THE STATE OF EUROPEAN UNIVERSITY-BUSINESS COOPERATION

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Science Marketing_
Science-to-Business Marketing Research Centre Germany

Contents

Abbreviations

EC	European Commission
EEA	European Economic Area
EU	European Union
EUA	European University Association
HEI	Higher Education Institution
ICT	Information and Communication Technology
IP	Intellectual Property
IPR	Intellectual Property Rights
LLL	Lifelong Learning
MUAS	Münster University of Applied Sciences
NQF	National Qualifications Framework
PhD	Doctorate of Philosophy
R&D	Research and Development
SME	Small- and Medium-sized Enterprise
S2BMRC	Science-to-Business Marketing Research Centre
TTO	Technology Transfer Office
UB	University-Business
UBC	University-Business Cooperation
UPB	University professional working with business
VU	Free University of Amsterdam

Title: **The State of European University-Business Cooperation**
Final Report - Study on the cooperation between Higher Education Institutions and public and private organisations in Europe

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Foreword

The Science-to-Business Marketing Research Centre in Münster, Germany (S2BMRC) is proud to present the results of the first major study on University-Business Cooperation (UBC) in Europe.

Nowadays a world without interactions between Higher Education Institutions (HEIs) and business is inconceivable, with discussions on cooperation with business no longer being about whether UBC is necessary, but rather how best to interact for the benefit of all stakeholders. However, imagine for a moment an environment where students are being prepared theoretically without an intimate understanding of the world they are about to enter; scientists researching topics with no thought of the practical situations in which their research might be most needed; entrepreneurs not benefiting from the extensive knowledge and potential new innovations on offer from within HEIs; and business not receiving new discoveries, knowledge or appropriately skilled human resources from within HEIs.

Following the Europe 2020 strategic plan, the Lisbon agenda and the modernisation agenda of European universities, the European Union has recognised the importance of the role of HEIs (through education, research and innovation) in the transfer of knowledge to society and their vital contribution to Europe's economic competitiveness. The need for closer cooperation between academia and the business world is underscored as UBC has proven that it provides a range of advantages and benefits for HEIs, students, business and society alike.

Despite these obvious benefits, there are few quantitative measurements of UBC in Europe that address the full gamut of UBC types. Data currently available from different sources includes that available from representative organisations (e.g. European Universities Association, Proton Europe, Association of European Science and Technology Transfer Professionals) or public bodies (e.g. European Commission, national governments) however they generally have a more specific focus. Furthermore, most studies and reports have traditionally concentrated on easily measurable outcomes, such as number of patents, licences or 'spin-offs'. The problem with these measurements is that they lack the point of view of those actually undertaking UBC and the potential for development as recognised by those people.

In respect to UBC, some studies concentrate on outcomes of UBC (Thursby et al. 2001), whilst others highlight personal views and behavioural issues related to UBC (e.g. Azagra-Caro 2007); this study follows the direction of the latter. Our focus is twofold. Firstly, only individual viewpoints can indicate what people actually think about certain issues. Hence, objective indicators cannot, practically speaking, illustrate individual points of view. With regards to academics, especially to researchers at HEIs, individual motivations are crucial in UBC. More recent studies like those of Plewa (2010), Etzkowitz (2008), Azagra-Caro (2007) and D'Este and Patel (2007) mention that the individual's perspective and the reasons behind this, combined with its potential, have been neglected. Thus, the study closes this gap by presenting genuine personal points of view. The second reason for our approach is that individual perceptions provide a more sustainable breeding ground for UBC development and improvement than pure measurement figures would do.

The study not only aims to measure the actual level of UBC (i.e. status quo) to provide a benchmark for European UBC; but also to outline potential reasons, influencing factors, drivers and barriers to UBC as well as offering recommendations for the future. It uses a multi-method approach emphasising subjective perceptions (e.g. 'to what extent do you think...?') and behavioural issues over pure objective measurements (e.g. 'please indicate the number of patents per year'). Since only perceptions can indicate what people really think or believe, they therefore form the basis for potential development and improvement. Furthermore, the results not only deal with amounts and measurements, but with the help of multivariate methods, analysing the data sets and connections, reasons and explanations can be developed.

The study has revealed an underdeveloped and highly fragmented European UBC environment. Large variations among countries, types of institutions and even disciplines have been identified with only a

concentrated group of academics and HEIs really engaging in UBC. This gives managers and policy makers an insight into the current extent of UBC.

The selected findings of the research are commented partly in a descriptive and partly in an interpretative way. The perceptions and individual attitudes of the respondents have to be considered in respect to various factors. For instance, they might relate to a former situation, to a colleague, or to another HEI or indeed to a different country. Apart from raising new questions, these results also outline interesting developments deserving of new interpretation efforts from various viewpoints and forming a benchmark for the improvement of European UBC.

The entire team of the Science-to-Business Marketing Research Centre in Münster (Germany) is proud to deliver this report for the sake of improving European UBC and interactions between academia and businesses. We feel honoured to have been able to work with the European Commission (EC) and we would like to thank everybody who has enabled us to conduct this study: UBC experts from around Europe, from whom we have received substantial and highly valuable contributions for this report, and especially the respondents of the survey, for their contribution to the success of the study and for allowing the current project results to be made available for discussion, comments and interpretation.

Kind regards,

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Münster, Germany, 30 August 2011

Executive summary

About the report

This report presents the finding of a fifteen and a half month study on the cooperation between HEIs [1] and public and private organisations in Europe. It was conducted by the Science-to-Business Marketing Research Centre, Germany (S2BMRC) for the DG Education and Culture at the European Commission (EC) during 2010 and 2011.

The main components of the project were in-depth qualitative interviews with 10 recognised industry experts as well as a major quantitative survey. The survey was translated into 22 languages and sent to all registered European HEIs (numbering over 3,000) in 33 countries during March 2011. Through this, a final sample population of 6,280 academics and HEI representatives was achieved making the study the largest study into cooperation between HEIs and business yet completed in Europe. Further, 30 good practice UBC case studies have been created to provide positive examples of European UBC.

Study objectives

The key questions addressed in the study were:

- how extensive is UBC in European HEIs?,
- why do some academics and HEIs engage in UBC and not others?,
- if situational factors are only part of the explanation for UBC activity, what else can help to explain total European UBC?

The results for these are summarised below.

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[1] *HEIs* are understood to mean all types of institutions, which provide higher education. These institutions must be formally recognised by the relevant national/regional authority and includes:
- Universities,
- Universities of applied sciences,
- Polytechnics /technical universities,
- Colleges and tertiary schools.

Logical basis for this report

The justification for the study came from the following details:

- <u>Europe is embracing cooperation and integration</u> - With the creation of the Europe 2020, the European Union's (EU) growth strategy for the coming decade, and the higher education modernisation agenda, Europe is embracing the need to create a more connected and functioning relationship between Government, business and HEIs in order to increase employment, productivity and social cohesion,

- <u>University[2]-Business Cooperation (UBC) is important</u> - Successful cooperation of HEIs in synergetic relationships with governments and businesses (the 'triple helix') is considered to be an essential driver of knowledge-based economies and societies. This study focuses on two actors in the triple-helix: HEIs and business[3] from the perspective of the HEI. Some of the outcomes attributed to successful UBC include improving the education and future job prospects of students, the research conducted within the HEI and the transfer of knowledge and research to the community. Additionally, there are indirect outcomes including support in the creation of a knowledge economy, support for local business, creation of jobs, stimulation of economic growth and increased living standards whilst reducing hindrances to good living,

- <u>A need exists for a study on European UBC</u> - Though many studies have been directed at understanding certain interactions between HEIs and business, not much is known about UBC within a European context. This study has been commissioned to fill this knowledge gap. It aims to give a clear picture of the extent of UBC in Europe and to gain a better understanding of how UBC can be fostered, promoted and strengthened.

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[2] The term university used in University-Business Cooperation or the acronym UBC refers to all HEIs as defined previously.
[3] *Business* is defined in the study to include:
- Privately and publicly owned organisations,
- Non-government organisations,
- Not-for-profit organisations.

Summary of findings

Overall

Whilst there are some exceptions, cooperation between HEIs and business in Europe is still in the early stages of development. The study found that European UBC is influenced by a large number of factors including the *perception of benefits* coming from UBC as well as *barriers to* and *drivers of UBC*. Moreover, situational factors such as *age, gender, years at the HEI, years in business, type of HEI and country* also influence the extent of UBC undertaken. Despite this complexity, UBC can be increased by focussing on appropriate UBC *strategies*, *structures and approaches*, *operational activities* and *framework conditions*. The model depicted below outlines the relationships among these different elements within the UBC Ecosystem.

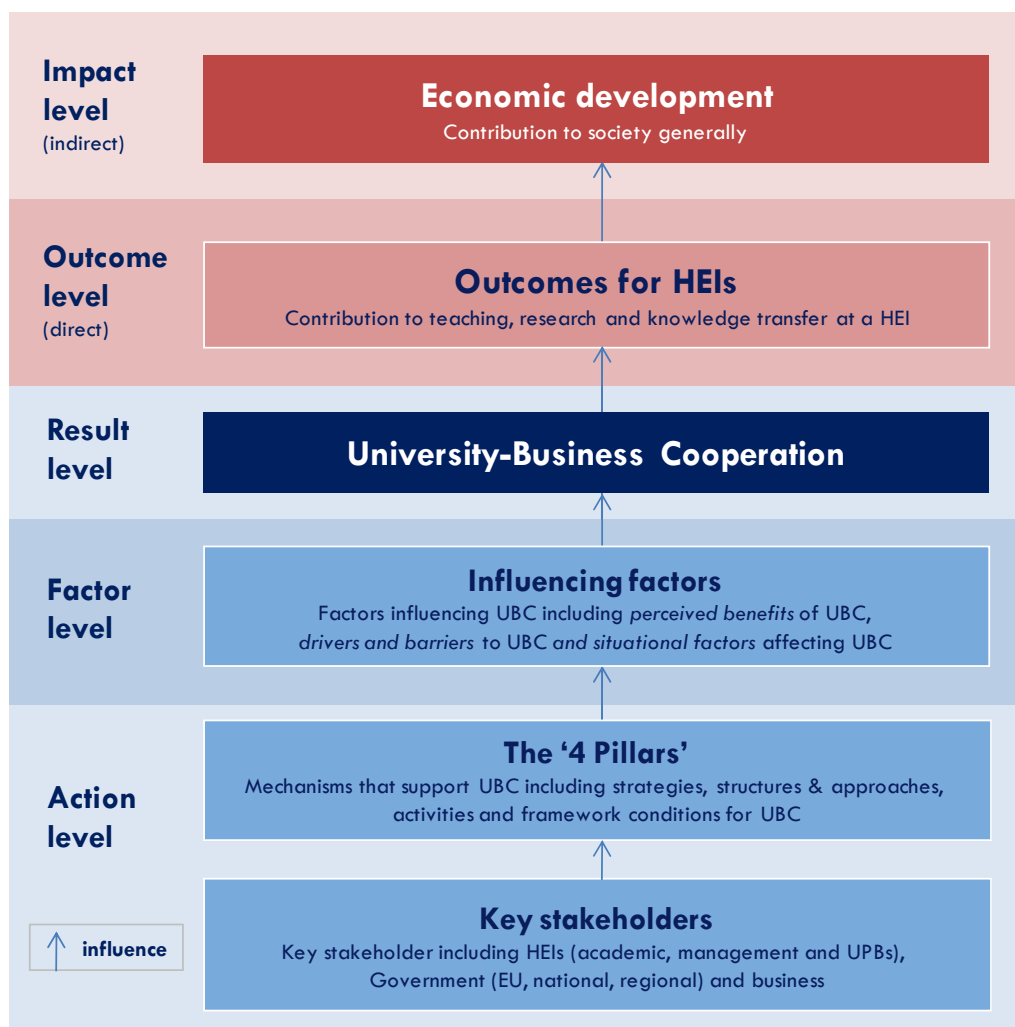|	
Impact level (indirect)	**Economic development** Contribution to society generally
Outcome level (direct)	**Outcomes for HEIs** Contribution to teaching, research and knowledge transfer at a HEI
Result level	**University-Business Cooperation**
Factor level	**Influencing factors** Factors influencing UBC including *perceived benefits* of UBC, *drivers and barriers* to UBC *and situational factors* affecting UBC
Action level	**The '4 Pillars'** Mechanisms that support UBC including strategies, structures & approaches, activities and framework conditions for UBC
↑ influence	**Key stakeholders** Key stakeholder including HEIs (academic, management and UPBs), Government (EU, national, regional) and business

Illustration: The UBC Ecosystem
Created during the project by Davey & Galan-Muros 2011

Key

In the illustration:
- the *blue-shaded* areas indicate elements that were researched during the study, and
- the *maroon-shaded* areas indicate elements that were not researched during the study.

How extensive is UBC in European HEIs?

Extent of European UBC (Result level)

Most academics are not engaged at all in UBC or only to a low extent whereas at the institutional level, most HEIs engage in some degree of UBC. Approximately, 40% of academics are not engaged in UBC at all, 20% of academics undertake only a low[4] extent of UBC whilst only 40% of academics undertake a medium or high extent. In respect to HEIs, it has been found that most of the HEIs surveyed (92%) engage in some degree of UBC at an institutional level, with approximately 65% of HEIs having at least a medium degree of UBC.

There are eight different ways in which HEIs and business cooperate:

1. Collaboration in research and development (R&D),
2. Mobility of academics,
3. Mobility of students,
4. Commercialisation of R&D results,
5. Curriculum development and delivery,
6. Lifelong Learning (LLL)[5],
7. Entrepreneurship,
8. Governance[6].

The results showed that there is a clear relationship among the eight cooperation types. For example, when an academic engages in one type of cooperation, it is likely that they also undertake a similar extent of the other types of cooperation. Similarly it was found that when a HEI engage in one type of cooperation they are also likely to engage in a similar extent of cooperation in the other types of UBC.

Despite these relationships, those types of UBC offering more direct, measurable and promotable benefits are the most developed ones. Both academics and HEIs place a certain emphasis on cooperation related to research and the commercialisation of research which provide opportunities for direct income-earning (i.e. cooperation in R&D and commercialisation of R&D) as well as student mobility, which directly benefits to students. Less developed cooperation can be found in more academic cooperation types (i.e. *lifelong learning* and *curriculum development and delivery),* whilst other 'less measurable' cooperation types that provide a more indirect benefit and little ability to promote, such as *governance* and *mobility of academics*, are the least developed types of UBC.

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[4] Using a 10 point scale, the extent of UBC for each of the eight types of UBC were rated by the respondent using the following structure: 1 = not at all, >1 - 4 = low extent of UBC; >4 - 7 = medium extent of UBC; >7 - 10 = high extent of UBC,

[5] In this study, *LLL* is restricted to the provision of adult education, permanent education and/or continuing education involving the acquisition of skills, knowledge, attitudes and behaviours at all stages of life by HEIs,

[6] *Governance* is defined as cooperation between HEI and business at a management level of the HEI and includes having business leaders in HEI decision making or on HEI boards.

Why do some academics and HEIs engage in UBC and not others?

Factors affecting European UBC (Factor level)

The reasons why some academics and HEIs engage in UBC and others do not can be partly answered in the 'factor level of UBC'. **Some factors are found to influence the extent of UBC for academics and HEIs including: benefits, drivers and barriers of UBC** (as perceived by the academic or HEI) **as well as situational factors such as age, gender, years working in a HEI or business and the country of the respondent.**

Perceived benefits of UBC

Academics were asked to assess a series of statements relating to the perceived benefits of UBC for the following UBC stakeholders: students, HEIs, business and academics (personal benefits). It was found that academics did indeed recognise the high degree of benefits from successful UBC for students and business as well as the ability of UBC to 'achieve the mission of the HEI' at a medium level. However, the academics perceived the personal benefits they receive from UBC at a significantly lower extent. Within the study, academics state that UBC rarely increases their standing in their HEI or their chances of promotion. Furthermore, academics rate 'inclusion of UBC as part of the assessment of work performance' and 'the provision of incentives for academics to encourage UBC' as the lowest developed *strategies* (as did HEI representatives). In other words, **academics do not recognise the benefits of UBC for themselves or their research and especially not in respect of their standing within the HEI or their chances of promotion.** All of these factors highlight that academics perceive personal benefits of UBC to be low and this could be another reason for the low extent of UBC.

Furthermore, HEI representatives were asked to assess the benefits of UBC for the students, business, the HEI itself and for society. From the perspective of the HEIs, they rated the highest benefits for students, followed by business, then the ability of UBC to contribute to the mission of the HEI with the lowest benefits perceived for society. There was a significant difference between the perception of the academics and the HEIs in respect to the extent that UBC supports the HEI in achieving its mission with HEIs perceiving these benefits to be higher.

Finally, the effect of perceived benefits from UBC was tested against the extent of UBC and the results show that **the higher the perceived benefits, the higher the extent of UBC carried out;** an outcome that was true for both academics and HEIs.

Perceived drivers of UBC

Regarding the drivers of UBC, the study shows that the perceived level of UBC drivers significantly affects the extent of UBC for academics and HEIs. **This means that those academics or HEIs perceiving higher drivers for UBC are generally more engaged in UBC than those perceiving low drivers for UBC.**

The results show that the most important drivers for both HEIs and academics concern their relationships with businesses. For both academics and HEIs, the existence of mutual trust, mutual commitment and shared goals are rated as essential drivers, followed by drivers relating to the UB relationship. HEI representatives (management and professionals involved with UBC) generally perceive the UBC drivers in existence for the HEI to be significantly higher than academics do for their own UBC.

Perceived barriers to UBC

Contrary to the results for drivers of UBC, all academics, regardless of their experience or extent of UBC, see the importance of barriers quite similarly. **The vast majority of academics of all levels of UBC experience agree that funding barriers and bureaucracy within the HEI are the most relevant barriers.** Further, they believe that the main responsibility for funding UBC rests with the HEI so thus, see the main barriers to UBC to reside within the HEI.

All HEI representatives with any degree of experience assessed the barriers similarly for HEIs. **The main barriers seen by most HEI representatives are almost entirely focussed on the lack of funding** whilst bureaucracy is a factor not seen as such a barrier by HEI representatives. HEI representatives perceive the responsibility of funding UBC to be with governments and rated HEI-government relations as the highest source of barriers.

Barriers to UBC are perceived by all academics and HEIs similarly, although in various cases they can be overcome by the presence of high drivers and higher perceived benefits.

Drivers and barriers are related

A barrier provides a hindrance or obstacle to do something, while a driver provides the motivation to do that. Funding has been listed by both academics and HEIs as the highest barrier to UBC, meaning that they perceive that UBC cannot occur if there are no funds available. However, both academics and HEIs did not assess the 'possibility to access funding / financial resources for working with business' as one of the main drivers of UBC. Thus funding alone is not a sufficient incentive for academics to cooperate. Instead, mutual trust, commitment and a shared goal were the highest rated drivers. This means that even with the lack of funds as the highest barrier (obstacle) owing to the impossibility of cooperating without funds, **the presence of funds is not enough to cooperate if the 'relationship drivers' or perceived benefits (motivators) are not developed.**

Situational factors affecting UBC

Academics' personal characteristics play a role in influencing the extent of UBC. In respect to gender, males perceived a higher extent of cooperation in some UBC types and females in others, whilst regarding age, older academics usually undertake higher UBC than younger ones. Likewise, conditional factors, such as years working in the HEI, years working in business, the area of knowledge, the type of HEI they work for or the country where the HEI is located have been found to be reliable predictors of the extent of UBC carried out by academics. It has been found that those with higher development of UBC are those with more than ten years of experience working in HEIs, those with more than two years of experience working in business, those working in the area of technology and engineering, those in technical universities and those in eastern European countries.

In respect to HEIs, the country where the HEI is located has a large influence on their perceived extent of UBC with HEI representatives from Ireland, the United Kingdom and Romania rating themselves the highest. When the results of HEI representatives are added to the results from the academics, then the survey population from Sweden, Denmark and the United Kingdom rated themselves the highest. Further, the type of HEI also plays a role in the type of cooperation they undertake; with polytechnics and universities of applied sciences having the highest level of cooperation. Both factors are relevant for governments to consider in the design and implementation of UBC policies.

Whilst 'situational factors' help to understand European UBC; they provide only a few implementable options for increasing UBC.

If influencing factors are only part of the explanation for UBC activity, what else can help to explain total European UBC?

Actions that create and support European UBC (Action level)

A large piece of the UBC ecosystem is understood in the *4 Pillars*[7] of UBC which consist of (i) *strategies*, (ii) *structures and approaches*, (iii) *activities* and (iv) *framework conditions*. **The extent of development of the *4 Pillars has* been found to significantly affect the extent of cooperation between HEIs and business.** The *4 Pillars* constitute the 'action-level', where all stakeholders need to focus their efforts when they want to influence the amount of UBC. The *4 Pillars* provide a checklist of actions that can be used to reduce barriers (obstacles) to UBC, increase the drivers (motivators) of UBC, address situational factors, provide benefits for UBC or stimulate the different types of UBC.

Perceived development of the actions that create and support UBC (the *4 Pillars*)

HEI representatives rate the mechanisms supporting European UBC (the *4 Pillars*) generally as moderately developed, providing some room for future improvement. The extent of development of the *4 Pillars* from most developed to least is *operational activities* (5.4 of a 10 point scale[8]), *structures and approaches* (5.1), *strategies* (4.9) and *framework conditions* (4.5).

In respect to the *strategies*[9] for UBC, the 'documented strategies' (e.g. management committed to UBC or mission / vision embracing UBC) are said to be more developed than the 'implementation strategies' (e.g. the dedication of resources or the provision of incentives for UBC). Regarding *structures and approaches*[10], the development of dedicated 'agencies' for UBC and the appointment of responsible people are perceived to be both developed to a medium extent. For *operational activities*[11] those UBC activities targeting students are more developed than those UBC activities targeting academics. Finally, *framework conditions*[12] are assessed by HEI representatives to have the lowest development of the *4 Pillars*, with 'laws positively supporting UBC' being more developed than those supporting *staff mobility*.

Academics were also asked to assess the development of two of the *4 Pillars*[13]. They perceive the pillars to be significantly less developed than the HEI representatives. This indicates either that the academics are perhaps not aware of the commitment within the HEI to UBC or of the existing support mechanisms in place for UBC or alternatively it may indicate that the HEI representatives are over-estimating the extent of development.

It was also found that the presence of some structures, such as the presence of a central contact person, a central agency or a programme or initiative specifically for UBC in *entrepreneurship*, *LLL* and/or *mobility of students and academics*, result in a significantly higher development of those types of UBC.

An analysis was undertaken to identify how much of the extent of UBC is explained by each of the *4 Pillars*. That is, how much the perception of the development of UBC increases when the perception of each of the pillars do so. It was found that UBC *strategies*, followed by *operational activities* and then *structures and approaches*, provide the highest contribution to the development of UBC. This suggests that a focus

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[7] The term '*4 Pillars*' was created during the life of the project in reference to the different actions that can be undertaken by HEIs and the way these 4 elements underpin UBC,

[8] Using a 10 point scale, the extent of development of the *4 Pillars* were rated by the respondent using the following structure: 1 = not at all, >1 - 4 = low extent of UBC; >4 - 7 = medium extent of UBC; >7 - 10 = high extent of UBC,

[9] *Strategies* are the drafting and implementation of cross-functional strategic decisions by a HEI that will enable it to achieve its long-term objectives with respect to UBC,

[10] *Structures and approaches* are constructions created as a result of top-level strategic decisions within (or related to) a HEI that enable UBC and include the creation or development of institutions, positions, methods, policies and programmes,

[11] *Operational activities* are actions of a practical nature undertaken by a HEI to create and support UBC whose scope and volume can be described/measured,

[12] *Framework conditions* are mechanisms applied by regional, national and international governments to maximise the long term economic performance, welfare or other policy objectives of a region through UBC,

[13] *Structures and approaches* as well as *framework conditions.*

should be put on *strategies* since they are the pillars whose development will have the highest impact on the extent of UBC.

Actions that can increase European UBC

All UBC stakeholders have a substantial role in stimulating cooperation between university and business. In order to make UBC more attractive to academics and HEIs, and to support their active involvement, a series of actions could be undertaken.

- Increasing the perceived **benefits** of UBC by academics, personal incentives for them to work with business or the inclusion of UBC in their work assessment could represent effective motivation. At the same time academics must also be aware of the benefits and perceive them as attractive and desirable,

- Reducing the highest **barriers**, particularly ensuring that funds are available to encourage UBC as well as simplifying the bureaucratic procedures of UBC, would allow a greater level of UBC especially if these actions are carried out together with the promotion and support of drivers,

- Fostering relationships **drivers** between academics and business as well a providing relationship-management support (e.g. managing expectations, assisting in the trust and commitment building) would have a positive result on the extent of UBC,

- Encouraging academics to spend time working with business through the appropriate incentives or employing academics who fit the profile of a high UBC academic will have a positive impact in the extent of UBC undertaken,

- Developing the **mechanisms that support UBC (*4 Pillars*)** should be a priority for HEIs and/or governments because all *Pillars* have been found to have a significant influence on the extent of UBC. The influence of the *strategies* on UBC is particularly high, which makes them a priority within the pillars,

- Looking at countries or regions that have well developed UBC (or the proxy for this, the degree of development of the *4 Pillars*), taking **examples** from these systems (e.g. strategy authorities in Sweden, structure and approach specialists in the UK and activities leaders in Ireland) and transferring them to their own countries or regions with the appropriate adaptations.

Insights

Some of the key insights into European UBC from the entire study are summarised as follows.

Insight 1	**Multiple UBC actors need to work cooperatively and in an integrated manner to affect and increase UBC** There are many actors playing a role in UBC including actors that are not subject to the present survey (e.g. regional development agencies, politicians, students, businessmen and managers). The cooperation between science and industry will turn out to be successful only if all actors positively perceive, develop and drive their respective areas of responsibility and parts. If only one of the actors does not perform actively, the disruptive influence might be considerable enough to inhibit the whole momentum causing new obstacles, disappointments and blockades. UBC is a very complex ecosystem. All actions need to be handled simultaneously at all levels and actors have to be addressed as a whole.
Insight 2	**UBC is complex and integrated** In order to have a complete view of UBC, one cannot only concentrate on certain aspects of the UBC ecosystem; since many factors and cause variables are closely linked and dependant on each other affecting positively or negatively. Rather, an integrated approach involving many elements of the UBC ecosystem is required. The benefit of this is that development or activity in one element of the ecosystem is likely to benefit others. Because of this integration however there is no easy or fast method for improving UBC. Instead understanding the elements in the ecosystem and how they interrelate, then having patience and persistence should be the hallmarks of an integrated approach to improving UBC.
Insight 3	**The focus of UBC should be on the relationships between the academic and the business** The focus of activities to foster UBC should be on researchers and teaching staff, the actual players within the HEI involved in UBC relationships. Without their passion and inner drive, there would be no UBC. Therefore, all measures and corresponding effects should aim to target academics with the impact to be validated internally within the HEI. In the marketing of products and services, a 'pull' technique is always preferable to a 'push' system. Comparatively, 'push' techniques in UBC are the least successful techniques to encourage UBC within academics. The degree of development of 'pull' techniques such as incentive systems targeting academics is still very low; showing that there is still much room for improvement. For that purpose, additional levers such as recruiting, rewarding, promoting, providing incentives or fostering contract frameworks can be used to motivate academics to cooperate. The belief that UBC is a 'people business' is also supported in a growing body of literature. Authors like Hughes, Link, Abreu, Dooley and Kirk argue that the key to successful knowledge transfer is a process of continuous dialogue, a build-up of social networks[14]. This success is a function of

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[14] Nicolaou and Birley 2003

	development of strong personal (as opposed to institutional) relationships over time which leads to the creation of trust (a key element in entrepreneurial activity). It has even been argued that too much focus upon transactional mechanisms such as licenses and patents may distract from the development of personal intimacy and trust.[15]
Insight 4	**UBC is closely connected with mind-set, attitude and willingness.** UBC is founded on an attitude or a mind-set rather than on isolated factors. It is driven by intrinsic and psychological elements (trust, mutual commitment, shared goals) rather than by rules (e.g. commercial orientation) or quantifiable elements (e.g. funding, access to knowledge and recourses). Likewise, age, gender, experience and background also represent factors that are based on human elements than on rationality. Those academics remaining inactive do not see the benefits for UBC and therefore will see the need for action to be outside their own area of responsibility. People with a high degree of UBC activity will instead recognise benefits and identify drivers finding ways to make it happen. Thus, in order to increase cooperation within the academic ranks, HEIs have to create a positive environment, communicate advantages, demonstrate best practice, use role models and establish a series of appropriate incentives, and reward systems.
Insight 5	**There is a difference in development between those types of UBC with clearly measurable, direct and potentially large financial benefits and those without.** For both academics and HEIs, those types of UBC providing more measurable, direct and potentially large financial benefits for either the HEI or the students have a higher level of development than those providing benefits academically or a more indirect contribution. This is evident in the greater development of R&D cooperation and commercialisation as well as mobility of students compared to those cooperation types providing indirect and long-term benefits within the HEI such as curriculum development and delivery, mobility of academics and governance. Finding methods for firstly measuring or benchmarking the second group of UBC cooperation types would provide an approach for managing the development of these cooperation types. Further, by creating mechanisms that encourage and reward these 'indirect' UBC types, the HEI can create the required drivers for UB activity in these types.
Insight 6	**In terms of income, only a small part of third party-funds derives from cooperation with business.** The extent of UBC undertaken in Europe is generally low and only very few HEIs derive a high amount of third-party-funds from companies. Whilst the amount may differ depending on the type of HEI, there clearly is too little income being earned through UBC. Money is not necessarily a success factor but it is an indicator of the authenticity and substance of cooperation. Contrastingly, the largest part of the third-party-budget derives from public funding of the EU or national programmes. That means that there is still a

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[15] Dooley and Kirk 2007, Brown and Jenkins 2008

	reliance on public funding and therefore substantial room for development in this aspect.
Insight **7**	**Removing barriers is not enough: UBC drivers and the presence of obvious benefits (motivators) are also needed to foster UBC. Further, these drivers and benefits also have to be obvious to the academics.** Previous studies have focused too much on barriers and too little on drivers. It must be emphasised that clearing the path of barriers (obstacles) alone would not be enough. Even if there were no barriers, development in UBC would not occur. Only by the existence of drivers and a demonstration of the benefits for all involved parties can the momentum in UBC be created.

Recommendations

Based upon the results of the study, the following recommendations are being made. Due to the complexity, integration and inter-relationship of the UBC Ecosystem, all stakeholders need to play a role in addressing the actions.

The comments in the 'action' column are suggested actions that could be taken to achieve the goal based upon good practice. HEI stakeholders are encouraged to use the below matrix focussing on the findings and goals to develop further UBC actions. Furthermore, it is important to define the appropriate UBC stakeholders to undertake the agree actions.

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
Integrated approach to UBC	Multiple UBC actors need to work cooperatively and in an integrated manner to affect and increase UBC	Bringing together all regional UBC actors including: HEI management, regional development agencies, politicians, academics, students and businessmen	Creating regional forums, 'do-tanks' and action groups responsible for the development of UBC as a means for regional 'knowledge-based' economic development
	UBC is complex and integrated	Attaining an understanding of the elements in the UBC ecosystem and how they interrelate	Having a longer term approach to the creation of strategies, structures and approaches, activities and framework conditions by all UBC stakeholders. Patience and persistence should then be the hallmarks of an integrated approach to improving UBC
	UBC is about relationships. The focus of UBC should be on the relationships between the academic and the business	Increasing and supporting the interactions between academics and business	Fostering activities that encourage encounters between academics and business, in which they can exchange their ideas and build long-term relationships
Result level			
All 8 Types of UBC (*appropriate to all 8 types of UBC*)	Generally, UBC is not sufficiently developed amongst academics	Creating or developing supplementary support mechanisms that positively affect all types of UBC	Creating or further developing programmes, agencies and/or positions responsible for supporting and developing UBC
			Creating or further developing measurements and benchmarks, where possible with industry-wide acceptance, in order to provide a basis for recording and managing UBC

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
			Creating business development manager positions or similar within the HEI / business focussed on managing relationships between the HEI and businesses
		Increasing knowledge about the different types of UBC	Further developing knowledge about all types of UBC e.g. increasing research funds or forming industry associations around the topic
			Promoting good practise and success in UBC as well as the benefits of the different forms of UBC
Collaboration in R&D	*Collaboration in R&D* is the highest developed type of UBC but is still only moderately developed amongst academics	Achieving further support for collaboration and joint research projects between academics / HEIs and business	Providing business with 'research vouchers' that are redeemable for research completed by an academic within the HEI
Mobility of students	*Mobility of students* is the second highest developed type of UBC but it is still only moderately developed through academics	Increasing support mechanisms for fostering the *mobility of students*	Creating an online resource where opportunities for student exchange are posted
			Increasing collaboration with the human resources department of businesses to offer students greater opportunities for mobility
Mobility of Academics	*Mobility of academics* is the second lowest developed type of UBC	Increasing support mechanisms for fostering the *mobility of academics*	Encouraging the exchange of people in the short-term to build relationships, exchange perspectives and create shared learnings
			Developing laws and regulations that allow longer-term ease of movement for academics between business and the HEI (i.e. so that long service, holidays, pension, status are not lost)
		Increasing knowledge about the *mobility of academics*	Establishing a champion within the faculty for *mobility of academics* as well as providing information about the process of mobility
Commercialisation of R&D Results	*Commercialisation of R&D results* is the third highest developed type of UBC but is still only lowly developed amongst academics	Increasing support mechanisms for fostering the *commercialisation of R&D Results*	Developing laws or regulations positively supporting the creation of new companies from academic research (spin-offs)
			Focusing on academics who are participating in cooperative R&D with business already. Promote the benefits of commercialisation to them and support their efforts

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
Curriculum Development and Delivery			Streamlining and making transparent the process of research commercialisation within both the HEI and business
		Increasing knowledge about the *commercialisation* of *R&D Results*	Further developing the understanding of UBPs about business and commercial relations through spending time in business or through courses
	Curriculum development and delivery is lowly developed amongst academics	Increasing support mechanisms for fostering *curriculum development and delivery*	Encouraging existing UBC collaborators from business to participate in *curriculum development and delivery* to provide insight into commercial needs and orientation
			Including business representatives in discussions about the curriculum.
			Offering information about how to involve business in *curriculum development and delivery* whilst meeting academic requirements
LLL	*LLL* is lowly developed amongst academics	Increasing knowledge about *LLL*	Communicating to business the possibilities and the benefits that LLL offers, facilitating the accessibility to the different LLL activities
Entrepreneurship	*Entrepreneurship* is lowly developed amongst academics	Increasing support mechanisms for fostering the *entrepreneurship*	Improving the entrepreneurial culture and education within the HEI exposing both academics and students to entrepreneurship and entrepreneurial pathways
Governance	*Governance* is the lowest developed type of UBC	Increasing business participation in the management decision-making of the HEI	Inviting business delegates to sit on the advisory boards of HEIs as well as liaising with faculty management
Factor level			
Benefits	The higher the perceived benefits, the higher the extent of UBC carried out, which is true for both academics and HEIs	Increasing the actual and perceived level of benefits from UBC for academics, making them aware of the benefits and making sure that these benefits are perceived as attractive and desirable	Rewarding academics who successfully work together with business and encouraging further UBC by providing incentives (i.e. lowering their teaching load or facilitating the process) to motivate academics

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
	Academics rate the benefits of UBC for themselves the lowest and HEIs' representative rate the positive contribution to the mission of the HEI lower than the benefits for students and local industry	Increasing the perceived benefits of UBC for academics and HEIs, especially the benefits for themselves	Including UBC as part of the assessment of work performance for academics and as a means to increasing their chances of promotion
			Informing HEI representatives and academics about the current UBC actions carried out involving the HEI and future UBC funding and networking opportunities
			Create a positive image of UBC within peers and heads of departments
Drivers	Those academics or HEIs perceiving higher drivers generally undertake significantly higher UBC than those perceiving low drivers	Creating or developing a set of drivers that foster relationships between academics and business	Personal incentives for academics to work with business
			Increasing the awareness of the existing UBC drivers for academics and HEIs
			Create the environment to build up mutual trust and commitment amongst all the UBC stakeholders
			Incorporating business demands, needs and requirements into the research policies and departments of the HEIs by further educating researchers in marketing issues
Barriers	A lack of funds is the highest barrier due to the impossibility of cooperating without funds; however, the presence of funds is not enough to cooperate if the relationship drivers are not sufficiently developed	Reducing barriers to UBC for academics and HEIs	Particularly ensuring that funds are available not just to encourage but also simply to maintain UBC
			Reducing and simplifying the bureaucratic procedures of UBC
			Seeking to minimise the perception of barriers by academics and HEIs
			Facilitating and supporting UBC processes and interactions
			Creating policies to support businesses which absorb research findings with the intention of increasing business interest and participation
			Creating policies that simultaneously consider the reduction of barriers and the increase of drivers
Situational factors	Situational factors have a substantial effect on European UBC. *Years in business* as an academic	Considering the effects of the situational factors in the UBC decision-making processes	Employing academics who fit the profile of a high UBC academic
			Targeting UBC strategies to three target groups: those with high, medium or low collaboration

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
	characteristic and *country of the HEI* provide the most significant areas of focus for policy makers.		Providing funding and support for 'first-time' researchers in collaboration with business
			Strategically focussing actions on those groups with the most unfavourable situational factors
			Generating funds for UBC projects within social sciences in order to foster UBC in that area of knowledge
Action level (*4 Pillars*)			
4 Pillars of UBC	The development of the *4 Pillars* has a significant impact in the extent of UBC	Developing all the *4 Pillars*	Focussing on those strategies, structures and approaches, operational activities and framework conditions that have the highest impact on the extent of UBC (as found in the study)
			Fostering a wider understanding of UBC beyond patents and licenses within the HEI, making use of a mix of the *4 Pillars* to support UBC
			Using good practice cases studies as examples to promote each of the *4 Pillars*
			Creating and launching a strategic partnering process for the HEI integrating business partners (researchers as well as marketers) within the entire innovation process to increase the market thinking
Strategies	*Strategies* are the second least developed pillar	Achieving a higher development of UBC strategies	Improving the clarity of HEI *strategies* and rules relating to research cooperation with industry
	Some *strategies* have a higher impact in UBC than others	Focussing on the *strategies* with the highest impact on UBC	Developing the "inclusion of UBC as part of the expected work performance academics" (the strategy found to have the highest impact)
	Documented *strategies* are substantially more developed than implementation and motivation strategies	Further developing the implementation and motivation strategies.	Creating the mechanisms needed to transform documented *strategies* (e.g. documented mission/vision embracing UBC) into implementation and motivation *strategies* (e.g. the dedication of resources to UBC)
Structures and approaches	*Structures and approaches* are the second most developed pillar but they are not highly developed	Achieving a high development of UBC *strategies*	Making the measuring of UBC more transparent and simple

AREA OF FOCUS	KEY FINDING	GOAL	POSSIBLE ACTION
	Some *structures and approaches* have a higher impact in UBC than others	Focussing on those *structures and approaches* with the highest impact on UBC	Developing "industry professionals employed in knowledge transfer areas" (the structure with the highest impact on UBC)
Operational activities	Even when operational activities are perceived as the most developed of the *4 Pillars*, they are only moderately developed	Further developing the *operational activities*	Further developing tools and methodologies around long-term partnerships
	Some *operational activities* have a higher impact in UBC than others	Focussing on those *operational activities* with the highest impact on UBC	Developing "activities facilitating students interactions with business" (the activity with the highest impact on UBC)
Framework conditions	*Framework conditions* are the least developed of the *4 Pillars*	Further developing the *framework conditions*	Having a comprehensive understanding of the UBC processes and interactions in order to create effective regulations and principles
	Some *framework conditions* have a higher impact in UBC than others	Focussing on those *framework conditions* with the highest impact on UBC	Developing "laws and regulations positively supporting UBC" (the framework condition with the highest impact)

Report structure

This report focuses on the relevant issues regarding UBC in a European context from the point of view of the HEIs and is structured as follows:

Chapter 2 outlines the aims and methodology of the study. It states the study research question and main objectives, together with methodological aspects such as the methods applied the target groups, the sample size or the sample description.

Chapter 3 is the main piece of the report and includes the key study results. Firstly, the result level is analysed, including the *8 Types of UBC* (collaboration in R&D, mobility of academics, mobility of students, commercialisation of R&D results, curriculum development and delivery, LLL, entrepreneurship and governance) and the general measurement of Total UBC. The perceptions of the extent of cooperation for both groups and some associated measurements are shown for each one. Three segments are identified for academics and HEIs, representing groups that undertake low, medium and high extent of UBC.

Secondly, the factor level is examined. Drivers that facilitate, and barriers that hinder UBC are described and explained and the main barriers and drivers for the best and worst performing segments are compared. Likewise, situational factors and perceived benefits of UBC for both groups are defined and compared. Thirdly, the action level is studied, which contains the *4 Pillars* (strategies, structures and approaches, operational activities and framework conditions) that support UBC. The extent of development of each pillar is individually assessed and the relationships among the items of each factor stated and explained. Finally, the interrelations among the items of the three different levels are analysed and the significance of its influence is statistically tested.

Chapter 4 contains the discussion of perception in European UBC, considerations in the implementation of the findings for the improvement of European UBC and the importance of UB Partnerships.

Finally, **Chapter 5** presents the main conclusions drawn from the findings, adding the limitations of the study and a set of recommendations for further research.

Introduction

Introduction to UBC

UBC is understood as transactions between HEIs and business for mutual benefit, fostering UBC and extracting its value can help HEIs to face the problem of decreasing public funds[16], and help businesses to gain and maintain their competitive advantage in today's dynamic international markets[17], but also contribute to the economic development on a regional and national level[18] as well as meet the demands of the labour market to provide more relevant knowledge and skills[19]. In this context, UBC creates mutual benefits for all parties involved, and, to society as a whole.

> ### Definition of University-Business Cooperation
>
> *UBC is defined as all types of direct and indirect, personal and non-personal interactions between HEIs and business for reciprocal and mutual benefit including: collaboration in R&D, personnel mobility (academics, students and business professionals), commercialisation of R&D results, curriculum development and delivery, LLL, entrepreneurship and governance.*

Successful cooperation of HEIs in synergetic relationships with governments and businesses (the 'triple helix') is considered the ideal driver of knowledge-based economies and societies[20]. Throughout the world, societies are continually being challenged to stay relevant in the ever more dynamic international markets. The flattening of the world's economy playing field has meant that societies are being faced with challenges unimaginable fifty years ago resulting from this greater accessibility to, and coordination with world markets. By engaging HEIs in a coordinated and complementary symbiosis with government and businesses, it is said that a 'knowledge economy' can be cultivated and thus, regional economic development fostered.

Over the last few decades there has been a dramatic shift in the focus of HEIs and policy makers towards the HEI's so-called 'third mission'. Through this, HEIs have had their roles focussed to a greater extent on the need to contribute to society in a more meaningful way through knowledge and technology creation, transfer and exchange[21]. In recent years, the focus has been extended to recognise all the ways in which HEIs can contribute to society including LLL, entrepreneurship or exchanges of workers with business as means to reach the third mission. Owing to this, the holistic extraction of value via UBC has become more important for the viability and relevance of HEIs. Furthermore, the prominence of the role of HEIs in LLL, namely to educate and prepare students during their private and professional lives, has increased as the benefits of closer and better cooperation between HEIs and business and the benefits for the students have been increasingly recognised.

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[16] Carayol (2003)
[17] Tucker (2002)
[18] OECD (2002)
[19] Gibb & Hannon (2006), Storm (2008), Razvan & Dainora (2009)
[20] Etzkowitz & Leydesdorff (2000)
[21] UNISO (2002-2004)

Framework for UBC

The *UBC Ecosystem Model* below documents the different elements involved in any type of UBC. The model describes how the act of UBC is affected, influenced or supported by other elements including *influencing factors*, the *4 Pillars of UBC* and key UBC stakeholders. The model also shows the complex interrelationship and co-reliance among these elements within the UBC ecosystem: UBC stakeholders are needed to 'action' the *4 Pillars* (on the action level); the *4 Pillars* in turn are affected by the *influencing factors* (on the factor level) in their ability to develop UBC (at the result level).

The report will structure the results from the study using the *UBC Ecosystem Model* as a basis structuring the results into the following three key areas:

1. Result level – where the extent of UBC is visible. This level explains the 8 different types of UBC that can be undertaken.

2. Factor level – where factors influencing UBC efforts are located. This level includes all the influencing factors which need to be considered in any attempts to affect UBC.

3. Action level – where actions to stimulate UBC occur. This area contains the *4 Pillars* where actions to influence the extent of UBC occur.

The following diagram shows the *UBC Ecosystem* as a means of explaining the UBC environment and relationships:
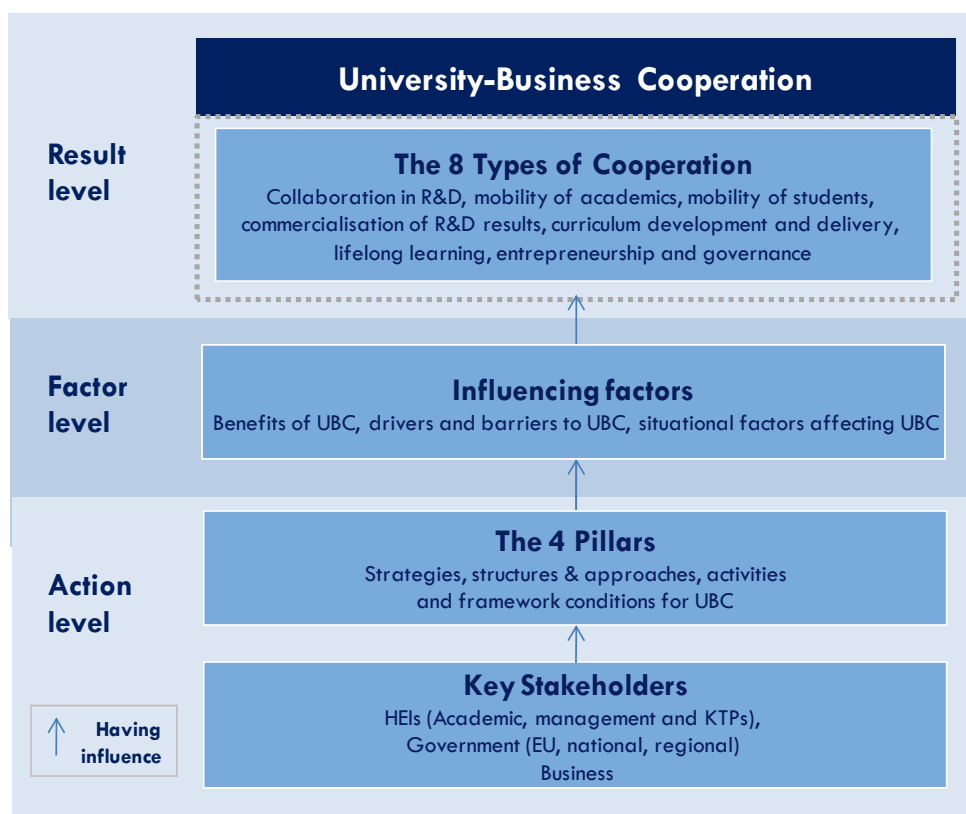
Illustration: Simplified UBC Ecosystem Model
Created during the project by Davey, T., Galan-Muros, V. (2011)

This model was tested and validated with the data collected during the study and further validated by experts in UBC.

Result level – the 8 Types of cooperation

The 'result-level of UBC' is where UBC takes place and consists of *8 Types* that encapsulate UBC activities and are explained in the following table.

Type of cooperation	Explanation
Collaboration in R&D	Cooperation including joint R&D activities, contract research, R&D consulting, cooperation in innovation, informal and personal networks, joint publications with firm scientists/researchers, joint supervision of theses with firm scientists/researchers (Bachelor, Master, Doctoral Degree [PhD]) in cooperation with business and student projects in cooperation with business.
Academic mobility	Temporary or permanent movement of teaching staff or researchers from HEIs to business; and employees, managers and researchers from business to HEIs.
Student mobility	Temporary or permanent movement of students from HEIs to business.
Commercialisation of R&D results	Commercialisation of scientific R&D results with business through spin-offs, disclosures of inventions, patenting or licenses.
Curriculum development and delivery	Generally speaking, is the process of creating a learning environment and the development of human resources relevant to modern society. This includes university-business cooperation in the development of a fixed programme of courses, modules, majors or minors, planned experiences as well as guest lectures by delegates from private and public organisations within undergraduate, graduate, PhD programmes or through further professional education.
Lifelong learning	The provision of adult education, permanent education and/or continuing education involving the acquisition of skills, knowledge, attitudes and behaviours at all stages of life by HEIs.
Entrepreneurship	Actions involving HEIs towards the creation of new ventures or developing and innovative culture within the HEI in cooperation with business.
Governance	Cooperation between HEI and business at a management level of the HEI or firm. This includes having business leaders involved in HEI decision-making or sitting on the boards of HEIs, as well as being involved at a faculty management level. Conversely, governance also includes academics involved in firm decision-making or sitting on the boards of firms.

Factor level – benefits, drivers, barriers and situational factors

The 'factor level of UBC' explains the factors that influence the extent of UBC for academics and HEIs and includes: benefits, situational factors, drivers and barriers. Through a review of relevant reports and articles, qualitative interviews and the practical experience, the following drivers, barriers and situational factors for UBC were identified.

Benefits

Benefits are the benefits that are received by the academic or HEI in undertaking UBC. They can be arranged in the following categories: benefits for students, benefits for business, benefits for society, benefits for HEIs and personal benefits for academics.

Type of benefit	Explanation
Benefits for students	Factors that benefit students, including: • Improving the learning experience of students, • Increasing skills and graduate development, • Improving the employability of future graduates.
Benefits for business	Factors that benefit business, including: • Improves the performance of business.
Benefits for society	Factors that benefit society, including: • Increasing local employment, • Benefitting the local industry, • Increasing local GDP and disposable income, • Creating a variety of range of social and recreational benefits, • Improving regional productivity.
Benefits for HEIs	Factors that benefit HEIs, including: • Achieving the mission of the HEI.
Personal benefits for academics	Benefits that relate to the personal benefits for the academic, including: • Increasing the academics reputation in the field, • Being vital for personal research, • Increasing chances of promotion and employability, • Improving the standing within the HEI.

Drivers

Drivers are those factors that facilitate the academic or the HEI to engage in UBC. In essence they are factors that provide motivation to undertake UBC and can be grouped under two headings: relationship drivers and business drivers.

Type of driver	Explanation
Relationship drivers	Drivers that relate to the relationship between the academic/HEI and the business, and these include: • Existence of mutual trust, • Existence of mutual commitment, • Having a shared goal, • Understanding of common interest by different stakeholders (e.g. HEIs; business; individuals; students), • Prior relation with the business partner, • Cooperation as effective means to address societal challenges and issues.

Business drivers	Drivers that relate to the business factors that motivate UBC; and these include: • Employment by business of HEI staff and students, • Interest of business in accessing scientific knowledge, • Possibility of accessing funding / financial resources for working with business, • Short geographical distance of the HEI from the business partner, • Flexibility of business partner, • Access to business-sector research and development facilities, • Commercial orientation of the HEI.

Barriers

Barriers are those obstacles that restrict or inhibit the ability of the academic or HEI to engage in UBC and can be grouped under three headings: usability of results, funding barriers and relational barriers.

Type of barrier	Explanation
Usability of results	Barriers that relate to the way the results of UBC (mainly R&D results) are utilised by business; and these include: • The focus on producing practical results by business, • The need for business to have confidentiality of research results, • Business fears that their knowledge will be disclosed.
Funding barriers	Barriers that relate to the provision of funds for UBC from both internal and external sources; and these include: • Lack of external funding for UBC, • Lack of financial resources of the business, • Lack of HEI funding for UBC, • The current financial crises.
Relational barriers	Barriers that relate to or affect the actual UBC relationship or interactions, occurring between the academic /HEI and the business; and these include: • Business lack awareness of HEI research activities / offerings, • The limited absorption capacity of SMEs to take on internships or projects, • Differing time horizons between HEI and business, • Differing motivation / values between HEI and business, • HEIs lack awareness of opportunities arising from UBC, • Bureaucracy within or external to the HEI, • Limited ability of business to absorb research findings, • Differing mode of communication and language between HEI and business, • A lack of contact people with scientific knowledge within business, • Difficulty in finding the appropriate collaboration partner , • No appropriate initial contact person within either the HEI or business.

Situational factors

Situational factors describe demographic and other status indicators that were tested for their influence on the extent of UBC. They are also used to describe the sample population and to check the representativeness of the population.

Type of situational factor	Explanation
Age	The age of the respondent and its effect on the extent of UBC by academics.
Gender	The gender of the respondent and its effect on the extent of UBC by academics.
Years in HEI	The number of years that a respondent has been employed at a HEI and its effect on the extent of UBC by academics.
Years in Business	The number of years that a respondent has been employed or worked in business, prior to working in the HEI, and its effect on the extent of UBC by academics.
Area of knowledge	The area of knowledge in which the respondent is employed and its effect on the extent of UBC by academics.
Denomination of HEI	The denomination of the HEI by the respondent and its effect on the extent of UBC by academics as well as the extent of UBC by HEIs.
Country	The country in which the HEI of the respondent is located and its effect on the extent of UBC by academics as well as the extent of UBC by HEIs.

Action level – the *4 Pillars*

The *4 Pillars* constitute the 'action-level', where all stakeholders need to focus their efforts when they want to influence the amount of UBC

Type of pillar	Explanation	Primary responsibility
Strategic instrument	<u>Def</u>: *The drafting and implementation of cross-functional strategic decisions by a HEI that will enable it to achieve its long-term objectives with respect to UBC.* A strategic instrument is usually created by decisions made at a HEI board level. The study will seek to understand whether cooperation with business is part of their mission, whether HEIs have clearly defined strategies to address UBC, and if so, what are they and which areas are addressed.	HEI management
Structural instrument or approach	<u>Def</u>: *Constructions created as a result of top-level strategic decisions within (or related to) a HEI that enable UBC and include the creation or development of institutions, positions, methods and policies and programmes.* The study will seek to understand the kind of structures and approaches put in place in order to promote, develop or implement UBC. They can be on the level of HEI governance, curriculum development, career guidance offices and/or technology transfer offices. The two primary structural instruments are related to the creation and /or expansion of positions (personnel) and agencies (units of focus).	Governments, regional agencies, HEIs, business
Operational activity	<u>Def</u>: *Are actions of a practical nature undertaken by a HEI to create and support UBC whose scope and volume can be described/measured* The study will seek to understand the kind of concrete cooperation activities that exist within HEIs. Examples could include exchange of staff, placements of students, students working on concrete problems defined by companies (e.g.	Governments, regional agencies, HEIs, business

Framework conditions	master thesis, PhD), specific curriculum for people in the work place (LLL) and research projects.	
	Def: Conditions applied by regional, national and international governments to maximise the long term economic performance, welfare or other policy objectives of a region through UBC. The conditions usually exist (i) in the form of regulations, institutions, promotional measures or (ii) incentive schemes in the form of policy, economic or legal conditions.	Governments

Action level – UBC Stakeholders

Stakeholders for UBC need to be considered when discussing the UBC Ecosystem. The stakeholders are those actors who help to create the ecosystem that will support UBC between the HEI / academic and the business. Further, they will be the ones that actually engage in UBC.

Stakeholder	Explanation
Governments	Includes all levels of governments ranging from regional or national to international. The sources of contractual relations that guarantee stable interactions and exchange. *Role:* Implement and alter framework conditions, providing structures and approaches and providing funding for activities to stimulate UBC including: • Economic frameworks – funding, stimulus packages, • Policy frameworks – taxation, • Legal frameworks – laws and regulations.
HEIs	HEIs are defined as all types of institutions, which provide higher education and are the source of new knowledge and technology. These institutions must be formally recognised by the relevant national/regional authority and include: • Universities, • Universities of applied sciences, • Polytechnics /technical universities, • Colleges and tertiary schools. Within the HEI there are a number of internal UBC stakeholders: I. <u>HEI representatives:</u> • University management (incl. Chancellors, Rectors, Presidents, board members, faculty heads) define the tone toward UBC at the HEI working with external stakeholders to develop appropriate UBC strategies, structures and approaches, activities and framework conditions, • University professional working with business (incl. knowledge transfer professional, liaison officer, fundraising officer, alumni officer, mobility officer, LLL officer, business development manager) responsible for the facilitation, organisation, execution and support of UBC and UBC activities, II. <u>Academics</u> (incl. professors, researchers and lecturers) *Role:* Responsible for the creation of strategies, structures and approaches and activities for UBC.

Business	Business is considered in a broad sense in the study to include: • Privately and publicly owned organisations, • Non-government organisations, • Not-for-profit organisations. _Role_: Collaborate with HEIs in creating UBC strategies, helping to fund UBC structures and approaches and participating in UBC activities together with academics and HEIs.
Intermediaries	Intermediaries in UBC can be understood as those organisations not owned or managed by either the Government or HEI that facilitate UBC. These include: Chambers of Commerce, business associations, investor groups and Regional Development Agencies. _Role_: Collaborate with HEIs and Government in creating UBC strategies, helping to support structures and approaches and organising UBC activities.

The Triple-Helix model explains the relationship between UBC stakeholders (HEIs, businesses and governments) in the creation of a knowledge economy and for their individual, and collective, roles in creating a regional innovation ecosystem. The following is an expanded version of the Triple-Helix model illustrating the roles of each stakeholder.
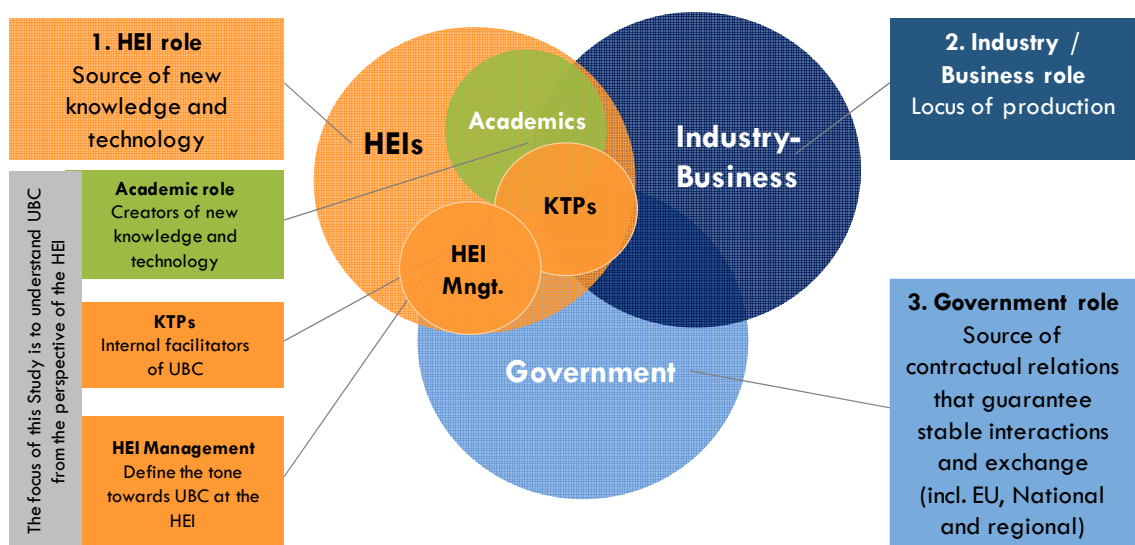
Illustration: The Triple Helix Model with further information about UBC stakeholders' roles
Model adapted from Etzkowitz & Leydesdorff (2000)

Chapter summary

The chapter describes:

    I.   the importance of UBC,

    II.   a framework for the management and understanding of UBC: *The UBC Ecosystem,*

    III.   an explanation for the various elements in the UBC ecosystem including:

        – The result level – the *8 Types of UBC*,

        – The factor level – perceived benefits, drivers, barriers as well as situational factors,

        – The action level – the *4 Pillars* and UBC stakeholders.

The next chapter will explain the aims and methodology of the study.

Aims and methodology

Aims

This report details the situation of UBC in Europe.

Study primary research question

What is the current situation of European UBC from the perspective of HEIs
including the largest drivers facilitating, and barriers preventing UBC?

Study sub-research questions

This question can be detailed in a series of sub-research questions:

I. Charting the current situation regarding UBC in respect to:

   a) the extent of UBC generally and in the *8 Types of UBC* in Europe,

   b) the extent of development of the mechanisms that support UBC (*4 Pillars*: strategies, structures and approaches, activities and framework conditions) that support UBC.

II. Identifying, analysing and describing the factors that originate from (benefits), facilitate (drivers), inhibit (barriers) and / or influence (situational factors) UBC in Europe.

III. Describing how the different elements in the *UBC Ecosystem* relate,

IV. Providing a summary of research findings (insights).

V. Making recommendations for increasing European UBC within HEIs.

The report has important implications for all stakeholders involved in UBC, including academics, department heads, HEI managers, knowledge transfer officers, regional development agencies, external intermediaries and governments at different levels.

Specific research questions addressed in the research will be explained at the start of the result chapter.

Methodology

Target group

Target countries – existing and candidate members of the EU plus those partly committed to the EU economy and regulations as members of the European Economic Area (EEA) were targets of the study. Refer to the map below which describes the participating countries,

Target respondents – HEIs and academics within the target countries are the target respondents of this study. The study provides relevant information on a representative sample of HEIs, in terms of geographical and typological distribution and a representative number of academics, in terms of gender, age, experience and area of knowledge.

PARTICIPATING COUNTRIES

Countries that are existing, or candidate members, of the EU or are partly committed to the EU economy and regulations as member of the EEA were targets of the study.

Involved in study

EU countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom

EU candidate countries: Croatia, Iceland, Macedonia and Turkey

EEA countries: Liechtenstein and Norway

Process

The following process involving four research methods (multi-research approach) was undertaken to achieve the study objectives.

I. Secondary information search	Creation of a solid practical and theoretical basis incorporating latest discussion and findings from recently published reports (national and EU level) as well as published books and journals.
II. Qualitative research	10 expert interviews were conducted with UBC professionals to further develop knowledge on UBC in a European context.
III. Quantitative research	— Online survey seeking a minimum of 3717 responses, — Survey translated into 22 languages and sent to 3551 HEIs based in the 33 countries, — A minimum of 30 responses from each country were sought, — the survey received 6,280 usable responses from academics and HEI representatives.
IV. Qualitative workshop	12 experts in UBC met in Brussels at the *Lighthouse Workshop* to view, and discuss the initial results and to and provide further focus for the analysis and reporting phase of the project.
IV. Case studies	30 good practice European UBC case studies were sought, selected and written

Survey sample size

The survey was created, translated and sent to over 11,000 HEI managers within Europe in February 2011 and was concluded in April 2011 with the response rates recorded as follows:

	Groups	No. of responses
I	**Academics**	4,123
II	**HEI management**	1,150
III	**University professional working with business**	1,007
	Total responses (after data cleansing [22])	**6,280**

Respondents

> The sample for the study represents the characteristics
> of the real European academic and HEI population

Position within the HEI

100% of respondents

16% — University professional working with business

18% — University management

66% — Academic

n=6280
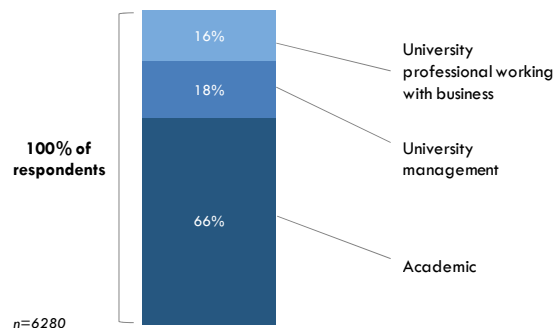
Of the entire sample of 6,280, 66% (4,123) of the respondents are academics with a further 18% (1,150) being HEI management and 16% (1,007) UPB.

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[22] Data cleansing consisted of :
1. Removing responses in which 'required questions' were not answered
2. Removing responses in which inconsistencies were identified
3. Removing responses containing extreme outliers

Academic respondents

Gender

Female — 40%

100% of respondents

Male — 60%

n=3150
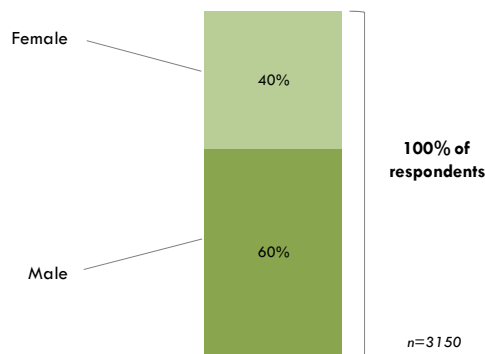
The majority of the respondents are male. *Eurostat* statistics were used to confirm the representativeness of the study's sample with respect to the percentage of actual male versus female academic staff. **The sample of this study can be considered representative with respect to gender.**

Age

11.4% — 60+
24.3% — 50-59
100% of respondents — 31.2% — 40-49
26.7% — 30-39
n=3177 — 6.4% — 20-29
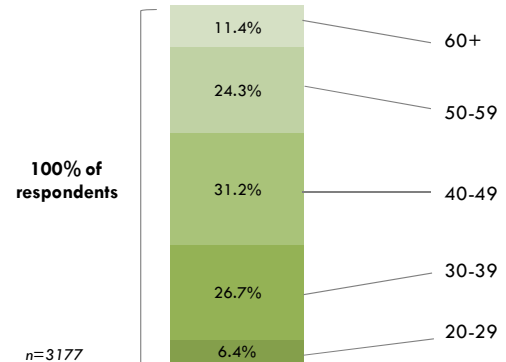
The main age group covered by the survey is the group of 40 to 49 representing 31.2% of the survey respondents, while the smallest one is that for 20 to 29 years. *Eurostat* statistics show that the percentage of the different age groups for academic staff in Europe differs from the real one less than 5% for all of the groups above for the sample. **The sample of this study can be considered representative with respect to age.**

Years in Business

20+ — 4.3%
10 - 19 — 8.4%
6 - 9 — 8.3%
3 - 5 — 15.1%
0 - 2 — 21.0%
100% of respondents
not at all — 42.9%
n=3150
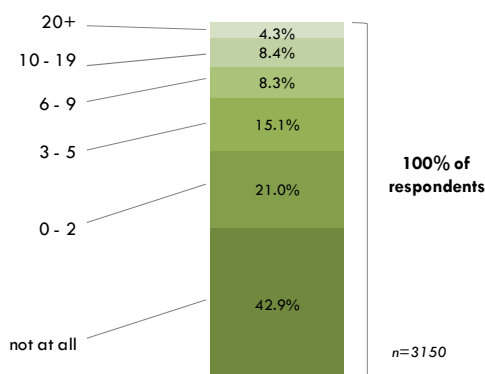
42.9% of the sample has not yet worked in business whilst 21% has worked for more than five years in business. **Therefore, the survey primarily addresses HEI workers with limited experience working in business.**

Years in HEI

29.1% — 20+
35.2% — 10 - 19
100% of respondents — 16.3% — 6 - 9
11.7% — 3 - 5
n=3145 — 7.7% — 1 - 2
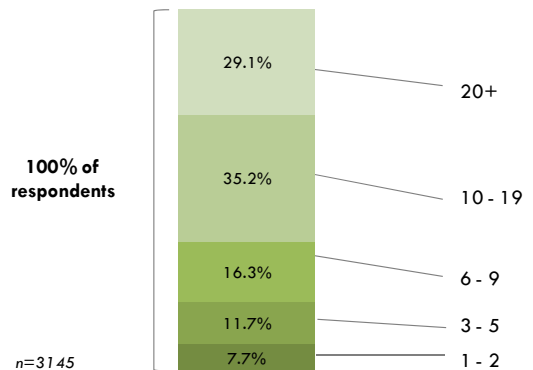
People working more than ten years at a HEI represent 64.3% of the sample. **Therefore, the survey primarily addresses experienced HEI workers.**

Denomination of HEI

Other — 1.5%
College of… — 3.6% / 3.2%
School of… — 15.1%
Polytechnic university / Technical university — 11.7%
University of applied sciences
University — 64.9%

100% of respondents

n= 4091
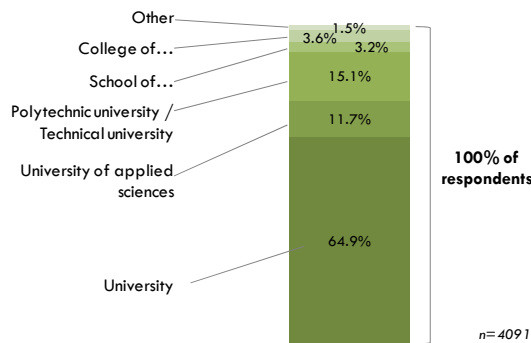
The majority of the respondents are employed in a university (64.9%). 26.8% of respondents work in a university of applied sciences or polytechnic / technical university. **Therefore, the survey primarily addresses academics employed in a traditional university.**
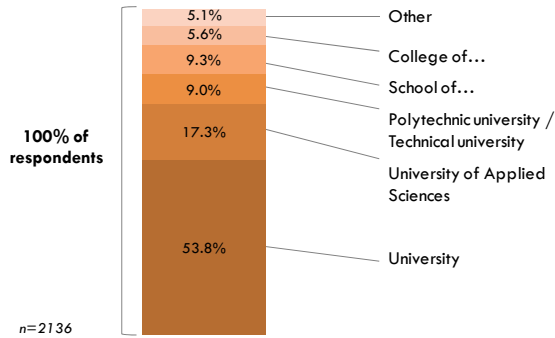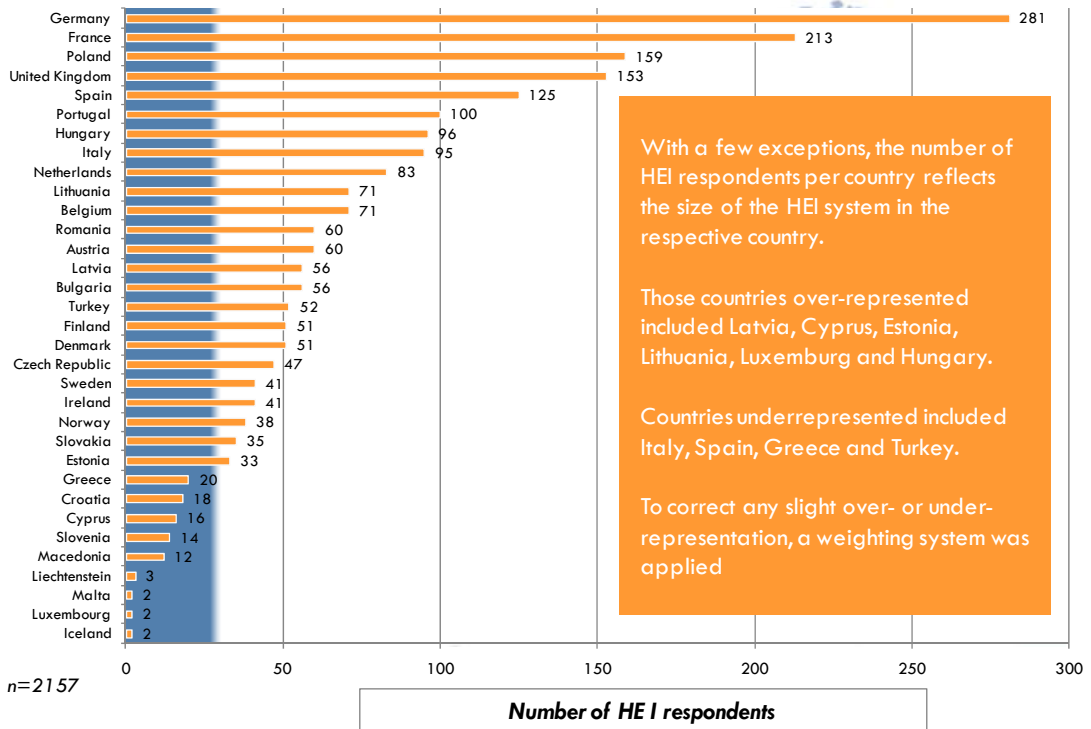
Area of knowledge

Technology & Engineering — 33.3%
Health & Biomedical Sciences — 24.0%
Social Sciences — 32.7%
Humanities — 10.0%

100% of respondents

n=4096
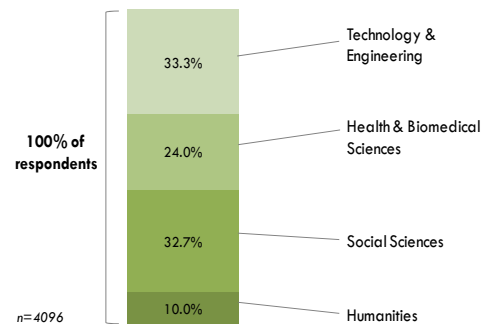
The sample has 90% of respondents relatively evenly spread through the social sciences, health and biomedical sciences and technology and engineering areas of knowledge whilst the remainder are from humanities. **The survey addresses mainly three areas of knowledge.**

Country

Portugal — 519
Spain — 471
Poland — 461
Italy — 324
France — 301
Germany — 240
Lithuania — 220
Bulgaria — 205
Romania — 183
Turkey — 152
Hungary — 122
Netherlands — 118
Austria — 109
United Kingdom — 102
Belgium — 95
Latvia — 93
Ireland — 72
Finland — 64
Slovakia — 48
Estonia — 35
Cyprus — 34
Croatia — 34
Greece — 29
Czech Republic — 25
Macedonia — 20
Sweden — 19
Slovenia — 13
Norway — 7
Denmark — 6
Liechtenstein — 2

n=4123

Number of academic respondents

The number of academic respondents per country reflects the size of the HEI system in the respective country with only a few exceptions.

Those countries over-represented included Lithuania, Portugal, Cyprus, Latvia, Bulgaria and Romania

Countries underrepresented included Denmark, Norway, Sweden, Germany and United Kingdom.

To correct the over- and under-representation, a weighting system was applied

HEI respondents

Denomination of the HEI

100% of respondents

5.1%	Other
5.6%	College of…
9.3%	School of…
9.0%	Polytechnic university / Technical university
17.3%	University of Applied Sciences
53.8%	University

n=2136

The majority of the respondents were employed in a traditional university (53.8%).

26.3% of respondents work in a university of applied sciences or polytechnic / technical university.

The distribution of responses is similar to those received from academics.

Country

Country	Number
Germany	281
France	213
Poland	159
United Kingdom	153
Spain	125
Portugal	100
Hungary	96
Italy	95
Netherlands	83
Lithuania	71
Belgium	71
Romania	60
Austria	60
Latvia	56
Bulgaria	56
Turkey	52
Finland	51
Denmark	51
Czech Republic	47
Sweden	41
Ireland	41
Norway	38
Slovakia	35
Estonia	33
Greece	20
Croatia	18
Cyprus	16
Slovenia	14
Macedonia	12
Liechtenstein	3
Malta	2
Luxembourg	2
Iceland	2

n=2157

With a few exceptions, the number of HEI respondents per country reflects the size of the HEI system in the respective country.

Those countries over-represented included Latvia, Cyprus, Estonia, Lithuania, Luxemburg and Hungary.

Countries underrepresented included Italy, Spain, Greece and Turkey.

To correct any slight over- or under-representation, a weighting system was applied

Number of HE I respondents

Explanation of the results

The following information provides instructions for the comprehension of results.

Who answered the survey (academic or HEI)

Questions were posed to two groups within HEIs. These groups were asked about their perception of UBC:

1. Individual academics were asked to respond on behalf of themselves

2. HEIs representatives (HEI managers and university professionals working with industry) were asked to respond on behalf of their HEI.

	Focus	Responded on behalf of	Colour code for results
1	Academics	Indv. academics	
2	HEIs	HEI management and university professionals working with industry	

Colour codes have been used though the report to identify those results received from the academic (green) and those results received from the HEI (orange).

Qualitative interviews

Comments and findings from experts in UBC

Content found in a box like this is relevant information from the qualitative interviews with experts/practitioners in European UBC.

Case studies results

Content found in a box like this include relevant information from the cases studies analysis carried out as part of the entire study.

Hypotheses testing

During the secondary research review, many statements about UBC were gathered and converted into hypotheses. Using the data from the survey, it was tested whether the hypotheses could be rejected or not.

The source of the hypothesis is stated next to the hypothesis.

"Where the hypothesis came from is detailed here" [23]

The hypothesis is stated here　　　***The result is here***

The hypothesis has been confirmed by the results of the survey ✓

The hypothesis has not been confirmed by the results of the survey ✗

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[23] David Crosier, Lewis Purser & Hanne Smidt (2007)

Chapter summary

The chapter described:

- the study's primary research question: what is the current situation for European UBC from the perspective of HEIs, including the largest drivers facilitating, and barriers preventing UBC?

- the target audience for the study – all HEIs in 33 European countries,

- the process for the study – a multi-research approach,

- the sample size achieved – 6,280 full responses (after data cleansing),

- a description of the respondents – which describes that the sample for the study is representative of the characteristics of the real European academic and HEI population. Furthermore:

  - the gender and age were found to be representative of the academic landscape in Europe,

  - the study primarily addressed experienced HEI workers,

  - the study primarily addressed HEI workers with limited experience working in business,

  - the majority of the respondents were employed in a university,

  - the rate of respondents from the 33 countries was relatively representative. The data was adjusted for over- and under-represented country response rated through the use of a weighting system.

- An explanation of the interpretation of the results that will be presented in the next chapter.

In the following chapter, the results from the execution of the research method will be presented.

Results

The following model and questions form the frame for the presentations of the results.

Frame

The previously introduced *UBC Ecosystem* model will be used to explain the objectives that were addressed during the study and subsequently in this report:
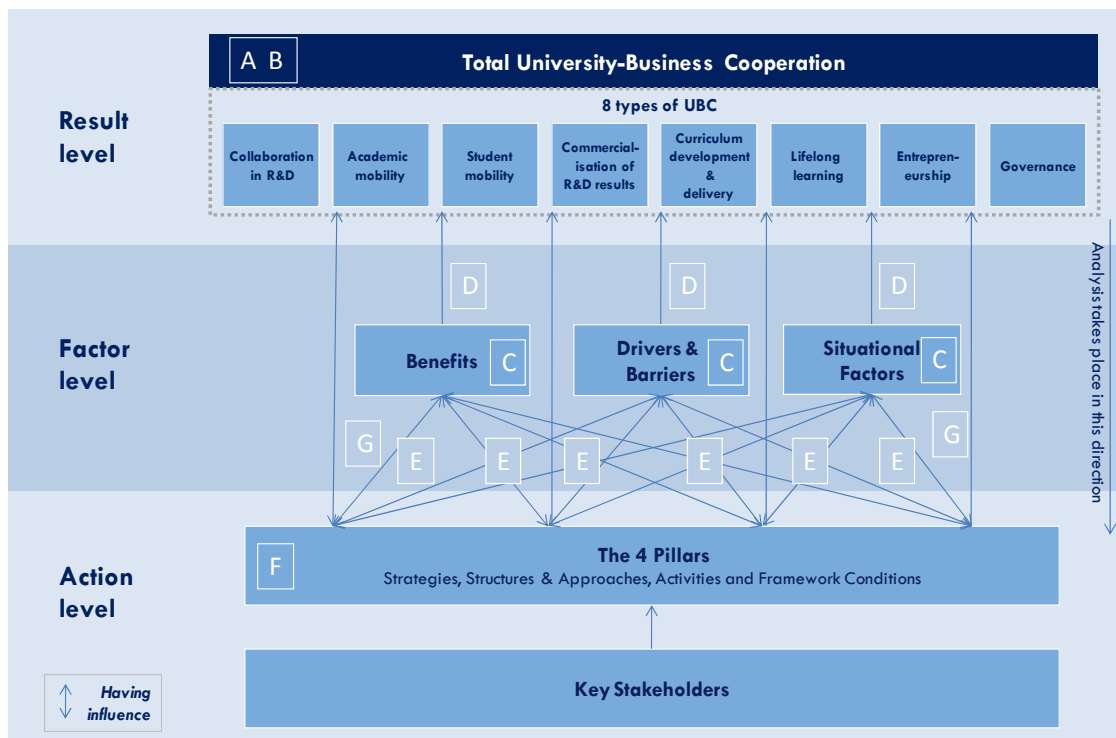
Result level (Total UBC)

A. What is the extent of Total UBC including the *8 Types* of cooperation?

B. What is the nature of EU UBC?

Factor level (Benefit, drivers, barriers and situational factors)

C. Which benefits, drivers, barriers and situational factors exist and how relevant are they?

D. What sort of influence do benefits, drivers, barriers and situational factors have on the extent of UBC (*8 Types of UBC*)?

E. What sort of influence do benefits, drivers, barriers and situational factors have on the mechanisms that support UBC (*4 Pillars*)?

Action level (4 pillars)

F. What is the extent of development of the mechanisms that support UBC (*4 Pillars*)?

G. What sort of influence do the mechanisms that support UBC (*4 Pillars*) have on the extent of UBC (*8 Types of UBC*)?

RESULT LEVEL
Total University-Business Cooperation (UBC)

- **Result level**
- Factor level
- Action level
- Inter-relationships

Results

The result level of UBC is where UBC actually takes place to create value for both academics and HEIs

There is substantial potential for developing UBC in Europe as it is still in the early stages of development

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Section objective

The following section will seek to answer the following research questions:

Total U-B Cooperation
A. What is the extent of Total U-B cooperation including the 8 types of cooperation?
B. What is the nature of EU U-B cooperation?

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8 Types of UBC

1 Collaboration in R&D
Joint R&D activities, contract research, R&D consulting, cooperation in innovation, joint publications with firm scientists/researchers, joint supervision of theses with firm scientists/researchers in cooperation with business and student projects in cooperation with business.

2 Mobility of academics

3 Mobility of students
Temporary or permanent movement of professors or researchers from HEIs to business; and employees, managers and researchers from business to HEIs.

4 Commercialisation of R&D results
Commercialisation of scientific R&D results with business through spin-offs, disclosures of inventions, patenting and licenses.

5 Curriculum development & delivery
The process of collaboratively creating a learning environment with members of the business community including creation of a fixed programme of courses or planned experiences.

6 Lifelong learning
Lifelong learning refers to all learning activity undertaken throughout life through a HEI, whether formal or informal.

7 Entrepreneurship
Actions within or involving HEIs towards the creation of new ventures or developing and innovative culture within the HEI in cooperation with business.

8 Governance
Cooperation between HEI and business at a management level of the HEI or firm.

Extent of European UBC

R&D-related cooperation	Extent of cooperation	
1. Collaboration in research and development,	ACAD	4.5 (Low)
2. Commercialisation of research and development results,	HEI	5.9 (Medium)

Cooperation in mobility	Extent of cooperation	
3. Mobility of academics,	ACAD	3.6 (Low)
4. Mobility of students,	HEI	5.5 (Medium)

Non-contract cooperation	Extent of cooperation	
5. Curriculum development and delivery,	ACAD	3.6 (Low)
6. Lifelong learning,	HEI	5.6 (Medium)
7. Entrepreneurship,		
8. Governance.		

Focus for the 8 Types of cooperation
The 8 Types can be structured into*
three themes:
1. R&D-related cooperation,
2. Cooperation in mobility,
3. Non-contract cooperation.

No type of cooperation was perceived as being highly developed by either academics or representatives from HEIs.

NB. The difference between academics and HEIs in their assessment of total UBC could be because they were each asked for their perception on two different things. Academics were asked for the extent of UBC undertaken by themselves (as individuals) and HEI representatives were asked about the extent of UBC at the HEI.

*A factor analysis was performed to determine this

Interrelationship of the 8 Types

A correlation test to see the inter-relatedness of the 8 Types shows that collaboration in R&D and commercialisation of R&D are expectedly highly related whilst there is a moderate relationship between the two types of mobility. Finally, a moderate relationship exists among curriculum development and delivery, LLL, entrepreneurship and governance, showing that in most cases cooperation in these areas is similarly developed or under-developed.

Total UBC – Academics

Collaboration in R&D — 5.0
Mobility of students — 4.3
Commercialisation of R&D results — 4.0
Lifelong learning — 4.0
Curriculum development and delivery — 3.8
Entrepreneurship — 3.3
Governance — 2.9
Mobility of academics — 2.9

ACAD

1 2 3 4 5 6 7 8 9 10
Not at all Low Medium High

n=3460
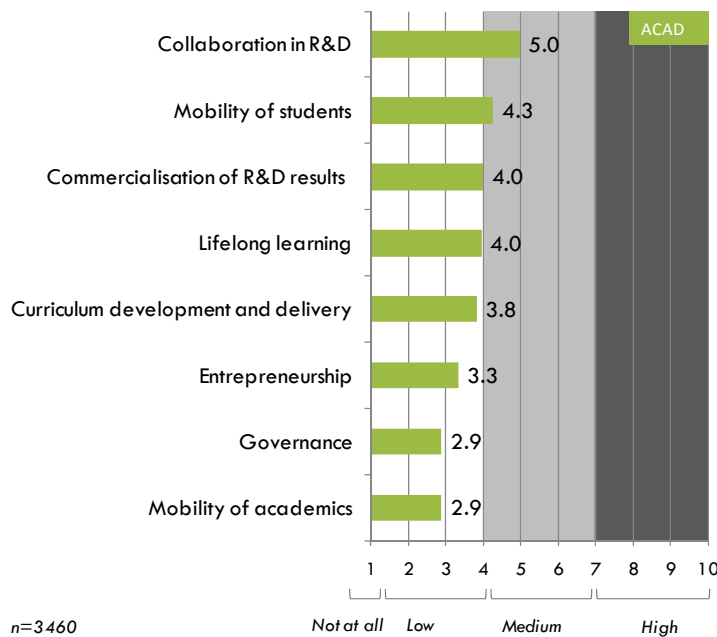
Medium level of UBC
- Collaboration in R&D
- Mobility of students

Low level of UBC
- Commercialisation of R&D results
- Lifelong learning
- Curriculum development and delivery
- Entrepreneurship
- Governance
- Mobility of academics.

Level of UBC	% of academics with this level of UBC
Not at all	37%
Low	26%
Medium	21%
High	16%

The extent of UBC amongst academics is mostly low (rated 4 or below) with only *collaboration of R&D* and *mobility of students* being rated at a medium level of development. There is a much higher *collaboration with business in R&D* than there is in *commercialising the results of R&D.* Furthermore, the much higher cooperation with business in *student mobility* compared to *academic mobility* suggests that academics either perceive the benefits for students as higher than the benefits of the cooperation for themselves (i.e. lack of motivation, which is confirmed within this study), or the barriers for *academic mobility* are higher than for *student mobility* (inconclusive from the study but also likely to impact).

An academic cooperates with business to a similar extent for all *8 Types*

The results show that in general academics tend to cooperate at a similar level in all UBC types e.g. if they cooperate to a high extent with *business in collaboration in R&D*, they generally also cooperate at a similar extent for all the types of UBC

A cluster analysis shows that academics could be categorised into three segments, which share a similar extent of UBC:

(i)   the 'trailblazers academics' undertaking a medium / high level of all types of UBC,

(ii)   the 'attempter academics' undertaking only medium level of UBC for all types, and

(iii)   the 'non-UBC academics' undertaking a low level of UBC (or not at all) for all types.

Comments and findings from experts in UBC

Many of the experts stated that HEIs are increasingly tending to create longer-term relationships with business. It is also remarked that despite efforts at top level to coerce relationships, the relationships between HEIs and business often commences from more personal interactions involving a researcher around mutually beneficial topics of interest.

'Not at all' UBC Academics

11% of all academic respondents did not assess their extent of UBC as higher than 2 (on a scale of 1 to 10) for any of the types of UBC.

Total UBC – HEIs

Type	Value
Collaboration in R&D	6.4
Mobility of students	6.3
Commercialisation of R&D results	6.0
Lifelong learning	5.8
Curriculum development and delivery	5.8
Entrepreneurship	5.7
Governance	5.2
Mobility of academics	4.7

n=1753

Medium level of UBC
- Collaboration in R&D
- Mobility of students
- Commercialisation of R&D results
- Lifelong learning
- Curriculum development and delivery
- Entrepreneurship
- Governance
- Mobility of academics.

Level of UBC	% of academics with this level of UBC
Not at all	8%
Low	26%
Medium	36%
High	30%

The extent of UBC amongst HEIs is rated at a medium level (> 4 to 7) with *governance* and *mobility of academics* being ranked the lowest, as academics do. Likewise, HEIs representatives recognise *collaboration in R&D* and *mobility of students* as the highest.

A HEI cooperates with business to a similar extent for all *8 Types*

Similar to the academics, the results show that HEIs tend to cooperate at a similar level in all UBC types e.g. if they cooperate to a high extent with business in *collaboration in R&D*, they cooperated to a similar extent for all the types of UBC. Equally, it was found that HEIs could also be categorised into 3 segments:

1. the 'trailblazer HEIs' undertaking a higher level for all types of UBC,

2. the 'attempters HEIs' undertaking a medium level for all types of UBC,

3. the 'non-UBC HEIs' executing generally a low level (or not at all) for all types of UBC.

'Not at all' UBC HEIs

Only 1% of all HEIs did not assess their extent of UBC as higher than 2 (on a scale of 1 to 10) for any of the types of UBC.

Comments and findings from experts in UBC

A trend relating to the extent of cooperation was observed throughout the interviews: an increase of HEIs cooperating with business in all types of UBC. It was further commented by some of the interviewees' that the focus of the cooperation has moved away slightly from expecting income from UBC, to less tangible longer-term benefits of UBC. A good example of this development is the increasing involvement of business in curriculum development that is observed e.g. business representatives sit more often on boards and so they are increasingly influencing the curriculum development.

Furthermore, the knowledge of HEIs about UBC has grown as has the amount of finances dedicated to UBC. A theme running through the interviews was that companies were more open to sharing issues with HEIs and that business are trying to influence education.

Time spent on UBC – Academics

The average amount of total work time spent by academics on UBC is 20%

100% of Academics

12% — Spend 50% or more of their time on UBC

34% — Spend 10-50% of their work time on UBC

54% — Spend 10% or less of their work time on UBC

n=2060

Most academics spend less than 10% of their work time working in UBC

12% spend more that 50% of their time working in UBC
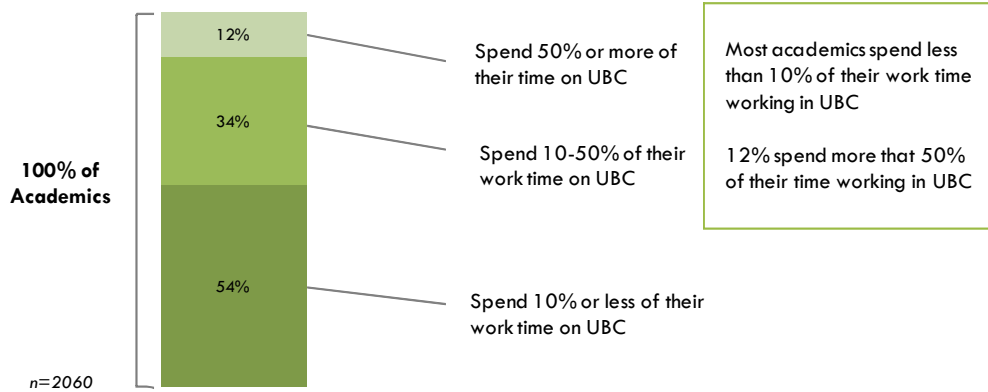
Percentage of HEI budget coming from UBC

About 4.5% of total HEI financial budgets come from UBC

Third-party money as a percentage of the HEI budget

The average amount of the HEIs budget coming from third-party money was 27%.
(Third-party money is money earned from external sources additional to the regular fixed budget from the Federal State)

Total HEI budget

27% Third party money

n=790

UBC as a percentage of all third party money

Percentage of HEIs that receive more than 50% of third-party money from UBC — 5%

Percentage of HEIs that receive more than 10% to 50% of third-party money from UBC — 28%

Percentage of HEIs that receive 10% or less of third-party money from UBC — 67%

Amount of third party money from UBC

100% of HEIs

The average amount of third-party money coming from UBC was 17% - about 4.5% of Total HEI budget (17% of 27%).

n=755
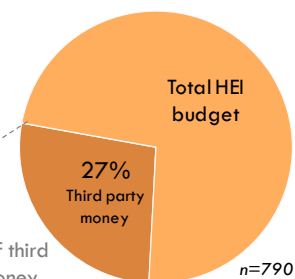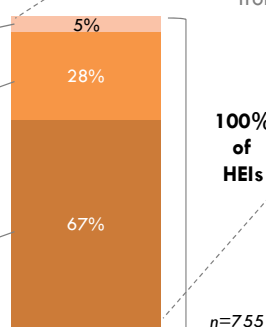
Comments and findings from experts in UBC

Many of the experts recognised, as a positive shift, that income from UBC is now being used less as a measurement for UBC. However, income from UBC is a relatively easy measurement to calculate and a reason for many HEIs to undertake UBC in the light of diminishing government funding. [24]

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[24] Carayol (2003)

Collaboration with business in R&D
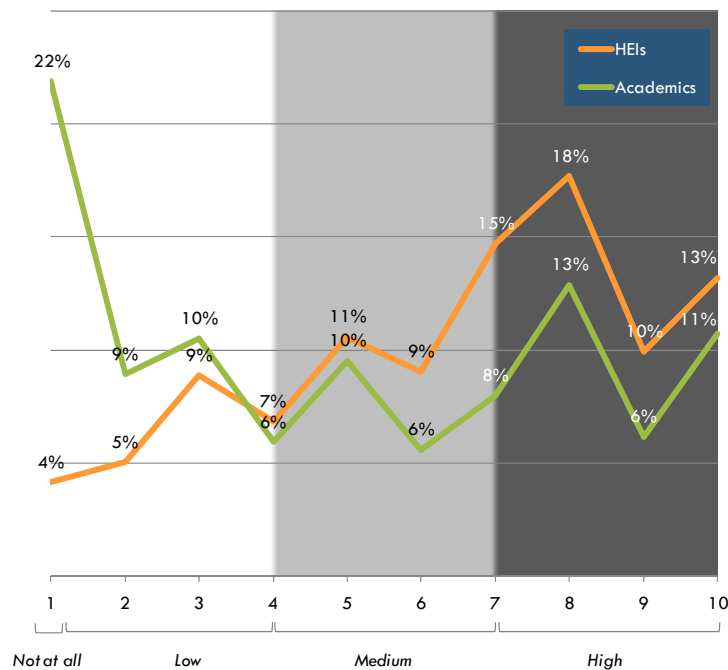
Academics
There is an even distribution of academics at the four levels of cooperation with business.

Collaboration in R&D	% of ACAD
Not at all	21,9%
Low	25,3%
Medium	23,1%
High	29,7%

HEIs
40.8% of HEIs have a high extent of cooperation with business in collaboration in R&D.

Collaboration in R&D	% of HEI
Not at all	4,2%
Low	20,7%
Medium	34,3%
High	40,8%

n=5971

Joint research and development projects by academics with business (last 12 months)

n=2118

Contracted research projects by academics with business (last 12 months)

n=2068
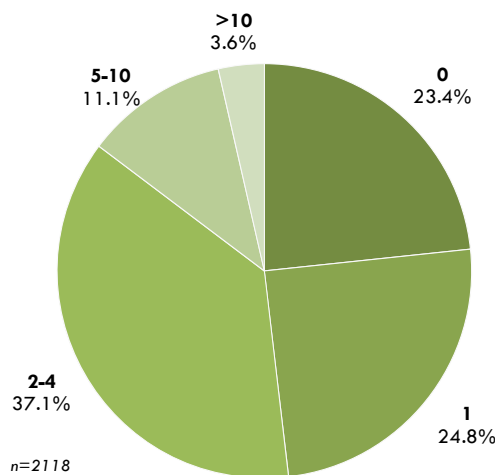
76.6% of academics have participated in at least one joint R&D project in the last 12 months with 51.8% participating in more than one.
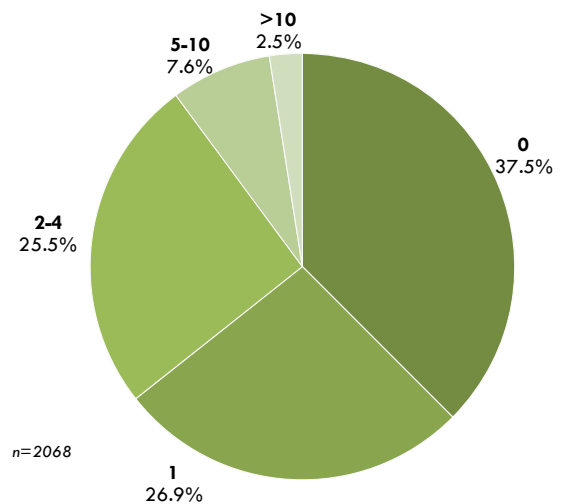
62.5% of academics have participated in at least one contract research project in the last 12 months with 33.4% participating in more than one. For academics, joint R&D projects are a more common form of collaboration with business in R&D than contract research

> **Comments and findings from literature**
>
> Businesses can significantly benefit by taking on PhD students to undertake R&D projects, not only because they obtain highly skilled people but also because they gain access to academic contacts and knowledge. The students benefit from higher stipends and improved employability skills as a result of their experience in industry.[25]

> **Demola platform - Hermia Ltd with Tampere University of Technology, University of Tampere and Tampere, University of Applied Sciences.**
>
> Funded by the Creative Tampere Programme, Demola is a Finnish open innovation platform for the creators of next generation products and services. Demola provides students and companies with a collaborative and multidisciplinary innovation environment where students from three regional universities create demonstrations of novel service and product concepts coming from companies. Offered by higher education institutes in Tampere, Demola gives student teams the opportunity to develop demo products and services based on company concepts. Companies ranging from local SMEs to international large-scale enterprises as well as public organisations collaborate with the teams. Demola reflects successful open innovation between companies and students within a dedicated (neutral) innovation environment.

Mobility of academics
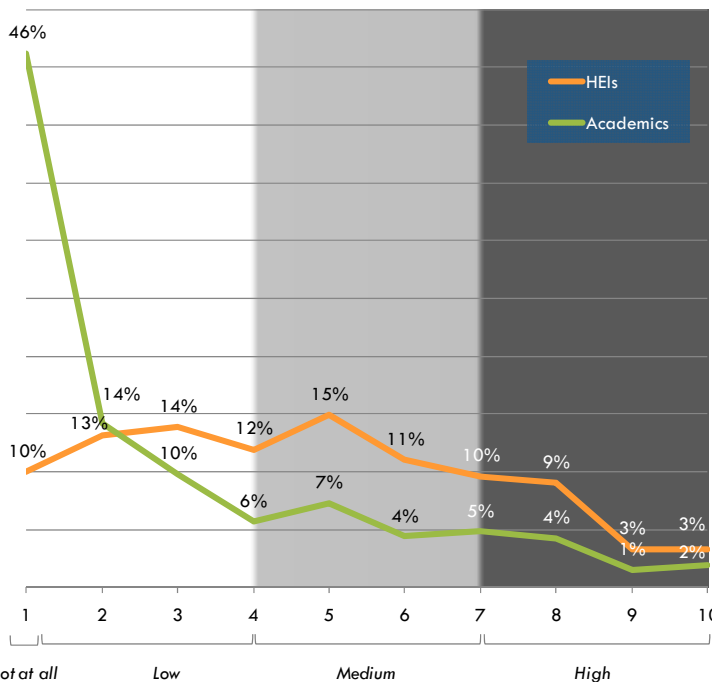
Academics
The results show that 46% of academics have not engaged in any form of academic mobility to business.

Mobility of academics	% of ACAD
Not at all	46.2%
Low	29.6%
Medium	16.5%
High	7.7%

HEIs
48.8% of HEIs rate at a low level of academic mobility or none at all.

Mobility of academics	% of HEI
Not at all	9.9%
Low	38.9%
Medium	35.5%
High	15.6%

n=5732

Hypothesis source

"Mobility between researchers and business representatives also plays a major role in the context of strategic cooperation concepts". [26]

Hypothesis

Universities of applied sciences have more mobility between researchers and business representatives

Result

✕

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[25] Lambert review (2003)
[26] Stifterverband für die Deutsche Wissenschaft (2007)

Number of staff-exchanges by academics from HEIs to business (last 12 months)

2-4
9.1%

5-10
2.2%

>10
0.6%

1
12.1%

0
76.0%

n=1928
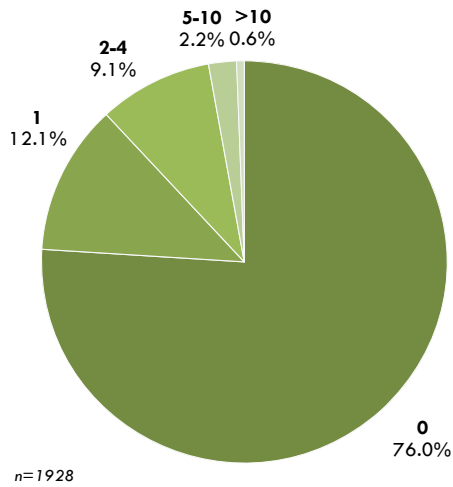
Almost 80% of the academics surveyed have not been involved in academic exchanges in the last 12 months, with over 10% involved in more than 1.

Number of personnel-exchanges from business to HEIs (last 12 months)

2-4
8.4%

5-10
2.1%

>10
0.9%

1
8.4%

0
80.2%

n=1899
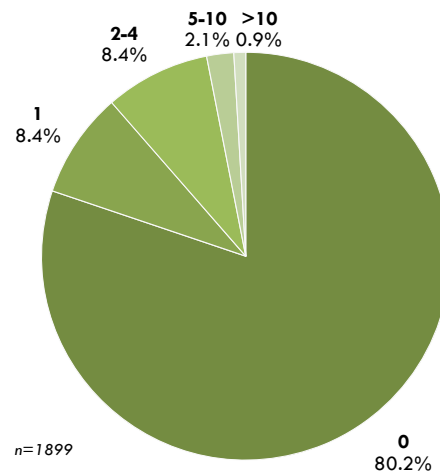
Only 19.8% of academics have been involved in an exchange where someone from business has come into the HEI. This figure is lower than academics going to business.

Number of business professionals temporarily working within the HEI (last 12 months)

0
20.3%

1
2.0%

2-4
14.9%

5-10
24.5%

>10
38.3%

n=506
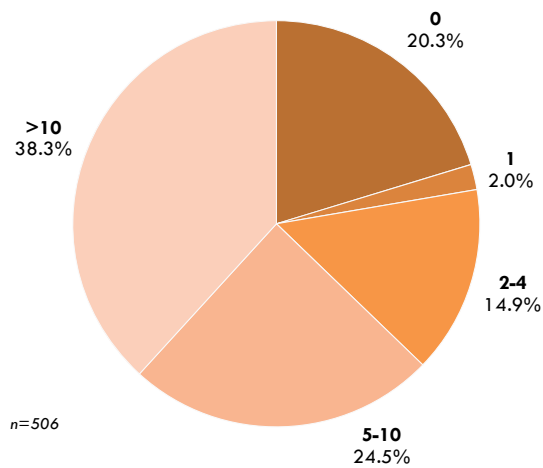
According to 20.3% of HEI representatives, no business professionals have worked temporarily within a HEI in the last 12 months. In 62.7% of HEIs, five or more business professionals have worked temporarily within their HEI. Of the nominated HEI types, traditional universities recorded the highest amount of business professionals temporarily working within the HEI.

Number of honorary or part-time professorships awarded to non-academic workers (last 12 months)

>10
14.2%

5-10
10.5%

2-4
14.1%

1
9.2%

0
52.0%

n=531
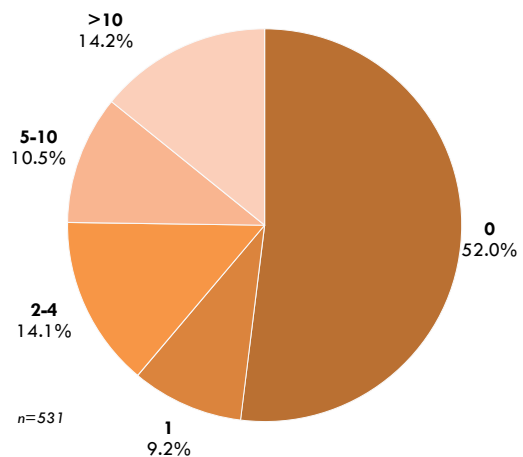
The data shows that for 52% of HEIs no honorary or part-time professorships have been awarded to non-academic workers in the last 12 months. Only in 14.2% of the HEIs, more than 10 honorary or part-time professorships have been awarded to non-academic workers. Universities and polytechnics recorded the highest amount of honorary or part-time professorships awarded to non-academic workers.

Mobility of students

Academics
27.2% of academics declare that they do not participate in student mobility to business at all

Mobility of students	% of ACAD
Not at all	27.2%
Low	27.6%
Medium	26.2%
High	19.0%

HEIs
75.1% of HEIs rate at a medium or high level of student mobility.

Mobility of students	% of HEI
Not at all	4.1%
Low	20.7%
Medium	37.8%
High	37.3%

n=5829
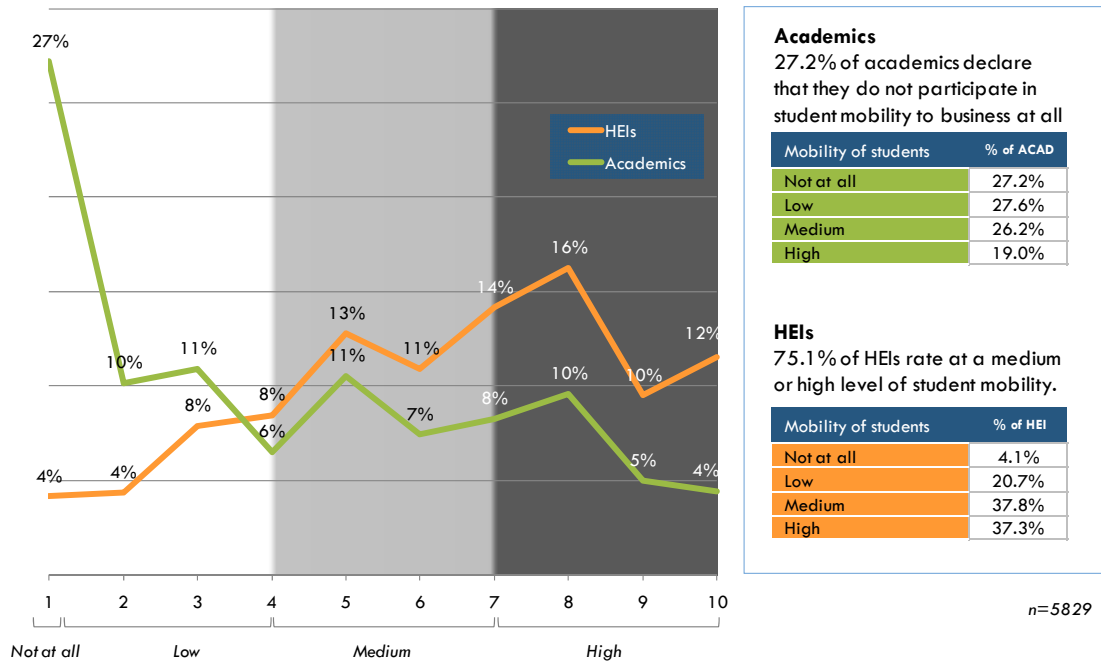
Presence of supporting features for mobility of students

n=382

Student-exchanges from HEI to business
(last 12 months)

n=2015
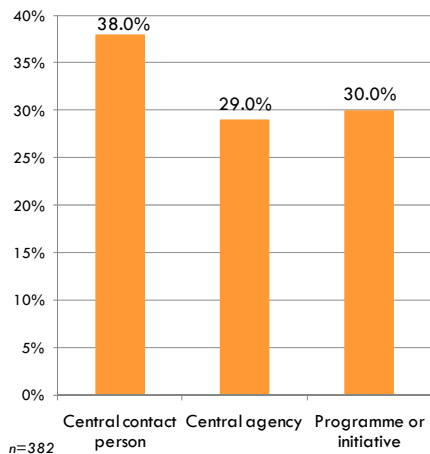
Having a central contact point is the most common form of support offered for mobility of students though only 38% of HEIs have this support feature. Less than 30% have either a programme or central agency for mobility of students.

The results also show that those HEIs with a specific contact person, contact agency or programme / initiative have a significantly higher development of mobility of students than those that do not have them.
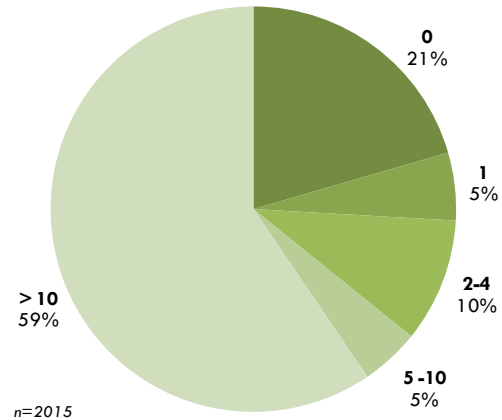
Almost 80% of the academics surveyed have been involved in student exchanges in the last 12 months, with 59% of them involved in more than 10.

NB. This graphic shows that 21% of academics stated that they were not involved in any student exchange, while the amount of academics rating their extent of UBC in respect to mobility of students at 'Not at all' was 27.2%. The difference is caused by a number of respondents that did answer the first question but did not provide an answer to this second one.

Comments and findings from literature

Since its inclusion in the Erasmus Programme, company placements abroad have grown rapidly. Out of the 213,266 Erasmus students, 35,561 went on company placements abroad in 2009-2010. This represents an annual increase of over 17%. France sent the most students abroad for company placements, followed by Germany, Spain, the United Kingdom and Poland. The top destinations for students on company placements were once again Spain, the United Kingdom, Germany, France and Italy. Students of humanities and arts make up the biggest share of trainees. This number has more than doubled compared to the previous year. They were followed by students of social sciences, business and law. Those taking courses in engineering, manufacturing and construction participated in lower numbers.[27]

Q-PlaNet – the Quality Placement Network

Q-PlaNet is the network of Quality Reference Centres (QRCs) for student placements. QRC offices act at a regional level to check the quality of placement and promote the mobility of students in practical training. The Q-PlaNet project sets up concrete standards and structures for quality assurance in order to provide students, host organisations and universities with a solid and secure basis for European-wide comparable placements. The Q-PlaNet project is coordinated and run by a consortium of ten partners from Romania, Germany, Estonia, Luxembourg and Belgium that formed a mixed group of universities, enterprises, networks and associations.

Commercialisation of R&D
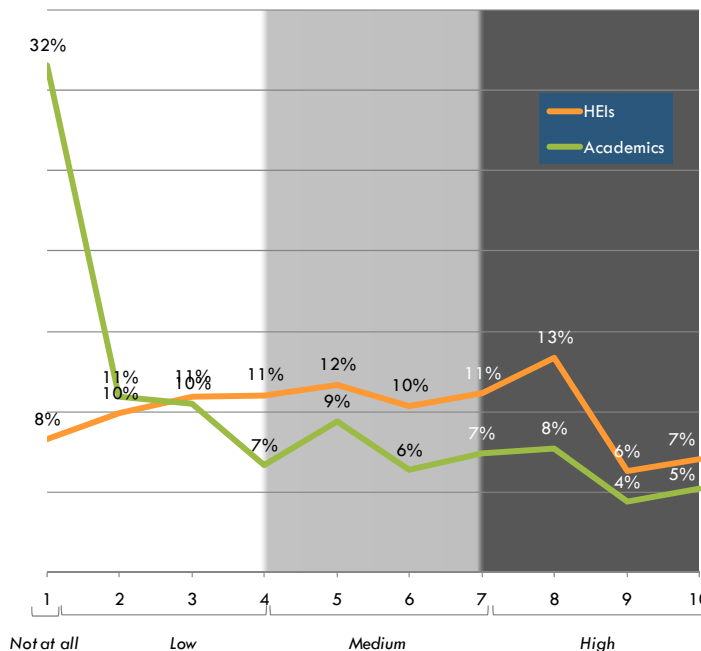
Academics
31.6% of academics state that they are not involved in commercialisation of R&D at all

Commercialisation in R&D	% of ACAD
Not at all	31.6%
Low	28.1%
Medium	23.1%
High	17.2%

HEIs
26.7% of HEIs define their extent of UBC in commercialisation of R&D as high

Commercialisation in R&D	% of HEI
Not at all	8.3%
Low	31.9%
Medium	33.2%
High	26.7%

n=5688

Academics engage in registered patents to a slightly higher degree than license deals as a form of *commercialisation of R&D.*

HEIs engage in registered patents to a higher degree than license deals as a form of *commercialisation of R&D.*

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[27] Erasmus facts, figures and trends (2009-2010)

License deals per academic
(last 5 years)

- **5-10** 2,8%
- **>10** 1,7%
- **2-4** 7,8%
- **1** 8,0%
- **0** 79,7%

n=1693

Patents registered per academic *
(last 5 years)

- **5-10** 4.2%
- **>10** 1.3%
- **2-4** 9.7%
- **1** 9.9%
- **0** 75.1%

n=1758
* **o**r named as the inventor on a patent
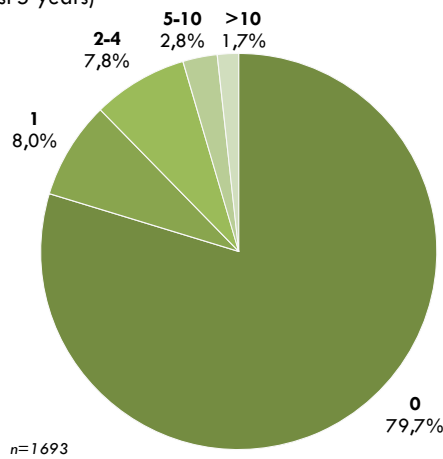
79.8% of academics have not made a license deal in the last five years.
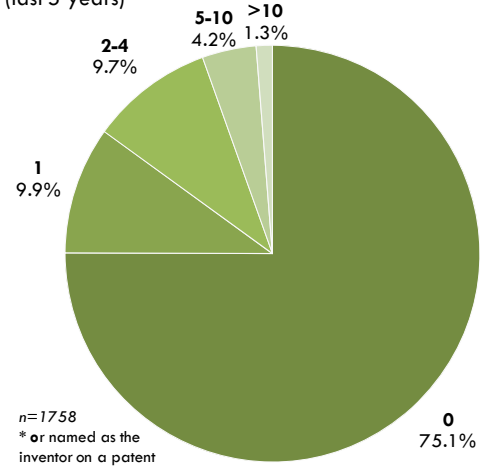
Fewer than 25% of academic respondents have registered a patent in the last five years.

License deals per HEI (last 12 months)

- **>10** 13.0%
- **5-10** 13.3%
- **2-4** 22.7%
- **1** 12.0%
- **0** 39.0%

n=309

Patents registered per HEI (last 12 months)

- **>10** 22.6%
- **5-10** 20.4%
- **2-4** 17.5%
- **1** 7.8%
- **0** 31.7%

n=343
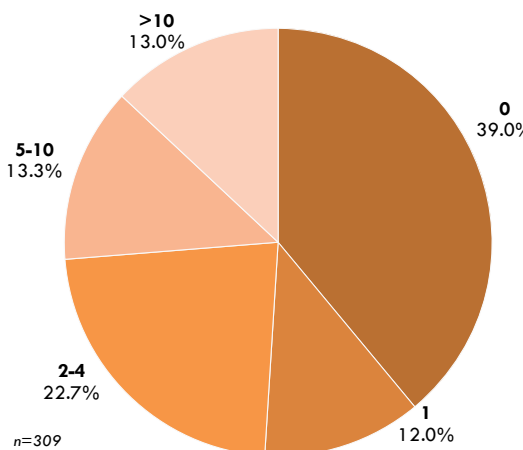
61% of HEIs have made at least one license deal in the last 12 months with 13% registering more than 10. Polytechnics recorded the highest number of license deals in the last 12 months.
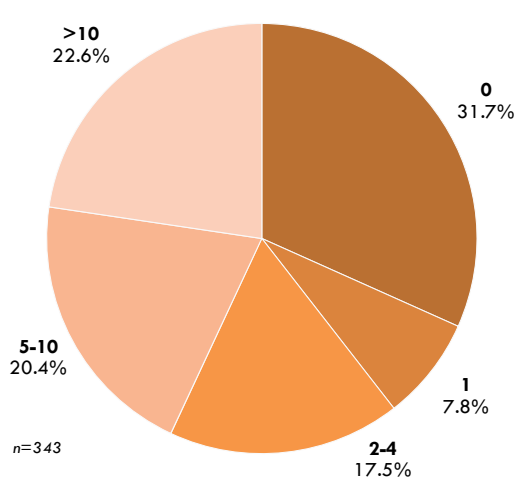
69.3% of HEIs have registered at least one patent in the last 12 months with 22.6% of HEIs registering more than 10. Universities recorded the highest number of patents registered in the last 12 month.

InnoCash Programme - Genoma España Foundation, Spanish Ministry of Science and Innovation

The *InnoCash* programme facilitates the nurturing of R&D results and technologies from HEIs, which are still on-the-drawing-board for market placement and need additional resources (e.g. surveys, scaling, prototyping, business networks, etc.) to make the transfer possible. *InnoCash*'s main task is identifying, valorising and nurturing research & development (R&D) results and technologies, generated primarily by public research centres and HEis. These innovation projects are subsequently taken to the market by business and financial investors.

Curriculum development and delivery
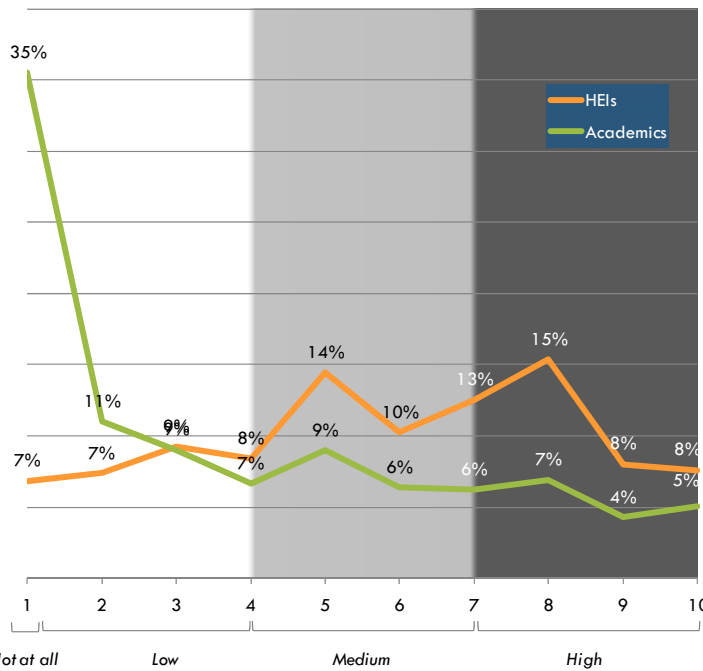
Academics
35.5% of academics state that they have no involvement with business in curriculum development and delivery.

Curriculum development & delivery	% of ACAD
Not at all	35.5%
Low	26.7%
Medium	21.6%
High	16.2%

HEIs
30.9% of HEIs state that cooperation with business with respect to curriculum development and delivery is high

Curriculum development & delivery	% of HEI
Not at all	6.8%
Low	25.0%
Medium	37.2%
High	30.9%

n=5888

Guest lectures given by business
(last 12 months)

- >10 9.1%
- 5-10 15.9%
- 2-4 27.2%
- 1 14.8%
- 0 33.0%

n=2143

Industry projects as part of training and education (last 12 months)

- >10 3.1%
- 5-10 7.7%
- 2-4 15.6%
- 1 11.6%
- 0 62.0%

n=1848
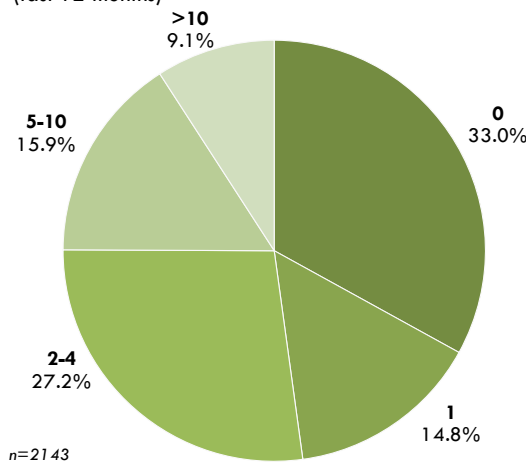
A third of academics surveyed have not been involved in guest lectures given by business in the last 12 months.
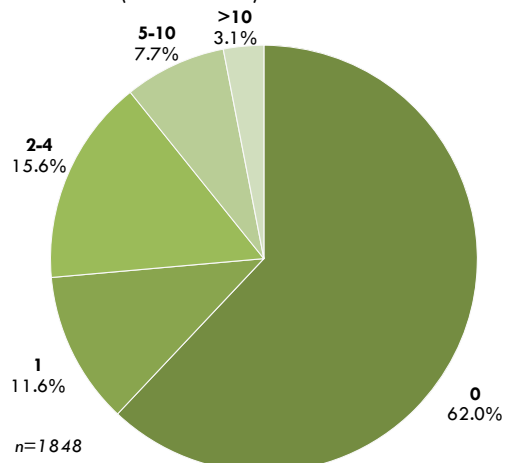
62% of academics have not been involved in industry projects as part of training and education in the last 12 months.

Business and the curriculum

Business has a substantial influence on the curriculum development — **6.6**

Business has a substantial influence on the curriculum delivery — **4.6**

The curriculum meets the needs of surrounding business in the environment in which my HEI operates. — **5.3**

n=923

Scale: 1 — No UBC | 2 3 4 — Low | 5 6 7 — Medium | 8 9 10 — High

> HEI representatives state that business has a substantial influence on the curriculum development but a lesser impact on curriculum delivery.
> In line with these results, HEIs representatives believe that the curriculum meets the needs of business in the environment

The influence of business in curriculum development and delivery and the meeting of business needs is is one of the few areas in which many HEIs rated themselves as high (>7) and where all HEI rate themselves at least as medium (<4)

Highest curriculum collaborators	Lowest curriculum collaborators
1. Denmark	1. Greece
2. Cyprus	2. Poland
3. Latvia	3. Croatia

The importance of curriculum development

The importance of curriculum development as a theme can be seen in the application received for the Erasmus University Cooperation Projects. Most applications were received under the curriculum development action (67), followed by the cooperation between HEIs and enterprises action (33) and the modernisation of higher education action (24). Funding dedicated solely to curriculum development together with business, with special focus on getting business involved in delivery (found in this study to be lower that development) could further increase UBC in curriculum development and delivery.[28]

> *Comments and findings from experts in UBC*
>
> The experts believed that there is a trend, particularly in the UK, where HEIs work ever-more closely with companies and there is an increase in working with business in curriculum development.[29]

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[28] Erasmus facts, figures and trends (2009-2010)
[29] Expert interview: respondent 2

The Northern Institute of Technology Hamburg

The NIT is a privately-owned non-profit university founded in November 1998 by more than 30 professors and staff of TUHH. With its close links to both the public TUHH and leading companies of the private sector, the NIT is considered one of the role-models of public-private-partnership in Germany. The NIT is closely linked and fully sponsored by global companies like Airbus, Daimler Chrysler, Philips Semiconductors, SAP, Siemens, ThyssenKrupp, and many other enterprises. Students can do industrial internships, project and master thesis in the company during the second year of study. The program is suited to outstanding individuals with a proven track record of both academic and personal achievements. Students can receive a scholarship covering all tuition and fees including German language training, tutor programme, free accommodation on campus, free public transport and free access to the NIT sport facilities. In addition to that the NIT can also offer a student loan to cover the remaining cost of living. The current students of the NIT in Hamburg, Germany's second largest city, come from 40 countries all over the world, forming a highly international group of future leaders in industry, science and politics.

Lifelong learning (LLL)
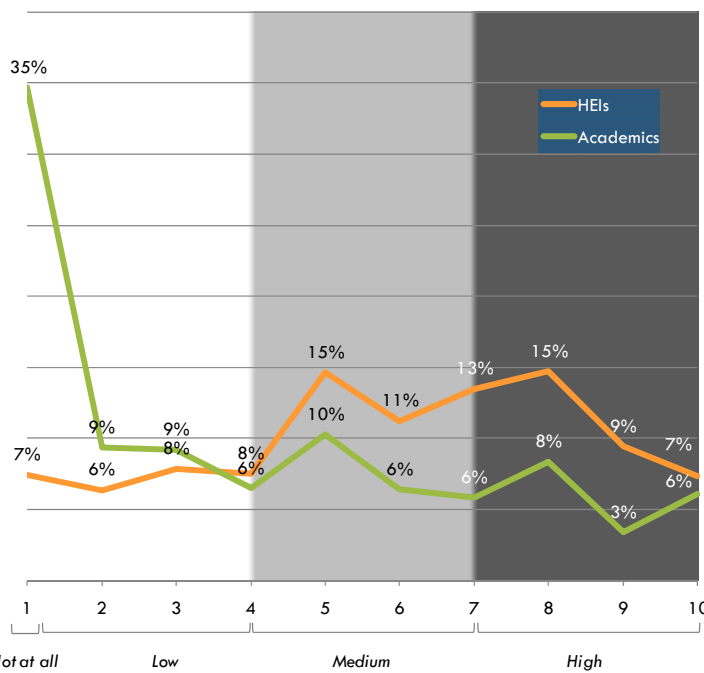
Academics
34.7% of academics state that they have no cooperation with business in respect to LLL.

Lifelong learning	% of ACAD
Not at all	34.7%
Low	25.0%
Medium	22.5%
High	17.8%

HEIs
31.5% of HEIs state that they have a high cooperation level with business in respect to LLL.

Lifelong learning	% of HEI
Not at all	7.4%
Low	21.7%
Medium	39.3%
High	31.5%

n=5981

Presence of supporting features for lifelong learning
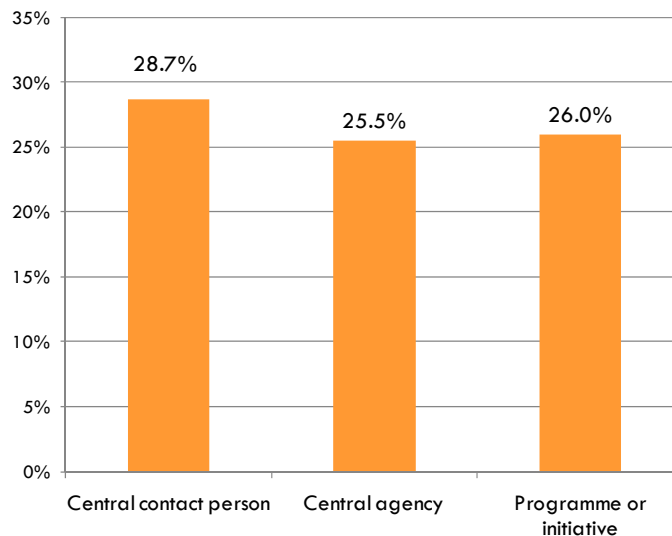
Having a central contact point is the most common form of support offered for lifelong learning though only 29% of HEIs have this support feature. 26% of HEIs have either a programme or central agency for lifelong learning.

The results also showed that those HEIs with a specific contact person, contact agency or programme / initiative have a significantly higher development of lifelong learning

n=288

Hypothesis source	*Hypothesis*	*Result*

"Only 15% of EU HEIs included LLL in their strategic objectives in 2009"[30]

Universities and business have a low cooperation in terms of LLL

<u>Comments and findings from experts in UBC</u>

"We live in a fast-changing lifestyle. LLL is a reality of today's society and its needs. As such continual learning is essential. However, there does not seem to be many initiatives addressing this. People need to be taught to learn".[31]

<u>Comments and findings from literature</u>

There are strong incentives for large companies to take on students for work placements as a way of both obtaining high-quality people at low cost and recruiting and retaining the best talent. Many large companies already run substantial internship programmes and have established links with careers services, demonstrating that they are clearly aware of these benefits.[32]

Master of Entrepreneurship and Technology - University of Tartu, Estonia

The master programme in Entrepreneurship and Technology Management was launched in 2002 as an 'open university' MBA programme at the University of Tartu – Faculty of Economics and Business Administration. The need for the programme emerged from the region's economic life, as at that time many new high-tech companies were founded in Estonia: 25 in biotech and 350-400 in the information and communication technology sector. Working closely with local industry representatives, the master program aims to further the existing knowledge of managers of high-tech companies, SMEs, local entrepreneurs and employees of the public sector responsible for regional development in Estonia. Launching the ETM programme was a pioneering initiative in the Baltic States, since it was quite novel for other neighbouring countries as well.

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[30] University Business Forum 2009
[31] Expert interview: respondent 9
[32] Lambert review (2003)

Entrepreneurship
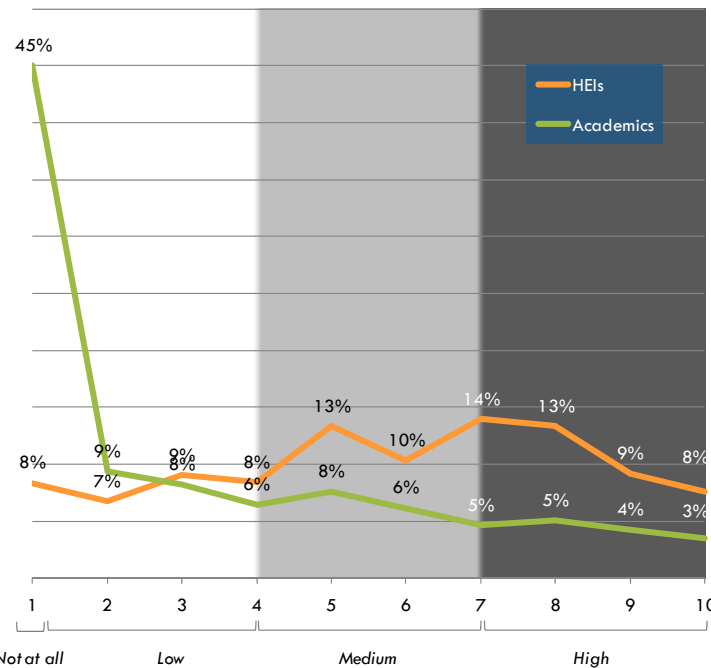
Academics
45% of academics declare that they have no cooperation in respect to entrepreneurship.

Entrepreneurship	% of ACAD
Not at all	45.0%
Low	24.0%
Medium	18.3%
High	12.7%

HEIs
30% of HEIs comment that they have a high cooperation in respect to entrepreneurship

Entrepreneurship	% of HEI
Not at all	8.4%
Low	24.1%
Medium	37.5%
High	30.0%

n=5868

Spin-offs created per academic from the academics' research (last 5 years)

n=1693
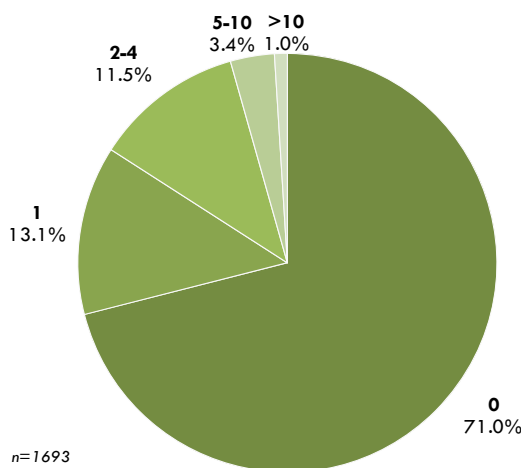
71% of academics have not been involved in spin-offs created from their research in the last five years.

Spin-offs created per academic not directly involving the academics' research (last 5 years)

n=1469
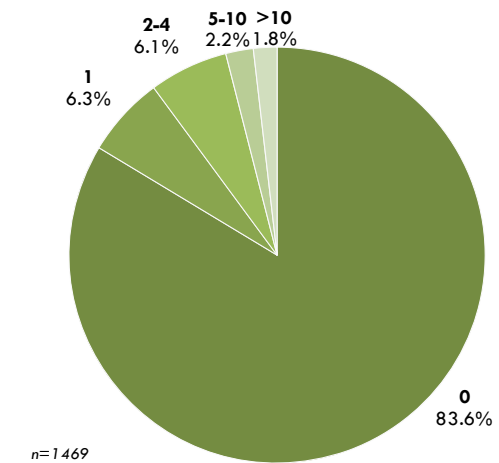
Only 16.4% of academics have been involved in the creation of one or more spin-offs not created from their research in the last five years.

Presence of supporting features for entrepreneurship

n=307
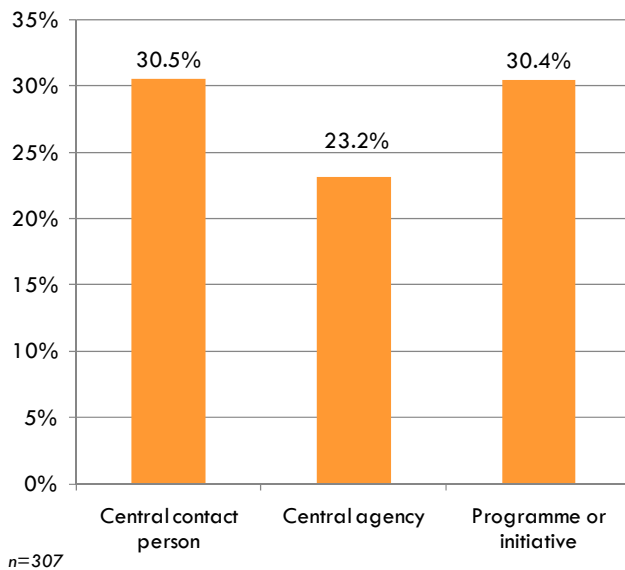
Having a central contact point is the most common form of support offered for entrepreneurship though only 31% of HEIs have this support feature. 30% of the HEIs have a programme whilst only 23% have a central agency for entrepreneurship.

The results also show that those HEIs with a specific contact person, contact agency or programme / initiative have a significantly higher development of entrepreneurship.

Comments and findings from literature

Graduates of the entrepreneurship programme should personally know relevant people from the support infrastructure (banks, incubators, consultants) and entrepreneurs and therefore already have a relevant business- and social network. [33]

Student Placements for Entrepreneurs in Education (SPEED), Wolverhampton University and university partners

The SPEED programme offers a nine-month placement to university students who have completed the second year of their degree programme. These students are budding entrepreneurs who create a self-employed placement as an alternative to traditional industrial placements. SPEED is designed to help students who have a sound business idea to take the necessary steps towards running a real business. The objective is to provide students with a learning opportunity that aims to ultimately develop business ideas into successful businesses. This will run for a minimum of 18 months. It provides students with a learning opportunity (unaccredited) while they are still studying.

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[33] Second European Forum on Cooperation between Higher Education and the Business Community (2009)

Governance
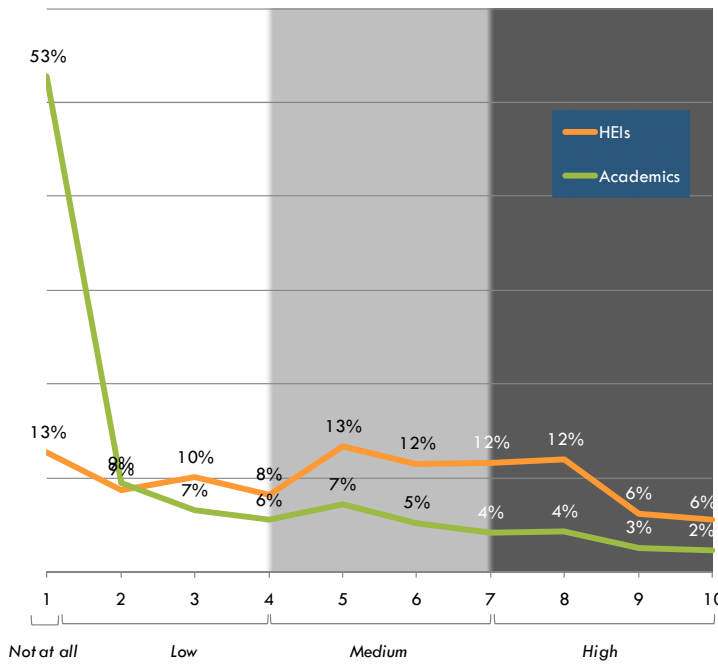
Academics
52.8% of academics have no cooperation with business in respect to governance.

Governance	% of ACAD
Not at all	52.8%
Low	21.5%
Medium	16.6%
High	9.1%

HEIs
23.7% of HEIs state that they have high cooperation with business in governance.

Governance	% of HEI
Not at all	12.7%
Low	27.0%
Medium	36.5%
High	23.7%

n=5755

Comments and findings from literature

As part of the process of management improvement, well-run universities are appointing more professionally qualified and accredited staff, often from the private sector. Directors of human resources, estates management, marketing and communication are commonplace in leading HEIs.[34]

Ministry of Education, the Netherlands

In the nineties the strong separation between the health faculty and the academic hospital in terms of administration and governance became artificial and inefficient. It was necessary to search for a new strategic approach. Since there was an increasing need for strong administrative connections, the integration of the health faculty with the academic hospital was a logical next step. To implement this policy the following actions have been undertaken

- The executive board of the university and executive board of the academic hospital have legal obligation to establish a common policy body. This policy body approves a document holding the results of the appointments of the university and the hospital concerning medical education and research,

- The academic hospital separate funding for its functioning as clinical workplace,

- The academic hospital and the university (health faculty) are legally obliged to make common arrangements for medical research and education. These arrangements are a prerequisite for funding.

A research output is that the Netherlands comes second only after the United States in terms of the number of references to the country's medical publications. Dutch medical and biomedical publications are cited 40% more often than the global average.

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[34] Lambert review (2003)

UBC per country

Extent of academic UBC per country

Country	Collaboration in R&D	Mobility of academics	Mobility of students	Commerciali-sation of R&D results	Curriculum development and delivery	Lifelong learning	Entrepreneur-ship	Governance	Total UBC
Austria	4.8	2.3	3.1	4.3	3.0	3.1	2.6	2.3	3.3
Belgium	4.7	2.4	4.1	4.0	3.9	3.6	3.1	2.6	3.6
Bulgaria	4.7	3.8	4.5	4.1	4.5	5.5	3.8	4.2	4.6
Croatia	4.2	3.8	3.6	3.9	5.1	5.6	3.8	3.6	4.2
Cyprus	4.6	2.8	4.0	3.6	5.2	4.8	3.3	2.6	3.9
Estonia	4.6	3.6	4.6	2.8	5.4	4.8	2.7	2.8	3.9
Finland	6.8	3.9	4.3	5.4	4.2	4.4	3.8	3.0	4.4
France	5.0	2.3	5.5	3.8	4.8	4.1	3.3	3.1	4.1
Germany	6.2	2.8	4.8	4.9	3.0	3.4	3.1	2.8	4.0
Hungary	4.7	3.3	4.6	3.8	4.8	4.5	3.3	3.0	3.9
Ireland	5.0	2.0	4.6	3.7	4.9	4.2	3.7	2.9	3.9
Italy	4.4	2.5	3.8	3.3	3.1	3.7	2.5	2.3	3.3
Latvia	5.3	4.3	4.6	4.4	5.9	4.7	2.8	3.4	4.6
Lithuania	4.5	4.6	5.6	4.4	5.5	5.8	4.3	4.1	4.9
Netherlands	6.7	3.0	4.7	5.2	4.2	4.2	4.0	3.2	4.4
Poland	3.0	2.3	2.8	2.6	2.9	3.0	2.3	2.3	2.8
Portugal	4.4	2.4	4.2	3.2	3.7	4.2	3.5	2.4	3.5
Romania	4.8	3.6	4.4	3.7	4.3	5.2	3.5	3.2	4.2
Slovakia	4.7	3.2	3.4	4.0	4.5	4.4	3.3	2.8	4.1
Spain	4.4	2.2	3.6	3.4	3.4	4.1	3.2	2.6	3.5
Turkey	4.8	4.1	5.0	4.3	4.2	4.6	4.5	4.1	4.5
United Kingdom	4.8	3.0	3.6	4.0	3.9	3.6	3.4	2.6	3.7

         ■ Highest extent of cooperation per country

The table above illustrates the perceived level of UBC for academics in each country regarding the *8 Types of UBC*. For each country, the type of cooperation with the highest extent is highlighted. The table provides the opportunity to review and compare the extent of cooperation in each of the *8 Types* on a country basis.

According to the 63.5% (14) of academics the highest extent of cooperation for their country is *collaboration in R&D*, for 27% (6) of the countries *LLL* is the highest, 9% (2) has *mobility of students* and 4.5% (1) *curriculum development and delivery*.

Extent of HEI UBC per country

Country	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D results	Curriculum development and delivery	Lifelong learning	Entrepreneurship	Governance	Total UBC
Austria	6.7	3.8	5.1	5.5	5.0	5.4	4.5	4.4	**5.0**
Belgium	6.3	4.5	5.9	5.6	5.5	5.4	5.6	4.5	**5.4**
Bulgaria	5.4	5.4	6.0	4.8	5.7	6.4	5.6	5.5	**5.8**
Czech Republic	6.1	5.0	5.8	5.0	6.3	6.3	4.0	3.9	**5.3**
Denmark	6.3	4.8	6.7	5.4	5.8	6.3	6.0	4.7	**5.8**
Estonia	5.1	4.1	5.2	4.7	6.9	6.4	4.9	4.0	**5.1**
Finland	7.4	5.3	7.0	5.4	5.9	6.6	6.0	5.0	**6.2**
France	6.8	4.0	6.8	5.2	6.3	6.2	6.0	5.9	**5.9**
Germany	7.2	4.6	6.7	5.9	4.9	5.3	5.6	4.7	**5.6**
Hungary	6.4	4.6	5.4	4.7	6.1	6.2	4.8	5.1	**5.6**
Ireland	7.9	5.1	7.2	7.7	7.3	7.1	7.6	6.8	**6.9**
Italy	5.8	4.8	6.0	5.0	5.9	5.5	5.1	4.7	**5.3**
Latvia	6.4	5.9	7.2	4.4	6.7	6.8	5.6	6.0	**6.4**
Lithuania	4.9	5.9	7.2	4.4	6.7	6.8	5.5	5.6	**6.0**
Netherlands	6.4	4.6	6.1	5.4	5.2	5.4	5.9	4.8	**5.4**
Norway	6.5	4.0	5.3	4.7	4.5	4.7	4.6	3.9	**4.7**
Poland	4.9	4.4	5.5	4.0	5.1	5.2	5.0	4.7	**4.9**
Portugal	6.0	4.8	6.8	4.8	6.0	6.4	6.1	5.1	**5.8**
Romania	6.8	6.3	7.2	5.5	6.9	7.0	6.5	6.4	**6.6**
Slovakia	5.1	4.8	5.4	4.4	4.9	5.5	3.9	4.3	**4.6**
Spain	6.9	4.9	6.6	6.1	5.7	6.4	6.3	5.5	**6.1**
Sweden	7.0	4.4	5.4	6.2	5.5	5.8	6.1	5.0	**5.7**
Turkey	5.6	5.0	5.4	4.5	4.6	5.3	5.7	5.4	**5.2**
United Kingdom	7.6	5.4	6.5	7.4	6.9	6.5	7.2	6.3	**6.6**

Highest extent of cooperation per country

The table above illustrates the perceived level of HEIs cooperation in each country regarding the *8 Types of UBC*. The highest extent of cooperation per country is highlighted. The table provides the opportunity to review and compare the extent of cooperation in each of the *8 Types* on a country basis, as perceived by HEI representatives.

According to 54% (13) of HEI representatives the highest extent of cooperation in their country is *collaboration in R&D*, followed by 35% (9) nominating *mobility of students*, 4% (1) *LLL*, 4% (1) *curriculum development and delivery* and 4% (1) *entrepreneurship*.

54% (13) of the highest HEI values recorded for each country were the same as those given by the academics.

Total academic UBC and Total HEI UBC by country

Showing total academic UBC and total HEI UBC by country

The countries that appear above the trend line have a larger perceived difference between the perception of academics and HEI within that country. Ireland, UK and Romania especially have larger perceived differences.
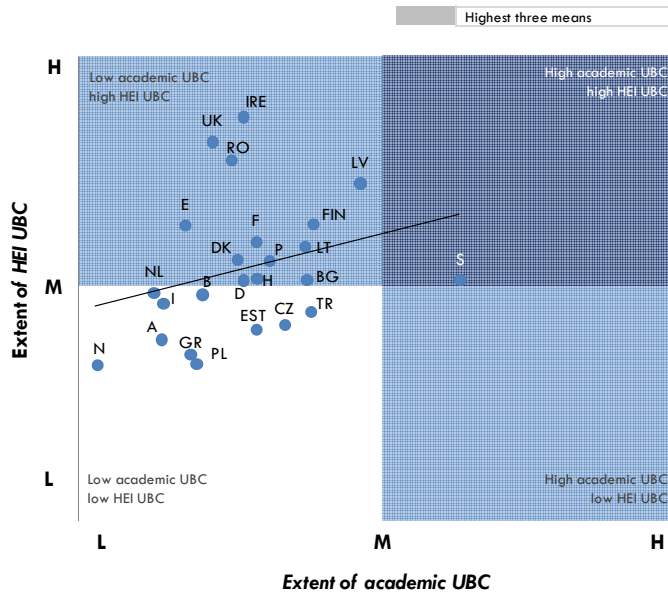
Country	Short Code	ACAD Mean	HEI Mean
Austria	A	3.19	5.07
Belgium	B	3.53	5.45
Bulgaria	BG	4.40	5.58
Czech Republic	CZ	4.22	5.19
Denmark	DK	3.83	5.75
Estonia	EST	3.98	5.15
Finland	FIN	4.46	6.06
France	F	3.98	5.91
Germany	D	3.88	5.58
Greece	GR	3.44	4.94
Hungary	H	3.99	5.59
Ireland	IRE	3.87	6.98
Italy	I	3.21	5.38
Latvia	LV	4.85	6.41
Lithuania	LT	4.39	5.87
Netherlands	NL	3.13	5.47
Norway	N	2.66	4.85
Poland	PL	3.49	4.86
Portugal	P	4.09	5.74
Romania	RO	3.78	6.61
Spain	E	3.39	6.05
Sweden	S	5.68	5.58
Turkey	TR	4.44	5.31
United Kingdom	UK	3.62	6.77

Highest three means

Extent of HEI UBC

H — Low academic UBC high HEI UBC ... High academic UBC high HEI UBC

M

L — Low academic UBC low HEI UBC ... High academic UBC low HEI UBC

L — M — H

Extent of academic UBC

1 = "Not at all developed yet" to 10 = "Highly developed"

It must be noted that the academics and HEIs are assessing the extent of UBC in respect to two different subjects: their own extent of UBC (by academics) and the HEIs (by HEI representatives). The matrix can be best used to observe the combination of these two perceptions within a country in order to try to better understand the perceptual differences between HEIs and academics. For those countries with the highest differences, the possible interpretations and options of possible action are as follows:

Interpretations		Possible action
I.	HEIs representatives understand to a better degree the level of UBC at the HEI - This implies that academics are not aware of the extent of cooperation in the HEI or view the extent more negatively than the reality.	Better communication of UBC activities within the HEI to all academics.
II.	Academics understand the actual reality of UBC at the HEI better than the HEI - implying that the HEI representatives are either misinformed or speak more positively about the reality of UBC within the HEI.	HEI representatives need to better inform themselves about actual UBC within the HEI.
III.	A mixture of interpretation one and two.	See above.

FACTOR LEVEL

Drivers, Barriers and
Situational Factors of
University-Business
Cooperation

Results
- Result level
- Factor level
- Action level
- Inter-relationships

The factor level of UBC informs us about the factors that have an influence on an academic or HEI's likely extent of UBC

Benefits, drivers, barriers, situational factors all have a substantial influence on European UBC

Section objective

The following section will endeavour to answer the following research question:

Benefits, drivers, barriers and situational factors
C.   Which benefits, drivers, barriers and situational factors exist and how relevant are they?

FACTOR LEVEL

- **Benefits**

  Benefits for students, the HEI, business, society and academics.

- **Drivers**

  Drivers relating to:
  - Commercial, practical and logistical drivers,
  - Relationship drivers.

- **Barriers**

  Barriers relating to:
  - Usability of results,
  - Organisational and relational barriers,
  - Funding barriers.

- **Situational factors**

  Situational factors relating to:
  - Academics (years in HEI, years in business, area of knowledge),
  - HEI (type of HEI, country).
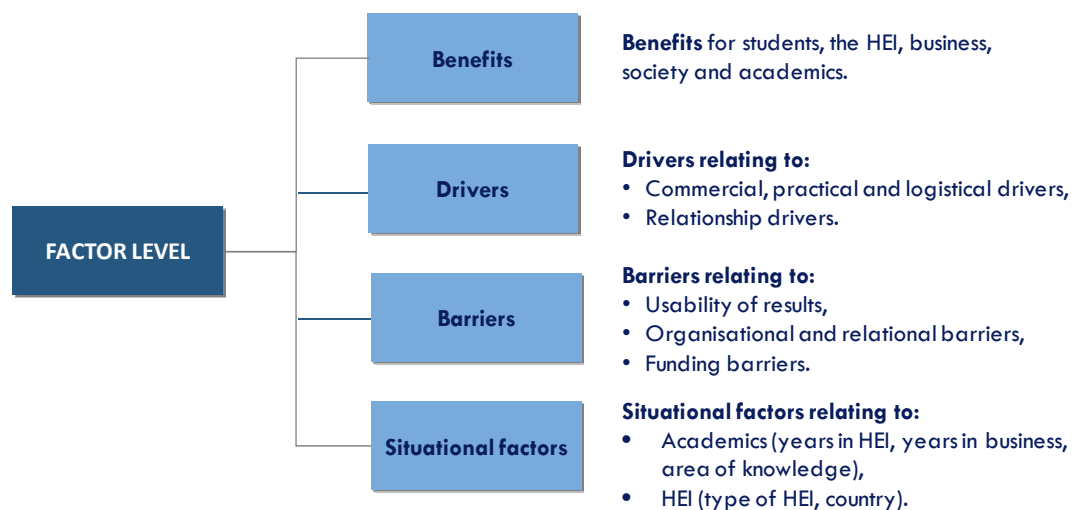
Benefits

Benefits from UBC assessed by academics

UB activities improve employability of future graduates — 8,0
UB activities improve the learning experience of students — 7,8
UB activities improve the performance of business — 7,6
Successful UBC is an excellent way of getting funding — 7,3
Successful UBC increases my reputation in my field of research — 6,6
Successful UBC is vital to achieving the mission of the HEI — 6,6
Successful UBC is vital to my resarch — 5,9
UB activities improves my standing within the university — 5,2
UB activities increase my chances of promotion — 4,4

Scale: 1 2 3 4 5 6 7 8 9 10
Not at all | Low | Medium | High

n=2394

Legend:
- Benefits for academics
- Benefits for students, business or the HEI

Academics perceive the benefits from UBC as follows:

- the current or future benefits of UBC for students are rated the highest,
- they then agree that UBC provides benefits for the businesses,
- then assess benefits for the HEI (mission) as slightly lower , and
- they rate the benefits of UBC for themselves the lowest, especially those regarding the incentives provided by their HEIs.

Academics see the benefits of UBC for other stakeholder groups higher than their personal benefits. For academics, UBC remains primarily a potential method of getting funds, without substantial importance for their own research or as an incentive for promotion.

Comments and findings from UBC expert interviews

One of the experts interviewed believes that the main benefits for HEIs from UBC are as follows: income, reputation and benefits of students, and for business, primarily new products and technologies. The respondent observed that business have become rather more robust and diversified in their relationships with HEIs which includes seeing HEIs as a place to find good employees.[35] A further expert comments that incentives, recognition, hours off lecturing, the provision of special infrastructure and facilities, as well a positive image of UBC with peers and heads of department were also seen as crucial. In the light of the results above, these comments seem extremely relevant in creating a higher perceived personal benefit for academics from UBC.[36] An additional interviewee stated that the HEI can influence the willingness of the researcher to work with industry. [37]

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[35] Expert interview: respondent 1
[36] Expert interview: respondent 5

Benefits from UBC assessed by HEI representatives

UBC increases skills and graduate development — 8,5
UBC has beneficial effects on the local industry — 7,7
UBC is vital to achieving the mission of the HEI — 7,7
UBC improves regional productivity — 7,6
UBC creates local employment — 7,3
UBC increases local GDP and disposable income — 7,3
UBC creates a range of beneficial social and recreational benefits — 6,6

1 2 3 4 5 6 7 8 9 10

Not at all   Low   Medium   High

n=313

Benefits for the HEI (and students)
Benefits for business and society

HEI representatives identify the benefits from UBC as follows:

- the highest benefits from UBC are for students (similar to academics),
- secondly, businesses and local industry receive the next highest benefits,
- then the positive contribution to the mission of the HEI, and
- the lowest perceived benefit is for society.

The HEI representatives rate the contribution of UBC to the mission of the HEI significantly higher than the assessment of the academics. Further, for both academics and HEIs, the effect of perceived benefits on the amount of UBC undertaken was tested and the results show that the higher the perceived benefits, the higher the extent of UBC carried out.

Comments and findings from UBC expert interviews The respondent said that one of the reasons why UBC is so well developed in Finland is that all the associations of labour market and employees and other stakeholders see the importance UBC.[38]	
Key finding	Academics rate the benefits of UBC for themselves the lowest, especially those regarding the incentives provided by their HEIs. HEI representative rated the positive contribution to the mission of the HEI lower than the benefits for students and local industry. Both groups rated as highest the benefits to students from UBC.
Recommendation(s)	Address the lack of understanding or perception of the personal benefits of UBC for academics with more incentives and better information.

[37] Expert interview: respondent 8
[38] Expert interview: respondent 8

Drivers

Relationship drivers	Extent of facilitation (1-10)	
• Existence of mutual trust, • Existence of mutual commitment, • Having a shared goal, • Understanding of common interest by different stakeholders (e.g. universities; business; individuals; students), • Prior relation with the business partner, • Cooperation as effective means to address societal challenges and issues.	ACAD	6.7 (Medium)
	HEI	7.0 (High)

Business drivers	Extent of facilitation (1-10)	
• Employment by business of HEI staff and students, • Interest of business in accessing scientific knowledge, • Possibility to access funding / financial resources for working with business, • Short geographical distance of the HEI from the business partner • Flexibility of business partner, • Access to business-sector research and development facilities • Commercial orientation of the HEI.	ACAD	5.6 (Medium)
	HEI	6.7 (Medium)

Focus for drivers of UBC

Are scientifically proven to be structured into two areas:

1. Relationship drivers
2. Business drivers

Relationship drivers are the biggest facilitators of UBC (assessed by both academics and HEI representatives).

NB Drivers were determined through two rounds of research (secondary and primary) and then further tested in a pre-test.

* A factor analysis was performed to determine this

Extent of facilitation of drivers

n=2919
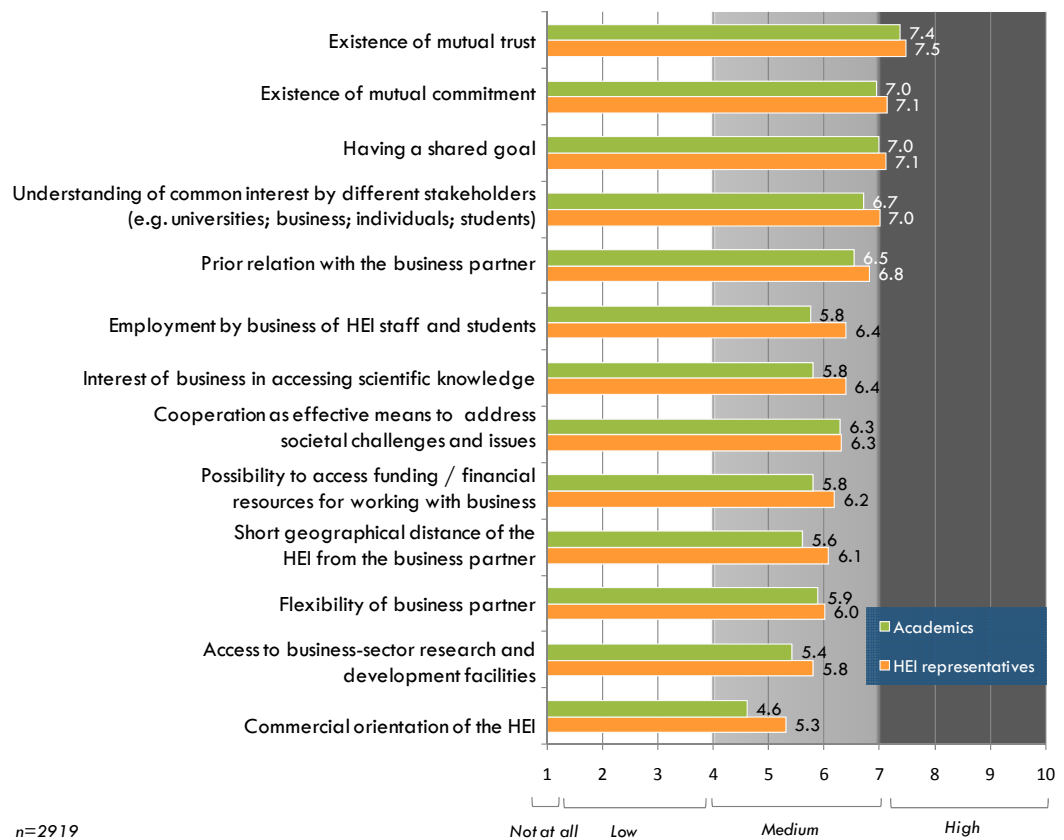
The drivers that facilitate both HEIs and academics in their UBC are perceived similarly by both groups. The drivers related to mutual trust, commitment and respect are clearly perceived to be important in

the facilitation of UBC, whilst 'the commercial orientation of the HEI' as well as 'the access to business-sector research and development facilities' are perceived to be the lowest facilitators of UBC.

Hypothesis source	*Hypothesis*	*Result*
The most important drivers are trust, commitment and communication/integration[39]	Trust and commitment are the most important drivers of UBC	✓

Key finding	Relationship drivers, especially mutual trust, commitment and respect are the highest rated drivers by both groups. Contrary, business drivers are perceived lower facilitators of UBC.
Recommendation(s)	Support or increase the most important drivers while increasing the awareness of the existence and the benefits of UBC drivers for academics and HEI representatives as a way to increase the extent of UBC.

Barriers

Usability of results	**Extent of relevance (1-10)**	
• The focus on producing practical results by business, • The need for business to have confidentiality of research results, • Business fear that their knowledge will be disclosed.	ACAD	6.1 (Medium)
	HEI	6.0 (Medium)

Funding barriers	**Extent of relevance (1-10)**	
• Lack of external funding for University-Business cooperation, • Lack of financial resources of the business, • Lack of HEI funding for UBC, • The current financial crises.	ACAD	6.5 (Medium)
	HEI	6.8 (Medium)

Relational barriers	**Extent of relevance (1-10)**	
• Business lack awareness of HEI research activities / offerings, • The limited absorption capacity of SMEs to take on internships or projects, • Differing time horizons between HEI and business, • Differing motivation / values between HEI and business, • Universities lack awareness of opportunities arising from UB-cooperation, • Bureaucracy within or external to the HEI , • Limited ability of business to absorb research findings, • Differing mode of communication and language between HEI and business, • A lack of contact people with scientific knowledge within business, • Difficulty in finding the appropriate collaboration partner, • No appropriate initial contact person within either the HEI or business.	ACAD	6.4 (Medium)
	HEI	6.2 (Medium)

Focus for barriers of UBC

Are scientifically proven to be structured into three areas:

1. Usability of results
2. Funding
3. Relational barriers.

Funding barriers are the biggest barriers for UBC (assessed by both academics and HEI representatives).

NB Barriers were determined through two rounds of research (secondary and primary) and then further tested in a pre-test.

* A factor analysis was performed to determine this

Hypothesis source	*Hypothesis*	*Result*
"The most prevailing structural <u>barriers</u> companies and universities have to overcome are the bureaucracy and the difficulty of finding an appropriate cooperation partner."[40]	The bureaucracy within or external to the HEI for the UBC is relevant / very relevant	✓

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[39] Corsten (1987)
[40] Corsten (1987)

Extent of barriers

Barrier	Academics	HEI representatives
Lack of external funding for UBC	6,7	7.0
Lack of financial resources of the business	6.7	6.9
Lack of HEI funding for UBC	6.9	6.9
Business lack awareness of HEI research activities / offerings	6.7	6.9
The limited absorption capacity of SMEs to take on internships or projects	6.5	6.6
Differing time horizons between HEI and business	6.5	6.6
The current financial crises	6.0	6.4
Differing motivation / values between HEI and business	6.7	6.4
Universities lack awareness of opportunities arising from UB-cooperation	6.2	6.2
The focus on producing practical results by business	6.4	6.2
Bureaucracy within or external to the HEI	7.3	6.2
Limited ability of business to absorb research findings	6.1	6.1
Differing mode of communication and language between HEI and business	5,9	6.0
A lack of contact people with scientific knowledge within business	6.2	5.9
Difficulty in finding the appropriate collaboration partner	6.2	5.9
The need for business to have confidentiality of research results	5.9	5.9
Business fear that their knowledge will be disclosed	6.0	5.8
No appropriate initial contact person within either the HEI or business.	6.0	5.4

n=3097

Scale: 1 2 3 4 5 6 7 8 9 10 — Not at all / Low / Medium / High

Funding for UBC (i.e. lack of external funding, lack of financial resources of business, lack of HEI funding) is identified as the most important barrier, or more specifically, how the lack of it hinders both HEIs and academics in undertaking UBC. Academics also perceive the bureaucracy within or external to the HEI as an important barrier in undertaking UBC, whereas the HEIs rated the importance of this barrier significantly lower.

Hypothesis source	Hypothesis	Result
"Many of the barriers that exist are similar across the EU."[41]	Barriers do not present significant differences among countries/regions	✘

Hypothesis source	Hypothesis	Result
"Funding is extremely important (Respondent 8) and a key factor for universities in undertaking UBC is money" [42]	The possibility to access funding/financial resources for working with business is relevant / very relevant	✓

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[41] Expert interviews: respondent 8
[42] Expert interviews: respondent 10

Key finding	All academics and HEIs see the importance of barriers quite similarly regardless of their level of UBC. The highest barriers for academics are related to bureaucracy and funding, while the ones for HEIs exclusively with funding.
Recommendation(s)	Reduce the highest barriers, particularly ensuring that funds are available to encourage UBC as well as simplifying the bureaucratic procedures of UBC

Comparing drivers and barriers by country

Comparing drivers and barriers creating a favourable environment for UBC

For UBC to prosper, it is preferable to create an environment where the drivers and high and the barriers are low. Approximately half of the countries fit into the favourable UBC situation of high drivers and low barriers lead by Denmark, Finland, Sweden and Germany. It is revealed that the Czech Republic has very low drivers for UBC whilst Greece and Spain had the highest UBC barriers.

1 = "Not at all developed yet" to 10 = "Highly developed"
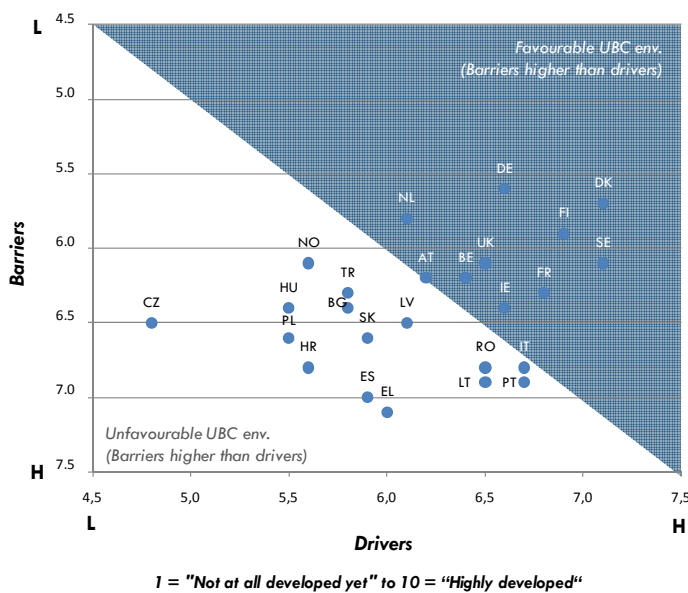
9.9 Highest driver / lowest barrier mean			
Country	Short Code	Drivers	Barriers
Austria	AT	6.2	6.2
Belgium	BE	6.4	6.2
Bulgaria	BG	5.8	6.4
Croatia	HR	5.6	6.8
Czech Republic	CZ	4.8	6.5
Denmark	DK	7.1	5.7
Finland	FI	6.9	5.9
France	FR	6.8	6.3
Germany	DE	6.6	5.6
Greece	EL	6.0	7.1
Hungary	HU	5.5	6.4
Ireland	IE	6.6	6.4
Italy	IT	6.7	6.8
Latvia	LV	6.1	6.5
Lithuania	LT	6.5	6.9
Netherlands	NL	6.1	5.8
Norway	NO	5.6	6.1
Poland	PL	5.5	6.6
Portugal	PT	6.7	6.9
Romania	RO	6.5	6.8
Slovakia	SK	5.9	6.6
Spain	ES	5.9	7.0
Sweden	SE	7.1	6.1
Turkey	TR	5.8	6.3
United Kingdom	UK	6.5	6.1

Situational factors

Explanation

In the study, both academics and HEI representatives were asked to indicate the extent to which they work with business in the *8 Types of UBC*. The following section looks at the results from a number of demographic and situational viewpoints to identify those factors that affect UBC. A minimum of 30 responses for each of the factors were required to be used in the analysis. In the tables, the figures represent the mean UBC value of respondents on the scale:

1   no UBC   >1 – 4   low UBC   >4 – 7   medium UBC   >7 - 10 high UBC

Gender

Highest developed types for males:

- Collaboration in R&D,
- Mobility of students.

Highest developed types for females:

- Collaboration in R&D,
- LLL.

Significant differences between males and females (males significantly higher cooperation) were found for:

- Collaboration in R&D,
- Mobility of students,
- Commercialisation of R&D,
- Entrepreneurship,
- Governance.

Age

In respect to age, it would be expected that the older a person is, the more likely they are to have engaged in UBC. The results reflect this hypothesis. Most cooperation types showed that **the older the academic, the higher the cooperation.**

Hypothesis source

"Focus activities on those younger academics who are more open to working with industry"[43]

Hypothesis and result

> Younger academics have a higher cooperation with universities than the older ones ✖

Years in HEI

It was found with only two exceptions, those **academics with more than 10 years in a HEI cooperate the most in the *8 Types of UBC*.**

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[43] Expert interviews: respondent 8

Years in business

	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D results	Curriculum development & delivery	Lifelong learning (LLL)	Entrepreneurship	Governance	Total UBC*
None	4.7	2.6	3.5	3.6	3.3	3.4	2.7	2.4	3.4
>0 - 2	4..1	2.8	4.3	4.2	3.9	3.9	3.7	3.0	3.9
3 – 5	5.4	2.9	4.7	4.7	4.1	4.4	3.6	3.3	4.2
6 – 9	5.6	3.4	4.9	4.5	4.8	4.5	3.7	3.4	4.4
10 - 19	5.3	3.1	5.1	4.5	4.3	4.4	4.0	3.5	4.5
20 + years	5.1	3.2	5.1	4.4	4.6	4.7	4.3	3.7	4.5

Scale: 1 = none, >1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

Those academics with 10+ years working in business have the highest Total UBC.

The amount of U-B cooperation is significantly lower for those academics having less than 2 years of experience in business.

5 years working in business is the 'tipping point' at which each extra year an academic works in business adds little more to their extent of UBC.
.

9.9	Highest per type of UBC
9.9	Highest per years in business

Area of knowledge

	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D results	Curriculum development and delivery	Lifelong learning (LLL)	Entrepreneurship	Governance	Total UBC*
Health, biomedical science	4.7	2.5	3.3	3.6	3.1	3.1	2.5	2.0	3.2
Technology and Engineering	6.0	3.2	5.0	4.6	4.3	4.3	3.7	3.2	4.4
Social Sciences	4.4	2.8	4.3	3.9	4.0	4.4	3.7	3.3	3.9
Humanities	3.9	2.8	4.0	3.0	3.6	3.5	3.1	2.7	3.4

Scale: 1 = No UBC, >1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

9.9	Highest per type of UBC
9.9	Highest per area of knowledge

Technology and Engineering have the highest level of UBC

Areas of focus
Health, biomedical science
• Collaboration in R&D

Technology and Engineering:
• Collaboration in R&D
• Mobility of students
• Commercialisation of R&D
• Curriculum dvlp. & delivery
• Lifelong learning

Social sciences
• Collaboration in R&D
• Mobility of students
• LLL

Humanities
• Mobility of students

NB To be an area of focus, the perception needed to be over 4

Hypothesis source

"UBC occurs mostly in technological areas and to a smaller degree in social areas."[44]

Hypothesis

The degree of UBC within academics of technological areas is higher than UBC in social areas

Result

✓

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[44] Expert interviews: respondent 10:

Type of HEI (academic)

	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D results	Curriculum development and delivery	Lifelong learning (LLL)	Entrepreneurship	Governance	Total UBC*
University	4.8	2.8	3.9	3.9	3.6	3.8	3.2	2.8	3.7
University of applied sciences	5.7	2.9	5.2	4.5	4.0	3.7	3.4	3.1	4.1
Polytechnic university / Technical university	5.4	3.3	4.8	4.4	4.5	4.5	4.0	3.2	4.4
School of …. **	5.2	3.0	5.3	3.8	4.5	4.8	4.2	3.2	4.3
College of … **	4.0	3.0	3.7	2.9	4.3	4.3	2.9	3.5	3.6

Scale: 1 = No UBC, >1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

9.9 Highest per type of UBC

9.9 Highest per type of institution

NB To be an area of focus, the perception needed to be over 4 (i.e. at least a medium level of UBC)

Polytechnic universities have he highest level of UBC

Areas of focus
University
- Collaboration in R&D

University of applied sciences
- Collaboration in R&D
- Mobility of students
- Commercialisation of R&D results

Polytechnic / Technical universities
- Collaboration in R&D
- Mobility of students
- Commercialisation of R&D results
- Curriculum development and delivery
- LLL

School of…
- Collaboration in R&D
- Mobility of students
- LLL
- Entrepreneurship

College of…
- Curriculum development and delivery

Type of HEI (HEI)

	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D results	Curriculum development and delivery	Lifelong learning	Entrepreneurship	Governance	Total UBC*
University	6.6	4.9	6.0	5.7	5.6	6.0	5.9	5.3	5.8
University of applied sciences	6.7	4.4	6.6	5.4	5.9	5.7	5.5	4.8	5.6
Polytechnic university / Technical university	6.6	5.0	6.4	5.5	5.9	6.0	6.0	5.2	5.8
School of … **	5.9	4.3	7.0	4.7	5.8	5.5	5.6	5.2	5.4
College of … **	5.8	4.4	6.5	5.0	6.0	5.9	5.6	5.4	5.5

Scale: 1 = No UBC, >1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

9.9 Highest per type of UBC

9.9 Highest per type of institution

Areas of focus
University
- Collaboration in R&D

University of applied sciences
- Collaboration in R&D
- Mobility of students

Polytechnic / Technical Uni
- Collaboration in R&D
- Mobility of students

School of…
- Mobility of students

College of…
- Mobility of students

NB To be an area of focus, the perception needed to be >6

Hypothesis source

"Public universities of applied sciences have more UBC than traditional universities."[45]

Hypothesis

Universities of applied sciences present a higher level of UBC

Result

✓

[45] Stifterverband für die Deutsche Wissenschaft (2007)

Country (academic)

Academics were asked to indicate to what extent they cooperate with business (mean of academic representatives in the country). A minimum of 30 responses were required.

Highest extent of UBC
1. Lithuania
2. Bulgaria
3. Latvia

Lowest extent of UBC
1. Poland
2. Austria
3. Italy

The mean extent of cooperation for academics in European countries is low (3.8)

n=4002
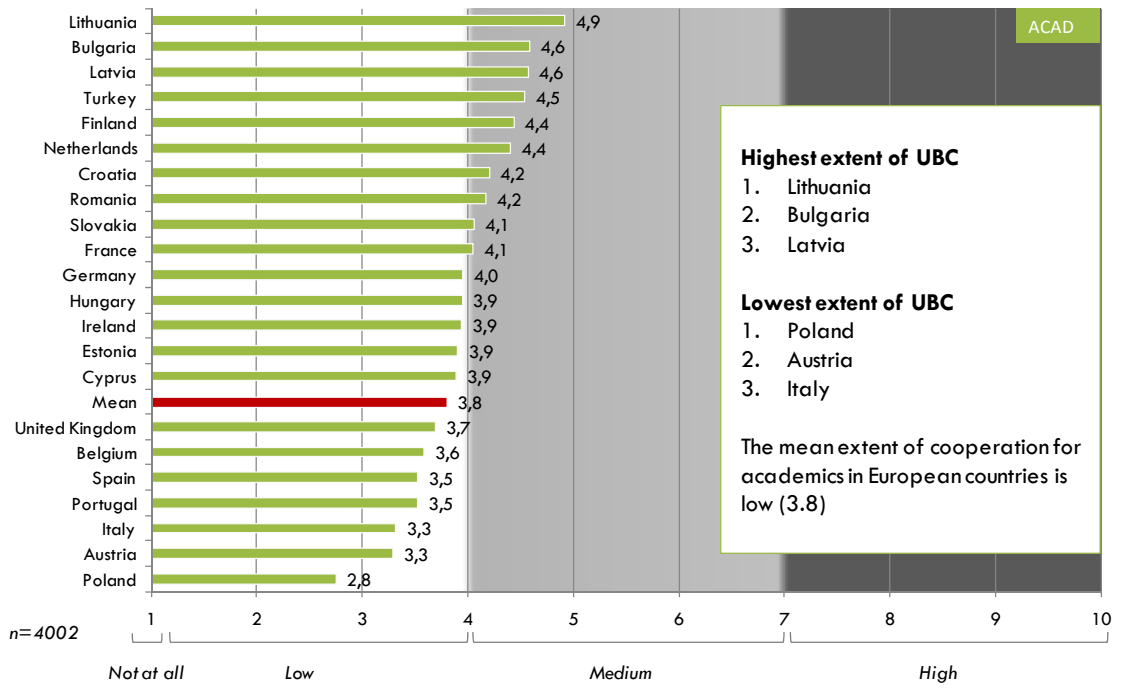
Country (HEI)

HEI representatives were asked to indicate to what extent their HEI cooperates with business (mean of HEI representatives in the country). A minimum of 30 responses were required.

Highest extent of UBC
1. Ireland
2. United Kingdom
3. Romania

Lowest extent of UBC
1. Slovakia
2. Norway
3. Poland

The mean extent of cooperation for HEIs in European countries is medium (5.7)

n=2052

Hypothesis source

Hypothesis

Result
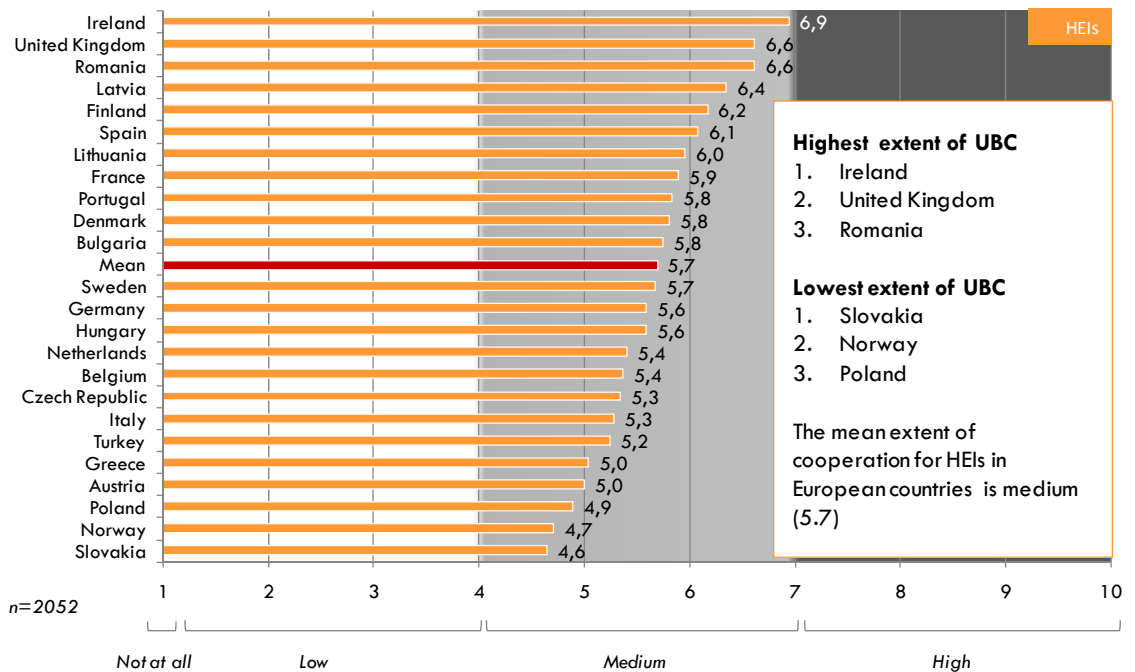
"The expert thinks that there is a trend, particularly in the UK, where HEIs work ever-more closely with companies, more so than in other countries".[46]

The degree of UBC is significantly higher within UK universities and businesses

✕

Key Finding	Situational factors have a substantial effect on European UBC. This provides greater understanding to all UBC stakeholders of the factors that influence UBC.
	Years in business, as an academic characteristic, and *country* of the HEI have the most significant effects, providing areas of focus for policy makers.
Recommendation(s)	Focus on *years of working in business* as a means for developing current and selecting future academics. Encourage and support academics to spend more than two years working in business or employ academics that fit the profile of high UBC.
	Partner HEIs from higher UBC countries with those from lower performing countries.

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[46] Expert interview: respondent 2

How to support UBC?

The following tree diagram depicts the responses from HEI representatives to the open question: '*How your HEI could be supported in its efforts to work with business?* Their responses were classified into the following themes. The percentage figure represents the number of responses referring to the topic.
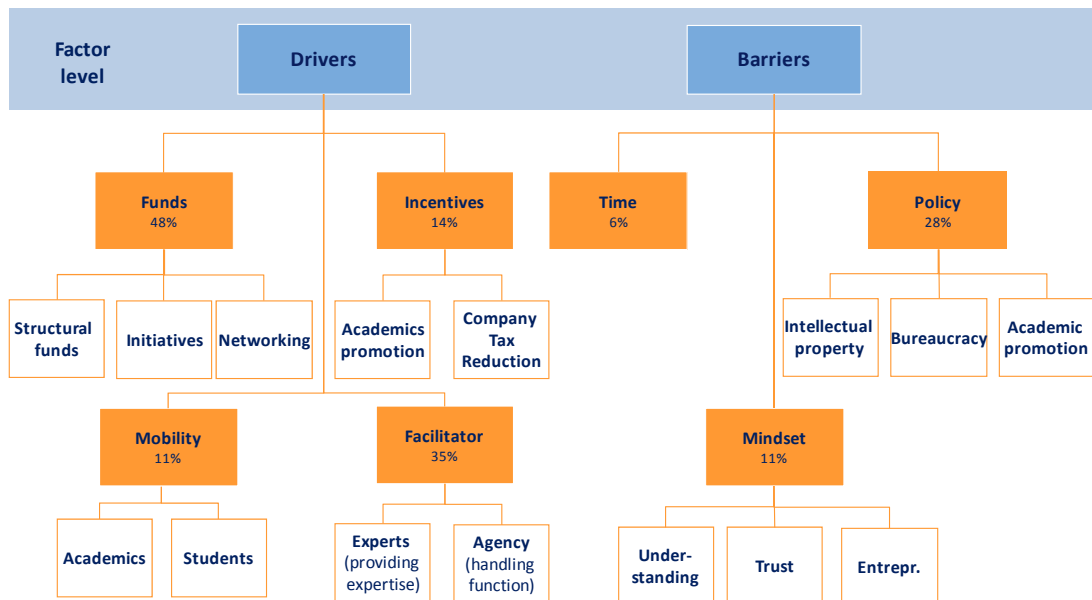
n=1024

47% of HEI representatives responded to the question of how their HEI could be further supported in its UBC efforts. Almost half of the respondents made statements about the need to be supported with the provision of different kinds of funds (48%). The second most common topic was the creation of an agency or experts to facilitate the UBC processes and provide guidance (35%). 28% of them also named the creation or improvement of polices for intellectual property issues and academic promotion together with bureaucracy reduction. The provision of incentives for academics and business (14%), the needed change in the academics and business people's mindset (11%), the mobility of academics and students (11%) and a solution needed for the time constraints to work in UBC issues due to their other responsibilities (6%) were also mentioned as supporting measures by HEI representatives.

HEI representatives focused their attention to a much greater degree on the UBC driver's development rather than the removal of barriers. It is presumed that their statements are directed at those actions with which government and regional development agencies can assist.

Key Finding	In direct contrast to the results found in the drivers and barriers section of the study, HEI representatives through that the biggest barriers were issues around trust and understanding and incentives for academics whilst they saw funding as the biggest drivers.

ACTION LEVEL

4 Pillars of University-Business cooperation

- Result level
- Factor level
- Action level
- Inter-relationships

Results

The *4 Pillars* are the 'action-level' where all implementation in UBC needs to be focused, regardless of the type of UBC or the situational factors in place

The extent of development of the *4 Pillars*
significantly influences UBC in Europe

Activities followed by structures and approaches are
the most developed of the *4 Pillars* in Europe

Section objective

The following section will seek to answer the following research question:

4 pillars
F. What is the extent of development of the 4 Pillars?

TOTAL UBC

1 Strategies
- Documented (Paper) strategies
- Implementation and motivation strategies

2 Structures & approaches
- Role-based approach in UBC
- Internal/External agencies focused on UBC

3 Activities
- Internally focussed education and workshops focused on academics and / or students
- Externally focussed networking, promotional and project activities

4 Framework Conditions
- Mobility laws
- Laws offering UBC support

Strategies

Documented (Paper) strategies	Extent of development (1-10) as perceived by	
• A top-level management committed to University-Business cooperation, • A documented mission / vision embracing University-Business cooperation, • A strategy for University-Business cooperation, • The internal promotion of University-Business cooperation., • The external promotion of University-Business cooperation.	ACAD	5.4 (Medium)
	HEI	6.8 (Medium)

Focus for strategies of UBC

Are scientifically proven to be structured into two areas:

1. Documented strategies,
2. Implementation and motivation strategies.

Documented and motivation strategies are the highest developed strategies (assessed by both academics and HEI representatives)

Implementation and motivation strategies	Extent of development (1-10) as perceived by	
• The dedication of resources (inc. funding) to support University-Business cooperation, • The provision of incentives for academics to encourage University-Business cooperation, • The inclusion of 'cooperation with business' as part of the assessment of work performance for academics.	ACAD	4.0 (Medium)
	HEI	5.4 (Medium)

'*Documented strategies*' are substantially more developed than *implementation and motivation strategies* within the HEI. This result suggests that many more European HEIs have developed *documented strategies*, a first step in the direction of developing *implementation and motivation strategies*. Special attention should be paid to assure that "documented strategies" do not remains in paper and are also applied, becoming "implementation and motivation strategies".

Extent of development

n=834
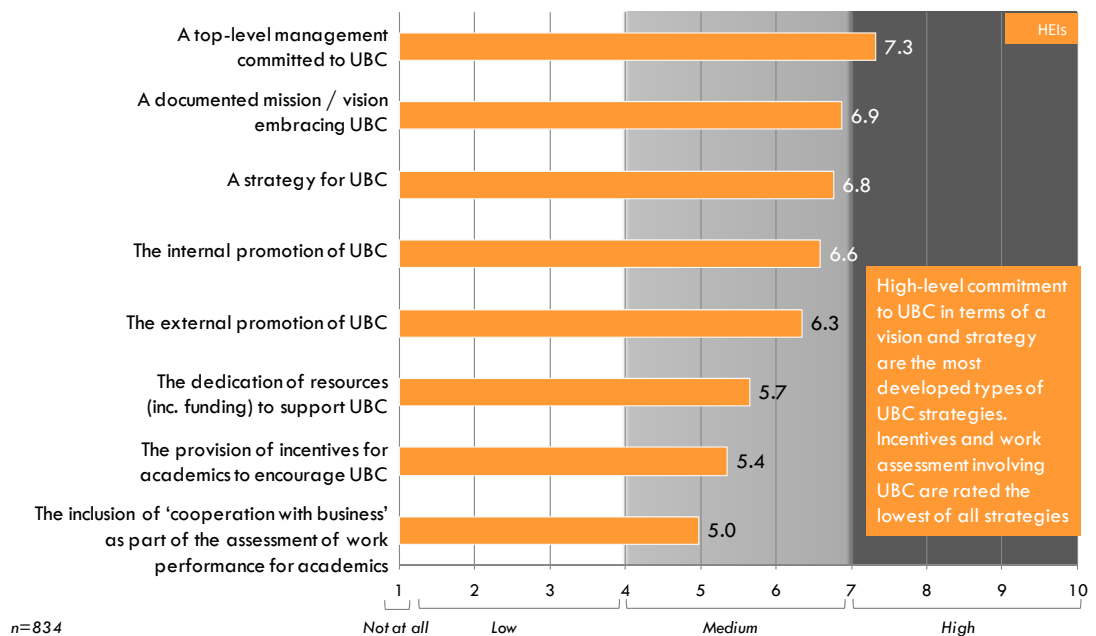
Hypothesis source	Hypothesis	Result
"There is little incentive for faculty members to engage in non-traditional activities" [47]	The provision of incentives for academics to encourage UBC is poorly developed	✓

[47] David Crosier, Lewis Purser & Hanne Smidt (2007)

The relationship between strategies and Total HEI UBC (per country)

Relating Total UBC with development of UBC strategies per country

The relationship between Total UBC and strategies for UBC is evident in the diagram below. It can be seen that as the development of strategies increase, so does the extent of Total UBC (the reverse is also theoretically possible, though experience would suggest otherwise).

1 = "Not at all developed yet" to 10 = "Highly developed"
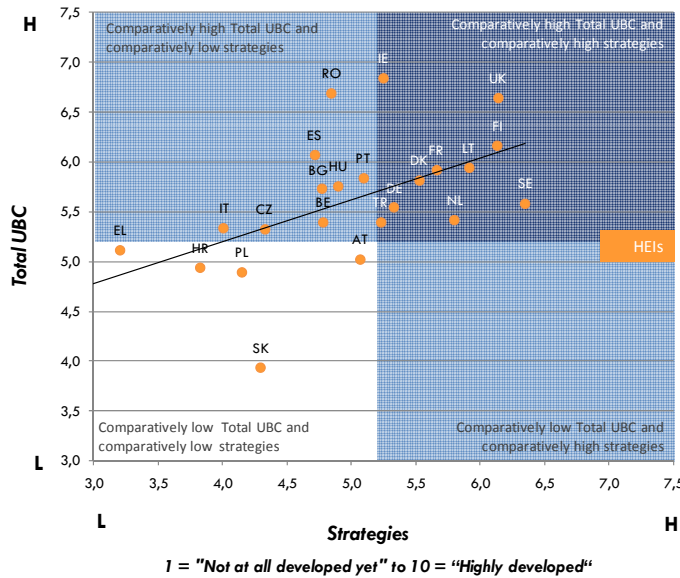
Country	Short Code	STRAT mean	TOTAL UBC (HEI)
Austria	AT	5.1	5.0
Belgium	BE	4.8	5.4
Bulgaria	BG	4.8	5.7
Croatia	HR	3.8	4.9
Czech Republic	CZ	4.3	5.3
Denmark	DK	5.5	5.8
Finland	FI	6.1	6.2
France	FR	5.7	5.9
Germany	DE	5.3	5.5
Greece	EL	3.2	5.1
Hungary	HU	4.9	5.8
Ireland	IE	5.3	6.8
Italy	IT	4.0	5.3
Lithuania	LT	5.9	5.9
Netherlands	NL	5.8	5.4
Norway	NO	3.0	4.8
Poland	PL	4.2	4.9
Portugal	PT	5.1	5.8
Romania	RO	4.9	6.7
Slovakia	SK	4.3	3.9
Spain	ES	4.7	6.1
Sweden	SE	6.4	5.6
Turkey	TR	5.2	5.4
United Kingdom	UK	6.1	6.6

The diagram above suggests that there is a positive relationship between the development of *strategies* and the extent of UBC. A few countries show a high level of Total UBC with a low development of *strategies*; however, in most cases a high level of UBC corresponds with a relatively high extent of strategy development.

Highest three means for the pillar

Hypothesis source	*Hypothesis*	*Result*
"Need to consider UBC in the career development/promotion of professors." [48]	The inclusion of "cooperation with business" as part of the assessment of work performance for academics is poorly developed	✓
"Clear HEI strategies and rules relating to research cooperation with industry need to be improved" [49]	Strategies of UBC are poorly developed	✓
"Universities of applied sciences align their mission with UBC"[50]	Universities of applied sciences have a higher development of missions embracing UBC	✓

[48] University–Business Forum (2008)
[49] Public consultation on transnational research cooperation and knowledge transfer between public research organisations and industry (2006)
[50] Expert interview: respondent 10

Impact of strategies on UBC

According to the respondents' perceptions, the following graphic explains the impact of each of the strategies on UBC. It details the impact that the development of each of the strategies considered have on UBC, suggesting the ones in which the HEIs should focus their efforts.

FACTORS	IMPACT		
The inclusion of UBC as part of the assessment of academic work performance	25%		$R^2 = 0,58$
The dedication of resources (including funding) to support UBC		18%	
The provision of incentives for academics to encourage UBC		13%	
The internal promotion of UBC		13%	
A top management committed to UBC		12%	
The external promotion of UBC		9%	
A documented mission/vision embracing UBC		7%	
A strategy for UBC		4%	
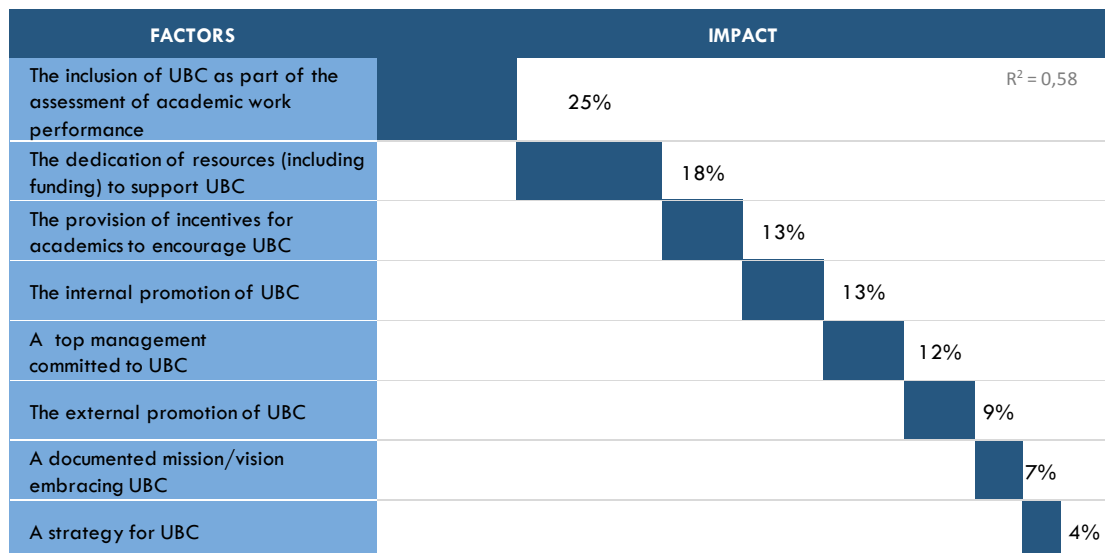
When the impact of *strategies* on UBC and the actual development of strategies are compared, it can be seen that *implementation strategies*, which have the highest impact on Total UBC, are the most underdeveloped. This means that HEIs are currently developing strategies with the lowest impact (*documented strategies*) and a re-focus on the strategies with higher impact is required (implementation strategies).

Key findings	'Documented strategies' are quite well developed while 'implementation strategies' (providing motivation for academics) are much less developed, especially in the eyes of academics. The most developed strategies are those with the lowest impact in Total UBC.
Recommendation(s)	Greater focus on those strategies with the highest impact, the 'implementation strategies', including UBC as part of the assessment of work performance for academics and increasing their chances of promotion to rise academics' perceived benefits of UBC for themselves.

Structures and approaches

Roles-based approaches in UBC	Extent of development (1-10) as perceived by	
• The presence of academics on company boards, • The presence of business people on the HEI board, • Board member or vice rector positions for University-Business cooperation. • The practise of recruiting industry professionals into the knowledge transfer area., • An alumni network.	HEI	5.4 (Medium)

Internal/External agencies focused on UBC	Extent of development (1-10) as perceived by	
• Career offices within the HEI, • Agencies (internal) within the HEI, dedicated to University-Business cooperation, • Incubators for the development of new business.	HEI	5.3 (Medium)

Focus for *structures and approaches* of UBC

Are proven to be structured into two areas:

1. Role-based approaches in UBC,
2. Internal/External agencies focused on UBC.

Role-based approaches are the highest developed structures and approaches (assessed by HEI representatives).

Extent of development

Career offices and alumni networks are the most developed types of UBC structures and approaches. External agencies dedicated to UBC and the presence of academics on company boards rated the lowest of all structures and approaches.

n=732
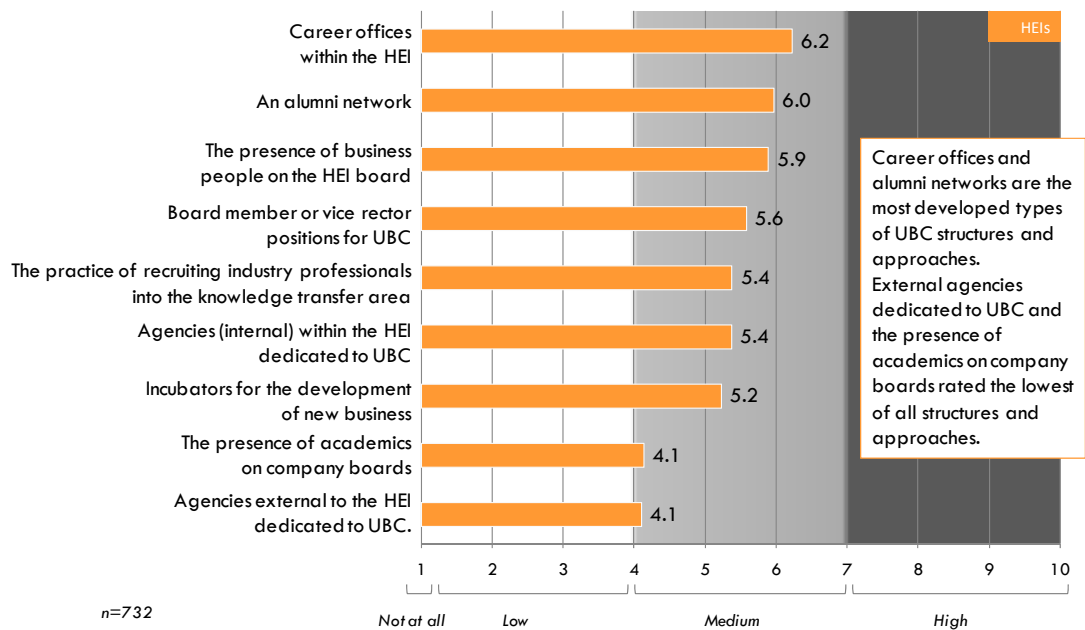
Comments and findings from literature

"Change is difficult. Structures are rigid, knowledge is limited easy to try and go in a certain direction, but the caravan has to follow. Getting academics into the discussion on human resources, businesses, accounting etc. is not easy. No change comes without a champion, but often more than one champion with different opinions is found.[51]

Universities, departments and faculties should develop their alumni networks in order to build closer relationships with their graduates working in the business community".[52]

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[51] Second European Forum on Cooperation between Higher Education and the Business Community 2009
[52] Lambert review, 2003

The relationship between structures and approaches and Total HEI UBC (per country)

Relating Total UBC with development of UBC structures & approaches per country

The relationship between Total UBC and structures & approaches for UBC is evident in the diagram below. It can be seen that as the development of structures & approaches increase, so does the extent of Total UBC (the reverse is also theoretically possible, though experience and logic suggests otherwise).

Structures & approaches

1 = "Not at all developed yet" to 10 = "Highly developed"
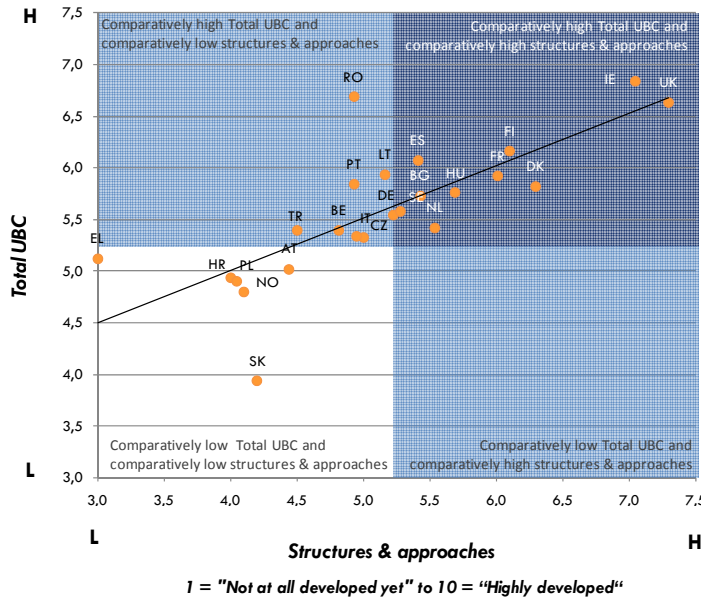
Country	Short Code	STRUCT mean	TOTAL UBC (HEI)
Austria	AT	4.4	5.0
Belgium	BE	4.8	5.4
Bulgaria	BG	5.4	5.7
Croatia	HR	4.0	4.9
Czech Republic	CZ	5.0	5.3
Denmark	DK	6.3	5.8
Finland	FI	6.1	6.2
France	FR	6.0	5.9
Germany	DE	5.2	5.5
Greece	EL	3.0	5.1
Hungary	HU	5.7	5.8
Ireland	IE	7.0	6.8
Italy	IT	5.0	5.3
Lithuania	LT	5.2	5.9
Netherlands	NL	5.5	5.4
Norway	NO	4.1	4.8
Poland	PL	4.1	4.9
Portugal	PT	4.9	5.8
Romania	RO	4.9	6.7
Slovakia	SK	4.2	3.9
Spain	ES	5.4	6.1
Sweden	SE	5.3	5.6
Turkey	TR	4.5	5.4
United Kingdom	UK	7.3	6.6

The diagram above suggests that there is a positive relationship between the development of *structures and approaches* and the extent of UBC. A few cases show a high level of Total UBC with a low development of *structures and approaches*; however, in most cases a high level of UBC corresponds with a relatively high extent of *structures and approaches* development. Those HEIs that have developed their UBC structures and approaches to a high extent will likely show high levels of Total UBC.

Highest three means for the pillar

Hypothesis source	*Hypothesis*	*Result*
"They sit more often on boards. Even at the beginning of this year business men started to sit on boards at the traditional universities in Finland".[53]	The presence of business people on the HEI board is significantly higher in Finland than in any other EU country	✓

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[53] Expert interviews: Respondent 10

Impact of structures and approaches on UBC

According to the respondents' perceptions, the following graphic explains the impact of each of the structures and approaches on UBC. It details the impact that the development of each of the structures and approaches considered have on UBC, suggesting the ones in which the HEIs should focus their efforts.

FACTORS	IMPACT
Industry professional employed in knowledge transfer area	18% $R^2 = 0,52$
Incubators for the development of new business	17%
Board Member for UBC	13%
Alumni network	13%
Existence of career office	12%
Academic on business board	11%
Business people on university board	8%
External agencies dedicated to UBC	4%
Internal agencies dedicated to UBC	4%
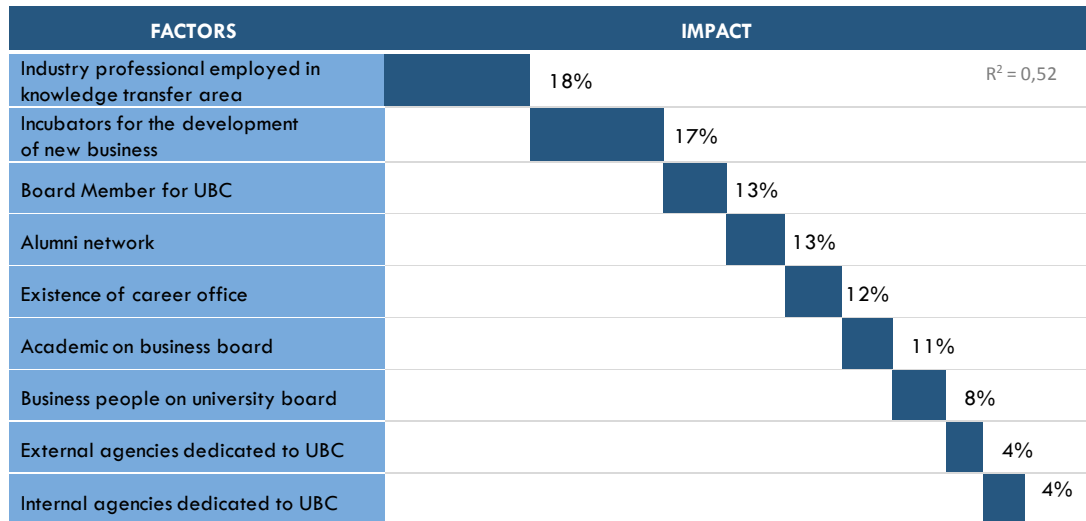
When the impact on UBC and the actual development of *structures and approaches* are compared, it is shown that there is no clear trend between the degree of development and the impact in this pillar.

Key findings	Both UBC roles and internal/external agencies are moderately well developed. There are a series of *structures and approaches* with high impact on UBC that are underdeveloped.
Recommendation(s)	Focus on those *structures and approaches* that provide the largest impact, like industry professionals working in knowledge transfer area and incubators for the development of new business.

Operational activities

Internally focused education and workshops focused on <u>academics</u>	Extent of development (1-10) as perceived by	
• Workshops, information sessions and forums for University-Business collaboration targeting academics, • Entrepreneurship education offered to academics.	HEI	**5.3** (Medium)

Internally focused education and workshops focused on <u>students</u>	Extent of development (1-10) as perceived by	
• Entrepreneurship education offered to students.	HEI	**6.3** (Medium)

Externally focused networking, promotional and project activities	Extent of development (1-10) as perceived by	
• Networking sessions or meetings for academics to meet people from business, • The featuring of University-Business cooperation prominently on the HEI's website, • Collaboration activities facilitating student interaction with business, • Collaboration activities facilitating academics interaction with business.	HEI	**5.7** (Medium)

Focus for operational activities of UBC

Are scientifically proven to be structured into three areas:

1. Internally focussed education and workshops focused on academics,
2. Internally focussed education and workshops focused on students,
3. Externally focussed networking, promotional and project activities.

Externally focused networking, promotional and project activities are the highest developed operational activities (assessed by HEI representatives).

Extent of development

Collaboration activities facilitating student interaction with business — 6,5
Entrepreneurship education offered to students — 6,3
Workshops, information sessions and forums for UB collaboration targeting academics — 5,7
Networking sessions or meetings for academics to meet people from business — 5,5
The featuring of UBC prominently on the HEI's website — 5,4
Collaboration activities facilitating academics interaction with business — 5,4
Entrepreneurship education offered to academics. — 4,8

n=643

Not at all | Low | Medium | High

Collaboration activities facilitating student interaction with business and entrepreneurship education are the most prevalent activities. Entrepreneurship education offered to academics is the least prevalent UBC activity.

The relationship between operational activities and Total HEI UBC (per country)

Relating Total UBC with development of UBC activities per country

The relationship between Total UBC and activities for UBC is evident in the diagram below. It can be seen that as the development of activities increase, so does the extent of Total UBC (the reverse is also theoretically possible, though experience would suggest otherwise).

H 7,5

Comparatively high Total UBC and comparatively low activities

Comparatively high Total UBC and comparatively high activities

Total UBC

Comparatively low Total UBC and comparatively low activities

Comparatively low Total UBC and comparatively high activities

L 3,5

3,5   4,0   4,5   5,0   5,5   6,0   6,5   7,0   7,5

L   *Activities*   H

1 = "Not at all developed yet" to 10 = "Highly developed"
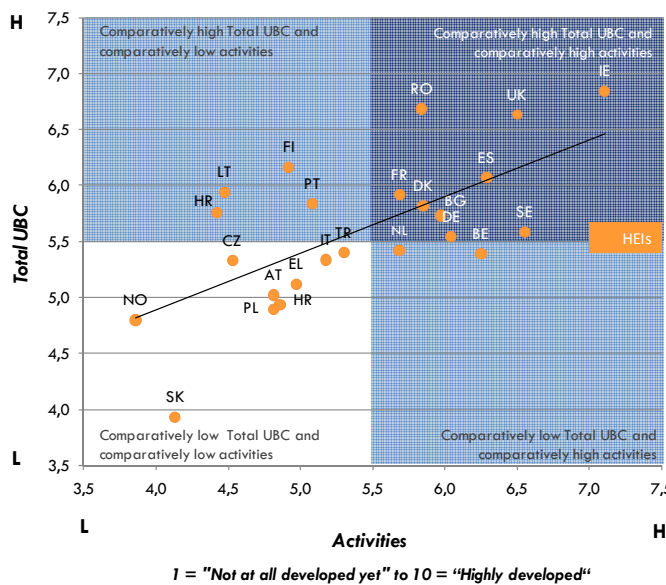
Country	Short Code	ACTIVITIES Mean	TOTAL UBC
Austria	AT	4.8	5.0
Belgium	BE	6.3	5.4
Bulgaria	BG	6.0	5.7
Croatia	HR	4.9	4.9
Czech Republic	CZ	4.5	5.3
Denmark	DK	5.8	5.8
Finland	FI	4.9	6.2
France	FR	5.7	5.9
Germany	DE	6.0	5.5
Greece	EL	5.0	5.1
Hungary	HU	4.4	5.8
Ireland	IE	7.1	6.8
Italy	IT	5.2	5.3
Lithuania	LT	4.5	5.9
Netherlands	NL	5.7	5.4
Norway	NO	3.9	4.8
Poland	PL	4.8	4.9
Portugal	PT	5.1	5.8
Romania	RO	5.8	6.7
Slovakia	SK	4.1	3.9
Spain	ES	6.3	6.1
Sweden	SE	6.6	5.6
Turkey	TR	5.3	5.4
United Kingdom	UK	6.5	6.6

The diagram above suggests that there is certain positive relationship between the development of operational activities and the extent of UBC. A few cases show a high level of Total UBC with a low value for operational activities; however, in most cases a high level of UBC corresponds with a relatively high extent of operational activities development.

Highest three means for the pillar

Hypothesis source	Hypothesis	Result
"HEIs don't teach people to be entrepreneurs". [54]	The entrepreneurship education offered to students is significantly higher in applied sciences universities	✖
"Universities of applied sciences focus on student internships as a part of their study programmes and cooperate intensely with businesses in this respect". [55]	Universities of applied sciences carry out significantly more internships	✔

[54] University – Business Forum (2009)

[55] Stifterverband für die Deutsche Wissenschaft (2007)

Impact of activities on UBC

According to the respondents' perceptions, the following graphic explains the impact of each of the activities on UBC. It details the impact that the development of each of the activities considered have on UBC, suggesting the ones in which the HEIs should focus their efforts.

FACTORS	IMPACT
Collaboration activities facilitating student interaction with business	27% $R^2 = 0,53$
Workshops, information sessions and forums for UBC targeting academics	25%
Entrepreneurship education offered to students	16%
Collaboration activities facilitation academics interaction with business	12%
The featuring of UBC prominently on the university's website	8%
Networking sessions or meeting for academics to meet people from business	7%
Entrepreneurship education offered to academics	5%
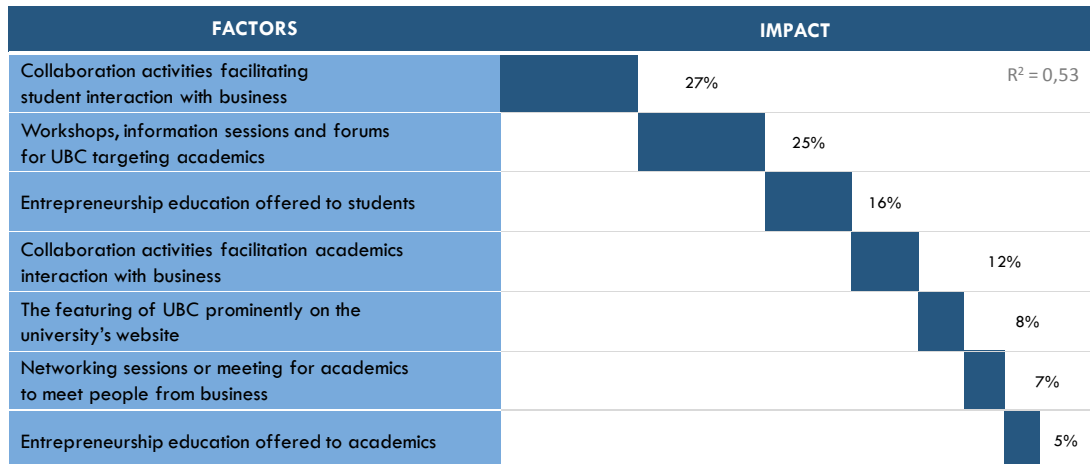
When the impact of UBC and the actual development of *activities* are compared, it is shown that *internally-focussed UBC activities focused on students*, which are the *operational activities* with the highest impact on UBC are also the most developed ones, meaning that the current priorities should be kept as they are.

Key findings	UBC *activities* centred on students are the most developed activities followed by the external activities and finally then UBC activities focussed on academics. The most developed activities are those with the highest impact in Total UBC.
Recommendation(s)	Keep the focus on the activities with the highest impact on UBC, such as "internally-focussed UBC activities centred on students".

Framework conditions

Framework conditions operate under the philosophy that incentives or conditions offered for UBC stimulate knowledge-based economic development.

Mobility laws	Extent of development (1-10) as perceived by	
• Personnel mobility laws / regulations allowing movement of staff between HEI and business.	ACAD	4.6 (Medium)
	HEI	5.3 (Medium)

Laws offering UBC support	Extent of development (1-10) as perceived by	
• Laws / regulations positively supporting the creation of new companies, • Laws / regulations positively supporting University-Business cooperation.	ACAD	4.7 (Medium)
	HEI	5.6 (Medium)

Focus for *framework conditions* of UBC

Are scientifically proven to be structured into two areas:

1. Mobility Laws,
2. Laws offering UBC support.

Laws offering UBC support are the highest developed *framework conditions* (assessed by both academics and HEI representatives).

Extent of development

Laws / regulations positively supporting UBC — 5.8

Laws / regulations positively supporting the creation of new companies — 5.4

Personnel mobility laws / regulations allowing movement of staff between HEI and business. — 4.8

HEIs

Law / Regulations positively supporting UBC and laws / regulations positively supporting the creation of new companies are more developed than mobility laws / regulations allowing movement of staff between HEIs and business.

n=621

Participation in EU funding programmes

HEI representatives were asked to indicate whether their HEI participate in the following EU programmes:

☐ Yes
☐ No

Erasmus Mundus Programme — 78,2% / 21,8%
Lifelong Learning Programme (LLL) — 66,2% / 33,8%
Framework Programme for Research and Development (e.g. FP6, FP7) — 65,3% / 34,7%
European Regional Development Fund (ERDF) — 62,3% / 37,7%
European Social Fund (ESF) — 62,3% / 37,7%
Tempus Programme — 54,4% / 45,6%
Competitiveness and Innovation Framework Programme (CIP) — 28,7% / 71,3%

n=465
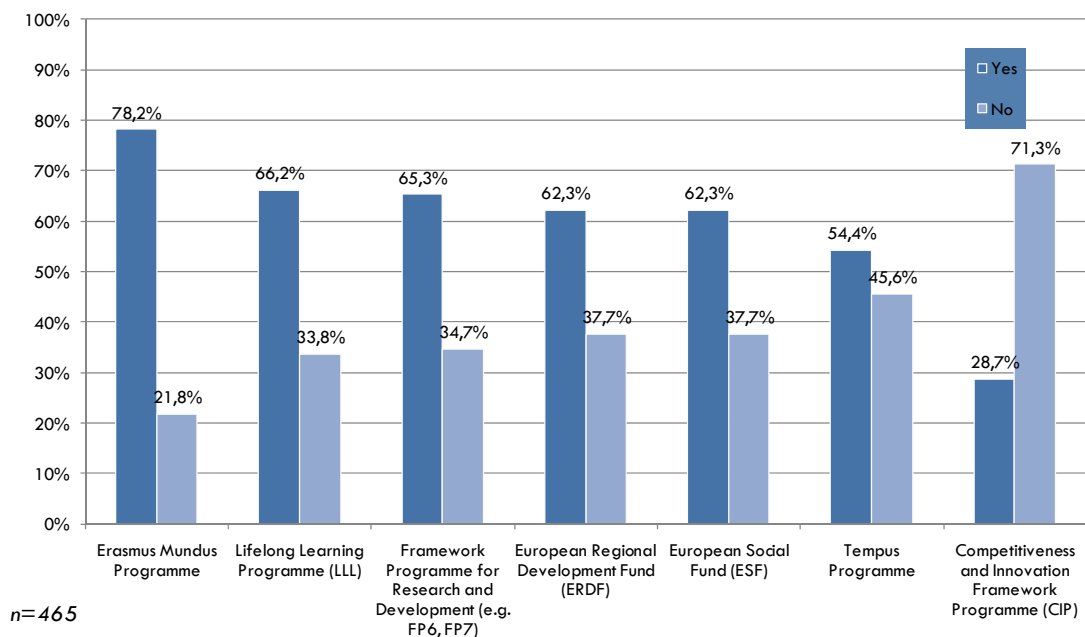
The chart above shows the percentages of HEIs participating in the mentioned EU programmes. Erasmus Mundus is the most popular type of EU programme, while competitiveness and innovation framework programme is the least common. Additionally, it was found that the higher the number of EU projects in which the HEI participates, the significantly higher its extent of UBC. The reasons could be (i) that the UBC mentality already exists at the HEI causing them to seek EU funding for UBC activities, or (ii) the funding programmes themselves create a higher level of UBC.

> *Comments and findings from experts in UBC, respondent 1*
>
> The interviewee stated that the role of framework conditions is primarily the responsibility of governments, and the existence is very important for successful UBC despite the fact that government strategy can be confusing towards stimulating UBC.[56]

The relationship between framework conditions and Total HEI UBC (per country)

Relating Total UBC with development of UBC framework conditions per country

It can be seen from the diagram below that the relationship between *framework conditions* and Total UBC is not as strong as with the other three *Pillars*.

1 = "Not at all developed yet" to 10 = "Highly developed"

Country	Short Code	FC Mean	TOTALUBC (HEI)
Austria	A	4,4	5,0
Belgium	B	4,6	5,4
Bulgaria	BG	3,9	5,7
Croatia	HR	3,7	4,9
Czech Republic	CZ	4,1	5,3
Denmark	DK	5,3	5,8
Finland	FIN	6,0	6,2
France	F	4,6	5,9
Germany	D	4,2	5,5
Greece	GR	3,8	5,1
Hungary	H	3,8	5,8
Ireland	IRE	5,3	6,8
Italy	I	3,7	5,3
Lithuania	LT	4,3	5,9
Netherlands	NL	5,1	5,4
Norway	N	4,8	4,8
Poland	PL	3,6	4,9
Portugal	P	3,8	5,8
Romania	RO	4,5	6,7
Slovakia	SK	3,8	3,9
Spain	E	4,8	6,1
Sweden	S	6,4	5,6
Turkey	TR	4,6	5,4
United Kingdom	UK	5,5	6,6
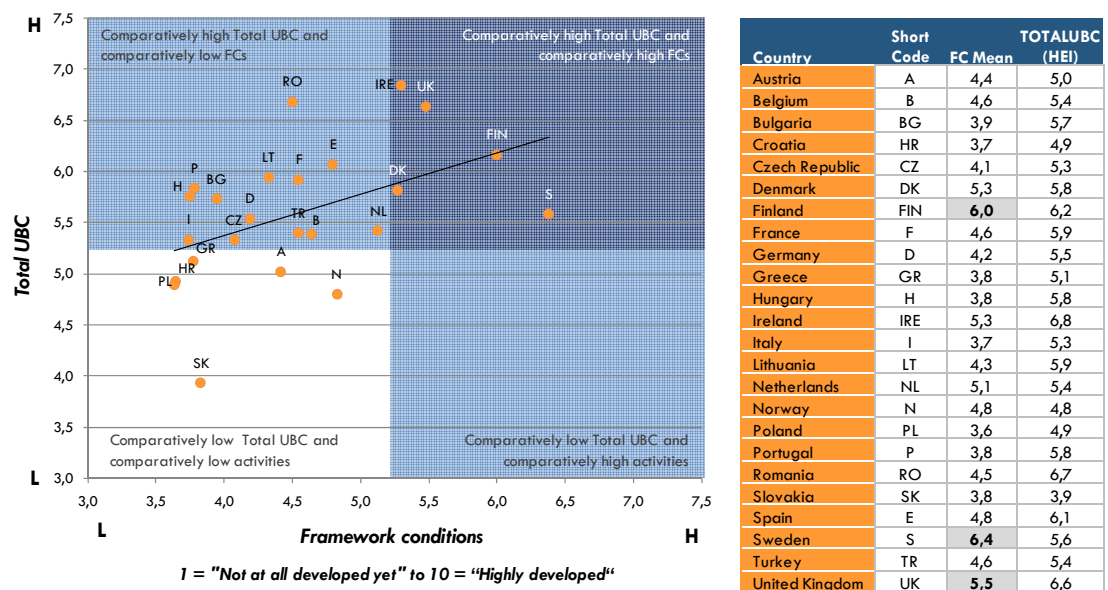
The diagram above suggests that there is a positive relationship between the development of framework conditions and the extent of UBC. Most cases are undertaking medium UBC with a low level

Highest three means for the pillar

of development of framework conditions; underlying that the relationship between the framework conditions and Total UBC is not as strong as with the other three *Pillars*.

Hypothesis source	*Hypothesis*	*Result*
"There are geographical differences in legislation concerning UBC."[57]	There are significant differences among countries/regions regarding laws/regulations positively supporting UBC	✓
"Whilst there are conflicting opinions, research by Polt et al. into UBC has suggested a weak and indirect relationship between framework conditions and successful UBC."[58]	There is a weak and indirect relationship between framework conditions and successful UBC	✓

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[56] Expert interviews: Respondent 1
[57] Public consultation on transnational research cooperation and knowledge transfer between public research organisations and industry (2006)
[58] Polt et al (2006)

Impact of framework conditions on UBC

According to the respondents' perceptions, the following graphic explains the impact of each of the framework conditions on UBC. It details the impact that the development of each of the framework conditions considered have on UBC, suggesting the ones in which the HEIs should focus their efforts.

FACTORS	IMPACT	
Laws/regulations positively supporting UBC	54%	$R^2 = 0,40$
Laws/regulations allowing movement of staff between university and business	39%	
Laws/regulations positively supporting the creation of new companies	7%	

When the impact of UBC and the actual development of activities are compared, it is shown that the *framework conditions* with the highest impact on UBC are the most developed ones, meaning that the current priorities should be kept as they are.

Key findings	Laws/regulations positively supporting UBC are the most developed *framework conditions* while laws/regulation supporting the creation of new companies is the least developed.
	Those *framework conditions* with higher impact in Total UBC are those more developed.
Recommendation(s)	Continue focusing on those *framework conditions* that provide the largest impact, especially laws and regulation positively supporting UBC.

The *4 Pillars* per country

Extent of 4 Pillar development by country

Country	STRATEGIES	STRUCTURES	ACTIVITIES	FRAMEWORK
Austria	5.1	4.4	4.8	4.4
Belgium	4.8	4.8	6.3	4.6
Bulgaria	4.8	5.4	6.0	3.9
Croatia	3.8	4.0	4.9	3.6
Czech Republic	4.3	5.0	4.5	4.1
Denmark	5.5	6.3	5.8	5.3
Finland	6.1	6.1	4.9	6.0
France	5.7	6.0	5.7	4.5
Germany	5.3	5.2	6.0	4.2
Greece	3.2	3.0	5.0	3.8
Hungary	4.9	5.7	4.4	3.7
Ireland	5.2	7.0	7.1	5.3
Italy	4.0	4.9	5.2	3.7
Lithuania	5.9	5.2	4.5	4.3
Netherlands	5.8	5.5	5.7	5.1
Norway	3.0	4.1	3.9	4.8
Poland	4.1	4.0	4.8	3.6
Portugal	5.1	4.9	5.1	3.8
Romania	4.8	4.9	5.8	4.5
Slovakia	4.3	4.2	4.1	3.8
Spain	4.7	5.4	6.3	4.8
Sweden	6.4	5.3	6.6	6.4
Turkey	5.2	4.5	5.3	4.5
United Kingdom	6.1	7.3	6.5	5.5
Average	**4.9**	**5.1**	**5.4**	**4.5**

1 = "Not at all developed yet" to 10 = "Highly developed"

9.9	Highest mean per type of UBC
9.9	Highest mean per Pillar

HEI representatives perceive that UBC *operational activities* followed by *structures and approaches* are the most developed of the *4 Pillars*, while *framework conditions* are the least developed ones. This could be explained because of the easier implementation and smaller investment required to undertake *activities*.

According to the HEI representatives, Northern European countries, Ireland, Sweden and United Kingdom are leaders in the development of the *4 Pillars*.

The relationship between the *4 Pillars* and Total HEI UBC by country

Relating Total UBC with development of the 4 Pillars per country

The relationship between Total UBC and the *4 Pillars* can be seen in the diagram below. According to the perception of HEI representatives, there are no cases where the *4 Pillars* are comparatively high and Total UBC is low. It is possible to have a higher level of Total UBC and lower value for the *4 Pillars*, however the countries that have the highest UBC all have a corresponding extent of development of the *4 Pillars*.
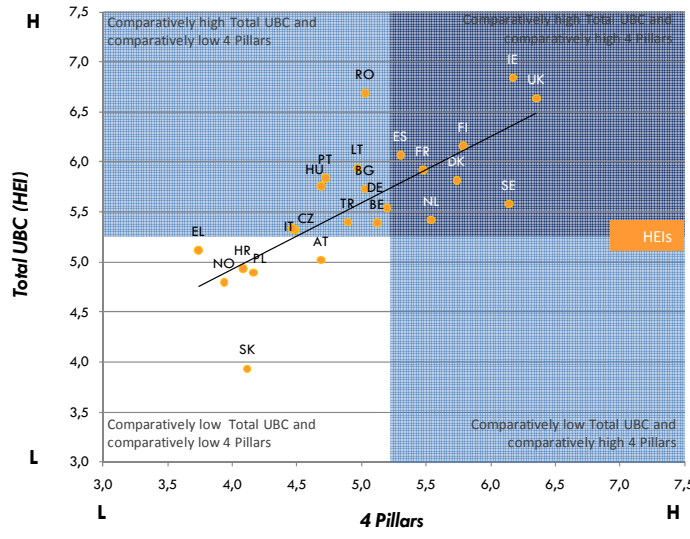
1 = "Not at all developed yet" to 10 = "Highly developed"

Country	Short Code	4 Pillars Mean	TOTALUBC (HEI)
Austria	AT	4.7	5.0
Belgium	BE	5.1	5.4
Bulgaria	BG	5.0	5.7
Croatia	HR	4.1	4.9
Czech Republic	CZ	4.5	5.3
Denmark	DK	5.7	5.8
Finland	FI	5.8	6.2
France	FR	5.5	5.9
Germany	DE	5.2	5.5
Greece	EL	3.7	5.1
Hungary	HU	4.7	5.8
Ireland	IE	6.2	6.8
Italy	IT	4.5	5.3
Lithuania	LT	5.0	5.9
Netherlands	NL	5.5	5.4
Norway	NO	3.9	4.8
Poland	PL	4.2	4.9
Portugal	PT	4.7	5.8
Romania	RO	5.0	6.7
Slovakia	SK	4.1	3.9
Spain	ES	5.3	6.1
Sweden	SE	6.1	5.6
Turkey	TR	4.9	5.4
United Kingdom	UK	6.4	6.6

Highest three means for the 4 pillars

Impact on Total UBC

Total UBC by the factored mechanisms supporting UBC (*4 Pillars*)

Using regression analyses for each of the mechanisms supporting UBC (*4 Pillars*), their contribution to the extent of UBC in Europe was estimated. The results provide a greater understanding of UBC by explaining the contribution of each of the *4 Pillars* to UBC. In the context of European UBC, *strategies* explain 58% of European UBC, *activities* explain 53%, *structures and approaches* 52% and *framework conditions* 40%. In practice these figures provide the focus for efforts to increase UBC efficiently in a given HEI, region or nation. In this case, UBC *strategies*, as we have previously seen particularly implementation strategies, should receive the highest focus within the pillars.

58%	**Strategies**	• Documented (Paper) strategies • Implementation and motivation strategies
52%	**Structures & approaches**	• Role-based approach in UBC • Internal/External agencies focused on UBC
53%	**Activities**	• Internally focussed education and workshops focused on academics and / or students • Externally focussed networking, promotional and project activities
40%	**Framework Conditions**	• Mobility laws • Laws offering UBC support

TOTAL UBC

Focus

Focus for strategies	Focus for structures and approaches
Focus for strategies should be on the following factors: • The inclusion of UBC as part of the assessment of work performance for academic (25%), • The dedication of resources (including funding) to support UBC (18%), • The provision of incentives for academics to encourage UBC (13%), • The internal promotion of UBC (13%).	Focus for structures and approaches should be on the following factors: • Industry professional employed in knowledge transfer area (18%), • Incubators for the development of new business (17%), • Board member for UBC (13%), • Alumni network (13%).

Focus for operational activities	Focus for framework conditions
Focus for activities should be on the following factors:	Focus for activities should be on the following factors:

Focus for operational activities — Focus for activities should be on the following factors:

- Collaboration activities facilitation student interaction with business (27%),

- Workshops, information sessions and forums for UBC targeting academics (25%),

- Entrepreneurship education offered to students (16%).

Focus for framework conditions — Focus for activities should be on the following factors:

- Laws/regulations positively supporting UBC (54%),

- Laws/regulations allowing movement of staff between university and business (39%).

Differences in perception exist between HEI representative and academics

Academics were also asked to assess the development of the UBC *strategies* and *framework conditions* (2 of the *4 Pillars)* at the HEI level and it was found that HEI representatives perceive the development of those pillars substantially higher than academics do. This indicates that either HEI representatives are overestimating their extent of development or academics are not fully aware of the UBC strategies and framework conditions that exist in their HEIs.

INTER

Inter-relationships among the three levels in the UB Ecosystem

Results

- Value level
- Factor level
- Action level
- Inter-relationships

Summary of findings
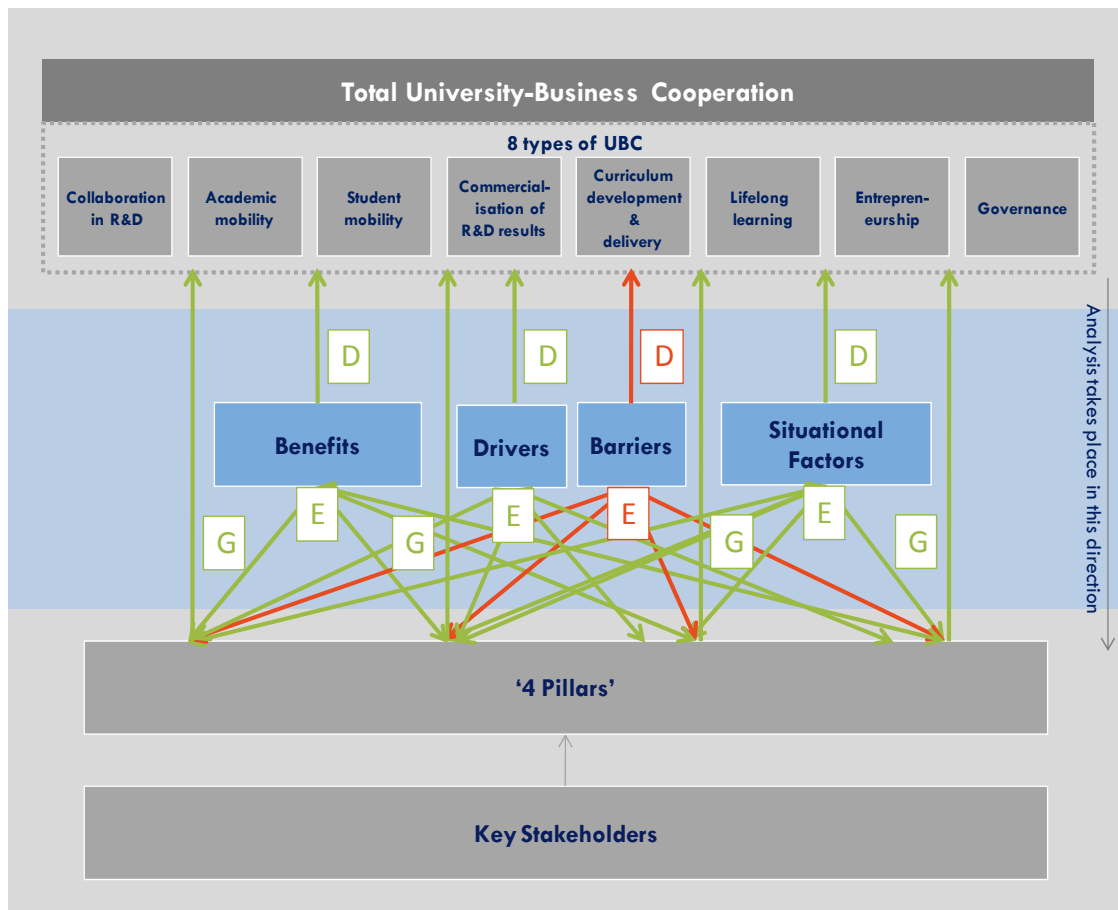
The following section analyses the inter-relationship of the elements in the *UBC Ecosystem* in order to provide a fuller understanding of European UBC. The subsequent tests were undertaken to determine these relationships.

Affect of the factor level on the result level **D** What sort of influence do benefits, drivers, barriers and situational factors have on the extent of UBC (8 Types of UBC)?	All benefits, drivers and all the situational factors significantly affect the extent of UBC (*8 Types of UBC*). HEIs with higher benefits and drivers tend to have significantly higher levels of UBC. HEIs and academics with different situational factors tend to have significantly different levels of UBC. However, the perception of barriers does not have a significant effect on the *8 Types of UBC* since all respondents perceive barriers very similarly no matter their level of UBC. This does not reduce the importance of barriers in UBC since, as discussed previously, they act as a clear obstacle to UBC.
Affect of the factor level on the action level **E** What sort of influence do benefits, drivers, barriers and situational factors have on the mechanisms that support UBC (4 Pillars)?	All *benefits*, *drivers* and all the *situational factors* significantly affect the mechanisms that support UBC (*4 Pillars*). HEIs with higher benefits and drivers tend to have significantly higher levels of the 4 Pillars. HEIs and academics with different situational factors tend to have significantly different levels of the 4 Pillars. However, the perception of *barriers* does not have a significant effect on the *4 Pillars* of UBC since all respondents perceive *barriers* very similarly no matter their level of UBC. As described above, this does not mean that *barriers* are not important in the development of the *4 Pillars* as they act as a clear obstacle.
Action level: *4 Pillars* **F** What sort of influence do the *mechanisms that support UBC (4 Pillars)* have on the extent of UBC (8 Types of UBC)?	The extent of development of each of the mechanisms that support UBC (*4 Pillars*: strategies, structures and approaches, operational activities and framework conditions) significantly affects the extent of UBC (*8 Types of UBC*). HEIs with higher levels of the *4 Pillars*, tend to have significantly higher levels of the 8 Types of UBC. HEIs and academics with different situational factors have significantly different levels of the 4 Pillars.

Confirmation of the proposed model

The proposed *UBC Ecosystem* model has been validated using the data from the survey. A number of points can be made that validate the model as a reliable model for the explanation of European UBC:

- All survey findings could be comfortably structured within the model,

- The model was useful as a basis for structuring the good practise case studies,

- The model has been tested with a number of European UBC experts,

- All the factor and action level items (*4 Pillars* along with drivers and barriers) were assessed at least of medium importance, which confirms the relevance of the items proposed.

- Most of the relationships between the elements within the *UBC Ecosystem* have been shown to be statistically significant, which provides positive confirmation:

- The level of perceived *benefits, drivers, barriers* and *situational factors* were found to significantly influence European UBC,

- The extent of development of the *4 Pillars* were found to significantly influence European UBC (the regression analysis also shows the satisfactory contribution of the *4 Pillars* to explaining UBC),

- There are significant relationships among the *4 Pillars* and all the situational factors (except barriers).

Chapter summary

The chapter explains the results regarding the levels of the UBC Ecosystem:

- Result Level - The extent of UBC for each of the 8 Types and for Total UBC, together with their internal relationships and some objective measurements. Whilst there are some exceptions, it was found that cooperation between HEIs and business in Europe is still in the early stages of development,

- Factor Level - The description of perceived *benefits, drivers, barriers* and *situational factors* affecting UBC:

  - Benefits - academics rate the benefits of UBC for themselves the lowest, especially those regarding the incentives provided by their HEIs. HEI representative rated the positive contribution to the mission of the HEI lower than the benefits for students and local industry. Both groups rated as highest the benefits to students from UBC,
  - Drivers - relationship drivers, especially mutual trust, commitment and respect are the highest rated drivers by both groups. Contrary, business drivers are perceived lower facilitators of UBC,
  - Barriers - all academics and HEIs see the importance of barriers quite similarly regardless of their level of UBC. The highest barriers for academics are related to bureaucracy and funding, while the ones for HEIs exclusively with funding,
  - Situational factors - have a substantial effect on European UBC. This provides greater understanding to all UBC stakeholders of the factors that influence UBC. *Years in business* as an academic characteristic and *country* of the HEI have the most significant effects, providing areas of focus for policy makers.

- Action Level - The development of the *4 Pillars* (*strategies*, *structures and approaches, operational activities* and *framework conditions*) and their effect on Total UBC:

  - Strategies - '*Documented strategies*' are quite well developed while '*implementation strategies*' (providing motivation for academics) are much less developed as perceived by academics. The most developed strategies are those with the lowest impact on UBC,

  - Structures and approaches - both UBC roles and internal/external agencies are moderately well developed. There are a series of *structures and approaches* with high impact on UBC that are underdeveloped,

  - Activities - UBC *activities* centred on students are the most developed activities followed by the external activities and finally then UBC activities focussed on academics. The most developed activities are those with the highest impact in Total UBC,

  - Framework conditions - laws/regulations positively supporting UBC are the most developed *framework conditions* while laws/regulation allowing movement of staff is the least developed. Those *framework conditions* with higher impact in Total UBC are those more developed.

- Inter-relationships: The relationships among the items at all the three levels were analysed. The proposed *UBC Ecosystem* model has been validated using the data from the survey.

Discussion

The following section outlines elements of the study as well as study results worth further discussion.

Considerations about measuring perceptions

Perceptions as a valid and complementary approach

The results of this study are based primarily upon respondents' subjective perceptions of European UBC. There are naturally advantages and disadvantages of having chosen a subjective study over gathering objective data; however, it was believed that a subjective study was the best approach to secure meaningful information about UBC. The main reason is that UBC involves people at its heart; it is about exchanges and interactions among people. Owing to this, understanding the perceptions of those people within the HEI was deemed to be essential, something only a subjective study can achieve.

In addition, there is a movement away from using objective metrics for UBC as it usually causes the focus and benefits to be narrowed towards those elements that are easily measured (e.g. patents, licences, spin-outs). In the expert interviews, it was noted that there is a movement away from these metrics towards economic and social-impact metrics (e.g. number of jobs and benefits to society for technology transfer and UBC rather than strict measurements such as patents, licenses or spin-outs). Furthermore, it has even been argued in literature that an over-focus upon transactional mechanics (e.g. licenses and patents) may distract from the development of personal intimacy and trust (Dooley and Kirk 2007, Brown and Jenkins 2008), a key driver in UBC.

However, there are some disadvantages of this method, which include the difficulty for respondents to assess the extent of UBC or the development of the *4 Pillars* on a scale from 1 to 10. This is because the scale is relative to their understanding of what is 'high' and what is 'low'. Additionally, another bias that could affect the results is that responses can be influenced by the respondents' own preferences and personal experiences, especially the more recent ones.

The need to complement academics perceptions with a business perspective

A further point for consideration is that this study addressed UBC from the perspective of HEIs and by doing so, the perspectives and opinions of those in business have not been accounted for. For this reason, the findings need to be contemplated as follows: UBC involves two parties and this study only considers one side of the equation. Consideration therefore needs to be given to the opinions of business in order to bring the two perspectives together. A similar study focussed on business would therefore be very valuable for comparison and greater UBC understanding.

Regional perspective

Lastly, when looking to develop UBC in a region, it is also important to take perceptions of regional stakeholders into account. The results of the data indicate that the European UBC playing field is as diverse as Europe itself and therefore within each country, there will be differences unique to a region or to a HEI.

Improving UBC-notes for practitioners

The challenge of successfully implementing the study results

The following section has been assembled to support the practitioner in developing UBC. The results of the study point to certain actions that could be undertaken to increase European UBC. With recommendations for the improvement of European UBC having already been made, the following models and tables have been suggested to guide the implementation of those recommendations.

Practical tool for the implementation of the study

At the heart of any action for the improvement in European UBC are the *4 Pillars*. No matter what the UBC objective or focus of the UBC initiative, one or more pillars need to be created to achieve the desired outcome. As an example, if the barrier of 'high bureaucracy within the HEI is to be addressed one of the following needs to be created:

- a *strategy* (e.g. policy for the streamlining of UBC activities with the HEI),

- a *structure or approach* (e.g. the creation of a contact person dedicated to supporting the academic through the bureaucracy),

- *operational activity* (e.g. academic training in the UBC process within the HEI), or

- *framework condition* (e.g. funds made available for the region-wide reduction in 'red-tape' and document handing for UBC activities).

The following diagram uses the original *UBC Ecosystem Model* to describe possible areas of focus in any endeavour to affect UBC.
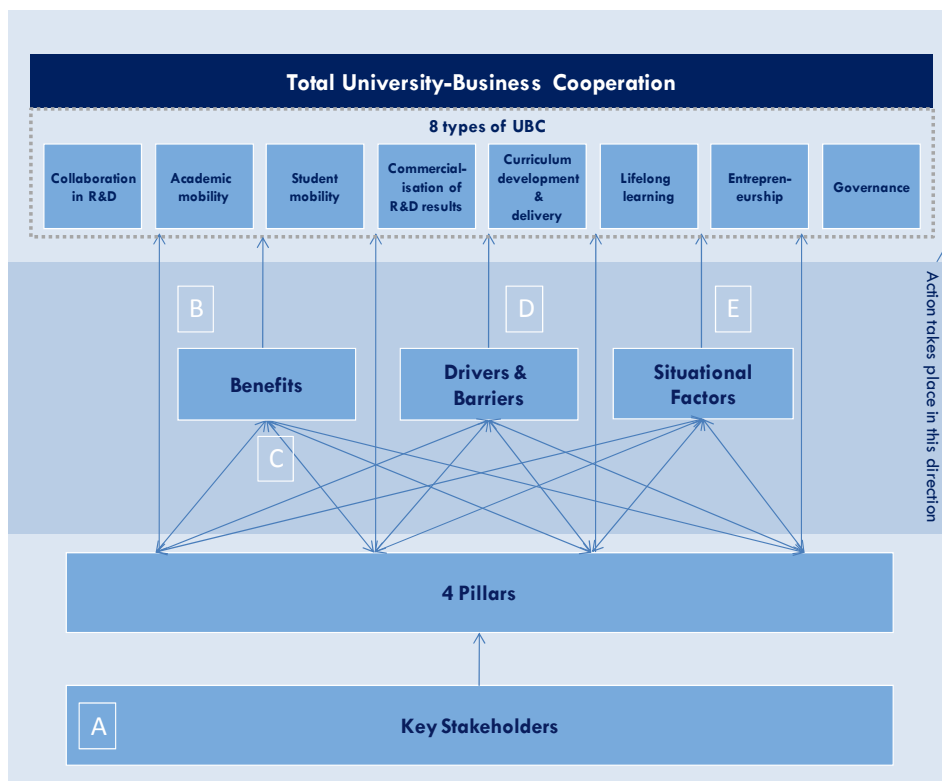
Illustration: UBC Ecosystem Action Framework
Created during the project by Davey, T., Galan-Muros, V. (2011)

The 'five-actions' framework

For someone involved in the task of developing university-business interaction there are a number of different ways in which one could focus their efforts.

	ACTION	IMPACT	DETAIL	ACTION EXAMPLE
A	Stakeholders focus	Indirect	UBC stakeholders can be developed as a long term strategy to stimulate the development of UBC in a region.	Audit the UBC key stakeholders that can support UBC in the region and identify gaps.
B	'Type of UBC' focus	Directly impacts UBC	Develop the '*4 Pillars*' for (direct) impact on the *8 Types of UBC*	Create a Centre for Entrepreneurship in order to develop UBC in entrepreneurship
C	'Benefits' focus	Indirect	Develop the '*4 Pillars*' focussing on increasing action or perceived *benefits* for stakeholders	Implement a strategy that allows academics to be promoted based upon their UBC efforts in order to increase perceived benefits from UBC
D	'Drivers and barriers' focus	Indirect	Develop the '*4 Pillars*' focussing on: 1. Supporting the *drivers* of UBC 2. Reducing the *barriers* to UBC	Make funds available for developing UB collaboration activities to address funding barriers. To organise an event inviting academics and those from industry in order to build relationships (a key driver of UBC)
E	'Situational factors' focus	Indirect	Develop the *4 Pillars* focussing on specific situational factors	Create a framework condition that allows for easy movement of academics into business and back into the HEI

Executing the *4 Pillars* requires appropriate expectations

Secondary research phase as well as the expert interviews highlighted that expectations for the implementation of each of the *4 Pillars* rely on differing stakeholders and also differing timelines:

- *strategies* can be implemented in a short time frame but may take much longer to take effect,

- *structures and approaches* generally much longer, especially if it is an agency, with more consultation,

- *operational activities* can be implemented in a short time frame with shorter term benefits, and

- *framework conditions* require a longer term focus to be truly effective.

The following '*4 Pillars expectations matrix*' summarises the findings of the study, including the qualitative interviews and case studies in respect to the *4 Pillars* to guide expectations about their development. Outlined below is information addressing responsibility, timeframe to implement the pillar and the impact on UBC (as found in a regression analysis to measure the impact of the *4 Pillars* on UBC).

	Primary responsibility for the Pillar	Secondary responsibility for the Pillar	Timeframe to implement	Time to impact	Impact on UBC
Strategies	HEI management	All HEI stakeholders	Short-Medium-term	Long-term	58%
Structures & approaches	HEI / Regional government and agencies	Regional UBC stakeholders	Agencies: long-term Personnel: short-term	Long-term	52%
Activities	HEI management and KTPs	All HEI stakeholders	Short-term	Short/Medium-term	53%
Framework conditions	Regional / National government and EU HEI management	National / regional UBC stakeholders	Medium-term	Medium/Long-term	40%

4 Pillars expectations matrix'
Created during the project by Davey, T., Galan-Muros, V., Baaken, T., (2011)

Different types of UBC have different implementation characteristics and impact metrics

There are many influencing factors on the ability of a practitioner to influence any of the *8 Types of UBC*. These include:

I.   Implementation characteristics:

- Level of commitment,

- The funds required to support the type of UBC, and

- The level of expertise required to facilitate the type of UBC.

II.   Impact characteristics:

- Impact horizon,

- Ability to generate income, and

- The primary contribution of the type of UBC to the HEIs three missions.

With this in mind, practitioners can assess the various types of UBC against these variables to realistic plan the increase of that form of UBC.

The importance of UB partnerships

The *Stairway Model* to strategic partnership

During the secondary research phase as well as the expert interviews it became clear that there was a general movement toward longer-term strategic partnerships between HEIs and business. It was also remarked that despite the efforts from the top level of the HEI to coerce relationships, the relationships between HEIs and business often commences from more personal interaction involving a researcher around mutually beneficial topics of interest. This was also recognised in the Lambert Review published in 2003:

> '*Large companies are consolidating their relationships with university research departments. Whereas in the past they may have had scores of short-term research contracts with different departments across the country, today many prefer a small number of substantial long-term collaborative research partnerships*'.

Owing to this development, there has been an increase in creating tools and methodologies for HEI-business partnering. One of these tools is the *Responsible Partnering Handbook* published by a high-level consortium or European associations involved in UBC. Additionally, a useful structure for the development of a HEI-wide strategy for UBC is the *Stairway Model to Strategic Partnership*, developed in 2007 at MUAS.[59] It was awarded as one of the Top 5 Universities in Germany applying the best strategies of UB knowledge exchange and tech transfer by the German Federal Ministry of Education and Research and the Donors' Association, an approach which included this model. For approximately six years the model has been presented at conferences and workshops dedicated to UBC meaning that the model has also been validated in multiple settings.

The model proposes an overall strategy for managing cooperation with business with it centred on the principle that cooperation between HEIs and businesses are at one of the stages of development. For each stage there is a corresponding set of strategies and actions.

	Formation	Basic collaboration	Joint collaboration	Strategic partnership
Number / Regularity of collaboration	Initial contact	One or several projects / irregular	One or several joint activities / regular	One or several joint activities / regular
Time orientation of collaboration	Initiation of short-term activities	Short- / medium-term	Medium- / long-term	Long-term
Number of people involved	Few	Few	Multiple	Multiple
Management level	Individual (Professor) / TA*	Individual (Professor)	Faculty (Dean)	Organisational (University Mgmt.)

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*Transfer agency

The Stairway Model to Strategic Partnership
Source: Baaken & Schröder (2008) further developed by David Serbin

[59] Baaken & Schröder (2008)

By climbing the stairs, institutional ties become tighter and more strategic involving, on each side, more senior representatives at higher management levels, e.g. at the strategic *partnership stage*, a president on behalf of the HEI and a CEO on behalf of the business. Apart from this, the stepwise identification of the relationship also develops the customer relationship management (CRM) activity and results in more strategic activities like partner relationship management (PRM) and key account management (KAM).[60]

At the same time, the strategic importance also has an influence on the number and variety of interactions. In a successful long-time strategic partnership, a favourable breeding ground for the whole variety of UBC may exist – HEI governance, technology and knowledge transfer, new curricula for employability, entrepreneurship, LLL and mobility.

Based upon the tenet that business demand for attractive strategic partnerships depends not on the individual academic's competencies but rather on the competencies of the HEI, the relevance of UBC at institutional level has increased considerably. It is vital that an adequate strategic HEI-internal environment exists as a key factor in promoting the UBC, beginning with an initial project up to sustainable strategic partnerships. The Coventry University provides an ideal example of adopting a partnership approach to UBC.

Coventry University, United Kingdom

Coventry University has taken a very strategic approach to UB interactions by focussing on the strategic development of business partners with relationships build upon trust, impact and vision. Coventry University has implemented a number of initiatives to embed partnerships with industry across the HEI. It has developed a number of core values to support partnership development on a platform of working in sustained partnerships with external organisations in all sectors; public, private and voluntary. Coventry University values the mutual benefits that partnerships with external organisations provide in the sharing of knowledge and expertise. In turn partnerships assist in increasing the likelihood of success and access to additional funding whilst also helping to raise the profile of the organisations. The lead area for supporting this activity is the Business Development Group, which was developed following the restructure of schools and faculties, and the development of applied research centres. It incorporates three key areas of HEI activity; The Corporate Partnership Unit, Business Development Support Office and the Business Development Managers/Officers. The Coventry University was recognised in the Higher Education Innovation Fund, round four allocations, as one of eight institutions achieving excellence in UB interaction.

Key Finding	Increasingly, HEIs and business are adopting strategic, long-term relationships for mutual benefit, though the human element, where relationships between people form the basis of a relationship between two parties, should remain in focus.
Recommendation	• Further develop tools and methodologies around long-term partnerships, • Use good practise cases to promote this approach, • Develop the *4 Pillars* around a partnership approach, • Provide funding for developing a longer-term focus.

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[60] Dottore *et al.* (2010)

The special case of SMEs and UBC

In cooperating with HEIs, it has been recognised in literature that SMEs usually have smaller cooperation with business since they face a more complex and difficult scenario. Structural obstacles, which relate to the lack of sufficient financial resources, personnel resources, and specific competences, are the main types of obstacles and are faced with higher transaction costs.[61] In addition to these structural obstacles, a lack of interest, motivation, and willingness are also considered to be structural barriers for companies. Another reason why SMEs are reluctant to engage in cooperation, is a communication problem[62], a general idea that rules in the minds of companies is that the HEI research findings are too theoretical and therefore cannot be applied to solve a practical problem. [63]

In addition, it was found that cultural barriers also present important hindrance for UBC. In the survey it was discovered that both academics and HEI nominated 'the limited absorption capacity of SMEs to take on internships and projects' as one of the highest barriers to UBC (6.5 / 6.6 respectively on a 1-10 point scale). This barrier would especially affect those HEIs who have a small amount of large organisations in their surrounding area as this was identified as a driver of UBC (5.6 / 6.1 respectively on a 10 point scale). This is because proximity matters, especially to SMEs[64]. Even big businesses find it harder to collaborate with HEI departments on the other side of the country than they do with those that are within easy reach of their base.

Key Finding	There are unique issues relating to HEIs cooperating with SMEs recognised in literature and reflected in the survey results specifically the lack of SME absorptive capacity and the need for proximity
Recommendation(s)	• Governments to offer funding of UBC between HEIs and SMEs within the same region, • HEIs to engage in better expectation management between academics and SMEs and provide better support structures.

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[61] Reinhard & Schmalholz (1996).
[62] Corsten (1987)
[63] Wissenschaftsrat (2007), Corsten (1987)
[64] Lambert Review (2003)

Conclusions

The following is a summary of main points coming out of the study:

The creation of a UBC Ecosystem Model

Within the report, a model for European UBC was put forward. *The UBC Ecosystem, provides a framework for the management and understanding of UBC was named, which* featured the following elements:

- The result level – the *8 Types of UBC*,
- The factor level – perceived *benefits*, *drivers*, *barriers* as well as *situational factors,*
- The action level – the *4 Pillars* and UBC stakeholders.

The proposed model was validated using the data from the survey. This means that the model can be used as a reliable model for the explanation of European UBC.

Result level

- Only few academics cooperate with business to a high degree, with the majority of UBC being undertaken by 40% of academics.
- Most HEIs cooperate at least at a medium level with business.
- Both groups state that there is a correlated development of the *8 Types of UBC*, although traditional (cooperation in R&D and commercialisation of R&D) types tend to be slightly more developed.

Factor level

- Perceived Benefits:
  - <u>Academics</u> value the *benefits* of UBC for the other stakeholders groups, especially those for students and business, higher than those for themselves,
  - <u>HEIs representatives</u> value the *benefits* of UBC for students and business higher than for themselves. They perceive the lowest *benefits* for the society,
  - The higher the perceived *benefits*, the higher the extent of UBC carried out, which is true for both academics and HEIs.
- Situational factors:
  - All demographical and conditional factors considered significantly influence the extent of UBC for academics,
  - The country and the type of HEI significantly influence the extent of UBC the HEIs undertake.
- Drivers and barriers:
  - For both groups, the highest facilitators are those *drivers* related to the UB relationship, especially mutual trust and commitment; while the lowest *drivers* are those internal to the HEI,
  - All academics and HEIs see the importance of *barriers* quite similarly regardless of their level of UBC. The highest *barriers* for academics are related to bureaucracy and funding, while the ones for HEIs exclusively with funding,

- Those academics or HEIs perceiving higher drivers generally undertake significantly higher UBC than those perceiving low *drivers*,
- A lack of funds is the highest *barrier* due to the impossibility of cooperating without funds; however, the presence of funds is not enough to cooperate if the relationship *drivers* are not sufficiently developed.

Action level

- *Strategies*, *structures and approaches* and *operational activities* are moderately developed, while *framework conditions* are less developed. Documentation strategies, agencies and people based approaches, activities targeting students and laws supporting UBC are the highest developed in each category,
- Academics perceive some *Pillars* significantly less developed than HEI representatives,
- Those HEIs that perceive the *4 Pillars* more developed, have a significantly higher extent of cooperation than those perceiving lower developed *pillars*.

Inter-relationships

- All the *4 Pillars* significantly influence the *8 Types of UBC*,

- All the perceived *benefits* significantly influence the *8 Types of UBC*,

- All the *situational factors* significantly influence the *8 Types of UBC*,

- All the *drivers* significantly affect the *8 Types of UBC*,

- Only some of the *barriers* significantly influence the 8 types of UBC,

- All the perceived *benefits* significantly influence all the *4 Pillars*,

- All the *situational factors* significantly influence all the *4 Pillars*,

- All the *drivers* significantly affect the all the *4 Pillars*,

- Only some of the *barriers* significantly influence all the *4 Pillars*.

Limitations

While the study provides significant contributions to theory and practice, the results have to be considered in the light of different limitations including the following:

Limitation	Detail	Mitigating step
Subjectivity bias	*Perception bias* - The study does not directly measure UBC rather it asks for the perception of UBC from the perspective of HEI representatives (asked about the HEI) as well as academics (asked about the HEI and themselves).	In order to increase the scope of the study, HEI representatives and academics were asked for their perception on the extent of UBC within their environment. It was believed that asking for the respondents' perception was the only way to ensure adequate response rates. In order to mitigate any subjectivity bias, respondents were also asked to respond to questions that were objective in nature. They were used to cross-check the subjective responses to ensure consistency.
Language Bias	*Foreign language bias* - Not all countries received the survey in their native language. Three countries (Sweden, Norway and Finland) did not receive the survey in their native language. Instead they received English surveys owing to their recognised competence in English.	The survey was translated into 22 languages in order to ensure that as many countries as possible received the study in their native language. This was seen to be essential to the success of the study.
	Translation bias - Additionally, the survey was firstly created in English and translated into the remaining languages, which could mean that some of the questions meanings were slightly altered in the translation.	Every effort was made to ensure that correct translations were made. This included having the emails to rectors as well as the survey translations checked by two separate translation countries.
Representation Bias	*Over- and under-representation* - In the results some countries were overrepresented and others underrepresented owing to the number of respondents, potentially leading to sample bias.	This was addressed by using a weighting system that adjusted both the responses from academics and from HEI representatives, more information on the weighting system can be found in appendix 2. Additionally, when analysis was conducted on a country level, it was ensured that there were at least 30 responses available for analysis, discarding the results of those countries with a response rate below 30.
	Responder selection bias - Owing to the length of the study, not all study participants (HEI management, UPB and academics) received all questions. This meant that not all questions could be analysed across all HEI groups. These sampling issues	Respondents were given as many of the same questions as possible considering the time that it would take them to complete the survey.

	inhibit researchers' ability to make generalisations about some of the study findings.	
	<u>Management influence</u> - The amount of cooperation perceived by academics could be influenced by communication from the HEI managers i.e. those who push UBC are perhaps more likely to emphasise the study to their HEI academics."	The survey was sent in an email as a link to an online survey to all European managers (present on public websites) with the request to forward the email to all academics. The importance of the study was stressed and a survey path for researchers who do not conduct any form of UBC was created.
	<u>Online survey</u> - Self-selection of respondents is a major limitation of online survey research[65] since there are undoubtedly some individuals who are more likely than others to complete an online survey. In this case, those who are already participating in UB.	Owing to the target population being academics, UPBs or HEI rectors, it was strongly believed that an online study would not substantially affect the type of respondents because it was believed that most would have certain interest in completing the survey due to the current and future relevance of the topic for their HEIs.

Recommendations for further research

The study gave significant new insights into UBC and provides an excellent basis for further research. The list of potential topics for further research has been collected through the qualitative interviews, from the survey results, from the survey validation workshop (the Lighthouse Workshop) and from the open questions of the survey, and includes the following:

- Use this study as a benchmark for UBC in Europe and conduct the same study periodically (bi-annually) to compare longitudinal data,

- Conduct a similar study into the extent of UBC looking at the barriers and drivers from the perspective of business,

- Cross-analyse the results with transnational reports and statistics:

  - to determine whether large companies in the region around the HEI influence the level of UBC e.g. Munich, Rotterdam,

  - to compare the level of UBC with certain types of development measures [e.g. a) GDP per capita in each country, b) total GDP per country and c) GDP growth (last 10 years average)],

  - to analyse the impact of UBC on the environment (innovation success of a region / country),

  - to compare the data with national employability scales.

- Make recommendations from the analysis about specific EU states,

- Conduct further research into the UBC ecosystem and its various elements,

- Analyse the dispersion of academics and HEIs actually undertaking UBC,

- Conduct further research with respect to the stakeholders involved in UBC and the roles that each one play.

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[65] Stanton (1998); Thompson et al. (2003); Wittmer et al. (1999)

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Project Team

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Science-to-Business Marketing Research Centre

The Research Centre Science-to-Business Marketing Research Centre at the Münster University of Applied Sciences in Germany developed the first strategic approach worldwide for successful commercialisation of research competencies, capacities and results with its concept of Science-to-Business Marketing.

Globally recognised for research in interface between universities and industry

The Science-to-Business Marketing Research Centre (S2BMRC) is world recognised for the project partnership approach to university-business cooperation. Further highlights include:

- Co-developer of the 'Responsible Partnering Handbook'

- Leading centre for the development of approaches to university/industry partnerships, as used by Coventry University

- Development of the "Science Marketing Toolbox" including 58 instruments to assist Science Marketing

- Developer and publisher of the TechAdvance ™ Technology Evaluation Handbook which provides a method for the evaluation of technologies

- Organiser of the international 'Science-to-Business Marketing' Conferences held in Germany, Belgium, China, South Africa, Japan, Australia, France and Russia.

- We are regularly engaged to:

  – Conduct research in university-business cooperation

  – Present at conferences

  – Conduct workshops on this topic

- The S2BMRC team are also regular publishers of journal and news articles on this topic

Appendix 1 – Definitions

Academics	A member of a higher education institution with teaching and research duties.
Applied research	Original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
Basic research	Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts without any particular application or use in view.
Business	Includes privately and publicly owned organisations, Non-Government Organisations (NGOs) and not for profit organisations.
Business professionals temporarily working within the HEI	The temporary movement to a HEI of a person that is employed in business.
Central contract person	Person in a HEI responsible for initial contact with business.
Central agency	An office that is dedicated to the support of a specific type of UBC.
Education	Organised and sustained communication designed to bring about learning.
Guest lectures given by business	Business professionals that are invited by the HEI to give one or more lectures. Here the business professional is rather a guest than an employee (i.e. an official lecturer).
Industry projects as part of training and education	Projects undertaken where a HEI cooperates with business in a practical way. These projects are part of the curriculum of the HEI.
University professional working with business (UPB)	Person responsible for the communication of knowledge and/or technology from his organisation to another part of the organisation or third parties.
Knowledge and technology transfer	The dissemination of professional knowledge from one person to another. Including the commercialisation of technology-based inventions or innovations originating in research universities, government or non-profit laboratories or large corporations.
License deals	Agreement under which the owner of a copyright, patent, trademark, or other IP, allows a licensee to use, make, or sell copies of the original. The agreement allows the users to limit the rights of one or both parties.
Patents registered	An exclusive right, granted to the inventor of intellectual property by the government, to give the inventor the exclusive rights of making use of an invention or process for a specific period, depending on the regulations.

Personnel-exchanges from business to HEIs	The movement to a HEI of a person that is employed in business.
Programme or initiative	A plan, procedure, occurrence or event in the HEI to support UBC.
Staff-exchanges from HEIs to business	The movement of a HEI staff member from a HEI to business, most commonly used to apply the gained practical knowledge in the HEI and/or curriculum.
Spin-offs	A company founded on the findings of a research group at a HEI.
Start-ups	New business venture.
Student-exchanges from HEI to business	The temporary movement of a student from a HEI to business as part of the curriculum (e.g. internships, placements).
Third-party money	Third-party money (or income) refers to money earned from external sources additional to the regular fixed budget from the Federal State. Typical sources of such funds are research grants of a National Research Council, various foundations grants, special project funding from the federal and national ministries or the EU, as well as money from private enterprises.
University	Includes all European HEIs.
University management	Define the tone toward UBC at the HEI working with external stakeholders to develop appropriate UBC strategies, structures and approaches, activities and framework conditions.

Appendix 2 – Weighting system

Weighting system explained

With a few exceptions, the number of respondents per country reflects the size of the HEI system in the respective country. However, in order to rectify any over- or under-representation, a weighting system was used in all the analyses on a country basis. The weighting process involves computing and assigning a weight to each survey respondent making a given respondent's contribution larger or smaller to compensate for both the planned and unexpected disproportionate effects.

Eurostat data (2009) was used to compare the number of responses for the academics with the real number of academics per country. Likewise, the responses for managers and UPB were compared with the number of universities per country. It aims to replicate in the sample the current number of academics, managers and UPB in each of the countries.

Weighting

All responses were weighted on a country basis to replicate the ratio of the target group from that country compared to the European total. The calculation for the weighting was as follows:

1.   Academic responses

The percentage of academics (including PhD students) from each country (where 100% is total amount of academic staff in Europe), divided by the percentage of academic responses from that country (where 100% is total amount of academic respondents).

2.   HEI management responses

The percentage of universities from each country (where 100% is total amount of universities in Europe), divided by the percentage of HEI management responses from that country (where 100% is total amount of HEI management respondents).

3.   UPB responses

The percentage of universities from each country (where 100% is total amount of universities in Europe), divided by the percentage of UPB responses from that country (where 100% is total amount of UPB respondents).

Appendix 3 – UBC Online Survey

The following is the survey is the basis for the study on the cooperation between Higher Education Institutions and public and private organisations in Europe. This survey was sent to European university rectors, vice-rectors and board members as part of the study into University-Business cooperation in Europe. They were asked to complete the study themselves as well as to forward the survey onto their academics and university professionals working with business.

UBC Online Survey

Please choose the language in which you would like to conduct the survey:

- ○ Ελληνικά
- ○ български
- ○ Македонски
- ○ Deutsch
- ○ eesti
- ○ English
- ○ Español
- ○ Čeština
- ○ Français
- ○ Hrvatski
- ○ Italiano
- ○ Latviešu

- ○ Lietuvių
- ○ magyar
- ○ Nederlands
- ○ Polski
- ○ Português
- ○ Română
- ○ Slovenščina
- ○ Slovenský
- ○ Suomi
- ○ Türkçe

Study on the cooperation between Higher Education Institutions and public and private organisations in Europe.

For the purpose of this study, the term 'university' incorporates all European Higher Education Institutions (HEIs) and business includes privately and publicly owned organisations, Non-Government Organisations (NGOs) and not for profit organisations.

Legend for questions

(orange)	*University management* and *University professional working with business*
(green)	*Academic*
(blue)	*Both*

What is your position within your university?

Please choose the first option that applies to you in the following order:

☐ University management (incl. Rector / President / Vice Chancellor)

☐ Academic (incl. Researcher / Lecturer / Professor)

☐ University professional working with business (incl. Knowledge Transfer Professional / Liaison Officer / Fundraising Officer / Alumni Officer / Mobility Officer / Lifelong Learning Officer / Business Development Manager)

Information about your university

Country (where the university is located):

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Latvia
- Liechtenstein
- Lithuania
- Luxembourg
- Macedonia
- Malta
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Turkey
- United Kingdom

The nature of your university

- University
- University of applied sciences
- Polytechnic university / Technical university
- School of arts
- College of education
- Other...

[ ]

In which faculty are you (or were you) <u>primarily</u> employed?

Faculty of...

- Accounting and Administration
- Aerospace Engineering
- Agriculture
- Applied Science and Engineering
- Architecture
- Arts
- Biological Science
- Business
- Civil Engineering
- Communication
- Economics
- Education
- Electronic Engineering
- Engineering
- Engineering & Technology
- Foreign Languages

- Forestry
- Graduate Studies
- Health
- History
- Humanities
- Informatics
- International Law
- Journalism
- Law
- Life Sciences
- Linguistics
- Management Studies
- Mathematics
- Mechanical Engineering
- Medicine
- Music

- Natural Sciences
- Nuclear Sciences
- Pharmacies
- Philosophy
- Political Sciences
- Politics
- Public Administration
- Science
- Technical Sciences
- Technology
- Theatre
- Theology
- Veterinary
- Responsible for all faculties
- Not involved in a faculty
- Other...

[ ]

Please indicate the number of... within your university.

Don´t know

Academics

☐

Students

☐

Participation and cooperation

Please indicate if <u>your university</u> participates in the following EU programs.

	Yes	No	Don´t know
▪ Lifelong Learning Programme (LLL)	○	○	○
▪ Framework Programme for Research and Development (e.g. FP6, FP7)	○	○	○
▪ Erasmus Mundus Programme	○	○	○
▪ Tempus Programme	○	○	○
▪ Competitiveness and Innovation Framework Programme (CIP)	○	○	○
▪ European Regional Development Fund (ERDF)	○	○	○
▪ European Social Fund (ESF)	○	○	○

Please indicate to what extent <u>your university</u> cooperates with business in respect to…

Please rate on a scale from 1 = "<u>Not at all</u>" to 10 = "<u>To a large extent</u>".

Please indicate to what extent <u>you</u> cooperate with business in respect to…

Please rate on a scale from 1 = "Not at all" to 10 = "To a large extent".

1 2 3 4 5 6 7 8 9 10

- collaboration in research and development

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- mobility of academics

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- mobility of students

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- commercialisation of research and development results (knowledge transfer)

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- curriculum development and delivery

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- lifelong learning

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- entrepreneurship

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- governance

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

- other…

    ○ ○ ○ ○ ○ ○ ○ ○ ○   ○

Please explain the reason for your university having little cooperating with business.

Strategies

> **Thinking about <u>strategies</u> used <u>within your university</u>, how developed are the following points?**

Please rate on a scale from 1 = "<u>Not at all developed yet</u>" to 10 = "<u>Highly developed</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ A <u>top-level management committed</u> to University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ A <u>documented mission / vision</u> embracing University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ A <u>strategy</u> for University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The **internal** <u>promotion</u> of University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The **external** <u>promotion</u> of University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The <u>dedication of resources</u> (inc. funding) to support University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The <u>provision of incentives</u> for academics to encourage University-Business cooperation.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The inclusion of 'cooperation with business' as part of the <u>assessment of work performance for academics</u>.	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Other...	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

Structures and approaches

Thinking about <u>structures and approaches</u> used <u>within your university</u>, how developed are the following points?

Please rate on a scale from 1 = "<u>Not at all developed yet</u>" to 10 = "<u>Highly developed</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ The presence of **academics** <u>on company boards</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The presence of **business people** <u>on the university board</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Board member or vice rector positions</u> for University-Business cooperation (e.g. knowledge-transfer, third-mission, valorisation, commercialisation, partnering etc.)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The practise of <u>recruiting industry professionals into the knowledge transfer area</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ An <u>alumni network</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Career offices</u> within the university	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Agencies</u> **(internal)** within the university dedicated to University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Agencies</u> **external** to the university dedicated to University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Incubators</u> for the development of new business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Other...	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

Operational activities

Thinking about <u>operational activities</u> used <u>within your university</u>, how developed are the following points?

Please rate on a scale from 1 = "<u>Not at all developed yet</u>" to 10 = "<u>Highly developed</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ <u>Workshops, information sessions and forums</u> for University-Business collaboration targeting academics	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Entrepreneurship education</u> offered to **academics**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Entrepreneurship education</u> offered to **students**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Networking sessions or meetings</u> for academics to meet people from business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The featuring of University-Business cooperation prominently on <u>the university's website</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Collaboration activities</u> facilitating **student** interaction with business (e.g. student projects with business)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Collaboration activities</u> facilitating **academics** interaction with business (e.g. collaborative problem-solving workshops)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Other...	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

Framework conditions

> **Thinking about <u>the environment</u> that <u>your university</u> operates in, how developed are the following points?**

Please rate on a scale from 1 = "<u>Not at all developed yet</u>" to 10 = "<u>Highly developed</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ <u>Personnel mobility laws / regulations</u> allowing movement of staff between university and business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Laws / regulations</u> positively supporting the creation of new companies	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Laws / regulations</u> positively supporting University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Other...	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

<u>Drivers and barriers</u>

How much do the following statements facilitate your university to cooperate with business
Please rate on a **scale** from 1 = "<u>Not at all relevant</u>" to 10 = "<u>Very relevant</u>".

How much do the following statements facilitate your cooperation with business?
Please rate on a **scale** from 1 = "<u>Not at all relevant</u>" to 10 = "<u>Very relevant</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ <u>Commercial orientation</u> of the university	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Possibility to access <u>funding / financial resources</u> for working with bus	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Flexibility</u> of business partner	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Interest of business in <u>accessing scientific knowledge</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Access to <u>business-sector research and development facilities</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Employment by business of <u>university staff and students</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Short geographical distance</u> of the university from the business partner	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Existence of mutual</u> **trust**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Existence of mutual</u> **commitment**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Having a <u>shared goal</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Understanding of common interest by different stakeholders</u> (e.g. universities; business; individuals; students)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Prior relation</u> with the business partner	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Cooperation as effective means to <u>address societal challenges and issues</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Other...	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

How relevant are the following <u>barriers</u> for University-Business cooperation?

Please rate on a scale from 1 = "<u>Not at all relevant</u>" to 10 = "<u>Very relevant</u>".

How relevant are the following <u>barriers</u> for your engagement in University-Business cooperation?

Please rate on a scale from 1 = "Not at all" to 10 = "To a large extent".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ **Business** <u>lack awareness</u> of university research activities / offerings	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ **Universities** <u>lack awareness</u> of opportunities arising from University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Lack of financial resources</u> of the business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The current <u>financial crises</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Lack of **university** funding</u> for University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Lack of **external** funding</u> for University-Business cooperation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ Difficulty in finding the <u>appropriate collaboration partner</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Bureaucracy</u> within or external to the university	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>The focus on producing practical results</u> by business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Business fear</u> that their knowledge will be disclosed	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ The need for business to have <u>confidentiality of research results</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>A lack of contact people with scientific knowledge</u> within business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Limited ability of business</u> to absorb research findings	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>No appropriate initial contact person</u> within either the university or business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Differing **motivation** / **values**</u> between university and business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Differing **mode of communication and language**</u> between university and business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Differing **time horizons**</u> between university and business	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>The limited absorption capacity of SMEs</u> to take on **internships or projects**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

▪ Other...

<u>Measuring University-Business cooperation</u>

Please estimate the percentage of your <u>overall working time per year</u> at the university which involves cooperating <u>with business</u>?

Percent

Please estimate the number of... in the last 12 months.

Don´t know

<u>Patents</u> registered

☐

<u>License</u> deals

☐

<u>Spin-offs</u> created from research

☐

Please estimate the number of... in the last 12 months.

Don´t know

Academics <u>temporarily working</u> within business

☐

Business professionals <u>temporarily working</u> within the university

☐

<u>Honorary or part-time professorships awarded</u> to non-academic workers

☐

Please indicate to what extent the following points apply to <u>your university</u>.

Please rate on a scale from 1 = "<u>Not at all</u>" to 10 = "<u>Strongly agree</u>".

	1 2 3 4 5 6 7 8 9 10	Don´t know
Business has a substantial <u>influence on the curriculum</u> **development**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
Business has a substantial <u>influence on the curriculum</u> **delivery**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
The curriculum <u>meets the needs</u> of <u>surrounding business</u> in the environment in which my university operates	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

Does <u>your university</u> possess the following points (refer to A, B, C) supporting the cooperation types below?

	(A) Central contact person within the university	(B) Central agency within the university	(C) Program or initiative within the university
Mobility of academics	□	□	□
Mobility of students	□	□	□
Lifelong learning	□	□	□
Entrepreneurship	□	□	□

Please estimate the amount of the following statements that you have <u>been involved in / organised</u> in the last <u>5 years</u>.

Don´t know

Patents registered (or named as the inventor on a patent)

☐

License deals

☐

Spin-offs created **from** your research

☐

Spin-offs created **not** using your research

☐

Please estimate the number of the following <u>University-Business activities</u> that you have <u>been involved in / organised</u> in the last <u>12 months</u>.

Don´t know

Joint research and development projects

☐

Contracted research projects

☐

Staff-exchanges from **university to business**

☐

Student-exchanges from **university to business**

☐

Personnel-exchanges from **business to university**

☐

Guest lectures given by business

☐

Projects conducted by students in cooperation with business

☐ ○

Bachelor, Master and / or PhD theses written in cooperation with business

☐ ○

Industry projects as part of training and education

☐ ○

Other...

☐ ○

Measuring University-Business cooperation

What percentage of the university budget comes from third party money (money earned from external sources additional to the regular fixed budget from the Federal State)?

Percent   ☐

What percentage of all third party money comes from University-Business cooperation?

Percent   ☐

Please indicate to what extent you agree with the following statements:

Please rate on a scale from 1 = "Not at all" to 10 = "Strongly agree".

	1 2 3 4 5 6 7 8 9 10	Don´t know
▪ <u>Successful University-Business cooperation</u> is **vital to my research**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Successful University-Business cooperation</u> is **an excellent way of getting funding**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Successful University-Business cooperation</u> is **vital to achieving the mission of the university**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Successful University-Business cooperation</u> **increase reputation** in my field of research	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>Interactions</u> with industry <u>conflict with my teaching and research responsibilities</u>	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>University-Business activities</u> increase my **chances of promotion**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>University-Business activities</u> improve my **standing within the university**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>University-Business activities</u> improve **employability of future graduates** (transition to labour market)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>University-Business activities</u> improve the **learning experience of students**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○
▪ <u>University-Business activities</u> improve the **performance of business**	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	○

How could your university be supported in its efforts to work with business?

How could you be supported in your efforts to work with business and by whom?

Information about you

The information provided in this section will remain confidential.

Name of university

Your gender

○Male
○Female

Your age

○ < 20
○ 20 - 29
○ 30 - 39
○ 40 - 49
○ 50 - 59
○ 60 - 69
○ 70 +

How many years have you worked at a university?

○ 0
○ 1 - 2
○ 3 - 5
○ 6 - 9
○ 10 - 19
○ 20 +

How many years have you worked in business before you worked at the university?

(Not including internships)

○   not at all

○   0 - 2

○   3 - 5

○   6 - 9

○   10 - 19

○   20 +

How many years have you been involved in University-Business cooperation whilst working at a university?

○   not at all

○   0 - 2

○   3 - 5

○   6 - 9

○   10 - 19

○   20 +

What is your position within your university?

○   Knowledge Transfer Professional

○   Liaison Officer

○   Fundraising Officer

○   Alumni Officer

○   Mobility Officer

○   Lifelong Learning Officer

○   Business Development Manager

○   Other

Extended survey

This concludes the central part of the survey, however there have been further questions created that would provide further information to the European Commission about University-Business cooperation.

Would you like to complete these questions?

○Yes

○No

Extended survey

Please indicate to what extent <u>your university</u> engages in the following activities (considering ALL university activities).

Sum of answers should equal 100%!

Basic research (blue sky)

☐

Applied research

☐

Education

☐

Knowledge and Technology Transfer

☐

Thinking about your university´s mission, how <u>important is University-Business cooperation</u> for:

Please rate on a scale from 1 = "<u>Not at all important</u>" to 10 = "<u>Very important</u>".

	1	2	3	4	5	6	7	8	9	10
Basic research (blue sky)	○	○	○	○	○	○	○	○	○	○
Applied Research	○	○	○	○	○	○	○	○	○	○
Education	○	○	○	○	○	○	○	○	○	○
Knowledge and Technology Transfer	○	○	○	○	○	○	○	○	○	○

Please indicate to what extent <u>you agree</u> with the following statements:

Please rate on a scale from 1 = "<u>Not at all</u>" to 10 = "<u>Strongly agree</u>".

Successful University-Business cooperation …

	1	2	3	4	5	6	7	8	9	10	Don´t know
is <u>vital to achieving the mission</u> of the university	○	○	○	○	○	○	○	○	○	○	○
<u>creates local employment</u>	○	○	○	○	○	○	○	○	○	○	○
<u>increases</u> local <u>GDP</u> and <u>disposable income</u>	○	○	○	○	○	○	○	○	○	○	○
has <u>beneficial</u> effects on the local <u>industry</u>	○	○	○	○	○	○	○	○	○	○	○
creates a range of <u>beneficial social and recreational benefits</u>	○	○	○	○	○	○	○	○	○	○	○
increases <u>skills and graduate development</u>	○	○	○	○	○	○	○	○	○	○	○
<u>improves regional productivity</u>	○	○	○	○	○	○	○	○	○	○	○

Please estimate the <u>percentage of the university budget</u> coming from the following:

Sum of answers should equal 100%!

Fixed budget from the regular fixed budget from the Federal State	*Percent*
Research grants of a National Research Council or Foundations grants	*Percent*
Special project funding from the federal and national ministries	*Percent*
Special project funding from the European Commission	*Percent*
Income from large organisations	*Percent*
Income from SMEs	*Percent*
Income from student fees	*Percent*
Endowments	*Percent*
Other	*Percent*

Many thanks for your participation

Thank you very much for the completion of this online study, your support is crucial to the success of the study and therefore your participation is highly appreciated.

If you would like to receive selected findings regarding this study please insert your e-mail address or send an e-mail to:

Model for University-Business cooperation relationships

Additionally, if you would like to view a model for explaining relationships in University-Business cooperation and participate in its further development by answering one question, please click "Yes" and go on with the survey.

○   Yes

University-Business relationship

UNDERSTANDING UNIVERSITY-BUSINESS RELATIONSHIPS

The following model has been created to explain University-Business cooperation and the concept of partnerships being the premier method for creating optimal value from University-Business cooperation. The model has been developed and validated in workshops, presentations, qualitative interviews and projects over a 10 year period. By answering the following question you will assist in the development of the model.

How many business partners does the university presently have at each level of the following stairway model?

How many business partners do you presently have at each level of the following stairway model?
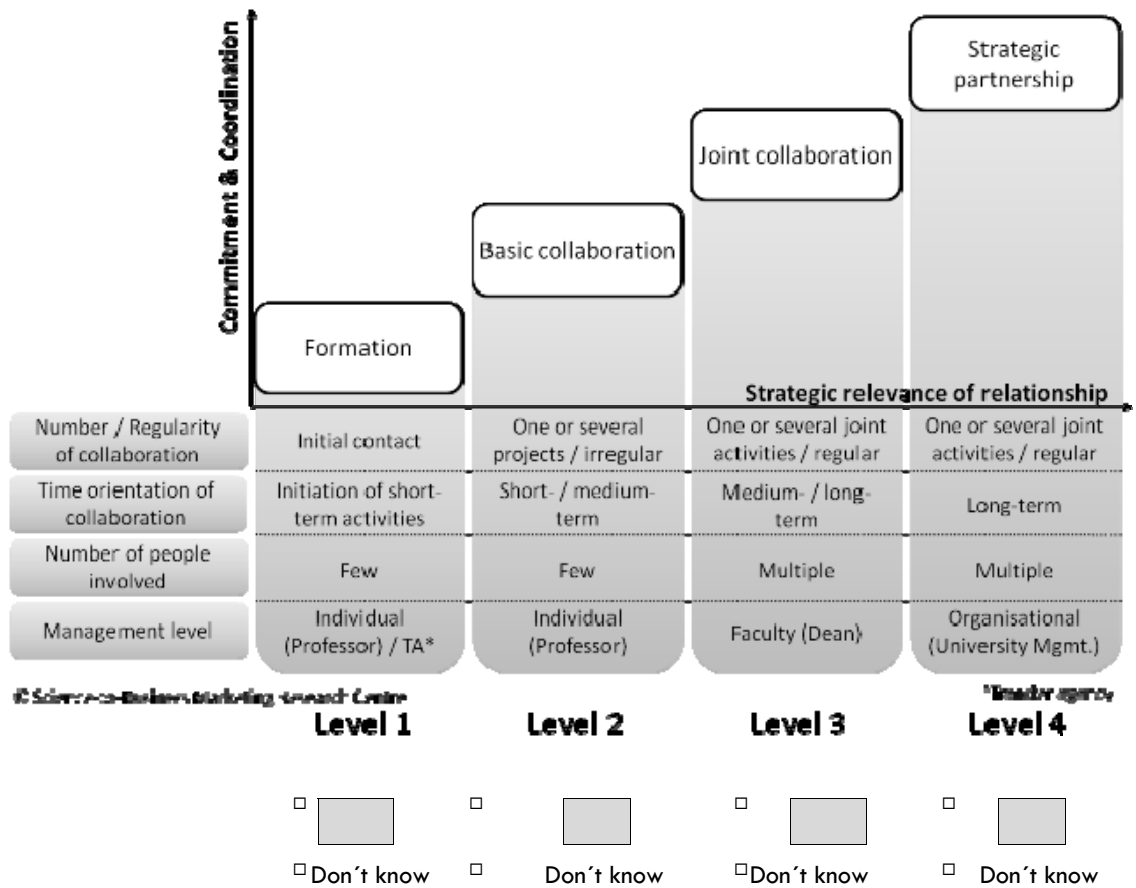
Thank you for your support

Appendix 4 – Project Partners

Project Partners Overview

Partner Organisation	Experience Highlights
CU	• CU is currently Lead Expert on an URBACT II network the Role of Universities in Urban Poles. In addition they have been the co-ordinator of an FP5 network Strengthening Academic and Industrial Links. In addition they have significant European expertise in FP5, 6 and 7, Interreg II, III, Leonardo and Erasmus programmes. • CU has developed a pilot Customer Relationship Management (CRM) programme that has been utilised extensively across the university and have hosted two events dedicated to CRM within universities. Findings from the first event were recently quoted within a UK National JISC tender to investigate the usage and the challenges associated with CRM implementation within UK Universities.
UEK	• UEK is the coordinator of the science-to-business national project and the internet platform that supports the cooperation between the two sectors. Within the project, the university promotes the tangible contacts between future partners • Created the Centre of Excellence in Entrepreneurship Support as well as the initiatives promoting intensification of the participation of research groups for the implementation of international projects
Red OTRI	• Red OTRI promotes the professional development of transfer of knowledge personnel for a better management of university portfolio and university-industry interaction. • Main projects: UNIEMPRENDIA Programme: promoting the formation of spin-off companies based on the research results and technologies created or developed by the universities. RedValor Project: testing methodologies for the evaluation of marketing potential of innovations generated at universities, in close cooperation with industrial experts.
VUA	• The VUA is recognised worldwide for its emphasis and leadership on entrepreneurship. Nikos is a university-led programme in which the VUA Institute for Knowledge Intensive Entrepreneurship participates. The project is an educational programme on entrepreneurship operated at the VUA and organisations outside the VUA in co-operation with partner groups • The VUA brings the expertise on university spin-offs, university spin-off programmes, university-industry interaction and knowledge transfer to the project. • Involved in creating the Responsible Partnering handbook and part of NVOA – A Dutch Flemish Entrepreneurship Academy

Coventry University

Contact person

Clive Winters is a senior University Director with significant experience working within the private and public sectors on the design, development and delivery of innovation and entrepreneurship programmes in the UK and Europe. He possess current and past experience of working with funding agencies for research, enterprise support, technology transfer and the development of new ventures.

Relevant experience
- Research interests specifically include UB interaction, Entrepreneurship & Business Incubation and Foresight & Scenario Planning
- Provided expert consultancy to the European Commission and European funded projects
- Innovation Management which included the Framework 6, 5 Schemes Project where he delivered a study of 5 European partner cities and developed tailored Innovation Management projects to fit local need and demand and as a Innovation Expert for South West Bulgaria in the development of their Regional Innovation Strategy
- Foresight and Scenario Planning where he delivered the West Midlands Regional Foresight Programme for Advantage West Midlands and subsequently was appointed to a European Commission High Level Expert Group on Regional Foresight producing a case study paper and national review
- Strong Innovation and Entrepreneurial profile
- regular speaker at project conferences and recognized innovation and enterprise events (e.g. UK Business Incubation, European BIC Network and National Training Conference)
- Increasing research conference portfolio

Qualifications & achievements
- Specific management and development responsibility for a team of over 25 staff from project assistant to programme director level delivering international and national projects, consultancy and university related activities in the fields of innovation, enterprise and entrepreneurship
- Responsibility for leading on the development on Enterprise and Innovation funding to the European Commission and its research and co-operation programmes (e.g. Framework, Interreg, URBACT) and to the UK Government and its regional development and research programmes (e.g. Regional Development Agencies, Lifelong Learning Network)
- Programme direction responsibility for ensuring the successful delivery of research and business development projects to meet contractual output and financial targets.
- Establishment of a project portfolio with a value in excess of £3m per annum and internal contribution levels of £400,000 per annum through the successful monitoring and management of projects and internal university financial management processes.
- Building of strategic partnerships with universities, local authorities and other economic development partners, representing the university on a global basis and hosting visits to raise the profile of the university on an ongoing basis
- Management of the Strengthening Academic and Industrial Links (SAIL) Thematic Network funded through the European Commission Framework programme
- Programme Management, Project Appraisal and Monitoring of ERDF Objective 2 projects in the area of Research and Innovation
- Management and delivery of research projects in the area of manufacturing and supply chain management

Cracow University of Economics

Contact person

Tomasz Kusio obtained the Master of Science at the University of Economics in Cracow, with principles subjects being Management and Marketing. He possesses extensive knowledge and experience in leadership, specialist knowledge and research.

Relevant experience
- Specialist/Projects' Coordinator (2001 – present)
    − analysing, applying, monitoring for the possible funds for University of Economics in Krakow
    − monitoring the process of University internationalization
    − increasing the University role in international science
- Organisational Coordinator (2002 – present)
- consultations for UEK faculties, students and Malopolska SMEs
    − training for UEK faculties, students as well as for SMEs from Malopolska region
- Advisee for the external funding to the Scientific Committee (2006 – present)
    − research and consultations within possibilities of external funding
    − applying and implementing the projects
- Organizational Coordinator (2004 – 2008)
    − research on funding programs and project management
    − didactical activities for students within initiatives on academic entrepreneurship
    − organisation of conferences, workshops and seminars
- Project Coordinator (2005 – 2008)
    − organisational coordination of each project work package
    − HR, financial and monitoring management
    − Promotion and evaluation of the project
    − training for UEK faculties, students as well as for SMEs from Malopolska region
    − consultations for students and companies
- Researcher (2007 – 2008)
    − preparation of the methodology for the improvement of the company effective performance
    − desk research leading to methodology elaboration
    − preparation of ORiW touristic audit
    − analysis of the local and regional market touristic market
    − recommendation for ORiW on the performance improvement

Qualifications & achievements
- mother tongue is Polish
- team spirit gained through managing groups of people
- good communication skills gained through the experience such as organising series of events
- intercultural skills gained whilst coordinating summer programs for foreign and Polish students
- leadership (currently responsible for a team of 15 people), beforehand responsible for teams of about 5 people;
- sense of organisation (organising different events home and international (trainings and workshops for groups to up to 20 people as well as conferences for about 100 participants) organizations of about 7 events annually);
- good experience in project or team management
- good command in cooperation with students through coordination of administrative activities for volunteers (students) willing to participate in different events mainly activities aiming to gain entrepreneurship abilities
- good command in international cooperation through Coordination of Summer Programs for students

Network of the Spanish Technology Transfer Offices

Contact person

Constantino Martínez Cavero started his career in 1991, with a Degree in Economics at the Autonomous University of Madrid (Spain). Following that, was the completion of a Master on Science and Technology Management Degree at the Carlos III University of Madrid (Spain) in 1994.

Relevant experience
- Technical Secretary of the Spanish Network of University Knowledge Transfer Offices (RedOTRI - Universidades), hosted by the Spanish Conference of University Presidents (from April 2004)
- Scientific and Technological Institute of Navarra- ICT (Spain), responsible for national and European R&D programmes and call for proposals and for the services provided to companies in the framework of the CENEO Innovation Relay Centre in Navarra (1995 – 2004)
- Office of Transfer of Research Results of the Carlos III University of Madrid (Spain), responsible for national and European R&D programmes and call for proposals (1995)
- Carlos III University of Madrid (Spain), member of the SPRINT Research Team, working in the European project entitled "International Network on Industrial Innovation, Diffusion and Technology Transfer", coordinated by PREST (University of Manchester) (1994 – 1995)

Qualifications & achievements
- European Parliament (Luxembourg), holder of a Robert Schuman Scholarship
  - research tasks at the Directorate General for Research
  - carrying out a research study entitled "The Future of the Inland Navigation", published by the EP (1993)
- Head Office of Repsol Group in Madrid (Spain), oil industry
  - Practical Training period and Administration Department

Vrije University

Contact person

Peter van der Sijde (1955) is trained as an educational psychologist (Free University Amsterdam – 1982) at the VU Amsterdam. He worked as an education consultant in higher education for 3 years; after that he transferred to the University of Twente to do a Ph.D. in Educational Studies (1987). He also studied management consultancy at the Saxion University for Applied Science (post graduate course). In 1987 he became programme manager at the University of Twente in the Education School's research centre (information technology and instruction systems). Since 1994 is engaged in European projects on entrepreneurship (spin-offs, e.g. Unispin, Spinnova, GlobalStart, BEPART), knowledge transfer (Sprint-project, ProTon Europe, Difuse) and innovation (Innomedia) either as project manager or as partner.

Relevant experience
- Research interests specifically include UB interaction, Entrepreneurship & Business Incubation and Foresight & Scenario Planning
- Active in the field of technology transfer as
  - consultant (1991-1993)
  - senior consultant (1994 – 1997)
  - manager (1998 – 2001)

Qualifications & achievements
- Senior research at the Business School of the University of Twente
- Co-founded the Dutch Institute for Knowledge Intensive entrepreneurship, Nikos)
- Chair for Entrepreneurship at the Saxion University (2003 – 2007)
- Associate Professor in the Department of Organization Science of the Faculty of Social Sciences at the VU University Amsterdam (2008)

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