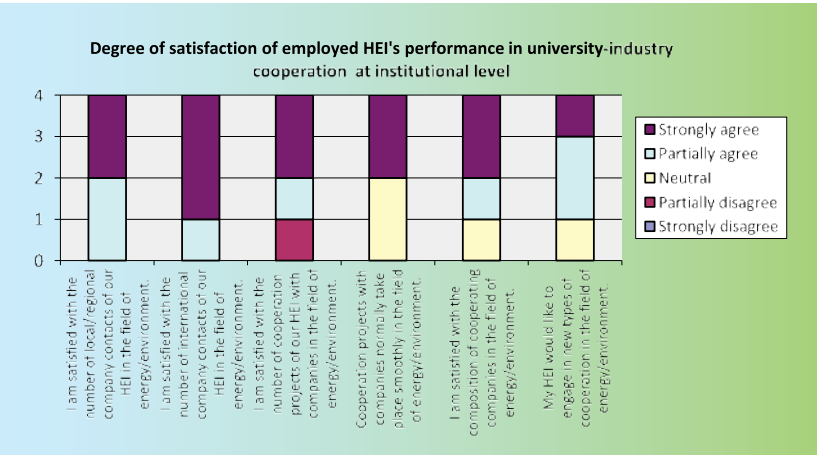


Diagram 9: Degree of satisfaction at institutional level

75% of respondents indicated the number of research cooperation agreements on average acquired per year, which varies significantly from 50 to 5 or 1. 50% added that intermediaries are involved in the acquisition process.

When being asked about the type of support given by intermediaries, 100% of respondents said that intermediaries directly fund cooperation. 67% stated that intermediaries either provide trainings or foster technology / knowledge transfer. Direct support such as arranging the cooperation, searching for funding opportunities, placing experts, accompanying the cooperation projects by providing know-how and giving support on IP issues seems to happen less often.

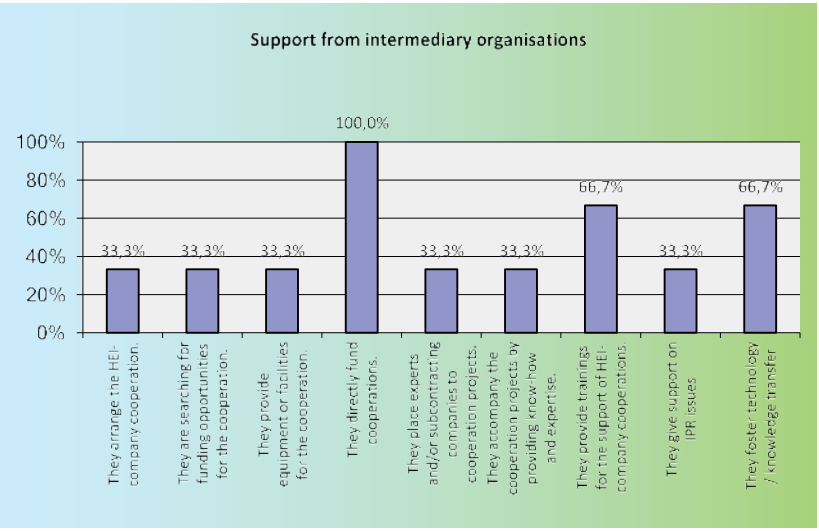


Diagram 10: Support from intermediary organisations

HEI representatives were asked to state the top priorities which need to be in place to ensure a quality engagement between HEI and business communities. Only 75% of respondents were willing to contribute to most parts this section. The respondents stated quality of R&D, full cost coverage of HEIs, structured information of possible cooperation areas, networking and clear IPR arrangements. Constraints were detected regarding available time and lack of cost coverage on HEI side. Therefore, one recommendation is that costs of HEIs should be covered completely.

HEI training

This questionnaire aimed at learning about training offers from HEI to companies in the field of energy and environment. The response rate was rather low, which makes interpretations difficult. The results shall nonetheless be displayed below.

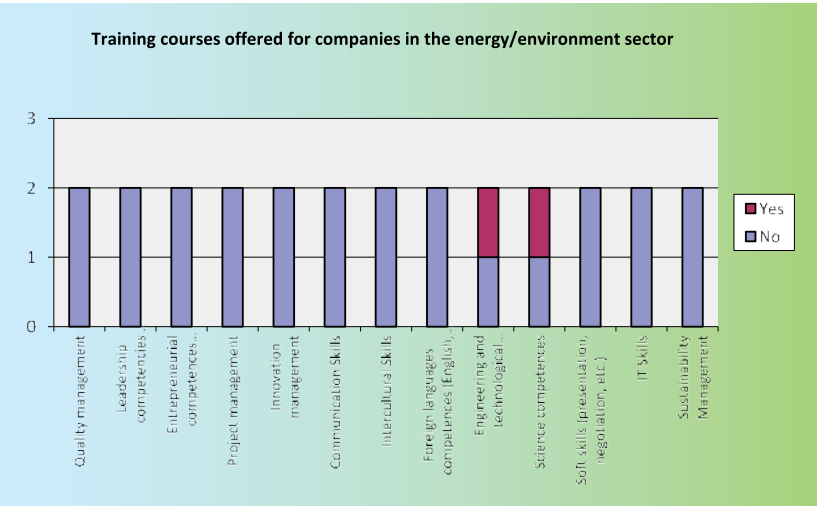


Diagram 11: Training courses offered by HEIs to companies

The main conclusion from the graph above is that HEI in general do not offer training courses, except for one positive response for "Engineering and technological competences" and "Science competences".

The next logical step was to ask HEI how satisfied they are with several elements of the trainings offered. As barely any training is offered anyways, the findings below are less significant than expected.

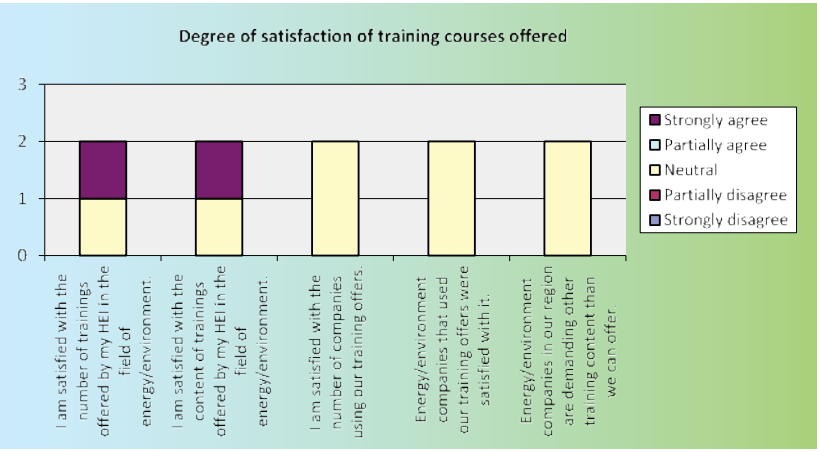


Diagram 12: Degree of satisfaction of training courses offered

50% of respondents were satisfied with the number of trainings offered and the content of the trainings, while the other items were rated as "neutral".

At this stage in the questionnaire, only one respondent remained, who rated the sufficiency of skills and competences taught at his/her HEI. 50% of all

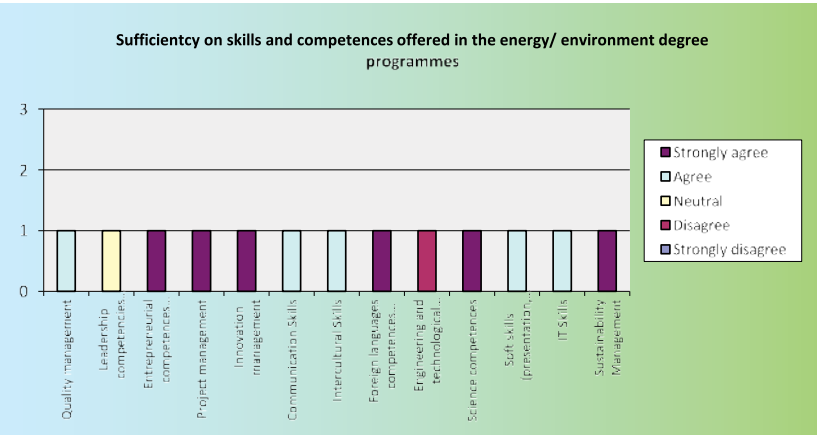


Diagram 13: Sufficiency on skills and competences offered

items listed were rated with "strongly agree" such as entrepreneurial competences, project & innovation management, science competences, sustainability management and foreign language skills. The only negative marking was put on "engineering and technological competences", which apparently points to the fact that competences must be extended in this field.

To find out about the work placement situation of graduates, one last evaluation question was asked. Graduates seem to be well-equipped for the working industry, they receive positive feedback from employers regarding their skills and competences and the HEI is receiving positive feedback from graduates regarding the work placement options. One critical point is the fact that the HEI does not have a work placement program for graduates, which certainly would increase the exposure of graduates to the industry even more.

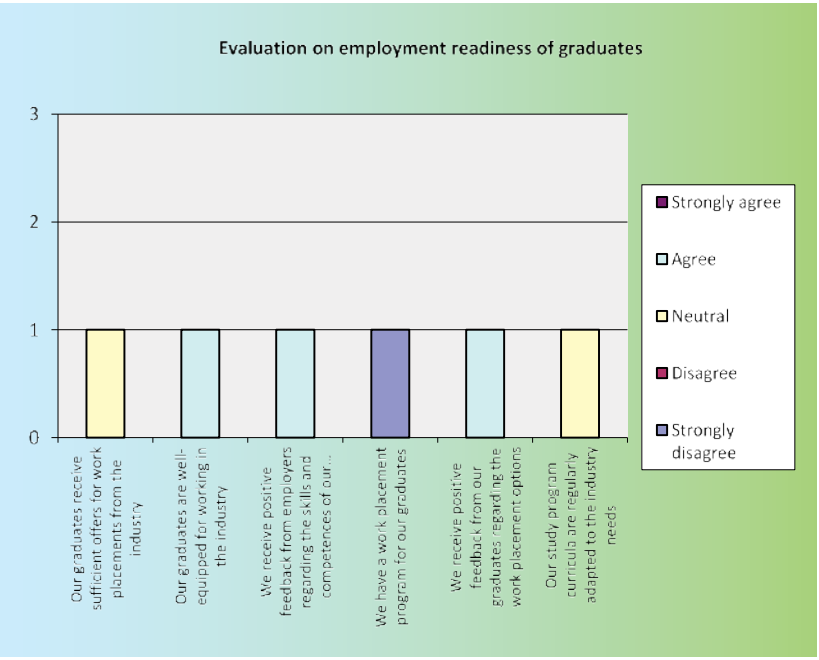


Diagram 14: Degree of satisfaction of graduates' placement

4.1.3 Intermediary Organisations

The last survey targeted intermediary organizations, from which 7 of them answered the questionnaire.

The first important topic to be examined was the areas intermediaries are supporting the specific industries of energy and environment in.

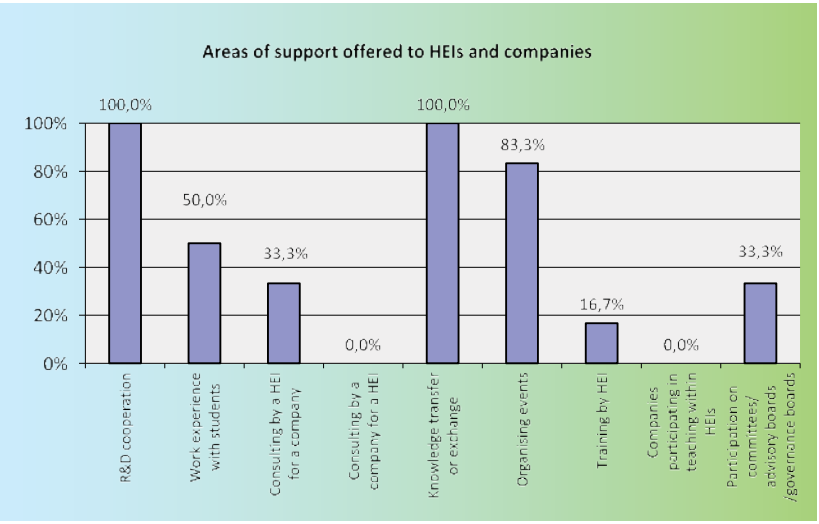


Diagram 15: Areas of support for HEI/company cooperation

Diagram 15 illustrates areas of support for HEI/company cooperation. All of the respondents support R&D cooperation and knowledge transfer. Almost everyone supports the organisation of events. No one stated that the support included consulting by companies for HEI and teaching involvement of companies.

Furthermore, it was interesting to determine what kind of support is given to companies and HEI in the target sectors.

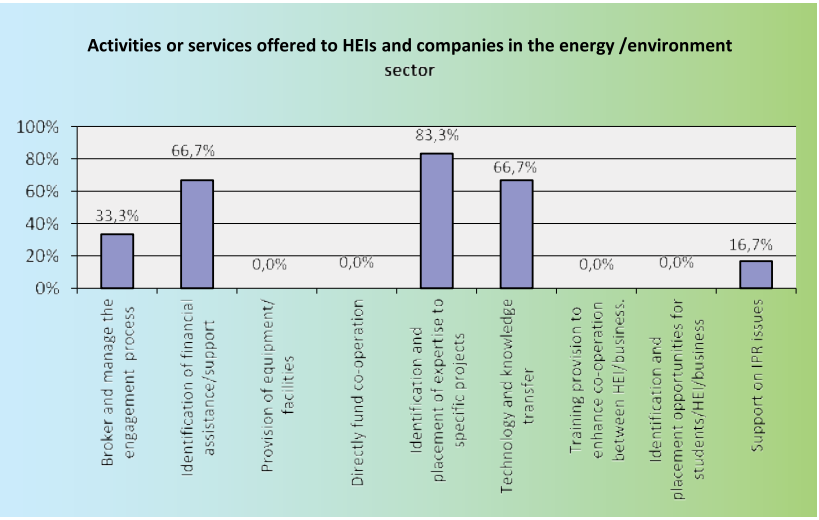


Diagram 16: Activities or services offered by intermediary organisations in the energy/ environment sector

Diagram 16 depicts the type of support intermediary organisations offer for HEI/company cooperation. Intermediary organisations give support in the process of identification and placement of specific expertise for projects, for technology and knowledge transfer, in identification of financial assistance as well as with brokering and managing the engagement process and support on IPR issues. In general, they do not provide equipment, directly fund cooperation, and provide trainings enhancing cooperation as well as identify and seek placement opportunities for students, HEIs and businesses.

Overall cooperation between companies and HEI work well, but room for improvement was also detected in this field. Especially the offering of trainings provided by HEIs could be increased in terms of quantity and in thematic areas. A major problem in R&D cooperation is the lack of funding and cost coverage for HEI.

4.2 Spain

The aim of the study was to detect the specific gaps between the needs of industry, and the provisions of Higher Education (Supply Vs. Demand). This was conducted, as in the other project partner countries, via a survey approach: 2 for Higher Education institutions, 1 for intermediary institutions, and 1 for companies. In the Spanish survey, the results were concentrated amongst the Valencian Community region, working with firms and intermediaries directly involved in the environment and energy fields. The survey included 33 companies, 5 HEI respondents and 3 intermediaries.The results of the survey can be seen below.

4.2.1 Companies

As called for in the survey instructions, the companies approached were to be SMEs as far as possible. 87.5% of those companies surveyed had between 1 and 50 employees, and the majority annual revenue of no more than 1 million EUR.

OF those companies approached, 45.5% stated that they had not worked in the past with Higher Education Institutions. For innovative industries, this is clearly a missing link in the R+D+I process. However, of the 50.5% who had worked with HEIs previously, 95% appeared to have found the relationship satisfactory and would recommend them as a partner to other SMEs and colleagues. When asked with which institutions local companies had had working relationships, the HEIs were disperse, from the southern to northernmost tip of Spain.

The relationships with HEIs were examined, and in what specific areas of work such relations had been carried out. For the most part (70%), cooperation with HEIs was regarding work placements for students, closely followed by 60% who had conducted some form of research collaboration. Companies could select as many options as were true.

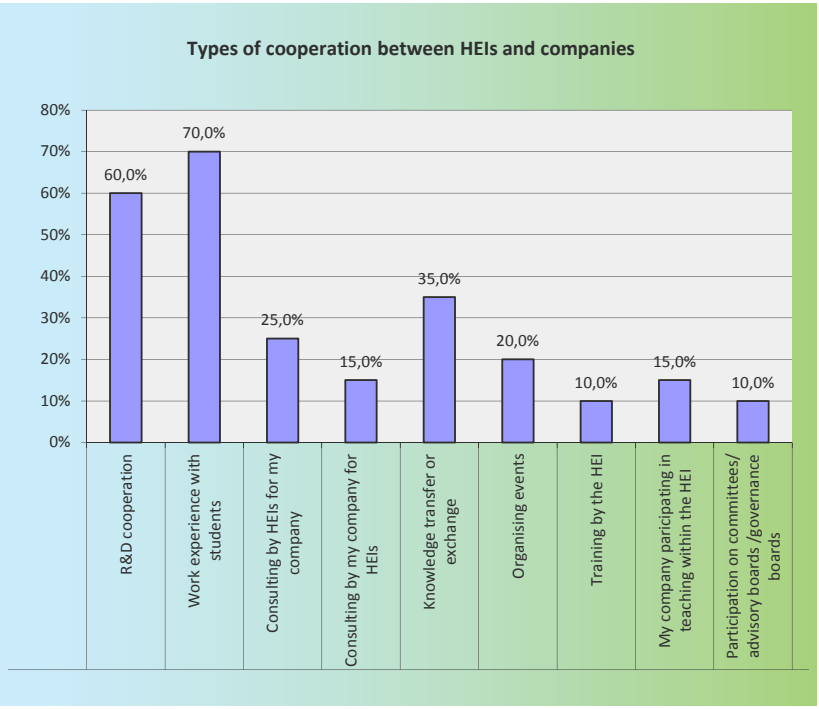


Diagram 17: Type of cooperation

It is interesting to note that these two types of cooperation are by far the main types, doubling and even tripling other responses. One item which appears to be poorly exploited (either by companies or by HEIs themselves) is the subject of training at a mere 10%. Technology transfer is also a rather poor indicator at 35%.

To be able to understand how the relationships between companies and HEIs develop and come about, it was important to find out how first contact is usually established.

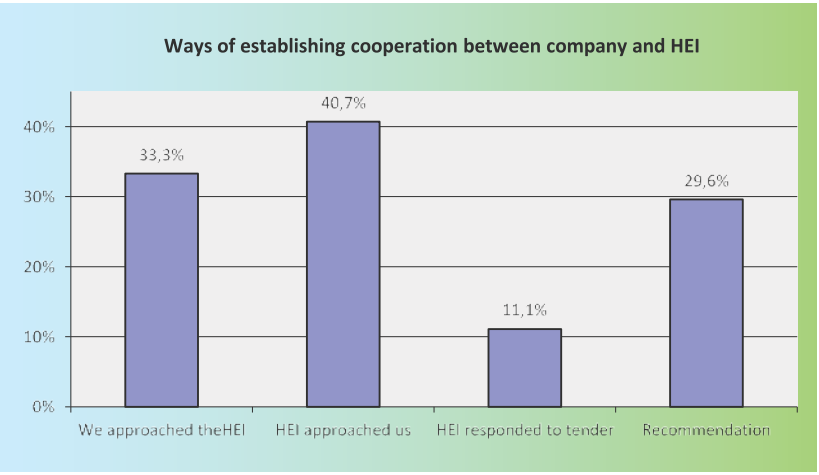


Diagram 18: Ways of establishing cooperation

Diagram 18 illustrates how relationships existing between HEIs and companies commenced. On the positive side, it is apparent that both companies and HEIs seek each other's assistance when considered appropriate. There is a slight inclination towards HEIs being the approaching party, with 40.7% compared to 33.3% of cases of the company approaching the HEI. Following this, a recommendation from a third party accounted for 29.6% of cases, and lastly, a small percentage of 11.1% being through a tender or other bidding process. It is clear from this, that direct approach can be the method to obtaining cooperation.

With a view to understanding why companies work together with HEIs, and what they consider their strengths to be, it was imperative to find out what the reasoning behind this cooperation might be. HEIs are not the only cooperation option, so they must exploit such strengths.

Companies were asked to select from the following options in Diagram 19 only the most important reasons.

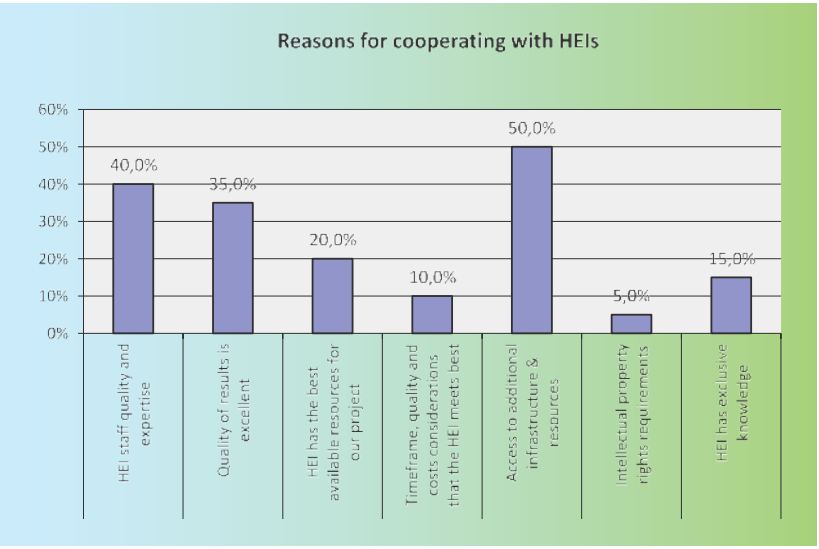


Diagram 19: Reasons for cooperation

Diagram 19 shows clear preference for the HEIs' resources and infrastructure availability as a cooperation pull factor for companies. Half of all respondents chose this as a main reason. This was followed up by the quality and experience of the HEIs' staff, with 40% and of their results, with 35%. It can be deduced from these responses and the graph, that HEIs are considered of seats of high quality results and qualified staff, as well as with resources that might otherwise be unattainable, in particular for an SME. However, in contradiction to this, companies did not highly consider that HEIs have exclusive know-how. What was not analysed in this particular question was the cost-quality ratio, which could have been an interesting factor to determine. It is worthwhile noting that of those surveyed who had collaborated with HEIs, the timescale of cooperation was relatively recent. The majority of respondents fell into the time bracket of within 5 years, which just two claimed 10 and 13 years respectively. Likewise, following a brief analysis of

which areas needed improvement within cooperation, there were various incidences of companies stating that the timescales offered for the completion of results and keeping to deadlines of HEIs was "poor". This is indeed an area to improve in this case.

Having examined the reasons and mechanisms behind cooperation, it was necessary to find out why the 45.5% of companies surveyed had not collaborated with HEIs. Unfortunately, no response was obtained from companies as to why they had not collaborated. Those who responded the survey skipped this question.

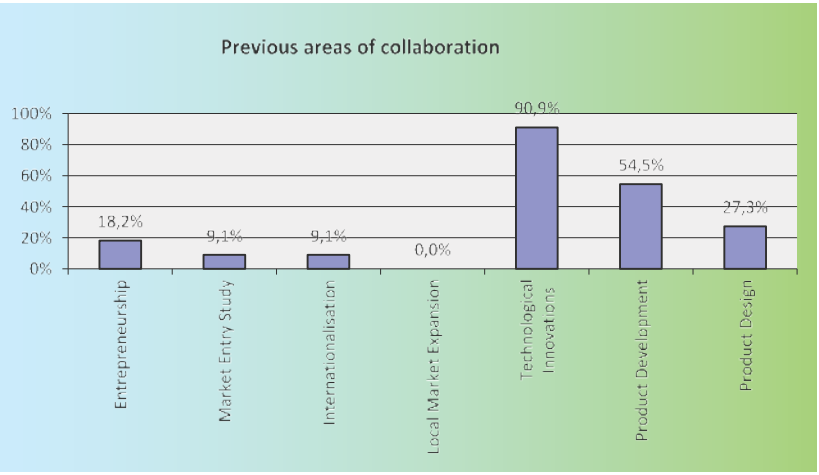


Diagram 20: Previous areas of collaboration

Returning to the companies with prior cooperation exercises with HEIs, they were asked to identify specific areas of joint work conducted.

Diagram 20 shows in which areas cooperation has been centred previously. The overwhelming majority has been in technological innovation, with 90%. Linked to this, 54% of cooperation was regarding product development. This shows a clear tendency towards commercial application and other industry-related development. When questioned about the thematic areas (scientific

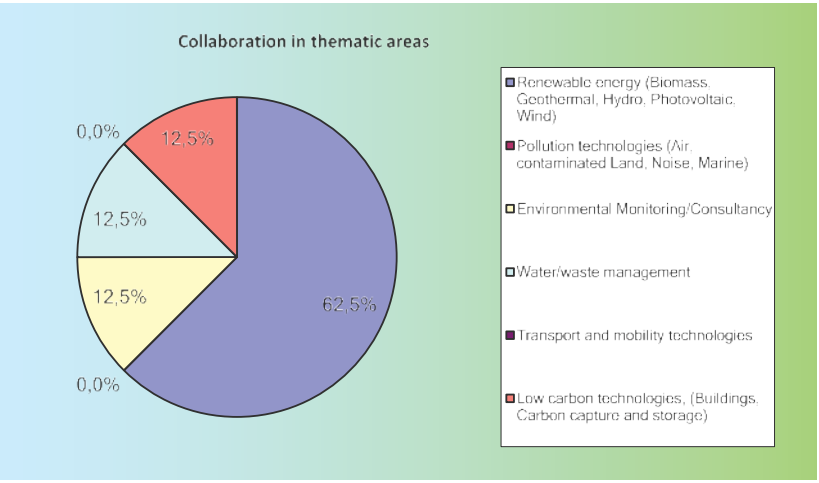


Diagram 21: Collaboration in thematic areas between HEIs and companies

disciplines and subject areas) around the environment and energy sectors in which cooperation has occurred, the responses were as shown below:

By far the largest area for cooperation was in renewable energy, with 62.5% of cooperation in this field. With the same percentage each (12.5%), was environmental monitoring / assessment, water and waste management, and low-carbon technologies. There was no cooperation cited in some areas mentioned in the survey, including clean transport technology, and contamination. This could be a reflection of a number of items, which could be determined through further study: a lack of specialization of universities in these fields, a lack of demand because of the makeup of the company survey sample (not working in these fields), lack of national interest in these fields.

75% of respondents stated in a further question that they would like to work on energy efficiency in the future.

Regarding the financing of cooperation, most companies were aware of the existence of grants and public awards for working together with other entities, such as HEIs. However, the prevalence of those who were able to achieve such a grant was significantly less than those who were aware of them. This could mean some important horizontal skills in drafting and attaining funding proposals from outside sources are lacking.

A subsection of the companies' questionnaire dealt with the assessment of university graduates' capacities and their applicability in the job market. Almost 85% of the companies surveyed had had some form of student worker, as a placement or an internship. Those who were asked to elaborate why not, and the responses included: they were not aware of this possibility, they simply did not need assistance, and they were studying the possibility to do so at the current time. Overall, the evaluation of students' selection processes and the relationship with the HEI for the internship process was positive. Companies considered generally that students were available with some appropriate skill sets, and that the communication with the HEI was good. Perhaps the best indicator is that 80% of companies had gone on to employ a student worker following the internship period.

However, when we examine the different individual skills and, in particular, horizontal skills, a different picture is painted:

Rate of graduates' competences:					
Answer Options	**Excellent**	**Good**	**Sufficient**	**Poor**	**Don't know or N/A**
Quality Management	3	8	4	3	3
Leadership competencies, including diversity management	1	7	7	4	3
Entrepreneurial competences (Networking, Strategic thinking etc.)	2	3	8	6	3
Project management	4	9	4	3	3
Innovation management	0	3	7	6	5
Communication Skills	2	11	2	5	2
Intercultural Skills	1	11	4	2	2
Foreign languages competences (English, German, Spanish)	2	4	7	6	4
Engineering and technological competencies	9	7	4	1	2
Science competences	1	8	7	0	5
Soft skills (presentation, negotiation, etc.)	2	7	5	5	2
IT Skills	4	8	7	1	2
Sustainability Management	0	7	7	0	7

Table 3: Graduates competences

Table 3 gives an overview of how companies rated individual skills such as quality management, oral and written communication, project management, etc. From this, we can see that graduates and work placement students

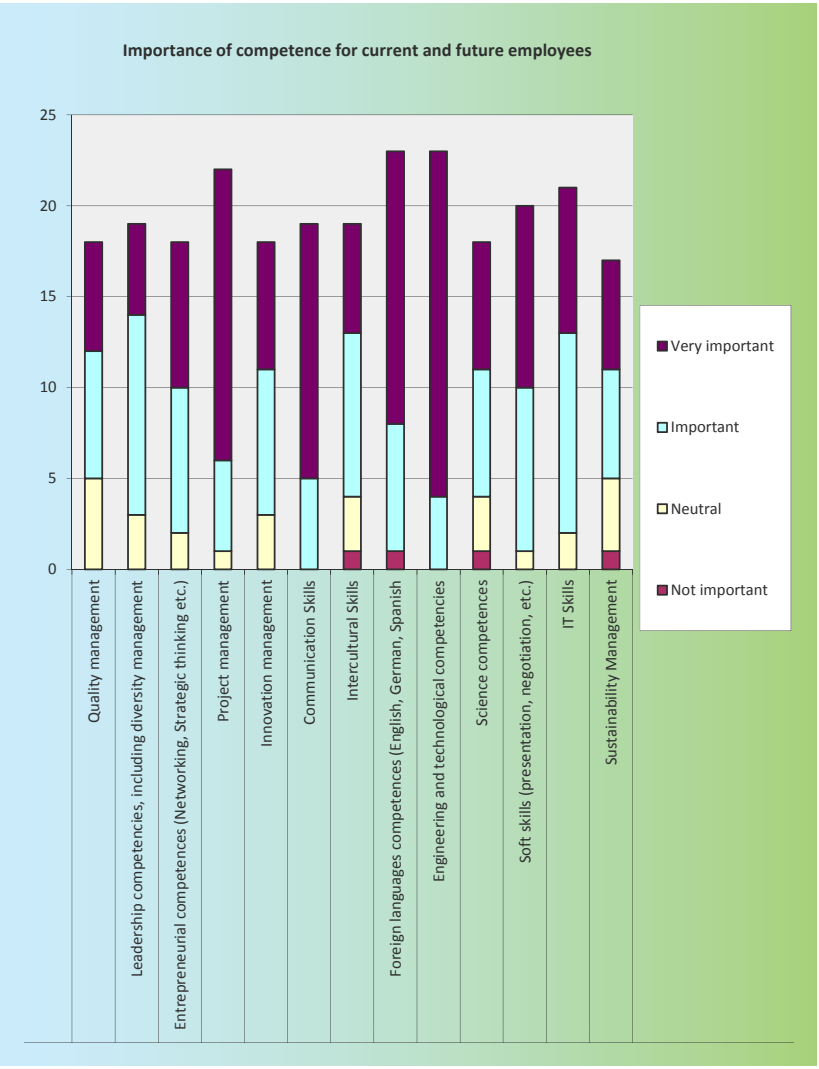


Diagram 22: Importance of competences for current and future employees

are lacking in many of these soft and complementary skills. There is no doubt that companies believe they have the technical and scientific knowledge following their previous answers. However, these soft skills need to be garnered and learned, and graduate profile and readiness should be enhanced. Companies did not consider in their totality (12.5%) that graduates are ready. Some comments included: "not ready for the realities of the labour market", "technically yes but not in terms of communication and other skills", "too much theory and not enough practice".

Companies were asked regarding which skills they considered fundamental for future graduates. Despite the above, the majority still considered technical and engineering competence as the most important.

This is closely followed by project management, foreign language competence, and communication skills.

Lastly, the survey focused on the training programmes and needs which are identified and adopted by the companies. The intention was to examine the relationship between skills, training offered by companies and if this is in collaboration with a training partner, such as the HEI.

Companies were asked how education and training is managed at their institutions. The majority response was that the company "encourages employees to educate themselves". This implies little or no commitment on the part of the institution towards training. This answer was counted in 19 responses, compared to the next most popular response with 12, which was that training is obligatory.

62.5% of companies stated that they received training offers from HEIs. It was important to know whether such offers were interesting, so the survey requested information in this regard. Results ranged from positive to outwardly negative. It was considered that courses offered were not entirely in line with the needs of industry, and that the practical elements were heavily outweighed by the theoretical. Lastly, companies stated that they had a clear preference for a combined online and classroom-based course, rather than one or the other for the training needs.

4.2.2 Higher Education Institutions

Two surveys were distributed among HEI to:

1. analyze R&D cooperation
2. observe the training & education situation of the HEI

Firstly, we will analyse the R+D cooperation elements as this ties in more with the previous section.

HEIs were asked how cooperation with enterprises commenced. There is quite some contradiction between the response and that of the companies.

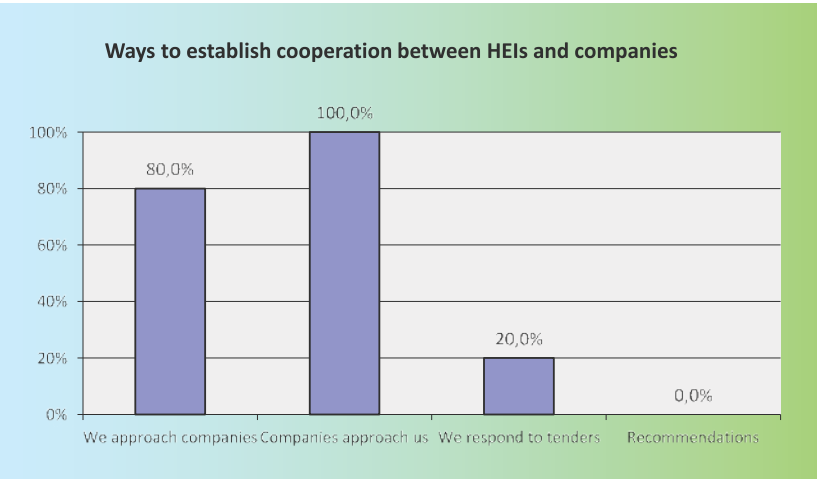


Diagram 23: Ways to establish cooperation between HEIs and companies

HEIs cited companies approaching them as the main factor in commencing cooperation (all respondents claimed this), whereas companies tended to state that HEIs approached them. In any case, it is clear from both items that this is the main starting point, a direct point of contact and most probably from a clear need.

Satisfaction of cooperation between companies and HEIs in the energy/ enviroment sector						
Answer Options	**Very satisfied**	**Satisfied**	**Neutral**	**Unsatisfied**	**Very unsatisfied**	
R&D Cooperation	1	2	0	2	0	
Work experience with students	0	4	0	1	0	
Consulting by my HEI for a company	1	1	1	1	0	
Consulting by a company for my HEI	0	1	1	2	0	
Knowledge transfer or exchange	1	1	0	2	0	
Organising events	1	1	1	1	0	
Training by my HEI	0	3	1	0	0	
Companies participating in teaching within my HEI	1	0	2	1	0	
Participation on committees/ advisory boards /governance boards	0	0	2	2	0	

Table 4: Satisfaction of cooperation between companies and HEIs in the energy/ environment sector

When asked about satisfaction levels (See table on previous page), it can be deduced that HEIs seem rather less satisfied with the interaction with companies than the companies themselves were. HEIs tended towards the neutral to less satisfied spectrum of responses.

HEIs were asked in which areas of cooperation they would like to intensify activity with companies.

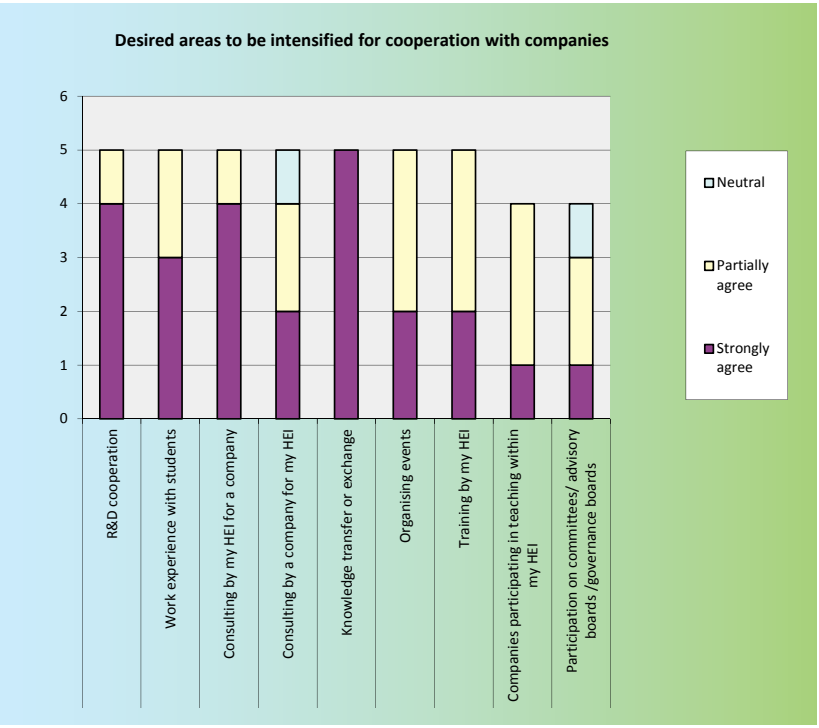


Diagram 24: Desired areas to be intensified for cooperation

The main area for HEIs of future interest was intensifying technology and knowledge transfer. This is a key priority within Spanish higher education at present (the national plan exemplifies it as a core practice for economic development). Therefore, it is logical that this be the strategic priority of the institutions surveyed at the present time. Secondary to this, is R+D coopera-

tion which is linked, and the issue of consultancy which no doubt is seen a source of new finance opportunities for the institutions. HEIs in Spain (as in most of Europe) are subject to budget restrictions for which they must seek a diversification of finances.

When questioned regarding the level of satisfaction with current cooperation activity and opportunities, HEIs stated in their entirety (100%) that they would like to intensify activity in the field of environment and energy, on different projects and actions. Logically, 50% were rather unsatisfied with the current number of cooperation projects with enterprises in this field. Other causes for concern were the number of international contacts they disposed of, and the relationship with the companies they current worked with had some room for improvement.

All HEIs (100%) questioned stated that intermediaries intervened in the relationship and contact between HEI and industry. In hindsight, It would have been interesting to include this option in the question regarding how contact is commenced, as it may be deduced that intermediaries could be a key starting point.

However, the following results give some interesting indicators:

Support from the intermediary on HEI-company cooperation in the field of energy/ environment	
Answer Options	**Response Percentage**
They arrange the HEI-company cooperation	50,0%
They are searching for funding opportunities for the cooperation	75,0%
They provide equipment or facilities for the cooperation	50,0%
They directly fund cooperation	0,0%
They place experts and/or subcontracting companies to cooperation projects	25,0%
They accompany the cooperation projects by providing know-how and expertise	50,0%
They provide trainings for the support of HEI-company cooperation	25,0%
They give support on IPR issues	0,0%
They foster technology / knowledge transfer	100,0%

Table 5: Support offered by intermediary organisations

All HEIs considered that intermediaries promote technology transfer, whereas the intermediaries themselves (see later) did not claim this as their main activity area. Therefore, there is some discrepancy, or perhaps lack of understanding, on their role in the process. Perhaps this is an area for HEIs and intermediaries to work out together.

When considering the constraints to cooperation, HEIs signalled similar difficulties to the companies, including financing and lack of knowledge of each other, including a lack of awareness of the needs of industry. Communication could be the key driver behind change. To overcome such constraints, HEIs cited intermediary assistance, public financing, and exchange and transfer actions.

On the subject of financing, Spanish HEIs gave equal importance to the financing provided by the European Commission (Framework Programmes) and the financing at national level from the "CDTI" (Centro para el Desarollo Tecnológico Industrial), an organization which is very active in science and technology.

HEI training questionnaires

Following an analysis of the R+D cooperation, HEIs were also given a second survey to look at the training situation and the competences of graduates, as well as lifelong learning elements.

Firstly, HEIs were asked if they offered training to companies and a list of topic areas was given. In particular, it was to determine which horizontal or complementary skills HEIs offer existing employees through training.

Diagram 25: Course offered by HEIs to companies

None of the HEIs survey gave training in leadership and related items. This would be a large market gap for training, given the importance of leadership not only for Directors, but also team leaders, supervisors, or project leaders. Only 1 HEI gave intercultural and communication skills training, which are also fundamental skills. Most commonly offered training include quality control, technical and engineering competences, and scientific skills. Again, there is a tendency towards the scientific and technical elements, but not a clear focus on complementary or life skills. HEIs had on average between 7 and 15 training

contracts a year. However, this average does not paint a clear picture, as 50% the HEIs surveyed did not have any at all, so it is clearly a case by case basis.

When discussing the skills and competences given to graduates, it was similarly evident that the main focus is on technical and engineering skills, and less importance is placed on the horizontal skills. This matches up with the industry evaluation of the preparedness of graduates. In terms of placements and opportunities for graduates, the following data is observed:

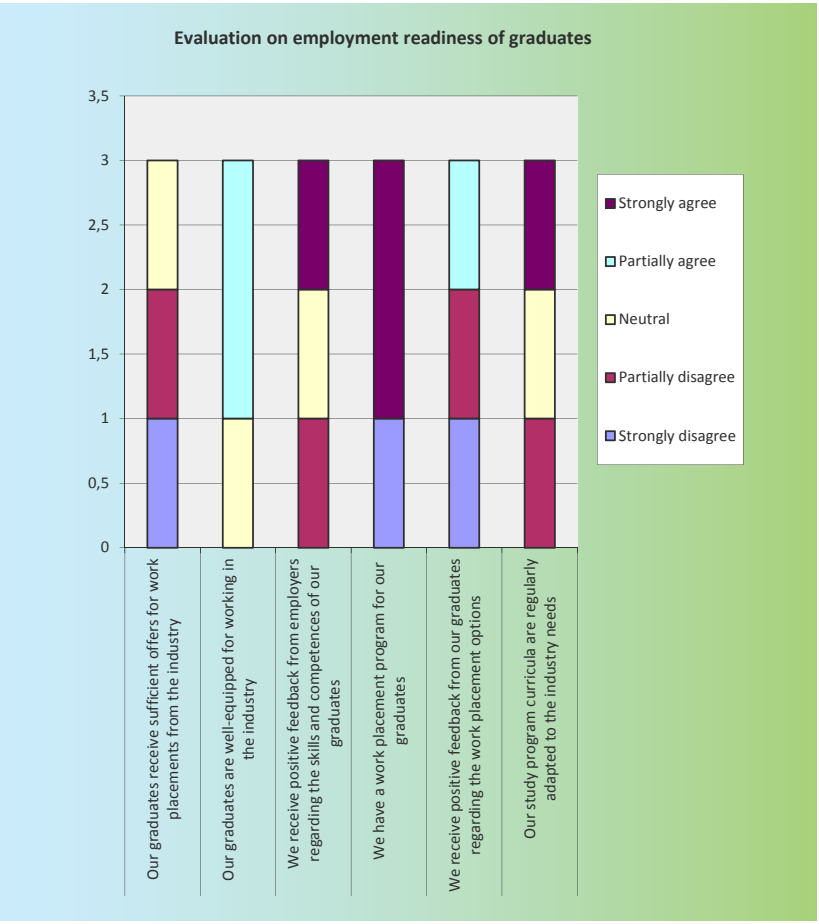


Diagram 26: Evaluation on employment readiness of graduates

HEIs feel in part that there is not enough opportunity for the placement of graduates, as well as that the feedback mechanisms do not give them enough information. Perhaps most tellingly, HEIs recognize at least in part that their programmes do not adequately fit the needs of the labour market and industry. The average time stated by HEIs for graduates to enter the workplace is 9 months.

4.2.3 Intermediary Organisations

The last target of the survey was intermediary organisations, working with companies and, where possible, also with HEIs. The survey was answered by organisations who were clusters and associations, technology platforms, and

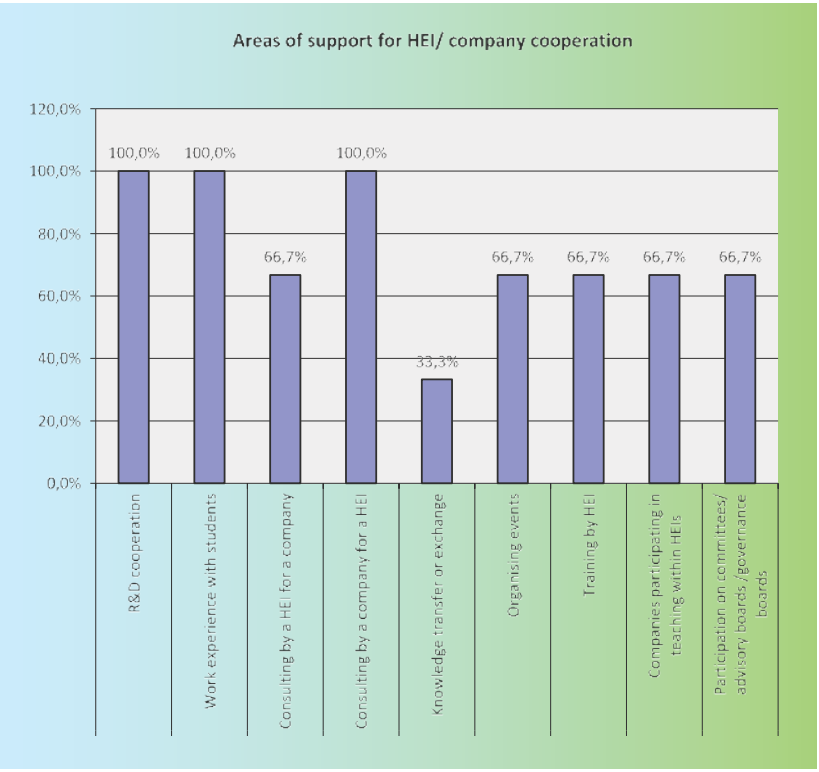


Diagram 27: Areas of support for HEI/company cooperation

not-for-profit private business intermediaries linked to a HE institution. All stated that a part of their work is to support cooperation between HEIs and industry in the fields of environment and energy.

Respondents were first asked what areas they support in their work as intermediary.

All of the respondents supported R+D cooperation, work experience for students, and, interestingly enough, consultancy for the HEI by a company. Other elements, such as transfer of knowledge and training were not in the priorities of the intermediary organisations.

Furthermore, it was interesting to determine what kind of support is given to companies and HEI in the target sectors. All intermediaries offered support in three areas: identification and placement of expertise for specific projects, technology and knowledge transfer, training provision to enhance cooperation between HEIs and enterprises, and identification of placements for students / HEI / business. No intermediary gave direct resources such as funding or equipment, and none was involved in the contractual side of cooperation. There was also no intermediary directly involved in or working with intellectual property issues.

When questioned regarding the skills they considered important for graduates to have within the industrial fields of environment and energy, intermediaries tended to coincide with the evaluation of companies. Project management, languages, and technical competence were high on the list of priorities. However, intermediaries also recognised the importance of knowledge and skills in knowledge and innovation management. When asked which preconditions should be in place for a quality engagement between HEI and companies, intermediaries gave equal importance to: a) a match of curricula offering to the needs of industry, b) exchange and other such schemes from HEI to industry and vice versa, and c) increase training opportunities with post-doc and student scholarships.

Besides the pre-conditions for successful cooperation, intermediaries were asked to consider the main constraints. Again, equal importance was given to three such constraints: a) the separation of basic research and industrial application, a mismatch of ideas and phases of development, b) lack of knowledge about the know-how and quality of the HEIs' teaching and results, and c) fall in R+D funding and business research activity, as well as a comment on how the rates of work of HEIs differ from those needed by companies.

When asked to prioritise methods to improve these situations, intermediaries chose **communication between both companies and HEIS** as the main tool. They considered that better communication, and more frequent communication, would be the key. This includes all types, formal and non-formal, meetings, seminars, projects, etc.

4.3 The United Kingdom

4.3.1 Companies

Of the thirty three companies surveyed within the UK twenty two said they had cooperated with companies in the past. Of these, twenty said they would recommend their HEI partner to other companies.

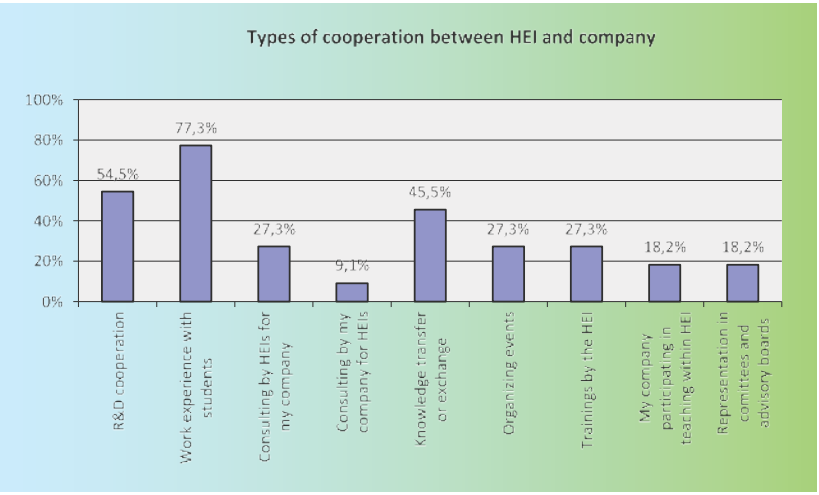


Diagram 28: Type of cooperation

Diagram 28 depicts the type of cooperation carried out by the 22 companies. The vast majority had been involved in work experience with students, while just over 50% had taken part in R&D cooperation projects, while just under 50% had been involved in knowledge transfer and exchange. This reflects a national trend in University-Industry collaboration although there is also some ambiguity (especially on the part of the companies) as to what constitutes knowledge exchange. The trend towards greater promotion of what is known in the UK as Continuous Professional Development (CPD) and work-based learning represents a growing area of University-Industrial engagement although it is still relatively low at under 30%. Surprisingly, perhaps, consultancy projects were the lowest form of collaboration at under 10%.

With the work carried out by Interface and other organisations it was also interesting to ascertain how companies first became aware of the opportunities for collaboration.

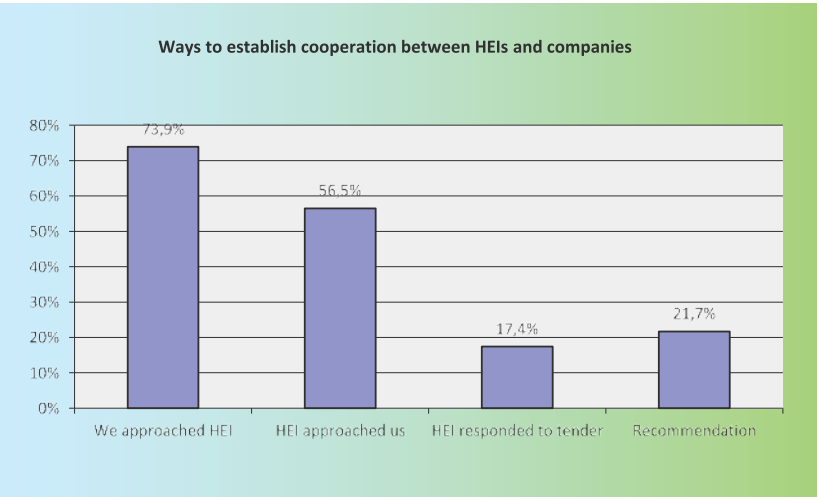


Diagram 29: Ways of establishing

The survey perhaps does not clearly define whether the approach by the company or university was direct or through an intermediary. Interestingly, in a larger proportion of cases the company approached the university (73.9%) rather than the other way round (56.5%). 17.4% responded that some relationships resulted from a call for tenders and 21.7% said that it was through recommendation. Although inconclusive this might suggest that Universities can do far more in approaching the companies. However it might also be true that companies and especially SME's are not really interested in exploring opportunities for engagement until they are incentivised to do so, either because of a particular need or because of funding such as the innovation voucher scheme. Universities on the other hand have a defined mission to seek opportunities for collaboration and the challenge is rather how and what SMEs to target.

A starting point to this may be to consider what the USPs (unique selling points) are offered by the Universities. In other words, why it is that companies collaborate with universities in the first place.

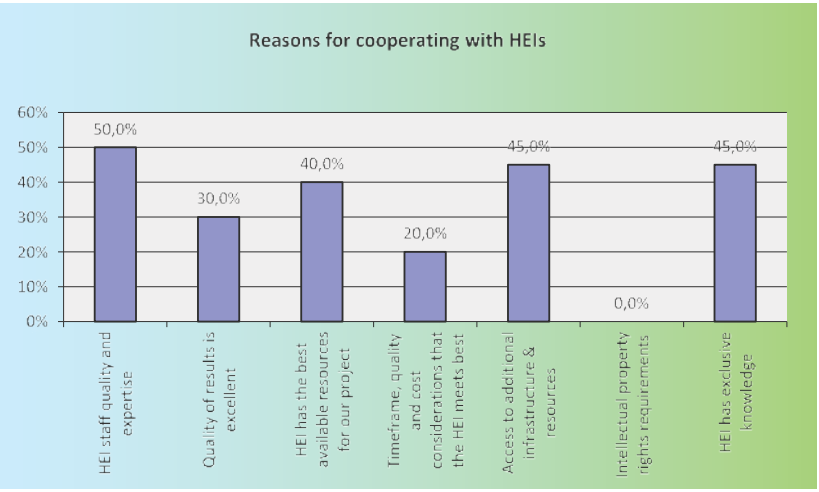


Diagram 30: Reasons for cooperation

It may seem surprising that only 50% responded that it was directly because of staff expertise, although that was the predominant reason. But clearly other areas such as the access to additional infrastructure the resources they offer and the exclusive knowledge offered by the universities is almost as important, as are such considerations as timeframe, quality and cost. It is notable too that none of the respondents were required to work with Universities because of intellectual property agreements. Although this is often seen as the mainstay of the University's innovation output, this survey clearly suggests that there are many other forms of relationship that are not based on license agreements.

It is equally important to try to identify reasons why companies have not collaborated with universities up until now.

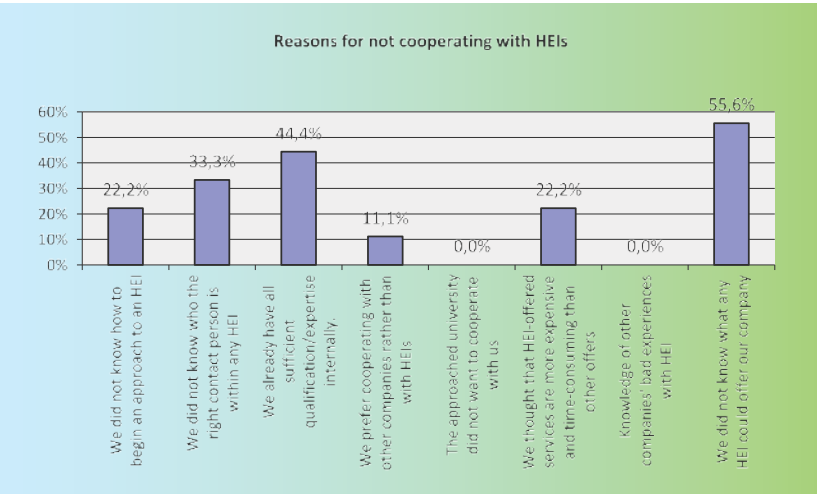


Diagram 31: Reasons for not cooperating

Predominantly (55.6%) of respondents actually stated that they were not actually aware of what Universities could offer. This clearly suggests that there is an issue with promotion on the part of the Universities. However, 44.4% also responded that they did not engage with Universities because they already had sufficient internal expertise. Although this might be the case, it also begs the question as to how companies know that there isn't something specific offered by Universities that might be of their benefit. There is a general assumption that University engagement is limited to technological innovation and that the company should be R&D active itself to be able to benefit from the opportunities offered through collaboration. This is clearly untrue.

More specifically it was interesting to reflect upon the types of activities in which universities and companies jointly engaged.

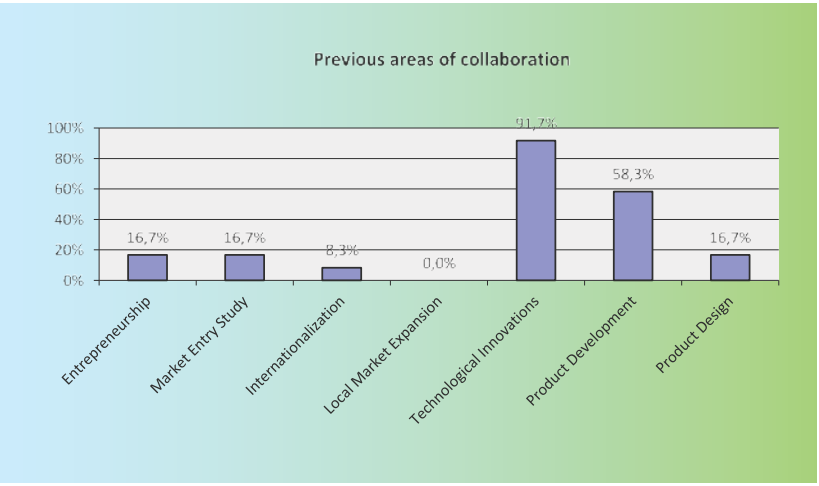


Diagram 32: Previous areas of collaboration

Perhaps unsurprisingly, the vast majority (91.7%) responded that it was based on technological innovations. Since none seemed to be involved in IPR agreements, at least at the beginning of their collaboration, it may be assumed that more of these were generated through some kind of joint project. None of the respondents had collaborated in improving local market expansion and under 10% had accessed international markets through universities (a relatively untapped resource that the Universities have to offer). Product development was deemed as quite important at 58.3%. Entrepreneurship, market entry study and product design were all cited as reasons for collaboration though less frequently.

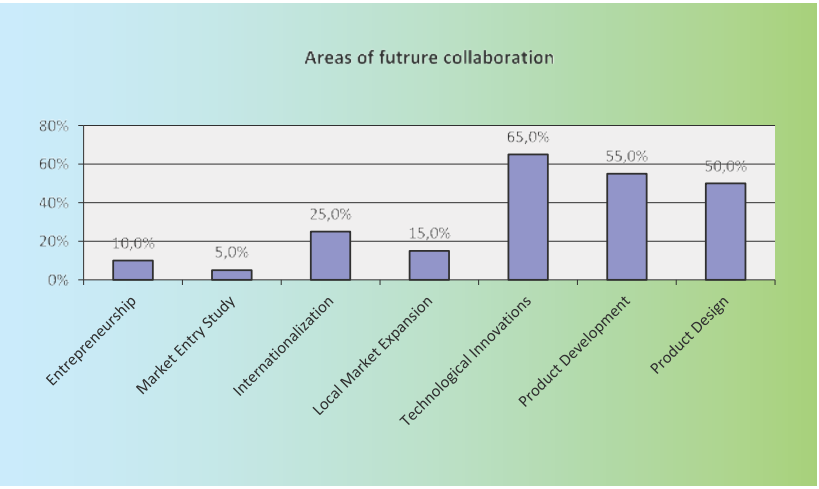


Diagram 33: Areas of future collaboration

It is also interesting to reflect on future or potential opportunities for future collaboration. While the majority (65%) said they would like to collaborate in the technological innovations, and to a lesser extent, product development (55%) and product design (50%), there was some interest in internationalisation and even to local market expansion (25% and 15%, respectively). There was less interest in collaboration based on market entry study and entrepreneurship.

Given the Scottish Government's priorities for their ambitious low carbon programme, it is relevant for universities to identify which thematic areas the companies might be looking as a possible basis for collaboration.

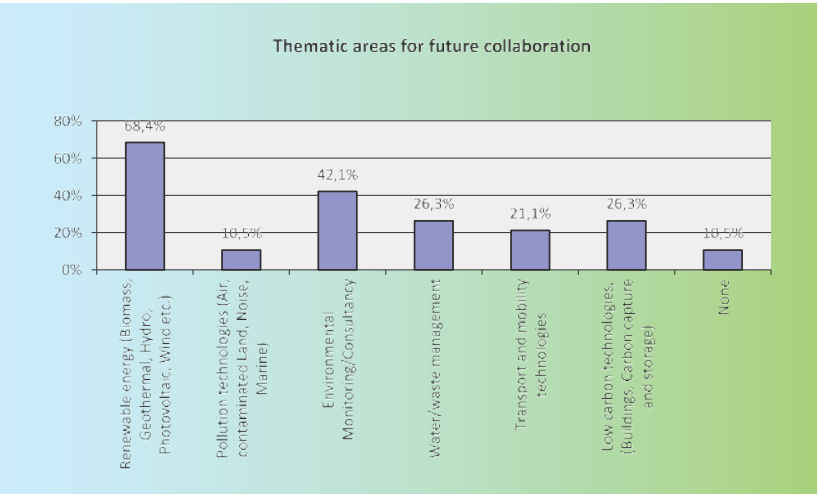


Diagram 34: Thematic areas of collaboration

By far the most predominantly identified area for future collaboration was in the renewable energy (68.4%) sectors, including biomass, geothermal, hydro, photovoltaic and wind energies, while there was also some interest (42.1%) in environmental monitoring and consultancy. Perhaps predictable, more specific technologies, such as pollution technologies, waste management and transport and mobility technologies attracted less interest.

Since companies predominantly cited internships and work experience as an important area of collaboration it is highly relevant to find out how the various skill sets of the graduates have been evaluated by the companies.

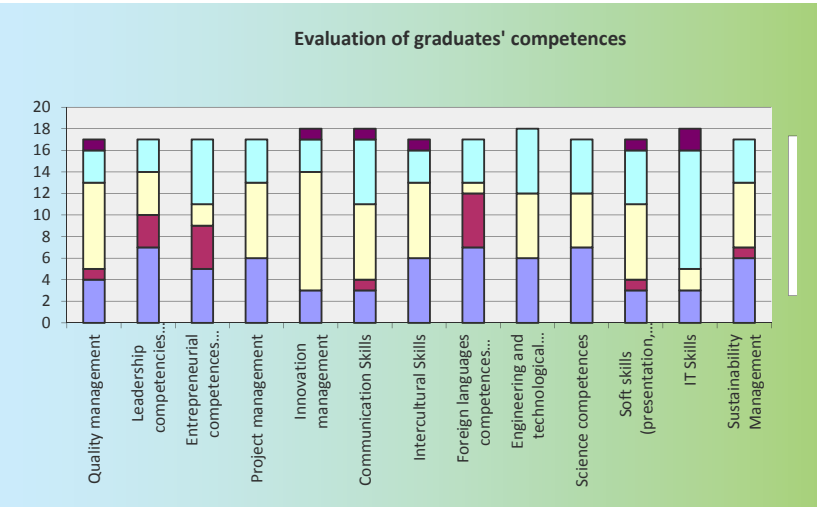


Diagram 35: Evaluation of graduates' competences

A familiar skill gap is identified with skills in foreign languages identified as a serious deficit in graduates (despite it would seem the efforts of programmes such as Erasmus which still struggles to attract significant numbers of UK students). Specific skills such as IT are more favourably assessed. Engineering and technological skills are never seen as excellent and project management skills are mostly seen as only sufficient. All these figures would suggest that a greater deal of practical experience is required for our students to add real value to the needs of the companies.

It is interesting then to compare about how companies perceive the relative importance of these skill sets.

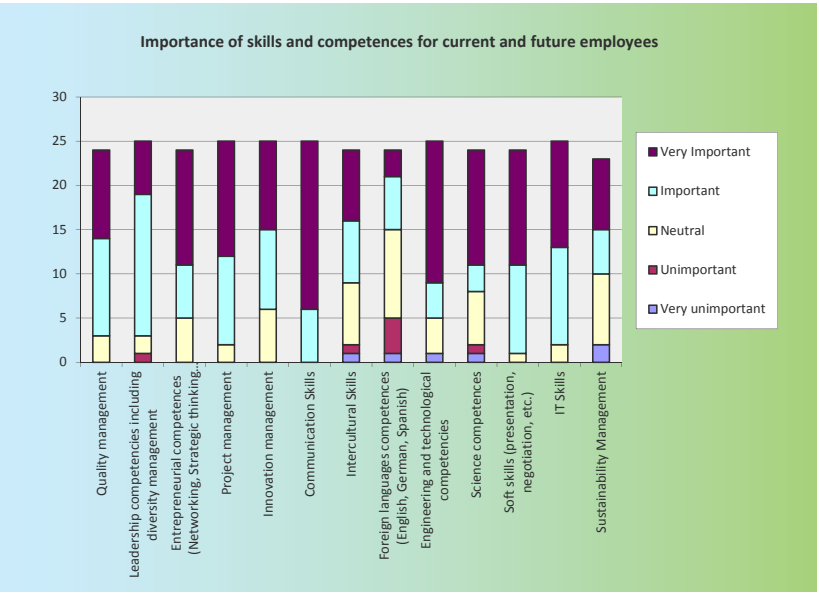


Diagram 36: Importance of skills and competences

By far the most important skill, according to those surveyed was the ability to communicate effectively, even more important than engineering and technological skills. Predictably, perhaps, project management was seen as a highly important skill as were entrepreneurial skills and innovation management. In fact, foreign language skills were not seen as relatively important.

4.3.2 Higher Education Institutions

Two surveys were distributed among HEI: R&D cooperation and observe the training and education situation of the HEI. It should be noted from the outset that the poor response from HEI may reflect their interest in the topic, or, more likely, the number of other national and international surveys that they are obliged to complete as part of their work, leaving them little time or inclination to take part in voluntary surveys. However, some of the opinions of those who took part on the surveys were noteworthy:

i. When asked about the top three priorities which needed to be in place to ensure a quality engagement between HEI/Business communities in the energy/environment sector, typical answers were as follows:

   a. Need to address it as a strategic priority
   b. A research need that the HEI can work on that satisfies 'impact'
   c. Signed and transparent collaboration agreements
   d. Resource from both partners being available, i.e. time and money
   e. Team commitment on all sides
   f. Realistic expectations on both sides

ii. When asked about the top three constraints to enabling a successful engagement to take place in the energy/environment sector, typical answers were as follows:

   a. Expectations not being managed properly
   b. Impact needs
   c. Poor communication
   d. Resource availability
   e. Poor management of costs
   f. Realistic expectations on both sides

iii. Respondents' top three recommendations to improve the engagement between HEI/ Business communities in the energy/environment sector included:

   a. Better communication
   b. The understanding that universities are bases of research and what research really is. Universities, particularly research intensive universities, should not provide ‚man with a spanner' type work
   c. Awareness of what is / what is not „research"
   d. The need to understand that real research is expensive
   e. Clear awareness of roles between partners
   f. £5k innovation vouchers are not research and are unattractive unless they lead to bigger projects.

iv. Respondents identified their top 3 most important funding programs best suited to foster the cooperation between HEI and companies in the energy/environment sector. These included:

   a. KTPs – Knowledge Transfer Partnerships
   b. TSB Feasibility Funding
   c. EngD – funding for professional engineering doctorates funded by the Engineering and Physical Sciences Research Council (EPSRC)
   d. Innovation vouchers
   e. Commissioned research

Although the responses from HEI were generally to be expected there is an increasing gap between the expectations and attitudes of research intensive universities, which are less enthusiastic about working with SMEs unless there is a clear R&D rationale behind it, and modern (post '92) universities whose research tends to be more limited though also more applied and responsive to societal needs and therefore more keen to cooperate with SMEs.

5

Case Study

Case Study - Rosendahl Maschinen GmbH - Austria

Rosendahl Maschinen GmbH is an international manufacturing solution provider headquartered in Pischelsdorf, Austria. Rosendahl serves for 3 different global industries offering manufacturing equipment for the battery industry, roll plants for the bakery market and production solutions for wires & cables.

As Rosendahl is acting as the market leader in the field of cable & wire and battery machines we rely on the permanent improvement of our performance and our research into new technologies.

Sometimes our internal resources are too weak or inefficient or we do not have the right equipment. This is the time when we get into contact with our partners from FH (University of Applied Sciences), university and external research departments.

We offer these institutions internships, bachelor works and diploma works as well.

Together with the universities we develop new technologies, engineer the processes for the different industries and also invent new materials and procedures for the industry.

Rosendahl started the collaboration with universities about 12 years ago together with the professional development of business strategies.

Universities and Research Departments give us an opportunity to find solutions that we would never find by ourselves.

Together with the University of Leoben, Rosendahl was able to develop new technologies and also materials to improve the coaxiality of energy cables for the industry. It was an almost one year process with 4 people involved from Rosendahl and at least 5 people from the university.

One of the best cooperation that we have with universities is the employment of students from the FH JOANNEUM in Graz (PTO – Production Technique and Organisation). It is the first degree program that is handled in a dual way. Students stay in the company for 6 month a year and 6 month in university. They learn how to apply their knowledge in a company and also get a fast response regarding their lessons learned.

For us it is one of the key degree programs for the future to keep our employees on a high educational level and secure their presence in the company.

As a summary

Universities and industry should have a permanent communication with specified contact persons to act and react promptly and also to understand each other's needs.

Case study: University-Industry Models in Spain

It is indisputable that cooperation between university and industry is a decisive factor for transfer of scientific knowledge. In the development of the GADGET Project to date through the company study, as well as the GADGET Café held on the 18th June, 2013, it has been possible to observe that the current state of university-industry collaboration in the environmental and energy sectors is carried out at distinct levels, and being able to be classified thus under three typologies of cooperation.

Committed Entrepreneurs

New entrepreneurs are aware that university-industry cooperation is a key factor to improve competitiveness, social and economic development. New business models depend more than ever on the generation of knowledge and the capacity to transfer it, for which purpose it is necessary to strengthen the link between the business and educational sectors.

This is the case of the company Abat Connection – www.abat.es (Company dedicated to electric-powered vehicles) which was recently formed. Within the initial business plan, cooperation with university was already considered as a factor to take advantage of the knowledge generated there, and transfer it to the electric vehicle sector in which their company is based. A cooperation agreement was signed with the Vice-Chancellorship for Research, Development and Innovation of the University of Alicante.

During the first year of business of Abat Connection, regulation and frameworks for the transfer of knowledge and technology have been defined, and joint research set in motion in subjects of energy efficiency, durability, and electrical motors.

Both the company's president and the Managing Director, Vicente Navarro, expressed their surprise at the equipment and installations at the University and their great potential, in terms of research, although they also expressed concern at the lack of initial knowledge, which they assert, is widespread, of the value the University of Alicante could offer the sector.

Sporadic Collaboration

This is the case of the company Atlántica Agrícola – www.atlanticaagricola.com. This company's activity is based around the development of humic acids, fertilisers and bio-catalysers, and with a clear focus on the improvement and respect for the environment. Since its beginnings, the company's policy has had a clear commitment to R&D&I, being a world class pioneer through the development of the fertiliser Biocat-15, a product which revolutionalised

the fertiliser sector. The company also conducts diverse lines of research to propose alternatives to pesticides and their use in agriculture.

As a result of its continuous internal research, the company set up Bio Atlántica, training and production centre in Honduras, where a new development line was created based on vegetable extracts. To obtain these abstracts, raw materials are cultivated and processed with the ultimate aim of controlling the production process from start to finish. This is essential for developing different research lines (R&D&I) studying the adaptation of products from each type of crop, climate, and agriculture.

Despite the company's continuous commitment to research, the majority of its research lines are conducted internally, merely supporting their internal findings with some minor input from universities and research centres. Their role is mainly analysis and tests, as this equipment is costly to run and obtain.

This situation can be easily traced to the fact that the research lines most universities follow in the fertiliser and bio-catalyser sector are fundamental or basic research with no direct market application. When the company has contacted research groups to discuss their real needs, groups have not been capable of adapting their research to satisfy such demands. All this, greatly hinders the generation of strategic alliances between university and industry, which could potentially be of large mutual benefit.

Case Study UK: AppleGreen Homes

Rising unemployment and dramatically increasing fuel prices could lead to significant fuel poverty in the UK unless more is done to invest in energy efficiency. Gas and electricity bills for millions of homes are expected to rocket in the coming years, as suppliers attempt to offset rising wholesale prices, energy analysts have warned.

Households are considered by the UK Government to be in fuel poverty if they have to spend more than 10% of household income on fuel to keep their home to an adequate standard of warmth. One of the most effective ways

of combating fuel poverty is to target energy efficiency measures in homes typically occupied by those on low incomes.

AppleGreen Homes worked with Glasgow Caledonian University and Glasgow-based Spacesix Architects to research and develop an affordable, energy efficient home for the future at the new BRE Innovation Park at Ravenscraig in Motherwell. It features a solar energy package that will not only help significantly reduce electricity bills but will also drastically reduce heating bills, helping to eradicate fuel poverty. In addition, a guaranteed feed-in tariff from the solar electricity package will be paid to the owner, developer, housing association or council.

The BRE Scotland Innovation Park was inspired by the BRE Innovation Park in Watford and aims to showcase the future of Scottish housing in the first phase, with non-domestic properties to follow later. This will be achieved by demonstrating full scale buildings that include future techniques, technologies and processes that will drive a step change in the construction industry. Taking a plot on the BRE Innovation Park for three years, AppleGreen Homes will demonstrate an entirely fitted out and furnished home starting from £50,000. AppleGreen aims to keep costs down in construction with speed of installation, sustainable recycled steel and eco effective products. AppleGreen is working with sponsor partners to showcase their products within the eco house, including windows from NorDan, Solar Edge panels from Ubbink, air exhaust heat pump from NIBE, and under floor heating system from Myson. At Glasgow Caledonian University, experts in the School of Engineering and the Built Environment are involved in researching and testing the AppleGreen eco house's energy consumption credentials throughout the development.

GCU is also developing and installing a wireless sensor system into its homes, funded with a CIC Start Online grant. The system will measure energy inputs and outputs and analyse the real time energy performance of the house. The environmental strategy for the house includes harvesting rain water, an exhaust air heat recovery system, effective insulation, under floor heating and solar energy panels.

AppleGreen Homes CEO Alan Wallace says:"Glasgow Caledonian University is helping us with energy analysis and calculations, which to be part of the BRE site must adhere to the strictest environmental guidelines. The research being conducted by the University is allowing us to confidently go ahead. The house will be so energy efficient that it will be cheap to heat, vastly reducing power output. From that point of view, this is a very timely development as when you buy a house in the near future, a main concern will be how much does it cost to heat."

Glasgow Caledonian University's Dr Stas Burek has MSc and PhD degrees in energy technology and has previously worked as an energy consultant to local authorities and a Research and Development Engineer in energy-related manufacturing companies. He has over 25 years' experience of research, consultancy and teaching in a wide range of energy technologies. Dr Burek's research interests include energy resource assessment, renewable energy, heat transfer in energy systems, energy policy and energy use in buildings. He has worked with business and public sector partners on projects including feasibility studies for renewable energy, CHP (Combined Heat and Power) and other technologies, renewable resource assessment, and practical monitoring, data collection and analysis. The AppleGreen energy efficient home is intended to be one of several different styles of home by different developers alongside a Visitors' Centre providing full information on all of the buildings and products on the Innovation Park, while also showcasing a range of new designs and technologies. There are also plans for future BRE Innovation Parks in other parts of the world including Toronto, Brazil and Moscow.

Annex
Methodology & Questionnaires

The needs and process identification was carried out in the form of an online survey directed towards 3 sets of target groups engaged in the energy and environment sector in Austria, Spain and the UK, namely companies, intermediaries and HEI. The objectives of the survey were manifold:

- to identify areas of collaboration between companies and HEI
- to evaluate the level of involvement of intermediaries in HEI-company cooperation
- to identify possible mismatches between HEI graduates' skills and requirements in the market
- to analyze the placement situation of graduates in the market
- to assess the level of training provided by HEI to companies

The questionnaires were developed collectively by all project partners keeping in mind the following guidelines: easy-to-follow and clearly worded questions, no leading questions, comparability of data and no excessive length. It was also important to respect items which may be obsolete or not applicable

in each of the three countries (i.e. no mention of specific laws). The first version of the questionnaires in English was presented, and underwent multiple feedback loops. Once this standard questionnaire was agreed, it was translated into German and Spanish.

Country Specific Modifications

It was decided that each of the three partner countries could make extremely minor and non-significant changes to the questionnaires in agreement with the other partners. This was to allow for national differences and any further information deemed to be interesting and / or necessary.

For Austria it was decided that only the company questionnaire needs to be translated to ensure that SMEs do not incur any language problems. Most HEI and intermediaries use English as a second working language and were expected to be comfortable with it.

In the UK, the Chamber of Commerce (Glasgow) requested during the creation of the final version permission to add a question, which was of personal interest for their records. This question was included but not into the overall analysis. They also replaced some terminology considered more appropriate for their local environment.

In Spain, the questionnaires were translated and presented exactly as agreed (no modifications necessary).

It is important to note that these modifications did not affect the comparability of the data.

The responses were collected over a pre-determined period of time through the online tool SurveyMonkey, for which FHJ has an institutional account. The collection was overseen by the same partner to ensure that all three countries reach or get as close to their target numbers as possible.

At the end of the collection time, the results per country were extracted by FHJ and distributed to the relevant partners. UA later made a com-

parative analysis following the production of country reports by the three HEIs involved.

Attached below are all 4 sets of questionnaires in the following order:

a. HEI Training
b. HEI Cooperation
c. Companies
d. Intermediary

Survey on Higher Education Institution-company cooperation - HEI

Introduction

This questionnaire is part of the project “Good Practice Pilot Action for Innovative Industries: Education, Training and Exploitation” (GADGET) a consortium of 9 international partners led by University of Alicante (Spain). GADGET's overall objective is to conduct a pilot action in 3 countries for good practice in cooperation between Higher Education Institutions and companies in environmental and energy industries. Any provided information and data is only used for this project, treated highly confidentially and will not be given to third parties. The questionnaire contains different questions to the subject areas as follows:

The questionnaire contains different questions to the subject areas as follows:

- General questions about your Higher Education Institution (HEI)
- Questions about your HEI’s training offers for companies in the energy/ environment sector
- Questions about placement of graduates

Completing the questionnaire will only take 10 minutes of your time. Individual responses will remain confidential. While we guarantee anonymity, we hope that you will fill in your contact information. This will allow us to provide you with a summary of the survey and project results.

Thank you very much for your cooperation!

Survey on Higher Education Institution-company cooperation - HEI

General Questions about You and your Institution

1. Name and weblink of your institution

Please enter the name of your institution:

Please enter the weblink of your institution:

2. Personal Data (Data stays confidential. It will only be used for informing you about the project.)

Name

E-mail:

*3. My institution is located in..

- ◯ Austria
- ◯ Spain
- ◯ United Kingdom

Survey on Higher Education Institution-company cooperation - HEI

Questions about your HEI's training offers for companies in the energy/ env...

4. We offer training courses for companies in the energy/environment sector in the following areas...

	Yes	No
Quality management	◯	◯
Leadership competencies including diversity management	◯	◯
Entrepreneurial competences (Networking, Strategic thinking etc.)	◯	◯
Project management	◯	◯
Innovation management	◯	◯
Communication Skills	◯	◯
Intercultural Skills	◯	◯
Foreign languages competences (English, German, Spanish)	◯	◯
Engineering and technological competencies	◯	◯
Science competences	◯	◯
Soft skills (presentation, negotiation, etc.)	◯	◯
IT Skills	◯	◯
Sustainability Management	◯	◯

Other (please specify)

Survey on Higher Education Institution-company cooperation - HEI

5. Please evaluate the following statements according to your observations.

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree
I am satisfied with the number of trainings offered by my HEI in the field of energy/environment.	◯	◯	◯	◯	◯
I am satisfied with the content of trainings offered by my HEI in the field of energy/environment.	◯	◯	◯	◯	◯
I am satisfied with the number of companies using our training offers.	◯	◯	◯	◯	◯
Energy/environment companies that used our training offers were satisfied with it.	◯	◯	◯	◯	◯
Energy/environment companies in our region are demanding other training content than we can offer.	◯	◯	◯	◯	◯

6. Training Contracts

How many training contracts do you acquire per year on average with industry partners from the energy/ environment sectors?

Survey on Higher Education Institution-company cooperation - HEI

Placement of Graduates

7. In our energy/environment degree programs, the following skills and competences are sufficiently taught.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Quality management	◯	◯	◯	◯	◯
Leadership competencies including diversity management	◯	◯	◯	◯	◯
Entrepreneurial competences (Networking, Strategic thinking etc.)	◯	◯	◯	◯	◯
Project management	◯	◯	◯	◯	◯
Innovation management	◯	◯	◯	◯	◯
Communication Skills	◯	◯	◯	◯	◯
Intercultural Skills	◯	◯	◯	◯	◯
Foreign languages competences (English, German, Spanish)	◯	◯	◯	◯	◯
Engineering and technological competencies	◯	◯	◯	◯	◯
Science competences	◯	◯	◯	◯	◯
Soft skills (presentation, negotiation, etc.)	◯	◯	◯	◯	◯
IT Skills	◯	◯	◯	◯	◯
Sustainability Management	◯	◯	◯	◯	◯

Survey on Higher Education Institution-company cooperation - HEI

8. Please evaluate the following statements according to your observations.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Our graduates receive sufficient offers for work placements from the industry	◯	◯	◯	◯	◯
Our graduates are well-equipped for working in the industry	◯	◯	◯	◯	◯
We receive positive feedback from employers regarding the skills and competences of our graduates	◯	◯	◯	◯	◯
We have a work placement program for our graduates	◯	◯	◯	◯	◯
We receive positive feedback from our graduates regarding the work placement options	◯	◯	◯	◯	◯
Our study program curricula are regularly adapted to the industry needs	◯	◯	◯	◯	◯

9. The average time period for graduates to find work placements is...

(in months)

Survey on Higher Education Institution-company cooperation - HEI

Thank you very much for completing the questionnaire!

In the course of the next days we will call you to ask follow-up questions, which also will not take much of your valuable time.

10. If you like to receive a copy of the final project results, please tick yes

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation - HEI

Introduction

This questionnaire is part of the project “Good Practice Pilot Action for Innovative Industries: Education, Training and Exploitation” (GADGET) a consortium of 9 international partners led by University of Alicante (Spain). GADGET's overall objective is to conduct a pilot action in 3 countries for good practice in cooperation between Higher Education Institutions and companies in environmental and energy industries. Any provided information and data is only used for this project, treated highly confidentially and will not be given to third parties. The questionnaire contains different questions to the subject areas as follows:

The questionnaire contains different questions to the subject areas as follows:

- General questions about your institution
- Questions about HEI-company cooperation in the Energy/environment sector

Completing the questionnaire will only take 10 minutes of your time. After answering the questionnaire, we would like to contact you to ask follow-up questions, which also will not take much of your valuable time. Individual responses will remain confidential. While we guarantee anonymity, we hope that you will fill in your contact information. This will allow us to provide you with a summary of the survey and project results.

Thank you very much for your cooperation!

Survey on Higher Education Institution-company cooperation - HEI

General Questions about You and your Institution

1. Name and weblink of your institution

Please enter the name of your institution:

Please enter the weblink of your institution:

2. Personal Data (Data stays confidential. It will only be used for the follow-up interview and informing you about the project.)

Name

E-mail:

Phone:

*3. My institution is located in...

- ◯ Austria
- ◯ Spain
- ◯ United Kingdom

Survey on Higher Education Institution-company cooperation - HEI

Questions about HEI-company cooperation in the Energy/environment sector

4. How does cooperation between your HEI and companies normally start?

- [ ] We approach companies
- [ ] Companies approach us
- [ ] We respond to tender
- [ ] Recommendation

Other (please specify)

5. From whom do you normally receive recommendations (e.g. former students, intermediaries, personal contacts etc.) for the cooperation with a company?

6. How satisfied are you with the degree of your HEI's company cooperation in the energy/environment sector with regard to..?

	Very satisfied	satisfied	neutral	unsatisfied	Very unsatisfied
R&D cooperation	◯	◯	◯	◯	◯
Work experience with students	◯	◯	◯	◯	◯
Consulting by my HEI for a company	◯	◯	◯	◯	◯
Consulting by a company for my HEI	◯	◯	◯	◯	◯
Knowledge transfer or exchange	◯	◯	◯	◯	◯
Organising events	◯	◯	◯	◯	◯
Training by my HEI	◯	◯	◯	◯	◯
Companies participating in teaching within my HEI	◯	◯	◯	◯	◯
Participation on committees/ advisory boards /governance boards	◯	◯	◯	◯	◯
Others	◯	◯	◯	◯	◯

If answering to "other", please specify the type of cooperation

Survey on Higher Education Institution-company cooperation - HEI

7. I want that my HEI intensifies cooperation with companies in the energy/environment sector in...

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree
R&D cooperation	◯	◯	◯	◯	◯
Work experience with students	◯	◯	◯	◯	◯
Consulting by my HEI for a company	◯	◯	◯	◯	◯
Consulting by a company for my HEI	◯	◯	◯	◯	◯
Knowledge transfer or exchange	◯	◯	◯	◯	◯
Organising events	◯	◯	◯	◯	◯
Training by my HEI	◯	◯	◯	◯	◯
Companies participating in teaching within my HEI	◯	◯	◯	◯	◯
Participation on committees/ advisory boards /governance boards	◯	◯	◯	◯	◯
Others	◯	◯	◯	◯	◯

If answering to "other", please specify the type of cooperation

8. Please evaluate the following statements according to your observations.

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree
I am satisfied with the number of local/regional company contacts of our HEI in the field of energy/environment.	◯	◯	◯	◯	◯
I am satisfied with the number of international company contacts of our HEI in the field of energy/environment.	◯	◯	◯	◯	◯
I am satisfied with the number of cooperation projects of our HEI with companies in the field of energy/environment.	◯	◯	◯	◯	◯
Cooperation projects with companies normally take place smoothly in the field of energy/environment.	◯	◯	◯	◯	◯
I am satisfied with the composition of cooperating companies in the field of energy/environment.	◯	◯	◯	◯	◯
My HEI would like to engage in new types of cooperation in the field of energy/environment.	◯	◯	◯	◯	◯

9. Research Cooperation Agreements

How many research cooperation agreements do you acquire per year on average with industry partners from the energy/ environment sectors?

Survey on Higher Education Institution-company cooperation - HEI

Questions about involvement of intermediaries

***10. Are intermediaries involved in HEI-company cooperation?**

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation - HEI

11. How does the intermediary normally support HEI-company cooperation in the field of energy/environment? (multiple answers possible)

- [ ] They arrange the HEI-company cooperation.
- [ ] They are searching for funding opportunities for the cooperation.
- [ ] They provide equipment or facilities for the cooperation.
- [ ] They directly fund cooperations.
- [ ] They place experts and/or subcontracting companies to cooperation projects.
- [ ] They accompany the cooperation projects by providing know-how and expertise.
- [ ] They provide trainings for the support of HEI-company cooperations.
- [ ] They give support on IPR issues
- [ ] They foster technology / knowledge transfer

Other (please specify)

Survey on Higher Education Institution-company cooperation - HEI

Open ended questions on HEI/company cooperation

12. What would be the top three priorities which need to be in place to ensure a quality engagement between HEI/Business communities in the energy/environment sector?

1
2
3

13. What would be the top three constraints to enabling a successful engagement to take place in the energy/environment sector?

1
2
3

14. What would be the top three recommendations to improve the engagement between HEI/ Business communities in the energy/environment sector?

1
2
3

15. What are the 3 most important funding programs best suited to foster the cooperation between HEI and companies in the energy/environment sector?

1
2
3

Survey on Higher Education Institution-company cooperation - HEI

Thank you very much for completing the questionnaire!

In the course of the next days we will call you to ask follow-up questions, which also will not take much of your valuable time.

16. If you like to receive a copy of the final project results, please tick yes

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation -

Introduction

This is a short survey looking at businesses' cooperation with Higher Education Institutions (HEIs). The questionnaire asks about the following areas:

- General questions about your company
- Questions about cooperation with HEIs
- Questions about R&D cooperation with HEIs
- Questions about students' work placements
- Questions about the training needs of your company

Completing the questionnaire will take at most, 20 minutes of your time. We appreciate your participation.

This questionnaire is part of the project "Good Practice Pilot Action for Innovative Industries: Education, Training and Exploitation" (GADGET) a consortium of 9 international partners led by University of Alicante (Spain). GADGET's objective is to pilot good practice across 3 countries in cooperation between Higher Education Institutions and companies in the energy/environment industries. Any information or data provided is done so in strictest confidence, will only be used for this project, and will not be shared with third parties.

We have endeavoured to make the survey as user-friendly as possible. While individual responses will remain confidential, we hope that you will fill in your contact information. This will allow us to provide you with a summary of the survey results and contact you with information on the training offers developed within the project, which will all be delivered free of charge.

Thank you very much, once again, for your participation.

Survey on Higher Education Institution-company cooperation -

General Questions about your company

If you wish to be anonymous please simply skip any questions on this page which you do not want to answer.

1. Your Company

Name of the company

E-mail

2. Number of Employees

- ◯ none
- ◯ 1 to 9 employees
- ◯ 10 to 50 employees
- ◯ 51 to 100 employees
- ◯ 101 to 250 employees
- ◯ over 250

3. Annual revenue in British Pounds

- ◯ less than 500.000
- ◯ 500.000 to 1 million
- ◯ 1 to 2 million
- ◯ 2 to 5 million
- ◯ over 5 million

4. Main area of business

5. Year of company foundation

Survey on Higher Education Institution-company cooperation -

Questions about Cooperation with HEIs (Higher Education Institutions)

Please answer those questions applicable to you

***6. Has your company worked with HEIs in the past?**

◯ Yes ◯ No

Survey on Higher Education Institution-company cooperation -

7. Recommendation

Would you recommend your HEI partner(s) to other companies?

◯ Yes ◯ No

If no, why not?

8. Which HEI has your company worked with?

9. My company has worked with higher education institutions (HEI) in following ways (multiple answers possible)

- ☐ R&D cooperation
- ☐ Work experience with students
- ☐ Consulting by HEIs for my company
- ☐ Consulting by my company for HEIs
- ☐ Knowledge transfer or exchange
- ☐ Organizing events
- ☐ Trainings by the HEI
- ☐ My company participating in teaching within HEI
- ☐ Representation in comittees and advisory boards

Other (please specify)

***10. How did the cooperation between your company and HEI start? (multiple answers possible)**

- ☐ We approached HEI
- ☐ HEI approached us
- ☐ HEI responded to tender
- ☐ Recommendation

Other (please specify)

Survey on Higher Education Institution-company cooperation -

11. Recommendation

By whom:

- [ ] Via personal contact
- [ ] Article/report in media

Survey on Higher Education Institution-company cooperation -

12. Why does your company choose to cooperate with HEI?
(Mark ONLY the most important reasons)(multiple answers possible)

- [ ] HEI staff quality and expertise
- [ ] Quality of results is excellent
- [ ] HEI has the best available resources for our project
- [ ] Timeframe, quality and cost considerations that the HEI meets best
- [ ] Access to additional infrastructure & resources
- [ ] Intellectual property rights requirements
- [ ] HEI has exclusive knowledge

Other (please specify)

13. How long have you been cooperating with HEIs?

14. How would you rate your last HEI-company collaboration in terms of....?

	Excellent	Good	Sufficient	Poor	Don't know
Competencies of university staff (teachers, admin, researchers, etc.)	◯	◯	◯	◯	◯
Quality of results	◯	◯	◯	◯	◯
Quality of available equipment	◯	◯	◯	◯	◯
Costs	◯	◯	◯	◯	◯
Timely delivery of results	◯	◯	◯	◯	◯

Survey on Higher Education Institution-company cooperation -

15. If you had not collaborated with HEIs to date, why is this? (multiple answers possible)

- [ ] We did not know how to begin an approach to an HEI
- [ ] We did not know who the right contact person is within any HEI
- [ ] We already have all sufficient qualification/expertise internally.
- [ ] We prefer cooperating with other companies rather than with HEIs
- [ ] The approached university did not want to cooperate with us
- [ ] We thought that HEI-offered services are more expensive and time-consuming than other offers
- [ ] Knowledge of other companies' bad experiences with HEI
- [ ] We did not know what any HEI could offer our company

Other (please specify)

Survey on Higher Education Institution-company cooperation -

***16. Research & Development Cooperation**

Has your company been involved in R&D with HEIs in the past?

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation -

17. Which type of activity have you collaborated in? (please indicate all that apply)

- [ ] Entrepreneurship
- [ ] Market Entry Study
- [ ] Internationalization
- [ ] Local Market Expansion
- [ ] Technological Innovations
- [ ] Product Development
- [ ] Product Design

Other (please specify)

18. Which thematic areas have you collaborated in?(multiple answers possible)

- [ ] Renewable energy (Biomass, Geothermal, Hydro, Photovoltaic, Wind etc.)
- [ ] Pollution technologies (Air, contaminated Land, Noise, Marine)
- [ ] Environmental Monitoring/Consultancy
- [ ] Water/waste management
- [ ] Transport and mobility technologies
- [ ] Low carbon technologies, (Buildings, Carbon capture and storage)
- [ ] Energy/Carbon Management

Other (please specify)

19. On which type of activity would you like to collaborate in future? (multiple answers possible)

- [ ] Entrepreneurship
- [ ] Market Entry Study
- [ ] Internationalization
- [ ] Local Market Expansion
- [ ] Technological Innovations
- [ ] Product Development
- [ ] Product Design

Other (please specify)

Survey on Higher Education Institution-company cooperation -

20. In which thematic areas would you like to collaborate in future? (multiple answers possible)

- [ ] Renewable energy (Biomass, Geothermal, Hydro, Photovoltaic, Wind etc.)
- [ ] Pollution technologies (Air, contaminated Land, Noise, Marine)
- [ ] Environmental Monitoring/Consultancy
- [ ] Water/waste management
- [ ] Transport and mobility technologies
- [ ] Low carbon technologies, (Buildings, Carbon capture and storage)
- [ ] None

Other (please specify)

21. Funding of cooperation

	Yes	No	NA/ Don't know
Do you know that there is grant funding available for collaboration with HEIs?	◯	◯	◯
Has your past or current cooperation with an HEI been grant funded?	◯	◯	◯
Would you have collaborated with the HEI if not grant funded?	◯	◯	◯

Survey on Higher Education Institution-company cooperation -

Undergraduate and postgraduate internships and work placements

***22. Have you engaged a student to work for your organization in the past?**

- ◯ Yes
- ◯ No

If no, why not?

Survey on Higher Education Institution-company cooperation -

23. Please tell us about you experience with internships by indicating how much you agree with the following statements.

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree	Don't know/NA
The HEI offered us an appropriate selection of students for work placement	◯	◯	◯	◯	◯	◯
The supervision by the HEI during the work placement was helpful and effective	◯	◯	◯	◯	◯	◯
After the work placement, the feedback process with the HEI worked well	◯	◯	◯	◯	◯	◯
We would be willing to take on more students in the future for work placement	◯	◯	◯	◯	◯	◯
The work of the student had a positive impact on our business	◯	◯	◯	◯	◯	◯

24. Funding of work placements

	Yes	No	NA/Don't know
Do you know that there is grant funding available for student work placement s?	◯	◯	◯
Did you use grant funding for any student work placements?	◯	◯	◯
Would you have taken on the student if not grant funded?	◯	◯	◯

25. Work Placement

Did you employ any of the students after the work assignment?

◯ Yes

◯ No

If no, why not?

Survey on Higher Education Institution-company cooperation -

26. How would you rate graduates' competences in your field of business in the following areas?

	Excellent	Good	Sufficient	Poor	Don't know
Quality management	◯	◯	◯	◯	◯
Leadership competencies including diversity management	◯	◯	◯	◯	◯
Entrepreneurial competences (Networking, Strategic thinking etc.)	◯	◯	◯	◯	◯
Project management	◯	◯	◯	◯	◯
Innovation management	◯	◯	◯	◯	◯
Communication Skills	◯	◯	◯	◯	◯
Intercultural Skills	◯	◯	◯	◯	◯
Foreign languages competences (English, German, Spanish)	◯	◯	◯	◯	◯
Engineering and technological competencies	◯	◯	◯	◯	◯
Science competences	◯	◯	◯	◯	◯
Soft skills (presentation, negotiation, etc.)	◯	◯	◯	◯	◯
IT Skills	◯	◯	◯	◯	◯
Sustainability Management	◯	◯	◯	◯	◯

27. Preparedness of Graduates

Do you feel graduates are generally well-prepared through their HEI education to work in your company?

◯ Yes

◯ No

◯ Don't know

If not, what do you think is lacking?

Survey on Higher Education Institution-company cooperation -

Questions about Training Needs of Current and Future Employees

Please answer those questions applicable to you

28. How important do you consider the following competencies for your current and future EMPLOYEES contributing to corporate success?

	Very Important	Important	Neutral	Unimportant	Very unimportant
Quality management	◯	◯	◯	◯	◯
Leadership competencies including diversity management	◯	◯	◯	◯	◯
Entrepreneurial competences (Networking, Strategic thinking etc.)	◯	◯	◯	◯	◯
Project management	◯	◯	◯	◯	◯
Innovation management	◯	◯	◯	◯	◯
Communication Skills	◯	◯	◯	◯	◯
Intercultural Skills	◯	◯	◯	◯	◯
Foreign languages competences (English, German, Spanish)	◯	◯	◯	◯	◯
Engineering and technological competencies	◯	◯	◯	◯	◯
Science competences	◯	◯	◯	◯	◯
Soft skills (presentation, negotiation, etc.)	◯	◯	◯	◯	◯
IT Skills	◯	◯	◯	◯	◯
Sustainability Management	◯	◯	◯	◯	◯

Other (List only competences that consider to be very important)

Survey on Higher Education Institution-company cooperation -

29. How does your organisation currently plan for and address its skills and training needs?

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree
We allocate budget for employee training	◯	◯	◯	◯	◯
Training has been undertaken in the past 12 months	◯	◯	◯	◯	◯
Training is planned in our company within the next 12 months	◯	◯	◯	◯	◯
Our employees are always encouraged to educate themselves	◯	◯	◯	◯	◯
Training is mandatory for employees to attend	◯	◯	◯	◯	◯
Our employees have all the necessary skills and competences	◯	◯	◯	◯	◯
Our employees are trained by our own staff, in house	◯	◯	◯	◯	◯
We make use of external training offers (training providers, consulting companies etc.)	◯	◯	◯	◯	◯
External training leads to the best results.	◯	◯	◯	◯	◯

***30. Do you receive information about HEI training courses**

◯ Yes

◯ No

Survey on Higher Education Institution-company cooperation -

31. Please evaluate the following statements according to your observations.

	Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree
HEI offer courses in line with the current industry needs	◯	◯	◯	◯	◯
HEI training courses offer a good balance between theoretical and practical content.	◯	◯	◯	◯	◯
HEI training courses fit exactly my company's needs	◯	◯	◯	◯	◯
The cost-benefit ratio of HEI training courses is adequate.	◯	◯	◯	◯	◯
The time-frame set for HEI training courses is adequate.	◯	◯	◯	◯	◯
HEI training courses are better suited for our company needs than courses offered by other training providers.	◯	◯	◯	◯	◯

32. What aspects should future HEI training courses include? Which do you prefer?

	Yes	No	Don't know
Face-to-Face	◯	◯	◯
Online / E-learning	◯	◯	◯
Mix of both	◯	◯	◯

33. Would you take more advantage of offered trainings if you had external funding available?

◯ Yes

◯ No

Survey on Higher Education Institution-company cooperation -

Thank you very much for completing the questionnaire!

34. If you like to receive a copy of the final project results, please tick yes!

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation -

Introduction

This questionnaire is part of the project “Good Practice Pilot Action for Innovative Industries: Education, Training and Exploitation” (GADGET) a consortium of 9 international partners led by University of Alicante (Spain). GADGET's overall objective is to conduct a pilot action in 3 countries for good practice in cooperation between Higher Education Institutions and companies in environmental and energy industries. Any provided information and data is only used for this project, treated highly confidentially and will not be given to third parties. The questionnaire contains different questions to the subject areas as follows:

The questionnaire contains different questions to the subject areas as follows:

- General questions about your institution
- Questions about HEI-company cooperation in the Energy/environment sector

Completing the questionnaire will only take 10 minutes of your time. After answering the questionnaire, we would like to contact you to ask follow-up questions, which also will not take much of your valuable time. Individual responses will remain confidential. While we guarantee anonymity, we hope that you will fill in your contact information. This will allow us to provide you with a summary of the survey and project results.

Thank you very much for your cooperation!

Survey on Higher Education Institution-company cooperation -

General Questions about You and your Institution

1. Name and weblink of your institution

Please enter the name of your institution

Please enter the weblink of your institution

*2. My institution is located in...

- ◯ Austria
- ◯ Spain
- ◯ United Kingdom

3. Type of Institution

- ◯ Science/technology park
- ◯ Economic Development Agency
- ◯ Business Incubator
- ◯ Enterprise network
- ◯ Governmental institutions
- ◯ Chamber of commerce

Other (please specify)

4. Personal Data (Data stays confidential. It will only be used for the follow-up interview and informing you about the project.)

Name

E-mail:

Phone:

Survey on Higher Education Institution-company cooperation -

Questions about HEI-company cooperation in the Energy/environment sector

Please answer those questions applicable to you

***5. Do you support HEI/Industry cooperation in the energy and/or environmental sectors?**

- ◯ Yes
- ◯ No

Survey on Higher Education Institution-company cooperation -

6. Indicate below what areas you are supporting in the energy/environment sector (multiple answers possible):

- [ ] R&D cooperation
- [ ] Work experience with students
- [ ] Consulting by a HEI for a company
- [ ] Consulting by a company for a HEI
- [ ] Knowledge transfer or exchange
- [ ] Organising events
- [ ] Training by HEI
- [ ] Companies participating in teaching within HEIs
- [ ] Participation on committees/ advisory boards /governance boards

Other (please specify)

7. What types of support do you specifically provide to business/HEIs in the energy/environment sector? (multiple answers possible)

- [ ] Broker and manage the engagement process
- [ ] Identification of financial assistance/support
- [ ] Provision of equipment/ facilities
- [ ] Directly fund co-operation
- [ ] Identification and placement of expertise to specific projects
- [ ] Technology and knowledge transfer
- [ ] Training provision to enhance co-operation between HEI/business.
- [ ] Identification and placement opportunities for students/HEI/business
- [ ] Support on IPR issues

Other (please specify)

Survey on Higher Education Institution-company cooperation -

8. How important do you consider the following employees' competencies for companies in the energy/environment sector in your region?

	Very Important	Important	Neutral	Unimportant	Very unimportant
Quality management	◯	◯	◯	◯	◯
Leadership competencies including Diversity management	◯	◯	◯	◯	◯
Entrepreneurial competences (Networking, Strategic thinking etc.)	◯	◯	◯	◯	◯
Project management	◯	◯	◯	◯	◯
Innovation management	◯	◯	◯	◯	◯
Communication Skills	◯	◯	◯	◯	◯
Intercultural Skills	◯	◯	◯	◯	◯
Foreign languages competences (English, German, Spanish)	◯	◯	◯	◯	◯
Engineering and technological competencies	◯	◯	◯	◯	◯
Science competences	◯	◯	◯	◯	◯
Soft skills (presentation, negotiation, etc.)	◯	◯	◯	◯	◯
IT skills	◯	◯	◯	◯	◯
Sustainability Management	◯	◯	◯	◯	◯

Other (List only competences that you consider to be very important)

9. What would be the top three priorities which need to be in place to ensure a quality engagement between HEI/Business communities in the energy/environment sector?

1
2
3

10. What would be the top three constraints to enabling a successful engagement to take place in the energy/environment sector?

1
2
3

Survey on Higher Education Institution-company cooperation -

11. What would be the top three recommendations to improve the engagement between HEI/ Business communities in the energy/environment sector?

1
2
3

Survey on Higher Education Institution-company cooperation -

Thank you very much for completing the questionnaire!

In the course of the next days we will call you to ask follow-up questions, which also will not take much of your valuable time.

12. If you like to receive a copy of the final project results, please tick yes

- ◯ Yes
- ◯ No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