A Comparative Analysis of Institutional Innovation and IP Policies, Strategies and Practices

Results of the Micro-Level Analysis of the IP Unilink project

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This **Micro Analysis Report** was developed, led and edited by Dr. Sari Scheinberg Andreas Norgren and Jannice Käll, of Chalmers University of Technology – Chalmers Industrial Technologies Foundation (CIT), Gothenburg, Sweden, with support of the IP-Unilink Project Consortium.

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IP-UNILINK PROJECT

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Foreword

This document is the 2nd key document that has been developed and produced in the framework of the IP-UniLink project, an initiative of Higher Education Institutions (HEIs) from the European Union (EU), Brazil, Russia, India and China (BRIC countries), co-funded by the European Union within the Erasmus Mundus Programme.

The members of the project consortium are: University of Alicante (Spain) as coordinating institution, Jagiellonian University (Poland), Chalmers University of Technology – CIT (Industrial Technologies Foundation) (Sweden), University of Campinas (Brazil), Electrotechnical University of St. Petersburg (Russia), Kunming University of Science and Technology (China), IPR Cell of Indian Institute of Technology- Roorkee (India).

The project idea was based on 2 key factors. First, there is an increasing importance of BRIC countries as strategic partners and associates of Europe. And second, there are recommendations in various EU official reports and studies, (ie: the European Research Advisory Board's[1] final report on international research co-operation) which states clearly 'that in order to promote international co-operation in education, science and technology, and strengthen the position of Europe, the EU should deepen its ties with emerging economic and technological centers, including China, India, Russia and Brazil (BRIC countries)'.

The IP-Unilink partners consider transparency and mutual understanding of IP management regimes and IP and innovation practices to be the keys of successful and sustainable co-operation in research and science between EU and BRIC countries.

As a result, the main aim of IP-Unilink is to promote EU IP management practices in order to facilitate research and technology development (RTD) linkages with BRIC countries. The project's specific objectives are the study of trends in Higher Education (HE) on both micro and macro levels with the objective to enhance joint research and future developments, to promote transparent compatible IP management practices, and to create a good practice guidebook for IP management and research collaboration between EU and BRIC countries.

This document is the second output of the project and contains the findings of the Micro-Analysis that targets studying the higher education R&D trends between the EU and BRIC countries in order to improve the visibility of joint research and the readiness for future research and innovation developments.

[1] European Research Advisory Board, 'International Research Co-operation' Final Report 2006; EURAB 05.032

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1 INTRODUCTION TO THE REPORT

1.1 Purpose of this report

The Report presented below, summarizes the results of the work the consortium members of EU Program – Erasmus Mundus have done during 2009-2010, in conjunction with the goals and objectives of the Second Phase of the IP Unilink Program. The main aim of the 2nd phase of the collaboration was to conduct a **Micro-level analysis** in the leading Higher Education Institutes (HEI) in Europe and the BRIC-countries. The aim is to contribute to transparency and mutual understanding of Innovation and IP management regimes by developing a comparative analysis of Institutional Innovation and Intellectual Property (IP) policies, strategies and practices. The consortium member, Chalmers University of Technology, was responsible for all aspects of the 2nd phase, including: design, management, analysis and presentation of the results of the study.

1.2 Contributors to this report

Several persons and HEI have contributed to this report, while the report itself has been produced by an interdisciplinary team at Chalmers Industrial Technologies Foundation. The people that made up this team are Sari Scheinberg, PhD Organisation Psychology, Andreas Norgren, M.Sc. Industrial Engineering and Jannice Käll, LL.M. and M.Sc. in Intellectual Capital Management.

The consortium members of HEI that were involved in the data collection process consisted of 3 Universities in Europe: Jagiellonian University, Poland; University of Alicante, Spain; and Chalmers University of Technology, Sweden, and 4 Universities in the BRIC countries: KUST, China; University of Campinas, Brazil; Indian Institute of Technology Roorkee, India and St Petersburg Electrotechnical University, Russia, (hereafter referred to as the consortium members).

However, in an effort to add to the richness of our work and understanding, the consortium extended the study to include one additional HEI in each BRIC country and 3 additional HEI in Europe. As a result, the consortium members invited 7 additional HEI to contribute with their data for this study and report. We are therefore also grateful for the participation and contribution of CUST, (China), Novosibirsk State Technical University (Russia), São Paolo Federal University (Brazil), Indian Institute of Technology, Kharagpur (India) , University of Surrey (Great Britain), University of Saarland (Germany) and KU Leuven (Belgium) hereafter jointly referred to as the 2nd HEI members.

As this study was very comprehensive, we want to express our gratitude to all of the consortium members and the 2nd HEI members who all graciously took time to answer the interview questions as well as to uphold the quality and standards needed to conduct such a pioneering cross-cultural and international study. We hope that you will gain insights from the information and analysis presented.

1.3 Disposition of the report

- **How the report is organized**

Following this introduction, the Report has been divided into 7 sections and is organized and presented as follows:

- Section 3– The concrete Goals and Outcomes expected from this study
- Section 4- The theoretical basis that was used to design this study
- Section 5 – The design and methods used to conduct this study
- Section 6 – The glossary of definitions of key concepts or jargon used
- Section 7 - The strategy used to conduct the analysis and a review of the main results found. Findings that are included in this section are organized - as follows:
    - The National Environment for Innovation and IP in the EU and each of the BRIC countries
    - The HEI Mission, strategies, policies and regulations – for the consortium and 2nd HEI members
    - The HEI Innovation System – the organisation units/functions dedicated to working with IP and Innovation – in the consortium and 2nd HEI members
    - The HEI Innovation Activities, Processes, practices and procedures for working and managing IP and Innovation - in the consortium and 2nd HEI members
    - The Indicators that are used to measure Innovation and IP – historically
    - The culture of innovation in the HEI – how it is defined and what impact it has on the HEI

- **How to read this report**

The aim of this report – is to present the detailed and concrete examples of innovation and IP management conditions, policies, processes and practices found in each of the HEI member organisations and their countries. As a result, this Report will not summarize information but prioritizes the value of providing the actual data, measures and figures that are based upon fact and actual experience. This report therefore offers the reader the opportunity to find concrete examples – so that they may learn and get inspired to apply or use the learning as a comparison to their own practice and organisation and of course country.

Each section (as listed above) is organized as follows:

- First, it presents a summary of the results found,
- Second, it offers a short reflection and assessment on the results presented,
- Third, a number of good examples are selected from our HEI members to highlight and to illustrate the concrete examples offered.
- Fourth, an assessment is provided that summarizes the strengths and weaknesses (that have been developed by each of the HEI members themselves) and ideas for how to improve the work in each section in the upcoming 2 years.
- Finally, each section also provides a reference to a table with very detailed information which is offered in the annex of this Report.

- **Who should read this report**

This Report is written for:

- University Leaders, researchers and administrators – who are working with and dedicated to learning and improving the management of the IP and innovation system, policies, processes and practices in their HEI in order to support improved

conditions for furthering cooperation within their own HEI and between their HEI and other HEI

- Policy makers – who are dedicated to supporting the improvement of research cooperation and the infrastructure building (including – policies, programs, structures processes and relations) that are needed improve the conditions for research cooperation within and between institutes and countries
- Industry leaders – who are interested in understanding more concretely what measures and conditions exist in HEI for working with innovation activities and IP. And to understand more specifically what conditions exist that will support collaboration and cooperation.

2 BACKGROUND AND PURPOSE OF THE IP UNILINK STUDY

2.1 Summary of the IP UniLink Study

The **main aim** of the Study is to promote European Higher Education IP management practices with a view to facilitate international RTD cooperation and university-industry links with BRIC countries. This general objective is in the framework of the Erasmus Mundus aim to develop a more structured co-operation between European Union and third-country institutions.

Specific objectives of the IP Unilink Study are:
- To study the higher education R&D trends between the EU and BRIC countries with a view to enhance the visibility of joint research and improve the readiness for future developments.

- To conduct an analysis which could contribute to the transparency and mutual understanding of IP management and innovation practices.

- To draft a "Good practice Guide for IP management and research collaboration between EU and BRIC countries, including Case studies" with aims to:
- To facilitate the transfer of IP management good practices between EU and BRIC countries

- To promote an IP and research commercialization culture in order to facilitate university-industry links

Thus the activities of this project fall into the program area **"Projects seeking to establish links between higher education and research, and between higher education and business and to exploit, whenever possible, potential synergies."**

More information about the IP-Unilink project can be found at: www.ip-unilink.net

2.2 The main focus of the micro analysis phase

Objective
The objective of Phase 2 of the IP Unlink Program is to conduct a micro-level analysis aiming to contribute to the transparency and mutual understanding of Innovation and IP management regimes by developing a **comparative analysis of institutional Innovation and Intellectual Property (IP) policies, strategies and practices**.

In total there are 7 countries participating in the consortium group of IP Uni-Link Study, including 3 countries in the EU, (Spain, Sweden and Poland) and the 4 BRIC countries (Brazil, Russia, India and China). One leading university from each of these countries was invited to join the consortium. They were considered leading as they: 1) are an active player in the EU-BRIC R&D cooperation scene, and 2) have deep and broad experience in innovation and IP management. Chalmers University (Sweden) is the leader of the consortium for the Micro Analysis phase. For this phase, the consortium members have been responsible for supporting: the design and guidelines for conducting the Micro-analysis, collecting and analyzing the data in their own university as well as identifying another leading university in their region and to collect the data from this 2nd HEI.

Participants
In total there are 10 countries and 14 HEI participating in the Micro Analysis Phase:

The Consortium Members participating include:

Country	University	Acronym
Poland	Jagiellonian University	UJ
Spain	Alicante University	UA
Sweden	Chalmers University of Technology, CIT	CU
China	Kunming University of Science & Technology	KUST
Brazil	University of Campinas	UNICAMP
Russia	St Petersburg Electro technical University	ETU
India	Indian Institute of Technology, Roorkee	IITR

The additional participating 2nd HEIs include:

Country	University	Acronym
Great Britain	University of Surrey	Surrey
Germany	Saarland University	Saarland
Belgium	KU Leuven	KU Leuven
China	Changchun University of Science & Technology	CUST
Brazil	Federal University of Sao Paolo	USP
Russia	Novosibirsk State Technical University	NSTU
India	NML Jamshedpur	NML

The Micro analysis conducted in the Consortium and the 2nd group of HEI - prioritized 8 key areas of IP and Innovation management to be evaluated. In the report that follows we will review both the results found in the individual HEI as well as compare the results found across the 14 HEI representatives.

The prioritized 8 key areas in IP and Innovation management that will be presented include:

- National and regional – laws and legislation for innovation and IP in each country
- Basic HEI information
- Mission, Strategy, Policies and regulations
- HEI innovation system – organisations, functions, departments, units
- Innovation activities, processes, practices and procedures
- Historical review of innovation – quantitative indicators
- Culture for innovation
- Critical success factors for innovation

2.3 The next phase in the project

The Micro analysis conducted in the 2nd phase, is followed by the 3rd phase, where a **Good practice guide** will be created. The main goal for this good practice guide is to highlight a select number of good examples from the Micro analysis. These good examples will help facilitate the transfer of useful IP management and innovation practices between EU and BRIC countries which will hopefully contribute to promoting and developing an IP and research, innovation and commercialization culture. The **Good Practice guid**e will be a document gathering together all the recommendations and findings compiled by the partners into an easy-to-use guideline document which will serve as a source of ideas for other higher education institutions wanting to improve their IP and innovation management practices. Special attention will be paid to key aspects in the research collaboration between BRIC countries and Europe identified in both the Macro and Micro analysis phase.

3 GOALS AND OUTCOMES EXPECTED FOR THIS STUDY

The research activity in this Phase is a micro-level analysis with the aim to study IP and innovation policies, strategies, procedures and related innovation activities in EU and BRIC Higher Education Institutions (HEIs). As this area is complex and encompasses many types of activities and actors, we have defined 4 main goals to be accomplished.

The 4 key goal areas that have been defined for this study will be presented according to the following format:

- The **Goal** for each section – is repeated from the key goals
- The **Rationale** for this goal – why we are pursuing this goal
- How to **Approach** and operationalize the goal area – identifying **critical questions** to answer in this goal area – and concrete **outputs** we want to collect from this goal area

The four key goal areas are:

1. To present the National legislative and political framework for Innovation and IP for Higher education institutions in the relevant EU and BRIC countries
2. To present a critical assessment on the status of how some of the best universities in the EU and BRIC countries have been and are currently managing innovation and IP*:*
    a. A review of their main Strategies and Policies for innovation and IP
    b. A review of their dedicated organisations, structures and functions for innovation and IP
    c. A review of their current activities, processes and practices
    d. An historical review of key indicators (e.g.: patent applications, spin-offs, budgets, etc.)
3. To present a critical analysis of what factors support and hinder best practices for innovation and IP management (e.g.: history, culture, organisation, leadership, resources, legislation, etc.)

3.1 Goal 1 – National Framework

To present the National framework for Innovation and IP for Higher education institutions in the relevant EU and BRIC countries

The Rationale - While this study primarily focuses on assessing the Institutional level – specifically how the leading universities are managing innovation and IP – it is critical to begin the assessment on the National level. Each university is living in a larger context – one of which is their legal and political environment. The country's laws and policies have a direct effect on the universities strategic and operational decisions. The university decisions regarding e.g.: ownership of IP, incentives and remuneration, and contracting – are influenced – for benefit or detriment – by the types and qualities of their national laws and policies on Innovation and IP. So, the ultimate question to answer for this goal – is ***whether and how the national legal and political environment – supports or hinders university based innovation and IP management.***

The approach and critical questions: Each of the HEI participating in our Study therefore followed a similar approach to respond to this issue.

- First, they would identify which laws and policies define the national context for university based innovation and IP.
- Second, they would answer the question: Does your country have laws and policies that help define the parameters for how the university will handle innovation and IP? If so, what are these laws and policies?
- Third, they would assess these laws and policies regarding -their strengths and weaknesses - in terms of how they support university based innovation and IP management.
- And finally, they would present their critical assessment – what are the strengths and weaknesses of your national framework related to 'University Innovation and IP'?

3.2 Goal 2 – IP and Innovation Management

To present a critical assessment on the status of how some of the best universities in the EU and BRIC countries have been and are currently managing innovation and IP: Strategies and Policies; Dedicated organisations, structures and functions; Current activities, processes and practices; Historical review of key indicators (e.g.: patent applications filed and granted, spin-offs, budgets, etc.).

The rationale – Universities are under a lot of pressure to constantly redefine its role and responsibility – and to reassess how it prioritizes its resources and position as an institution – that is in line with the ongoing development of society. Historically, universities have been able to contribute to society by offering educational services as well as the capabilities and mechanisms to support research and extension activities. During the past 30 years (e.g. the Bayh-Dole act was adopted in 1980 in the USA), there has been an added pressure to not only produce research but to also transform the research produced into potential products and services for society.

While this paradigm shift can be seen as an improvement and strengthening of the universities mission, purpose and link to society, it also puts an added pressure on the universities to redefine priorities and reallocate its resource base (personnel, money, technology, infrastructure, etc.). *This added role – of the university as an innovator* – however, has evoked a number of important debates and questions. For example, are universities expected to produce products and services that are open and free for society – i.e.: public goods – or is it ok for the universities to commercialize the results of their research? Who owns what? Universities around the world are making interesting choices and changes in order to cope, optimize and best succeed with these added dimensions. These choices and changes are determined by many factors, which include the university's historical context, priorities and of course it's existing resource base. So, it is exciting to explore the variation and critical differences of: how universities are describing innovation and IP in their mission, policies and strategies? What kind of infrastructure/ organisations/functions have the universities created or formed to support innovation and IP processes? What kind of activities and processes have the university and its staff implemented and integrated into its operation? What are the historical experiences that indicate how the university has succeeded or not in their commitment to innovation and IP?

In order for the university to generate good science it demands that researchers collaborate with research partners around the world. As a result of *the university's need to*

collaborate, clear procedures and practices to support the development of good relational agreements and formalized contracts have to be established.

The ultimate question to answer for this goal area is ***to find out how some of the best universities in the EU and BRIC countries are designing and managing their approach to work with and manage innovation and IP – and what we can learn from them.***

The approach and **critical questions-** Each of the HEI participating in our Study therefore followed a similar approach to identify and present a critical analysis of the following indicators of commitment to innovation and IP:

- Strategies and Policies: First, identify what mission, vision, strategies and policies exist in each university for innovation and IP. Second, in a critical assessment – assess the strengths and weaknesses of each organisation's formal position (policies, strategies, etc.) related to Innovation and IP.
- Dedicated organisations, structures and functions: First, to identify what infrastructure exists in each university today that supports innovation and IP – e.g.: what organisations or units are working with innovation and IP (science parks, TTO, incubators, VC, contract research organisations, etc)? Second, in a critical assessment – what are the strengths and weaknesses of each university's innovation system?
- Current activities, processes and practices: First, to identify important university activities, processes and practices that are managed to support innovation and IP in each university – e.g.: how do they educate researchers? How do they search for value in research? How do they manage invention disclosures? How do they support the commercialization and protection of research results? And who is the process owner (responsible) for these main processes? Second, in a critical assessment – what are the strengths and weaknesses of the current activities, processes and practices?
- Historical review of key indicators: First, to collect the data on the results each university has achieved according to the indicators listed (e.g.: patent applications filed and granted, spin-offs, budgets, etc.). Second, to identify and present other indicators that the university has used to measure results achieved regarding innovation and IP.

3.3 Goal 3 – Factors that Support and Hinder Innovation and IP

To present a critical analysis of what factors support and hinder best practices for innovation and IP management (e.g.: history, culture, organisation, leadership, relationships, resources, legislation, etc.)

a. **Rationale** - It is always exciting to search for and to find examples around the world of the good or even the best practices in innovation and IP management. However, as we all know, just because a process or practice exists or is deemed the best in one university, it does not mean it is easy to simply copy or 'borrow' their practice or that it will even be a relevant practice in your own university. We need to recognize that behind each practice and process are many other factors that either support it and energize it to succeed or hinder it or make it difficult for it to be introduced or maintained. In the field of organisation psychology and development and proven in various action research studies and practices (Scheinberg and Alänge 2006), there are a number of well proven factors and conditions that are essential to lead and manage the transformation of a

'traditional university' into a more 'innovative university'. What are some of these conditions?

From the start to the end of an organisation change process (as the introduction and implementation of innovation and IP in your university can be categorized as) – the role of the leadership is key to define the mandate and priority, to infuse passion into the introduction and to be part of the strategy to support the driving team and their process. Another important factor is how the 'culture' of an organisation and team affect the work. For example, what values and norms drive priorities, relationships and behaviours that are rewarded or punished? And how systematic and conscious is the way of working in the universities. Not all of the factors affecting innovation success are something that you can influence or change (as with leadership, culture) – but are factors that have been built into the university's history and experiences. For example, what trends have been important in the university – both in guiding successes and causing failures? How have these trends been dealt with – seen as opportunities to take advantage of – or as problems to solve?

So, the ultimate question to answer for this goal is - ***why are the practices that are considered 'best practices' in these universities and what is it that helped develop and maintain them – from a cultural, leadership relationship and learning perspective?***

b. **The approach and critical questions**: Each of the HEI participating in our Study therefore followed a similar approach to identify and present a critical analysis of their **culture of innovation** – defined as:
    i. How the HEI has committed to and prioritized innovation and IP
    ii. What roles, responsibilities and resources were made available to lead innovation and IP
    iii. How systematic and conscious work approaches are in innovation
    iv. What motivates personnel to work with innovation and IP
    v. What kind of relationships are needed to drive and sustain innovation and IP
    vi. What are the values that dominate and effect the HEI culture

3.4 Goal 4 – Success Indicators

To present a summary of the factors and measures used in the HEI to define the success for their Innovation and IP management regimes

a. The **Rationale** – In all universities there are measures or indicators that give you and your organisation a sense of whether or not you are successfully performing your work with innovation and IP management. These measures that determine whether or not you feel you are succeeding - can be explicit (defined clearly in your strategy, goals, etc) or more implicit or tacit (common knowledge in your organisation but not formal or written down). It is important to know in our work with innovation and IP management – what these success factors or variables or measures are! These factors can be defined in both quantitative (eg: number of patents filed, etc.) or qualitative (satisfaction, etc.) forms.

The purpose of this last goal area is to identify and summarize the 10-15 most interesting or important success factors for managing innovation and IP **across and within** each consortium member's sample. By success factors we include (all of

those measures we have already defined): strategies and policies; dedicated organisations, structures and functions; current activities, processes and practices; track records; history; culture; leadership; relationships; resources; legislation, etc. One purpose with doing this is to recognize and honour the key success factors found across all of the universities that we have analysed. The aim here is to find a pattern or trend across the sample universities of what factors are key to successful innovation practices and IP management. Another purpose is to try to arrange the work produced in this section to be used as a practical input for the last phase of the IP Unilink Project – that aims to create guidelines for best practices.

b. The **approach** and **critical** questions: Each of the HEI participating in our Study followed a similar approach to identify and present a critical analysis of what measures and factors they use to assess their success in IP and innovation management. These success factors were collected in 2 ways in our study:
First - In each of the previous goals and sections in this study, the HEI not only collected the facts to answer the question but also presented an assessment question (at the end of each section) of what they assessed was good and what needs improvement for each of these specific aspects of their innovation and IP practices and orientation. These strengths, weaknesses and ideas for improvement are compiled to develop an understanding and recognition of the critical factors that have led to their success.
Second - In addition, each HEI was asked directly, as the last question in this study, if they could name specifically what factors they have used to define and measure their success (or failure) with innovation and IP.

4 THEORETICAL PERSPECTIVE

Commonly, comparative studies on IP & Entrepreneurship tend to focus on one theoretical framework such as the legislative environment for IP. Also, there is a tendency to only consider IPR when investigating IP functions. However, in order to fully understand the complexity behind what makes up successful procedures for IP and Entrepreneurship, it is vital to look deeper into several theoretical frameworks. There is also lack of information on the actual experiences of doing this work and what actual processes are being used.

In order to develop our conceptual framework for this study we draw upon:

a. Benchmarking – previous experiences and learning we developed from studying universities in Sweden, Belgium, Israel, US, UK, etc.
b. Own experience – from the design, approach and experience generated from driving change processes and programs in universities e.g. Nicaragua (Alänge & Scheinberg 2004, Scheinberg 2007, Scheinberg 2009), Russia (Scheinberg, 2001), Bolivia (Alänge & Scheinberg, 2004), etc.
c. Literature – definitions, concepts, models and theories for research management, innovation, innovation systems, innovative universities, organizational culture, organisation change, organisation theory, learning, Gestalt psychology, etc.

As mentioned above, the authors of this report consist of a multidisciplinary team – organization psychology, engineering, law and intellectual capital management, which has supported our ability to explore and assess innovation and IP practices from these different academic perspectives.

4.1 Legal perspective

Below, the legal perspective is briefly presented. As will be seen, the legal questions in this report can be grouped into two main categories where the first covers the legal macro environment and the second covers the legal micro environment.

4.1.1 LEGAL MACRO ENVIRONMENT

The legal macro perspective of this study is carried out through outlining and analyzing the legislative political framework in all countries/regions of the participating HEI.

4.1.2 LEGAL MICRO ENVIRONMENT

The legal micro environment is analyzed from two dimensions. First, it investigates which regulations and less formalized norms exists inside the HEI that define the formal environment for IP and innovation. Second, it analyzes which kind of IP management the HEIs adopt. Examples of IPR management can include e.g. patent portfolio management, IPR management and protection for inventions and how disputes around IPR issues are solved internally.

4.2 Organization, culture and learning perspective

As this study is concerned with the Micro level of analysis, where the primary focus in on the organisation or institution level – it was important to build the study, method and the instruments on concepts and models supporting a deep understanding of how the HEI as organisations are oriented, prioritizing, behaving, working with and assessing their experiences in managing innovation and IP. In order to explore this properly, we have selected concepts that are focused on the organisation level of the system, the group level, the relationship level, as well as the individual level (ie; how the individual leaders and managers express their experience and assessment). Below, we present the concepts that were pertinent to defining and conceptualizing the aspects of the study – which are organized into 4 parts – first the concepts dealing with the innovation and organisation change; second, the concepts exploring culture; third the concepts focusing on learning and reflection; and finally, the concepts that are the cornerstones for the action research method we employed in this study.

4.2.1 INNOVATION AND ORGANISATION CHANGE PERSPECTIVE

Given that this study focuses primarily on how the HEI is managing innovation and IP, it is important that we built our definitions on key concepts, models and frameworks of innovation, organisation or institutional change. These concepts were used to design the interview instrument and action research approach. The following concepts were critical to the content of the design:

- Innovation systems, stakeholders, triple helix, strategic alliances
- Innovation – strategies, management, approaches, processes
- Innovative universities, institutions – concept and framework defined by research, design and work Nicaragua (2004 to 2011) – The ***Innovative University Program*** (Scheinberg and Norgren, 2007, 2009)
- Process management and development
- Technology transfer
- Organization change and development, Contracting and Strategies to change
- Motivation and drive
- Gestalt psychology –
    - Contact, Awareness, and the Quality and building of relationships
    - Approach to learning, working and innovating, the cycle of experience
    - Forces that support and hinder – force field analysis, resistance

4.2.2 CULTURE AND GENDER PERSPECTIVE

Of course, as this study was conducted across 14 partner HEI's which included 10 countries, it was necessary to be aware of and integrate 'cross cultural sensitivity' in all stages of designing, conducting and analyzing this study. The following concepts were critical to building and strengthening the cross cultural aspects of this study:

- Work and organisation culture – Schein
- National culture – Hofstede, Adler
- Gender in work – Fletcher (
- Relationships in a cross cultural context –
    - quality of relationship – efforts were made to develop multi-dimensional relations (respectful, task oriented, caring and ethical)[2] in order to create the commitment and trust needed in drive this study (Scheinberg)
    - degree of mutuality and co-creation – throughout our study, roles and responsibilities were clearly defined in order to avoid any misunderstandings. However, regardless of the role and responsibility – we also followed a philosophy of mutual responsibility, meaning that the entire team was responsible together to ensure that the quality of what is being delivered is upheld. We tried to maintain a strong degree of openness and feedback to support a smooth management of this complex and demanding study.
    - Contracting – as the study design was changing continuously to adapt to the various inputs and conditions, it was important for the team to adhere to ongoing communication and clear contracting – where we reassured in writing how we need to work and agree clearly (contract) the terms and conditions for our work (using references from Scheinberg and Block)

4.2.3 LEARNING & REFLECTION PERSPECTIVE – THROUGH SELF ASSESSMENT & CRITICAL THINKING

This study is not meant to remain – only a paper product – as a report or series of articles or presentations. This study was also meant, to be used as a basis to create better processes, relationships, contracts and ways of managing IP and innovation in HEI. In order to initiate the development of critical thinking (and not only reporting) in our study – special questions were included throughout the study, which asked the interviewee to assess the strengths, weaknesses and suggest areas for immediate improvement in their various innovation and IP management capacities. This critical assessment process will be used as input to further understand what priorities are being considered in the near future. As a result of the need and aim of this study to be practical as well as conceptual, a few key concepts were critical to building and strengthening the applicability of this study – to practice:

- Learning theory and models, including conscious and systematic approaches to work - the cycle of Experience, the role of reflection and feedback and the Relationship based learning model (Scheinberg, Frischer and Alänge 2004)
- Quality assurance tools for self assessment and continuous improvement
- Gestalt psychology – see above
- Co-creative approach to development – see above
- Mutual roles and responsibilities – see above

[2] The quality of relationships include 4 dimensions that lead to more conscious working, learning and innovative activity. These dimensions are interdependent and mutually supportive. Scheinberg (2000)

4.3 Research Design and Approach

Finally, certain concepts were critical in developing the research design. The design was build upon a qualitative method with a hermeneutic and action research approach. In this way, long and deep interviews were conducted with the various actors and stakeholders in the universities (researchers, leaders, technology transfer managers, research center leaders, etc.) – in order to develop a detailed understanding of both the facts and impressions for their experiences in leading IP and innovation activities. The analysis aimed to stay as close to the 'experience and expression' of the interviewees as possible – but of course, did follow a systematic method to analyse and make 'sense' of the meaning. So interpretation and reflections on the experiences are also included. In many cases, the interviewees had a chance to review the analysis made and to confirm or improve the results identified. The following concepts were used as the basis for our research design:

- Gestalt cycle of experience – to design a conscious and systematic Research approach
- Action research with a feedback loop – participative research, action study,
- Research management across cultures – concepts and techniques that supported the mutuality, co-creation of this research study across 14 HEI and 10 countries
- Management of Cross cultural research activities – see above
- Ethical considerations – see below
- Validity and reliability issues – see below

5 METHOD FOR CONDUCTING THIS STUDY

There were two main methods for collecting data for this Micro Analysis Study. The first method was ***empirical***, conducting interviews with key persons at the respective HEI who worked with IP & Innovation questions. The second method that was used was to consult ***secondary*** sources such as the websites of the HEI and national data.

For Goal area number 1, regarding the national legislative and political framework for innovation and IP, it was necessary to utilize different government websites such as the national IP/patent office, ministries, and the national agency for innovation - as many of individuals inside HEI did not often have this information.

For goal areas number 2-4 – regarding the university level inquiry, interviews were used as the primary source and secondary data were used in cases where this information could not be collected through the interview(s). The interviews, as mentioned above, where conducted with persons identified as key in the relevant processes. Furthermore, an interview guide was used to drive the interview process. This interview guide was developed by the Activity Coordinator with support and feedback from the consortium members. (See appendix for a copy of interview guide)

The collection of data through interviews was not always unproblematic as the interview guide was very comprehensive and the persons to be interviewed were usually very busy. As a result it was often necessary to break the interview into 2-3 interview sessions. While this did not confound the quality of the data, it could be one of the reasons why the data collection process was delayed by 3 weeks for the consortium HEI and by more than a month with regards to the 2nd HEI being interviewed.

The final version of the interview guide was in made in English and was presented to all of the consortium members. If the interviews were going to be conducted in another language than English, the proper double translation process[3] for creating an interview guide in the local language was clearly described and requested. In the end, the interview guide was translated into 4 other languages – Portuguese (in Brazil), Mandarin (in China), Polish (in Poland) and Russian (in Russia). In Sweden and Spain, the English version was used, and the interviewer translated the questions into the local language on the 'spot' and took the notes in English.

5.1 Rules, Ethics and Planning for the Data Collection

In order to keep a structure in the data collection leading to coherent results from all of the consortium members as well as ensuring ethical standards, some rules and planning for the data collection were constructed. The rules and the planning process are briefly explained below.

[3] This process implies that one person translate the English interview guide into local language and another person translate local language interview guide back into English in order to control whether or not the questions have remained intact.

5.1.1 INTERVIEWS

In line with the goals of this study, the interviewer had to find the 'right' persons to interview. The criteria for selecting 'the sample of persons' included: being the leader or part of the team responsible for working with IP, innovation and technology transfer activities, policies, etc. After identifying those persons who are responsible for the IP and innovation processes in the HEI, the interviewer was responsible to inform the potential interviewee, on the concrete goals, purpose and aim of the study – to ensure that the interviewee accepted to be interviewed with free will and consciousness. As confidentiality is not a factor in this study, it was important for the interviewees to see the value of participating in this study and to reveal their experiences and reflections openly.

Prior to the interview, the *interviewer* had to confirm 'in writing' the time, location, purpose of the interview, and how much time that was needed for the interview.

The interview process was divided into 3 parts to ensure clarity and order: First, there was an ***introduction*** – where the interviewers presented the purpose and goals of the interview and how the interview is structured. At this time the issues of confidentiality were reviewed again to ensure that the interviewee was fully aware of the fact that the data collected is public information[4]. In addition, the interviewer presented what would happen with the data, after it was collected, and how each of the participating institutions would be given access to the data analysis and final report written. Each interviewee was also asked the question if they were ready, as a way to ensure that they were there with free will and choice. In the second part of the interview, the interview was ***conducted*** and the data was collected by following the interview guide. Here the interviewee was given the questions and also given the opportunity to skip those questions they did not want to answer. In addition, for those questions that were more complicated, interviewees were supported with examples to support their reflections. Finally, in the 3rd part, the interview was formally ***closed,*** first by thanking the interviewee, then, by highlighting a few things that was learned during the session and lastly by asking them what stood out for them (ie: insights), and by reminding them again about what would happen next with the interviews and data collected.

It was estimated that in order to fully collect all the data in the interview guide, the interviewer needed 1 day for the national and regional level and at least 2 days for the HEI level. As a result, the interview was most often split into several separate sessions (in order to collect all of the data required). At least in the case of Sweden, the data collection required over 6 sessions, as there are many more actors in the HEI innovation system (due to a lack of centralized system inside Chalmers).

5.1.2 DOCUMENTATION OF THE DATA COLLECTED

The consortium members were recommended to use a number of ways to ensure the proper standard in documenting the data they collected. First, they were recommended to use 2 interviewers for each interview -where one person was responsible for interviewing and the other person was responsible for note taking. Second, it was also suggested to audio record the interview in order to have a back-up for any information that was missed in the notes taken during the interview. Third, after each interview the interviewer was required to type up his/her notes using Microsoft Office Word. Finally the data was to be organised according to each question in the interview guide. It was important for the data collected to be documented in a clear and standardized way, as the data was going to be shared between the consortium group, the Swedish team needed to be able to analyse the results collected from each of the member HEI in an independent and not complicated way and of course, the results

[4] This is a rule for EU projects

found need to be clear and transparent for other researchers to follow. Each interviewer was also asked to document their own experiences and reflections from the interviews as well. It was critical for our research team to keep track of the impressions from the interviews in order to share (their experiences with the other consortium members) and to make improvements in both the interview guide and the process when needed along the way.

5.2 Reflections on the Data Collection Process

The *data collection* process ran quite smoothly in most of the HEI consortium members. It was found however that the data collected from the 2nd HEI was more complicated to collect – as they were more restrictive on the time they had available and were more concerned with the confidentiality of certain information (eg: financial data). One of the more complicated data collection experiences was found in Sweden, due to the fact that there are so many actors involved in the innovation system (due to the lack of centralization -most likely caused by the lack of institutional ownership of IP). This both lead to a situation where it was somewhat difficult to set the limit on which actors to interview (to select from hundreds) and to process the data. Otherwise the experience from collecting the data in Sweden was primarily positive. In all of the consortium members the people interviewed were very involved in innovation and IP processes and were happy to answer all or most of the questions posed. The data collection from the 2nd HEI's in Europe went smoothly, without significant complication (except time restraints). However, the consortium members from China, Brazil and India complained about a more complicated data collection experience with their 2nd HEI. They found that their colleagues in the 2nd HEI did not offer 'enough' time, (to collect all of the data needed) and that they did not want to share some data as they claimed that there were rules regarding confidentiality of financial and other statistical data.

In contrast to the relative flow and ease in the *data collection process*, the *documentation* of *the data* was unfortunately more inconsistent and variable in the quality presented.
The consortium member HEI was responsible for documenting and organizing the results collected from their own and the 2nd HEI. The results were sent to Chalmers through e-mail. In nearly all cases, the quality of the first drafts varied but in general quite a lot of complimentary data was needed. The first results lacked many responses required in the interview guide, had 'difficult and incomprehensible' language and lacked information on the historical data. In addition, as none of the consortium members used a double translation process, it became apparent that some of the translation was not 'accurate enough', and hence gave responses that were not in line with what was being searched for.
However, it is interesting to note that the most common data lacking was the answers on the assessment questions (where each HEI was responsible themselves to assess their own strengths and weaknesses) following each section. One reason for this may be due to the fact that some of these questions were inserted a bit later in the construction of the interview guide (and some members appeared to have used earlier versions of the interview guide while collecting the data). Another reason may be the difficulty, is some cultures in developing and presenting (exposing) a critical analysis of their HEI.

The **lack of data** in the first step was overcome by sending very extensive feedback through e-mail - to each consortium member - promptly after the first versions of the filled out interview guides were received. In some cases this feedback was not enough to complete the interview documentation, so it was necessary to send new feedback and follow up letters. In the end however, complete data was sent in for all the consortium members.

The **quality** of the responses from the interview documentation was varied. In general the quality of the answers was much higher for the interviews conducted inside the Consortium members' own HEI. For example, the answers were generally much shorter and needed more completion in the 2nd HEIs, than the answers provided for the consortium members own HEIs. There were much fewer explicit examples given from the 2nd HEI members than from the consortium members and this has in turn resulted in fewer examples on the 2nd HEIs processes and practices in this analysis.

In addition, as stated above, most of the participants had problems living up to the double translation standards which resulted in confusion on which questions had been answered. The interview guide was translated into Chinese, Russian and Portuguese – but no consortium member followed the double translation process. In the end, misunderstandings were solved but the data collection process was significantly prolonged, which also slowed down the pace for the analysis process. However, what is good to note is, that we do in fact have interview guides available in 4 languages for future application. Anyone looking to conduct a follow up with our guides – would however, be well advised to double check the translation.

There is yet another interesting experience that can be added to our observations generated during our cross cultural team work. This observation has to do with how gender, power and responsibility affected both the quality of the relations we created and how our work 'got done'. In other words, the quality of the data collected was directly affected by our consortium teams' – diversity of gender, age, cultural and value orientation to commitments and experience levels. We are a consortium team of 14 persons with a mix of 5 men and 9 women, and with a range of ages from approximately 25 to 65. Our varying backgrounds explain some of the 'nuanced' complications and the implicit struggle (for the Chalmers team) in leading the data collection process using a co-creative and mutual approach (which is a feministic in orientation). We learned that even if we were formally responsible for the Micro section, that it was necessary to have Alicante's 'authoritative' blessing for many of the tasks and decisions we were making. And we learned that it was necessary 'to pay the Alicante Card' in order to be able to demand and to get the power needed to ensure ongoing clarity and transparency for our mutual and ethical understanding.

5.3 Data Analysis

In order to conduct an analysis of all of the data collected in the Micro study, the Activity leader created a strategy for both data organisation and data analysis. Hence, the results from all of the consortium members' own and 2nd HEI were organized into raw data sheets that followed the structure and questions of the interview guide. The culture questions were treated separately in an excel sheet that enabled statistical data to be easily processed already at the initial stage.

For the national level data, the consortium members were asked to hand in a 2 page national level assessment for their country. This assessment was to highlight some interesting examples on the macro level of each nation such as important legislations, funds etc. affecting the climate and conditions for innovation and IP in HEI in each country.

For most of the questions at HEI, Unit and Process Level, data was combined in a raw data sheet where tables were created in order to summarize the results. Once the data had been inserted into the tables, the results were summarized in text highlighting the main patterns and trends observed in the table. In order to *make sense* of these patterns observed in the

tables, examples from each of the HEI were collected and analysed. Then, interesting (often contrasting) examples from the HEI were selected to help illustrate and exemplify the trends defined. Finally, some final reflections and comments were documented by the analysis team, to capture some impressions and observations developed during the analysis process.

In addition to the descriptive data, this report presents historical statistics on how the HEIs have performed IP & innovation activities in the last 3 years.

The data on the HEIs culture was analysed in Microsoft Office Excel where the results could be easily compared. After the data had been combined in Excel, the results were analyzed in the same way as the above-standing sections.

Finally, one of the most exciting contributions of this study is the critical assessment offered by each of the HEI of their own innovative and IP environment. As a result, the assessments of the strengths, weaknesses and ideas for improvement were analysed for each of the key sections in the interview and a summary and comparison analysis was conducted. Insights and reflections from this analysis were also included in the analysis results.

5.4 The interview guide

An interview guide was created in order to support the collection of the data for this study in a systematic and standardized way. This guide covered several cross-disciplinary concepts and questions and was to be followed closely when conducting the interviews in order to not miss any important aspects of the HEIs innovation and IP processes and of course to try to ensure consistency of research approach across the 10 participating countries.

5.4.1 DEVELOPMENT OF THE INTERVIEW GUIDE

When creating the interview guide, guidelines and instruments used in previous projects were examined, adapted and further developed with the consortium team. For example, instruments used to examine the 'research to market' processes and the Innovation and IP audit conducted in 10 HEI in Nicaragua, we used as a foundation to build on.

5.4.2 THE STRUCTURE OF THE INTERVIEW GUIDE

The interview guide[5] was divided into two main categories and sub categories. These main categories were:

National and Regional Level – Legislation for Innovation and IP management in HEIs

HEI Level – the HEI level is divided in the following sub categories
Basic HEI information
Mission, Strategies, Policies and Regulations
HEI Innovation System – organizations, functions, departments, units
Activities, processes, practices and procedures
Historical review of quantitative indicators
Culture for innovation
Critical success factors for innovation

[5] Please contact the authors of this report to obtain a copy of the interview guide

5.5 Limitations and delimitations for this approach and method

The activity leaders of this phase were conscious of defining and controlling that the data collected and analyzed in this Micro Study followed defined standards to ensure ethical, validity and reliability consideration.

Number of participants in the sample – The consortium decided to limit their original ambition level (from having at least 3-4 HEI in each country) to selecting only 1 additional HEI. This decision was made as a result of the consortium's need to comply with the time and budget restraints of this project. We chose to conduct a wider and deeper interview in fewer HEI, rather than a more limited interview in more HEI.

Applicability and cross-culture relevance- It was important to build into the research process from the outset a strategy of participation and collaboration. Therefore, at each step in the data collection process, the participating HEI members were active in the development of the interview guide, guidelines, etc., n order to ensure that all participants were able to understand and adjust the meaning and purpose of the questions asked for their national context.

Generalizability - The participants are aware of the fact that we will not be able to generalize the results, as our sample is relatively small. This makes it is impossible to state with statistical security that the findings in this report constitutes a reflection of the reality of IP and innovation practices and processes in all HEI's across EU and BRIC-countries.

5.6 Validity/reliability and ethical considerations with this approach and how we managed them

This study complied with a number of rules and considerations to ensure that the research consortium were conscious of ethical, validity and reliability issues.

Ethics – when constructing the interview guide and method for collecting the data, the activity leaders considered the following issues to ensure that we followed an ethical approach in our research and analysis activity:

Informed consent – the interviewers were responsible to present the goals and aim of this Micro phase to ensure that the interviewees understood the purpose of this study and particularly how the data will be used. This way, the interviewees would consent to participate with a clear trust of what the purpose of this project was. In addition, the interviewers were conscious of taking culturally appropriate steps to secure informed consent and to try to avoid provoking any possible feeling or perception of 'invasion of privacy'. And finally, the interviewer would describe their role clearly and agreed upon boundaries and frame of this study. This was particularly important as the 'researchers' were themselves most often working in their Universities in other capacities and positions. So, it was important to ensure that there was not conflict of interest in their new role.

Harm and deception – during the interviews, the interviewer would do all they could to uphold the dignity of the persons interviewed and do nothing that would harm the interviewee- physically or emotionally. In addition, the interviewer would do nothing that would deceive the interviewee in any way. This was important in our study, as we needed to ensure the other universities in our regions (who are potentially competing universities) that

there was no hidden agenda in our study and that the results would be shared with all participants as initially agreed.

Relevance- the interview team ensured that the questions and observations generated are relevant to the purpose of the research

Reciprocity and trust – the interviewers were responsible to ensure that the benefits of participating in the research study were clear for both parties – interviewer and interviewee. It was made clear to all of the interviewees, that they would receive the results and reports generated from this study.

Trustworthiness - Given that this study followed principles and strategies of qualitative research, it was important for us to ensure and control (as much as possible) how we managed to ensure that our way of working would 'trustworthy'. In our case, we tried to do this by: a) ensuring that the data that we collected in each country context would be rich enough so that it was possible to understand the extent to which experiences could be 'transferable or not'; b) in addition, it was important that each of us in the collaborating team, 'acted in good faith' in all stages of our research process (from the design, data collection and analysis) so that it is possible to depend on our results and confirm the results we achieved. For example, that the investigators own values did not intrude into the work, and that data collected appears credible and believable.

Affiliation and conflicts of interest – The members of the consortium were clear from the start of this project, that the data we are collecting is free from any influence of the funders.
Intellectual Property – the consortium has agreed to monitor sources and acknowledge source in articles and reports.

As the collection of data was managed through a series of interviews both in person and on the phone, a specified norm for collecting the data was advised and followed. The interview was divided into 3 moments:

First, (as stated above) all interviews had to be preceded by a short introduction – where the purpose and goals of this study and what the data was planned to be used for was explained. All persons agreeing to participate had to have all information clearly presented – in order for them to make a decision to participate or not (if a HEI decided not to participate –the consortium member from this HEI/collecting data from this HEI was responsible for collecting their reasons for not participating).

During the interview – the person(s) being interviewed were being treated with great respect and care (e.g. giving them permission to ask questions during the interview and not to answer certain questions if they choose). Furthermore it was explained to the participants that the data being collected was supposed to become public data – and that confidentiality on an institutional level was not possible in this study.

Finally, the interviewees were told what would happen next in our data analysis. They were informed that the aim was to show them the draft analysis and report – in order to get their confirmation – that what was analysed was correct and in accordance to their view as well. The option of receiving the final version of our analysis and report was also given to them.

6 DEFINITIONS

Activity leader
A team from Chalmers Industrial Technologies Foundation (CIT) consisting of Sari Scheinberg, Andreas Norgren and Jannice Käll lead the data collection and analysis process for this report. This team is referred to as the 'activity leader'.

BRIC-countries
Brazil, Russia, India and China

Consortium members
The consortium members are the persons from each participating HEI responsible to collect data from both their own HEI and a 2nd HEI. The participating HEI that had this role were Jagiellonian University, Poland; University of Alicante, Alicante; Chalmers School of Technology, Sweden, Kunming University of Science & Technology, China; University of Campinas, Brazil; Indian Institute of Technology Roorkee, India and St Petersburg Electrotechnical University, Russia

HEI
Higher Educational Institute

2nd HEI
The 2nd HEI was selected by the consortium members in order to widen our understanding of good practices and processes in IP and Innovation. The criteria for selecting this 2nd HEI was as follows: for the BRIC countries, the 2nd HEI should be selected from within their their country that could serve as a good example. For the EU members, the 2nd HEI was selected from within Europe as a good example. The 2nd HEI responded to the same questions as the HEIs of the consortium members. The participating 2nd HEI included: University of Surrey, Great Britain; Saarland University, Germany; KU Leuven, Belgium; Changchun University of Science & Technology, China; Federal University of Sao Paolo, Brazil; Novosibirsk State Technical University, Russia; and NML Jamshedpur, India.

7 ANALYSIS STRATEGY AND FINDINGS

This chapter covers the analysis and findings of the studies conducted. **The first section presents the results found on the macro or national level.** Here each consortium member has highlighted some of the most interesting and relevant laws and conditions that have affected the innovation and IP climate in their HEI, in their country. This analysis will be presented as a 2 page summary from each consortium member. These summaries have not been edited by the editorial team, so you may observe that there is a variation in the quality of the English and focus.

The second section is on the HEI level and consists of 5 different sub-sections. The first sub-section is- 7.2 – HEI – Mission, Strategies, Policies and Regulation. This section compares the missions, strategies, policies and regulations of each of the HEIs contributing to this study. Interesting examples are highlighted and the results and reflections from additional questions (asked to the interviewees) are presented. The other sub-sections include:

- 7.3 – HEI Innovation System – Organizations / Units / Functions / Departments
- 7.4 – HEI – Innovation Activities, Processes, Practices and Procedures
- 7.5 – Historical indicators
- 7.6 – Culture

As there are many key questions in each sub-section - the results for each question will is organized as follows: 1) a summary of the cross-country results is presented, 2) a graphical representation will illustrate the results (in some cases)[6], 3) a number of interesting examples from individual HEIs are highlighted, and finally 4) a reflection on the results and examples will be offered.

There are 3 key underlying aims for this data collection process: 1) First, it is an instrument that generates a concrete comprehensive picture and understanding of the current status of IP and Innovation management in each HEI. 2) Second, it is a pedagogic approach that supports each HEI to be able to follow up and make practical actions for change and improvement based upon the results found in their own organisation. Hence, In order to support the HEI to generate their learning from this large effort and to take the strategic and practical steps needed to improve their IP and Innovation management process, each HEI was asked to make their own assessment of what they found to be the strengths and weaknesses of their IP and innovation approach and practice (defined clearly in each sub-section). Then each HEI was asked to generate their recommendations and priority areas for improvements based upon their critical assessment. 3) And finally, it is a source for identifying good examples of practices, policies, approaches, etc. that will be used in the Good Practice Guide (Phase 3 of the IP UniLink Program).

[6] In all cases we have presented the results in text form, however, in the Annex we have included tables illustrating the complete results from all the participating HEIs. Where applicable a reference is made to where the table can be found (table number and page number).

7.1 Macro – The National Environment for Innovation and IP

Naturally, HEIs do not exist in a vacuum but in an environment where many of the rules and regulations are defined in the context beyond the HEI. Higher education institutes have to adhere to the many of the rules and laws set on the national level that affects their strategic and daily work. However, with more and more regionalization, power and rules move to either the organizations that are even superior to the national state (e.g. the EU) or that have been decentralized from the nation to get closer to the persons/organizations over which it takes decisions (e.g. region governance inside a country). These organs also affect the macro environment of the HEI.

In order to form collaborations with another HEI it is important to first be clear about which supports and hinders exist in one's own external 'macro' environment – that can influence, limit or offer possibilities or benefits for a collaboration.

A macro level analysis was conducted by each of the Consortium members. They each assessed the formal conditions and characteristics of their national environment that effects innovation and IP in their country and HEI. In addition to a detailed review, each collaborating HEI was responsible for providing a 2 page summary of the highlights – of their National (macro) innovation environment (legal, policies, programs) and a summary of both the strengths and weaknesses of their national innovation environment.

It is important to note, that the Activity leader has not in any way altered the text from each consortium member and therefore, does not take on responsibility for the validity or the editorial content of the statements in the national summary sections. In order to make this summary, the consortium members were supported to use the detailed answers they already had developed from the interview guide as a source for finding those issues they believed would be interesting to lift out - for the summary.

The data included in this section – were answers to the following questions:

- **What legislation exists in your country or region for defining:**
  - The ownership of Intellectual Property (IP) for Higher Education Institutions (HEIs)?
  - The criteria for licensing (e.g.: exclusivity, licensee restrictions, etc.) in HEIs?
  - The innovation and IP components in Employment contracts in HEIs?
  - Remuneration for – universities, researchers, department in HEIs?
  - Legal incentives encouraging innovation activities for HEIs (e.g. tax privileges)
  - Innovation activities in HEIs (e.g. creation of HEI spin-off companies)
  - Other
- **Are there National and/or Regional policies/programs for Science & Technology and Innovation in HEIs?**
- **Are there national/regional funds/schemes that support R&D and innovation in HEIs?**
- **Is there a National IP / Patent office?**
- **What are the strengths of the legislative and political environment for HEIs (i.e. laws, policies, funds) in your country and region?**
- **What are the weaknesses of the legislative and political environment for HEIs (i.e. laws, policies, funds) in your country and region?**
- **If you could change 1-2 things in the next two years, what would you prioritize?**

In the following section, six of the seven consortium members[7] present their two page summary of their national IP and innovation environment:

1. Brazil
2. India
3. China
4. Poland
5. Spain
6. Sweden

[7] The summary from Russia is missing

7.1.1 BRAZIL

Brazil is a developing country is living a good moment for the generation of innovation, not only because it has reached maturity in certain industrial sectors, as directed by government efforts to promote innovative activities. This framework can be demonstrated by the efforts being deployed for the support for universities (HEIs) and the private sector to comply with the Law of Innovation. For the country's economic competitiveness depends on the ability to connect innovation, production capacity and market. Below is a brief description of some of the most important legal and financial conditions for the HEIs Brazil.

7.1.1.1 IP Ownership inside Brazilian HEIs

In Brazil, to encourage collaborative research between public and private sectors was established in 2004 the Innovation Law no. 10.973, which also stipulates that the HEIs have the centers of technological innovation (NIT). However, in Brazil, the Law stipulates that intellectual property and participation in the results mentioned in the second paragraph will be assured, since it is written in the contract, in proportion similar to the amount of the added value of the knowledge already existing in the beginning of the partnership and of the human, financial and material resources allocated by the contracting party.

The objective of the law is to enable the building of cooperative and specialized innovative environments, prescribing that the union, states, federal district, municipalities and their corresponding fomenting agencies may promote and support the constitution of strategic alliances and the development of cooperative projects involving national companies, HEIs and privately owned nonprofit organizations geared towards research and development activities aimed at generating innovative products and processes. Thus, with remuneration and during a fixed term, HEIs will be able to share their laboratories, instruments, materials and other facilities with micro firms and small-sized firms for activities focused on technological invention, to conduct incubation activities, with no harm to their core activity.

7.1.1.2 The funding situation

In Brazil, the funds to Support Scientific and Technological Development establish an innovative mechanism to stimulate the strengthening of the S & T National. They are tools for project financing of R, D & I in the country. Its resources come from contributions levied on sales of businesses and/or the result of the exploitation of natural resources belonging to the Union. The Federal Government is allocating for the "Plan of Action for Science, Technology and Innovation 2007-2010", a value of $ 41.2 billion of funds by 2010, of which 46% will come from the MCT and the remainder from other ministries.

In addition to their budgets, the institutions of Science and Technology (ICT) in Brazil, which include public and private universities and research institutes, have access to external resources of the Federal Government and State Governments for their activities in R & D. Projects are approved on merit, either through public tenders, either through the analysis by expert consultants. The main mechanism of external support comes from the ICT Sector Funds and programs of the State Foundations for Research Support. The projects supported by the State Foundations are funded by state budgets and to stimulate research in institutions of R & D sites, almost always directed to priority areas of the region. There are also projects of national interest, which are financed jointly by Federal and State Governments. The Sector Funds for Science and Technology, created from 1999, have been the main instrument of the Federal Government to stimulate the system C, T & I in the country They have enabled the deployment of many new ICT projects, which aim not only the generation of knowledge, but also its transfer to companies. These partnership projects have spurred more investment in

technological innovation by companies, helping improve their products and processes and also to balance the relationship between public and private investments in science and technology.

There are 16 Sector Funds, of which 14 related to specific sectors and two cross. Of these, one is focused on university-industry interactions (FVA - the Green-Yellow), while the other is to support the improvement of infrastructure of ICT (Infrastructure). Aside from these, the Fund for the Technological Development of Telecommunications, managed by the Ministry of Communications, the resources of other funds are administered by FINEP. The Sector Funds are still a valuable instrument of national integration policy, for at least 30% of its resources must be directed to the North, Northeast and Midwest, promoting the devolution of S & T and the consequent spread of its benefits

7.1.1.3 Strengths and weaknesses of the Brazilian macro environment of research and innovation inside HEI

In Brazil, the national legislation to encourage innovation brought important results, such as incentives for creation and structuring of real innovation in HEIs. However, analysis of the internal environment of HEIs shows that there are strengths and weaknesses. Among the strengths are the broad and diverse portfolio of IP, a growing network of relationships with companies in public and private sectors that are creating a balance between academics and business. In recent years recognition from the society in general about the performance of universities in creating innovations and significant increase in protection and commercialization of IP has been gained.

Among the points that demonstrate difficulties (weak) to innovation to develop a more satisfactory way is institutional weakness in innovation agencies, submission to the rules of public institutions. Another aspect that hinders the innovation from happening the way it should is the scarce resources for internal actions (HEIs), also does not have sufficient infrastructure.

However, other initiatives such as the Law of innovation may make it possible for Brazil to create and develop an integrated model of management of innovation environments in the country. Thus, increasing the results of licensing, projects, expand the integration and international actions, and improve the skills of internal HEIs.

7.1.2 INDIA

7.1.2.1 Legislation

In India, the Patent Act of 1970 (Amendments in 1999, 2002, 2005) serves a purpose of responding to emerging challenges posed by new developments relating to intellectual property systems. Its focus is to streamline and rationalize the procedure to make the system efficient, transparent and more users friendly. A patent can be defined as a monopoly right granted to a person who had invented a new and useful product, or a new process for making a product. The right granted is generally an exclusive right to manufacture a particular item, or the right to manufacture an item through a particular process for a period of time. The message of the law was to align the provision of the patent law to the minimum standards set by TRIPS Agreement.

7.1.2.2 National/Regional policies for Science & Technology and Innovation in HEIs

India has the “Scientific Policy Resolution (SPR)” of 1958, which aims "to foster, promote and sustain the cultivation of sciences and scientific research in the country and to secure for the people all the benefits that can accrue from the acquisition and application of scientific knowledge".

The “Technology statement” of 1983 stipulates that the spirit of innovation and invention is the driving force behind all technological change. We must awaken our science and technology to the exciting challenges of our times, provide incentives to encourage inventors, and direct their efforts to areas of special importance. The system of rewards and incentives will be strengthened for inventions, innovations and technological breakthroughs and their utilization. The fullest opportunity will be provided to make use of inventions.

The “Science and Technology Policy” of 2003, in India, promotes Innovation in all aspects. A comprehensive national system of innovation will be created covering science and technology as also legal, financial and other related aspects. It states that there is need to change the ways in which society and economy performs, if innovation has to fructify. A major initiative to modernize the infrastructure for science and engineering in academic institutions will be undertaken. Science, engineering and medical departments in academic institutions and universities and colleges will be selected for special support to raise the standard of teaching and research. To begin with, a significant number of academic institutions, specially the universities, as also engineering and medical institutions, would be selected for this support to make an impact. Flexible mechanisms for induction of new faculty in key areas of science would be developed. Constancy of support and attention will be ensured over at least a ten-year period.

7.1.2.3 National and/or Regional policies for Research in HEI

The “Science and Technology Policy” of 2003, in India, states that a strong base of science and engineering research provides a crucial foundation for a vibrant programme of technology development. Priority will be placed on the development of technologies which address the basic needs of the population, making Indian industries - small, medium or large - globally competitive, making the country economically strong; and address the security concerns of the nation. Special emphasis is placed on equity in development, so that the benefits of technological growth reach the majority of the population, particularly the disadvantaged sections, leading to an improved quality of life for every citizen of the country. These aspects

require technology foresight, which involves not only forecasting and assessment of technologies but also their social, economic and environmental consequences.
A major initiative to modernize the infrastructure for science and engineering in academic institutions will be undertaken. Science, engineering and medical departments in academic institutions and universities and colleges will be selected for special support to raise the standard of teaching and research. To begin with, a significant number of academic institutions, specially the universities, as also engineering and medical institutions, would be selected for this support to make an impact. Flexible mechanisms for induction of new faculty in key areas of science would be developed. Constancy of support and attention will be ensured over at least a ten-year period.

Intensive efforts will be launched to develop innovative technologies of a breakthrough nature; and to increase our share of high-tech products. Aggressive international bench-marking will be carried out. Simultaneously, efforts will be made to strengthen traditional industry so as to meet the new requirements of competition through the use of appropriate science and technology. This industry is particularly important as it provides employment at lower per capita investment, involves low energy inputs, and carries with it unique civilization traditions and culture. Value addition and creation of wealth through reassessment, redistribution and repositioning of our intellectual, capital and material resource will be achieved through effective use of science and technology. A comprehensive and well-orchestrated programme relating to education, R&D and training in all aspects of technology management will be launched. To begin with, Indian Institutes of Management (IIMs), Indian Institutes of Technology (IITs) and other selected institutions will be encouraged to initiate these programmes.

It supports Innovation in all aspects. A comprehensive national system of innovation will be created covering science and technology as also legal, financial and other related aspects. There is need to change the ways in which society and economy performs, if innovation has to fructify.

7.1.2.4 National IP / Patent office in India

The National Patent office in India was founded on 2nd January 1912 in Kolkata. Its branches came into existence after the enactment of Patent's Act 1970 (Mumbai in Aug .1972, Chennai in Aug.1972 & Delhi in Nov. 1976).

The Patent Office administers the law concerning protection of invention in the country by way of grant of patent monopoly to inventors or their assignees.
Intellectual Property Training Institute (IPTI), Nagpur established in 2002 is conducting training programmes meant for personnel engaged in the field of Intellectual Property and also providing training to the examiners of Patents, designs and Trade Marks and other technical officials working in IP offices.

It provides services like holding training programmes, workshops and meetings as well as participating in various gatherings.
National campaign on IP awareness was launched on April 2008 by Shri Kamal Nath, Union Minister of Commerce and Industry more-than 20 awareness programs has been conducted under this campaign.

National Institute of Intellectual Property Management is being set in Nagpur. NIIPM Building is under construction. This institute will take up training, awareness, education and think tank activities relating to IPRs.

7.1.2.5 National/Regional funds/schemes that support R&D and innovation in HEIs

The “Science and Engineering Research Council (SERC)” was established in 1974 and is an apex body through which the Department of Science and Technology (DST), Govt. of India promotes R&D programmes in newly emerging and challenging areas of science and engineering. SERC funding provides sophisticated equipment, instruments and facilities to academic institutions as part of R&D activities/ programmes and training to brilliant young scientists through fellowships, workshops, summer/ winter schools in few selected areas and students fellowships.

The objective of “Ramanna Fellowship” is to offer continued core financial support to those researchers who have performed excellently well in their ongoing basic research projects of SERC (viz. FAST TRACK Scheme for Young Scientists, Women Scientists Scheme-A, SERC Individual Research Projects, Nano Science and Technology Initiative projects and Swarnajayanti Fellowship projects). For major financial support for their research activities including major equipment and infrastructure creation, however, they would continue to go through the other available schemes of SERC and DST. The Ramanna Fellows would receive a Ramanna Fellowship per month plus a research grant of Rs. 10 lakh/year for a period of three years.

The Department of Science and Technology, through “Fast Track Scheme for Young Scientists”, provides quick research funding to young scientists below the age of 35 years (relaxable by 5 years in the case of SC/ST/OBC, woman and physically handicapped category) to undertake independent research in newly emerging and frontier areas of science and engineering. It provide quick research support to young scientists for pursuing exciting and innovative research ideas, provide opportunities for interaction and exchange of ideas with scientific community, to involve young scientists in national S&T development process. The funding is provided up to a maximum of Rs.17.00 lakhs (excluding overhead charges) for a period not exceeding three years.

7.1.3 CHINA

7.1.3.1 Introduction

China is generally known for a high speed of development in industry with a great emphasis on research and innovation. Correspondingly, the national legal system of IPR has experienced a massive amendment, especially after accession to WTO. It is also worth noting that HEIs have been targeted as the important growth point and radiant point of IP in the state development strategy of IP.

7.1.3.2 The law and policy situation

The macro law and policy environment of IPR in China has contributed to compose the "outside" circumstance of research and innovation in HEIs. On the one hand, legislations with the purpose of strengthening innovation have made great progress at both national and local level. Such legislations could be generally classified into three types: regulations on management and protection of IP, regulations on awards for innovative technology, and regulations on project management of research and innovation. On the other hand, the development policy of IP could be implemented in specific innovative action plan or fostering programme. The law and policy of IP inside HEIs basically follows such structure.

7.1.3.3 IP Ownership inside the HEIs

In China, the ownership of intellectual assets deriving from HEI research is guarded according to the general IPR acts. It is generally recognized that, for the service invention (i.e. an invention or creation made by a person in the execution of the tasks of the entity for which he works or made by him mainly by using the material means of this entity shall be a service invention or creation.), the ownership of intellectual property that may be protected through the patent system belongs to the HEI. Such structure of IP ownership has brought some challenges for the research community. It's shown that, as the individual researchers have no privileges of claiming the IP ownership in a service invention, they probably prefer to have their results published at each stage of the research. In some sense, researchers in HEIs care a lot about academic values of innovative activity which accumulates qualifications for further promotion. Such environment will implicitly destroy lots of potential commercial value of innovation.

7.1.3.4 The funding situation

The funding situation for research and innovation in China appears to be much better than before.

The resources of funding cover three levels: at the level of central government, local government, and the level of HEIs themselves. The types of funding generally include: research Fund, project/programme based funding, and research rewards.

National Natural Science Foundation of China (NSFC) is an active agency which aims to support innovation. Many selecting project-based strategic research will be granted with a great amount of money from NSFC each year. It will potentially create opportunity for individual researchers to carry out research and innovation, and further to seek for the protection of IPR.

7.1.3.5 Strengths and weaknesses of the macro environment of research and innovation inside HEI

With the awareness of importance of innovation and IPR, the government has promulgated series of policies and measures in order to advocate innovation and IP protection.
The legal system of IP has been comprehensively revised in respect of legislation purpose, content of rights, protection standard, and legal remedy, etc. The new system emphasizes the role of IP in the development of science and technology and promotion of independent innovation. The government also reinforces the macro administration on IP.

However, the dissemination of knowledge and awareness of IP still has a long way to go since the IP system in China is new for the public. The IP system provides few legal measures that directly encourage and promote IP activity. The imbalance between patent and other types of research achievement becomes a common phenomenon in HEI based on a long potential policy orientation of “emphasizing research findings rather than patent”.

7.1.4 POLAND

7.1.4.1 Introduction

Poland in the European Innovation Scoreboard 2008 is still placed in the last "catching up" countries group with innovation performance well below Europe average. However, it should be underlined that particularly in the high education sector have been recently undertaken significant steps aiming at improving that situation. There have been created legal grounds and established funding instruments stimulating R&D activity.

Next to the primary educational mission in the Higher Education Act 2005 has been mentioned the cooperation with the economic environment, in particular by selling or providing on free-of-charge basis results of research and development projects to entrepreneurs. The Act introduced also a legal basis for HEIs to operate academic business incubators and technology transfer centers. At the moment most universities have their own technology transfers offices or special departments responsible for commercialization of IP results created by academics, researchers and under some conditions also students.

7.1.4.2 IP Ownership inside Polish HEIs

The general rule is, that HEI as an employer acquires by virtue of law ownership of intellectual property created by researchers employed at HEI's unless otherwise agreed in employment contract. Common practice on this field is that employment contracts duplicates default basic rules. Currently, many HEIs have introduced (or are about to introduce) internal regulations concerning the IP created within the university, particularly specifying the issue of ownership. Detailed provisions concern for instance duty to disclosure of the invention or other innovative subject matters, procedure for an assessment of potential value as well as specific procedure regarding decision-making for obtaining the protection. Furthermore, HEIs' internal regulations specify possible ways of commercialization (licensing, creation of the spin-offs) and system of sharing benefits arising from commercialization of invention which should be understood as basic motivation tool for researchers.

As regards revenue sharing, industrial property law guarantees researchers participation in income resulting from commercialization, not specifying, however, the exact amount, indicating only that it must be done in due proportion to the profits obtained what in practice resulted in 50%-50% approach as regard the participation of the researcher and his HEI.

7.1.4.3 The funding situation

Currently, there are number of funding sources for innovation in Poland, including funds for innovation activities of universities and research institutions.

The main funding scheme is Operational Programme "Innovative Economy´2007-2013 based and financed from EU Structural Funds. Within the scope of OP IE, support is given to innovative projects at least at the national, within the framework of the following priorities eligible also for HEIs:

- Priority I. Research and development of modern technologies (enhancing the significance of the education sector in the economy by means of realisation B+R assignments)
- Priority III. Capital for innovation (increasing the number of new, innovative companies, which have just been launched and enhancing access to the external financing sources of their operation)
- Priority IV. Investment in innovative enterprises (upgrading the innovation level of the company by means of introducing modern solutions)

- Priority V. Diffusion of innovations (providing the companies with high quality services intended to explore their innovative potential, creating advantageous conditions of cooperation between the companies, the research and development sector and business background institutions.)
- Priority VI. Polish economy on the international market
- Priority VIII. Information Society

Second important source of supporting universities in innovative projects are funds and programmes governed by Ministry of Science and Higher Education. The good example is co-called "Patent Plus programme" that finances costs of applying for patent protection by universities.

Research and development projects on universities can also be effectively financed from EU Framework Programmes. As estimated, growing number of Polish universities actively participate in international projects undertaken under FP7.

7.1.4.4 Polish macro environment of research and innovation inside HEIs (strengths and weaknesses)

Legal tools encouraging innovative activity at universities

During the last years many Polish universities have used the opportunity expressly introduced in Higher Education Act and have established R&D centers (TT offices, incubators, etc), which in many cases are very active in commercialization of university IP, as well as obtaining funds for innovative university projects. This should be perceived as strength of the system.

Incentives for academics and researchers

Besides the already mentioned revenue sharing regulations, the scoring system of scientific achievements introduced by a Scientific Research Committee should also be pointed out. There are foreseen extra points for national or international patent applications which are given to academic inventors.

Some HEIs are undertaking other internal initiatives in order to encourage academics and promote innovation activities, like contests for the best patent application, where the winner receives further financial support for continuing research activities.

Growing "innovation" culture on universities

As a positive result of numerous national and international programmes encouraging academic invention activities, development of an "innovation culture" at that level can be observed. As tangible result may be pointed growing numbers of seminar and workshops devoted to academic society. These events cover different aspects of innovation processes like financial, legal and economical issues.

In this context the Regulation of Ministry of Science 2008 should be mentioned, where the obligation for elementary IP courses for students has been introduced.

7.1.4.5 Existing barriers in enhancing innovation at universities

One of the most important weaknesses of the university innovation system is researchers' lack of awareness regarding the intellectual property rights. Moreover, state financial support allocated for development of R&D area is still perceived as too low which makes conducting research in such areas as bio – and advanced technologies difficult. Still, there are some imperfections in organizational structure of universities in context of management and

commercialization of innovations (lack of professional legal support would be good example here). As a result the number of exclusive rights (especially patents) obtained by Polish HEI is relatively low and consequently the incomes from commercialization are not sufficient to finance further research.

As an overall assessment it may be pointed that Poland seems to be in transition period where on the one hand many institutional and legal initiatives were undertaken, on the other – it may be observed slowly changing attitude of Polish HEIs and academic society and some shortages of innovation system, particularly in IP management process at bottom level.

7.1.5 SPAIN

7.1.5.1 The National Innovation Environment – Laws and conditions affecting the University innovation activity in Spain

The promotion of scientific research in Spain was marked by the adoption of the Law 13/86 of Promotion & General Coordination of Scientific & Technical Research –"Law of Science"- adopted in 1986 when Spain joined the European Union. The Law of Science represented a cornerstone to build a science policy, virtually nonexistent by then, and posed new challenges to the innovation system. Twenty years after the law was adopted, it can be observed that Spanish universities have developed a strong science base. In terms of scientific productivity, indicators show that Spain is placed on the 10th place in the world ranking in scientific publications and the 12th in terms of most cited articles for the period 1992-2002. However when it comes to transforming research results into new products and services, and new business creation, the results are modest and suggest that the innovation policy is not performing as expected.

7.1.5.2 Main instruments of the National Innovation System

The National strategy for Science and Technology (Estrategia Nacional de Ciencia y Tecnología - ENCYT), currently set for the period till 2015, establishes objectives, indicators, and general lines of action in the area of R&D and innovation. The strategy forms the basis of successive national and regional plans for scientific research, development and technological innovation.
The National Plan for R&D and innovation (Plan Nacional de I+D+i) is the main programming instrument of the Spanish Science and Technology System and sets out the objectives and priorities of the R&D &innovation policy, as well as funding in the medium term.
The 1st National Plan of R&D 1988-1991, did foresee the development of Knowledge Transfer Offices (called OTRIs) to boost the relationships between universities and the business world. Today, the OTRIs can be defined as the units of knowledge transfer of the Spanish universities and public research offices, whose mission is to support and to promote the production of knowledge and its transfer to the business sector, and are responsible for the management of IP created within Spanish Universities and PROs.

7.1.5.3 IP in Spanish Higher Education Institutions

Spanish Universities are governed by the General law for Universities (Ley Orgánica de Universidades). The Ownership of IPRs in PROs in Spain is regulated for patents in the Spanish Patent Law (Art. 16-20). The laws set out that Public Research Organisations (PROs including Universities) own the inventions created by their employees, provided that the invention is created in the framework of the employee's research functions. Employees are entitled to receive a share of about one third of the potential revenues generated from IP commercialised. If the organisation is not interested in applying for a patent, the ownership can fall back to the inventor, while the PRO however may keep certain rights to the invention. In collaborative research, the law sets out that research contracts signed by the PRO must specify who the owner of the results will be.

Most HEIs have established internal IP policies, defining in more detail the procedures of disclosure, ownership of IP, costs of IP protection and revenue sharing rules. It may be interesting to mention that Universities in Spain are exempt from fees for filing national patent applications.

The responsibilities and activities performed by University based OTRIs include:

- research and technical support contracts for the exploitation of the scientific and technical abilities of the university researchers.
- R&D projects in collaboration with businesses and other bodies, and the public funding sources related to obtaining marketable results.
- Strategic alliances with other organizations, aiming to exploit the scientific skills and the results coming out of university research.
- protection of research results through patents and other ways of protecting the intellectual and industrial property rights (IPR).
- Transforming university research results to patented license contracts.
- Creating and developing new companies (spin-offs),
- Promoting the bonding of universities with companies and other institutions.

In 2007, Spanish OTRIS filed 434 patent applications, 192 PCT applications, signed 190 licence contracts and created 120 Spin-off companies. These indicators are considerable, but still modest compared to other European countries.
In the last years, some incentives have been introduced for University staff to engage in IP and TT issues. Assessment criteria for professors since recently do take into account activities of IP commercialisation, besides the number of publications in recognized scientific journals. In 2007 the government reformed the general law for Universities, introducing new measures to boost cooperation with enterprises, commercialisation of IP and the creation of spin off companies. Consequently new incentives were introduced to stimulate the creation of spin-off companies by university staff, such as leave periods (max. 5 years), and the possibility to participate in the capital and financial returns of spin-offs created from University IP.

7.1.5.4 Strengths and weaknesses

Besides considerable improvements over the last years, the Spanish innovation policy is not performing as expected towards meeting the national and EU Lisbon objectives set-out in the national R&D&I Plan. The authorities continue launching calls and adopting measures to catch up in terms of innovation. The legislative framework for IP management in Universities is well defined, new incentives have been introduced and institutions have implemented policies and operational structures to promote the use of IP and boost technology transfer. The Spanish Patent and Trademark Office (OEPM) does collaborate closely with universities, offering several kinds of services and assistance, such as seminars at universities, technology surveillance reports, retrospective searches and technology watch bulletins. Public universities are even exempt from costs of patent filing at OEPM. Besides recent improvements, still much is to be done to raise innovation and entrepreneurial culture among university researchers and students, and develop an entrepreneurial culture within HEIs.

7.1.6 SWEDEN

7.1.6.1 Introduction

Sweden is generally known for being a country with well developed industry and high spending on research and innovation. Even so, more and more voices are heard about the fact that there seem to have been a tendency of creating very much basic research whereas relatively little has lead to concrete development. This picture may of course have been largely created through the environment set out inside HEIs through the macro level environment they live in. Below, some of the most important legal and financial conditions for Swedish HEIs from a national level are therefore briefly explained.

7.1.6.2 IP Ownership inside Swedish HEIs

In Sweden, the ownership of intellectual assets deriving from HEI research is fairly well defined through law. The general IPR acts have been in place for several decades as well as the specific act that guards the ownership of intellectual assets inside the HEI which was established in 1949. However, unlike most other countries in the world, in Sweden, the ownership of intellectual property that may be protected through the patent system belongs to the individual researchers and not the HEI. This solution is commonly referred to as the Professor's privilege.

The 'Professor's privilege' has created both opportunities and challenges for the Swedish research community. For example, one overriding implication is that it is the researchers themselves who are responsible and need to be conscious of all of the steps in bringing their research out to the market in an efficient way (which includes thinking about IP). Another implication is that the HEI would find new ways (rather than the traditional ways) to support the researchers in their research to market process. However, evidence has shown that over the 60 years that the professor privilege has been in place, the Swedish researchers are not taking the responsibility for the process of establishing clear ownership of the IPR in their research projects. In fact, they continue to publish their results and are not exploring the commercial opportunities in any stage of their research as could have been hoped for. And that the HEI, (until just recently) has not been investigating or developing their role and responsibility in creating an environment that would support the potential opportunities associated with the 'professor privilege'.

The fact that a lot of potential value is being destroyed (given the continued publication priority rather seeking the commercialization opportunity) has initiated a discussion on national level of whether to keep 'the professor privilege' construction in the future - or not. Today, this national discussion has led to the introduction of several very interesting initiatives. For example, one initiative introduced by the national science funder, VINNOVA, is the creation of local research centers called, VINN-excellence centers, where the ownership of research results is assigned from the researchers to the HEI. No immediate change in the rules on the national level can however be foreseen but in time, most people inside HEI working with IP agree that an abandonment of the Professor's privilege is the way to move forward in establishing structured IP management inside the HEIs.

7.1.6.3 The funding situation

The funding situation for education and research in Sweden appears to be good. VINNOVA is a government agency which has as its special purpose to 'support growth by supporting innovation connected to research and development'. The role of the agency is to finance 'application driven research' that is needed for developing and sustaining a well functioning society and business climate.

In 2008, VINNOVA took part in a process of selecting research projects in five out of 24 strategic research areas. The total amount to be shared amongst the 24 areas is about 520 million Euros for the period of 2009-2011. The total amount of the national funding for these projects was an increase in funding for strategic research areas ranging up to about 130 million Euros. Thus, research in strategic areas is being increasingly prioritized during the coming years in Sweden.

As when it comes to funding to apply for 'protection of research results', researchers are in general out of support from the national arena. This is so due to the logic that the researchers own the research and have no obligations to give anything back to the state, thus the state does not feel the responsibility to support researchers in creating costly control positions around the results. However, a number of regional bodies have started to provide verification money to e.g. start-ups, where evaluations of the intellectual assets may be carried out. This in turn will hopefully create the opportunity to simplify and strengthen the application process for intellectual property rights enabling protection of core research results.

7.1.6.4 Strengths and weaknesses of the Swedish macro environment of research and innovation inside HEI

The fact that the legislation in Sweden grants ownership rights to individual researchers creates a culture for research which is fairly different from other countries. This has both positive and negative aspects. The positive side is that individual researchers may become more interested in commercializing their ideas as they have the potential of receiving a lot of monetary compensation in case the invention becomes a success. This is of course also good for the society as commercialization usually implies that a greater number of people will be able to enjoy the invention compared to if just publishing was being done.

However, according to the perception of several leaders in the innovation system in Sweden, the climate inside research projects due to the Professor's privilege - does not work as an incentive for the majority of researchers as they are interested in conducting research only and not be driving commercialization of results. Their motivation is simply not to become rich. As a reaction to this, it can be stated that it is a weakness in the Swedish system to keep the Professor's privilege as fewer people get to enjoy the fruits of research since no one takes on responsibility to drive the commercialization/utilization process.

On the other hand, the fact that there are some individual researchers that actually care about the process to bring research to the market, has created a diverse research environment where research centers even inside one HEI may be spread all over a city without being connected to each other. This thus creates several ways in to the HEI innovation system for external investors. However, this also means that it is very difficult to get an overview of the research initiatives going on inside the HEI.

Another weakness with the Professor's privilege is that due to the individualized approach no centralized body inside the HEI been created to help researchers clarify the various building blocks needed for commercialization of research results. Without dedicated advisors, Swedish researchers risk becoming an easy target in international collaborations when the ownership over intellectual property deriving from the collaboration is being negotiated since the counter party may be supported by a HEI technology transfer organization in negotiations while most of Swedish researchers do not even have insight in the fundamentals of the IPR system. Also, as the university does not take on any responsibility in this question, there are no processes

internally to support or even document the activities, trends, experiences of the internal activities generated by their researchers.

All in all, the legal solution with regards to the Professor's privilege is currently the most discussed question in relation to innovation and IP inside HEIs. As can be seen above, there are both advantages and disadvantages with this system, however the discussions today appears to speak in favor of a change in this legislation in order to better conform to the rest of the world. A future discussion on Swedish strengths and weaknesses of the macro environment will then most likely circle around how to transform the individual oriented research culture into a culture where the HEI takes on much more responsibility without losing too much of the strengths of the current system.

7.2 HEI – Mission, Strategies, Policies and Regulation

The ultimate boundaries for how an HEI can act and which incentives and hinders are created for innovation and IP activities is, as stated in the previous chapter, placed on the national or regional level. The next step in the hierarchy of governing rules can then be found at the HEI level where the mission and vision as well as other strategies, policies and regulation are put in place.

When designing these norms, the HEI of course needs to consider the national policy so that they do not conflict. However, as those rules are generally not so detailed, HEIs usually have a lot of freedom to design the internal environment as it sees fit to achieve the national goals on innovation creation (if such even exists).

It is important that the HEI takes on this responsibility – setting their own rules and regulations - as the system for innovation inside the HEI may otherwise risk being left without any direction and clarity. In the worst case scenarios, the effects could be very harmful, for example, as research results would risk remaining inside the academia, never reaching out to society to benefit the people; or research results and value could risk being lost to collaborators – who themselves took the initiative to protect their own rights.

In many aspects, the formalization at this level shows how far the leaders of the HEI have come in their understanding of the importance of innovation questions. Collaborating with a HEI that has several well defined and implemented innovation and IP policies in place therefore ensures a certain level of sophistication and understanding of these questions from the top level and hopefully diffused out to all levels and departments in the HEI.

This section therefore explores how the innovation and IP concept is targeted in the mission, strategies, policies and regulations inside the participating HEIs.

The section is organized as follows: 1) a summary of the results is presented, 2) a graphical representation will illustrate the results (in some cases), 3) a number of interesting examples from individual HEIs are highlighted, and finally 4) a reflection on the results and examples will be offered.

7.2.1 STRATEGIC ORIENTATION

The strategic orientation of a HEI may affect its freedom to operate in e.g. commercial activities. A public HEI might be expected to adhere to rules set up by the state or other state run governing institutions to a higher extent than if it was privately held. However, this is not always true, as in some countries the rules on how to operate a HEI are the same no matter the legal classification of the individual HEI.

In such cases, other internal strategic documents may play a much larger role in how and what the HEI can and should do and which objects resulting from the HEI's activities that may or may not be commercialized as inventions. Whether, the strategic orientation is set by the legal classification of the HEI or internal documents, it is however certain that insight in these questions is vital if one is to collaborate across national borders – considering that the strategy of the other HEI may impede or aid the collaboration process.

This section therefore explores the legal classification of the HEI's participating in the study as well as the mission and vision of the HEI and internal rules on which inventions that may be commercialized and which inventions that only may be utilized in the public sphere. In each section, interesting examples will be given from the HEI consortium as well as reflections on the results aiming to guide the reader in how to interpret these.

7.2.1.1 How is the HEI classified?

8 out of 14 HEIs in our study are public institutions. Of the remaining 6, 2 HEI are private institutions[8] and 4 HEIs are other kinds of institutions. Those HEIs that have placed themselves as having other kinds of ownership are actually all owned directly through the state, which is why similarities to public institutions can reasonably be expected.

Public	Private	Other
8	2	4

Table 1 - HEI Classification

Reflections and analysis

It is interesting to see that so many HEIs can be classified as public institutions. Even Chalmers that is classified as a private HEI in fact has to follow many public rules of Sweden. The reason for the dominance of public HEIs both inside BRIC and EU countries may depend on the fact that education is still dominated by and considered to be a responsibility of the state and therefore remains in the public domain – as a critical public service – available for all citizens.

In relation to the focus of this report, it becomes increasingly interesting to see whether the HEIs owned by the state have the same possibilities as privately owned HEIs to connect HEI activities to the industry and if they see the connection to innovation & IP as something necessary for being able to do so.

7.2.1.2 Does the HEI mission/vision include innovation?

11 out of 14 HEIs' visions/missions include innovation. However, KU Leuven, Saarland University and Jagiellonian University do not include these terms in their mission/vision statements. Thus, the HEIs that do not include innovation in their mission/vision are exclusively HEIs from within the EU.

Interesting examples

Alicante, Spain: Mission

'The University of Alicante is a public institution, dynamic and innovative, with international focus and it has a campus of reference, whose MISSION is the integral training of the students and the commitment to the advancement and improvement of the society through the creation and transmission of knowledge and cultural, scientific and technological development'.

R&D and Innovation is one of 7 Strategic axis of the UA:

- Humanism
- Training
- Research +Development +innovation

[8] Chalmers University of Technology is however non-profit private and needs to follow certain national norms that are common to both public and private HEIs in Sweden.

- Directions and organisation
- Infrastructure
- Communication and social projection
- Internationalization

IIT Roorkee, India: Mission: To create an environment that shall foster the growth of intellectually capable, **innovative and entrepreneurial professionals**, who shall contribute to the growth of Science and Technology in partnership with industry and develop and harness it for the welfare of the nation and mankind. **Vision** : To be the fountainhead of new ideas and **innovations** in science and technology and continue to be a source of pride for all Indians

Reflections and analysis

Most of the HEIs have at least something in their mission that indicates that they pursue innovation through their research. It appears to be common across the HEI to connect innovation to 'giving something back to society from the research. The focus of the various mission statements are however designed to target innovation in different ways. As can be seen in the two examples above, innovation is included in the HEIs respective missions in two different ways. The one extreme is focused on innovation as a crucial activity for some professionals to provide support to the industry and in this way improve society (see IIT Roorkee). The other extreme describes innovation as an activity supporting all other activities inside the HEI with the focus of improving the entire society (see the example from Alicante).

7.2.1.3 Which HEI outputs can be commercialized?

12 out of 14 HEIs state that the research results resulting from research inside their HEI may be subject for commercialization. The two HEIs that state that their research results may not be subject for commercialization are two BRIC country HEIs (São Paolo Federal University, Brazil and NML Jamshedpur, India).

9 out of 14 state that the teaching materials resulting from research inside their HEI may be subject for commercialization. 10 out of 14 state that the services resulting from research inside their HEI may also be subject for commercialization. Only 3 out of 14 HEIs state that the other objects resulting from research inside their HEI may be subject for commercialization. (Appendix - Table 6 – page i)

Interesting examples

Chalmers, Sweden: In Sweden, due to the Professor's privilege all research can be either public or commercialized depending on what the researcher wants. The copyright is vested in the researcher who has the right to do as he/she wishes with this (due to the Professor's Privilege). However, it is interesting to note, that in fact, copyright is not covered by the law of the Professor's Privilege, but is generally treated by the same rule -especially when it comes to computer software). The researcher has the right to perform services outside of his/her employment as long as it follows certain conditions. In those cases the specific service setting decides whether it is commercial or not. Otherwise, the services are not public goods as the HEI is private and nothing becomes public automatically.

Alicante, Spain: INVENTIONS protectable by Industrial Property:
Commercialization depends on the type of contract the research result was obtained. In principle a researcher should inform the TTO about a potentially patentable or commercialable result, which will then decide on whether to protect the result or not.

The ownership depends on the work contract or relationship to the institution. If the result was obtained within the framework of a project financed by a third party then the contract will define what happens to the results and who the owner of the results is.

Copyright works: Protected by copyright– the author, thus the professor is the owner; if a professor publishes a book and commercializes it, the authorship and income belongs exclusively to the author.

Computer Programs: Authors are the creators (UA staff). Exploitation rights and titles + Sui generis: belong to the University if the program was created by UA staff within their normal functions

Novosibirsk University, Russia: "Any technology growing out of research can act as consumer goods, and can be commercialized. Training programs, for example, can be commercialized. It is possible to carry to this area (services), for example, the most part of the software which act in both categories".

Reflections and analysis

The HEIs appears to have quite a lot of freedom in the selection of what can/should be commercialized. This may be based on the fact that only a few in the HEI have such advanced understanding for IP and innovation structures in order to have an insight on what could be used or hindered from being commercialized – even due to ethical reasons. For example, it might not always be good to allow teaching materials to be commercialized without any grant-back to the HEI that could state that the students of the HEI should be able to use the materials for free as the HEI paid the HEI employee salary to come up with these materials.

The examples show that there is diversity in how much the HEIs decide over what may be commercialized and not. At Chalmers University of Technology in Sweden as well as the country in general, all objects resulting from research may hypothetically be commercialized since this is the choice of the individual researcher who owns the rights to his/her results in most cases. At Alicante University, Spain, the HEI owns some of the outputs and the individual researcher owns some. In cases where the HEI owns the results only contracts related to the specific object may hinder commercialization. In the case of Novosibirsk University in Russia, the HEI may commercialize all objects resulting from research. This situation implies that they own the results and also they are not hindered by by-laws prohibiting commercialization in certain situations.

7.2.1.4 Which HEI outputs can be defined as public goods?

12 out of 14 HEIs state that the research results resulting from research inside their HEI may be defined as public goods. 12 out of 14 HEIs also state that the teaching materials resulting from research inside their HEI may be defined as public goods. 12 out of 14 HEIs state that the services resulting from research inside their HEI may be defined as public goods as well. 3 out

of 14 HEIs state that the other objects resulting from research inside their HEI may be defined as public goods.

There are three HEIs that state that not all of the mentioned objects can be put as public goods. Out of these three, two HEIs come from the BRIC countries (both from China) and the third one is University of Surrey from England, EU. (Appendix: Table 7 – page ii)

Interesting examples

Chalmers Sweden, ETU Russia and Alicante Spain, Novosibirsk University Russia: see above.
UJ, Poland: Theoretically all university outputs initially owned by employee or university may turn into public domain by the decision of the owner in given case.

Reflections and analysis

Most of the HEIs state that all of the mentioned outputs from research and teaching can be defined as public goods. This is most likely due to the fact that most of the HEIs in this study are in fact public institutions where the results by tradition may have ended up in the public sphere. Of course, this is not always an advantage as sometimes outputs can serve a greater good to the society if they only can be turned over to the society in the shape of commercial goods. The logic behind this is that the external actors having the means to maximize the value of an invention may require that they gain the research results on exclusive terms in order to be able to build a business idea on it.

7.2.2 POLICIES AND NORMS

Policies and norms are other ways to steer rules inside a HEI. They may be more or less formalized and implemented but the mere existence of a policy or norm generally indicates that the HEI has realized the importance of creating understanding around a certain question.

When collaborating with another HEI, the norms of both HEIs will be communicated. This is done more or less implicitly as the scope to what and how they collaborating HEI's may be able to agree on based on – is generally stipulated by the norms.

In the section that follows, the examples may be a source of inspiration for other HEI's aiming to improve their own HEI norms – particularly for policies related to innovation, IP and entrepreneurship. These examples can also be used as a framework to guide a necessary background check of a potential collaborator (for example, when the HEI has to cohere to special policies when conducting cooperation activities with external parties).

First, specific policies and norms will be presented and for each, illustrate how important particular norms are for the various consortium members. Thereafter, we will present a highlight of interesting examples from the HEI consortium.

7.2.2.1 Does your HEI have policies for innovation, IP and Entrepreneurship?

All HEI except Chalmers University of Technology and Jagiellonian University have some kind of policies that focus on IP, innovation or entrepreneurship. 11 out of 14 HEI have an innovation policy, 11 out of 14 have an IP policy and 10 out of 14 have an entrepreneurship policy. (Table 8 – page iii)

Out of those that have policies for IP, innovation and entrepreneurship, eight out of twelve HEI also have strategies for implementing these into the HEI working practice. For those HEIs that do not have such implementation strategy – they are fairly equally distributed between the BRIC countries and EU (one is from the BRIC countries and two are from the EU). (Table 9 – page iii)

Interesting examples of focus and messages of policies

KUST, China: Innovation policy focus: 'Establishment of the *Patent Fund* with the purpose of supporting invention or creation activity; Establishment of Science Research Fund for innovation projects; with a policy of subsidizing half cost of patent application; With a policy of rewarding patent'.

IP policy focus: 'IP-patent protection for research achievements and invention/creation - management of patent application -management of patent right -management of patent fees and costs (including agency fee, annual fee, etc.) - rewarding and punishment'

- **IIT Roorkee, India:** The IP policy has been in place since 2005 and the Entrepreneurship policy is under creation. The innovation policy is focused on creating an environment for acquiring new knowledge through innovation, develop an attitude of prudent IP management practices and promote an IPR culture compatible with the educational mission of the Institute. The IP policy is focused on:
  - Disclosure
  - Confidentiality
  - Evaluation & Exploitation Decision.
  - Commercialization of Institute-owned IP.
  - Transparency of IP Administration.
  - Institute's Acceptance of Independently owned Intellectual Property.
  - Institute's Right to update & Maintain Course Materials.
  - Statement by Creators.
  - Consulting Agreement
  - Responsibilities of Departments.
  - Authority of Contracts
  - First –refusal Option for Sponsors.
  - Handling of Theses, Term Papers & research submitted by students.
  - Assessments of Innovation for Protection.
  - IP Protection and Technology Transfer.

University of Surrey, Great Britain: The creation, nurturing and successful exploitation of Intellectual Property is recognised as part of the enterprise culture of the University and therefore is central to the achievement of the University's overall objectives. It is therefore the University's policy to encourage and facilitate the successful exploitation of IP. It was launched in 2007.

Reflections and analysis

It is interesting to see that as many HEIs as 12 out of 14 have some kind of IP, innovation or entrepreneurship policy as this could be interpreted as a sign that these questions are taken seriously in the strategies of these HEIs. However, out of those twelve HEIs, only eight have plans for how to implement these policies which might imply that the policies are merely the first initial steps needed, but still fall short of the necessary diffusion that is needed to anchor the processes into everyday reality. The fact that neither Chalmers University of Technology or Jagiellonian University have any explicitly formulated policies can be viewed as fairly remarkable since both Chalmers and Jagiellonian University seem to take on a lot of IP, innovation and entrepreneurship responsibility in their daily operations.

There are several interesting examples on policies amongst the HEIs showing that the focus of the policies may differ significantly and reveal more on how far the different actors really have come in their work with innovation, IP and entrepreneurship.

A first example can be taken from KUST in China where both the IP and innovation policies appear to be very focused on patentable inventions and not on general invention/creation-management. It was often found that the IP & innovation concept was interpreted as 'patents' while in fact it does not need to be the only IPR protection alternative. These policies can thus be a sign that KUST have recently started working with innovation and IP as a concept and has not yet fully conceptualizes these policies in their wider meaning.

IIT Roorkee on the other hand, appears to have come longer in developing their thinking around innovation and IP as their policies have a larger focus as e.g. the innovation policy states that:

"The innovation policy is focused on creating an environment for acquiring new knowledge through innovation, develop an attitude of prudent IP management practices and promote an IPR culture compatible with the educational mission of the Institute."

This kind of thinking is also supported in the IP policy of the University of Surrey where it is interesting to see that they understand that IP understanding is highly linked to the enterprise culture and the university's overall success.

7.2.2.2 Does your HEI have defined norms/regulations/by-laws for defining IP conditions more clearly? (E.g. ownership, distribution of income, contracting rules, disclosure rules etc.)

12 out of 14 HEIs answering this question have norms that define IP conditions more clearly. The two HEIs that state that they do not have such norms are both Russian.

Interesting examples

Chalmers, Sweden: In Sweden the institutional norms establish the rules for 3 different levels of collaboration:

1. Government financed research:
   - researchers owns IP at his own discretion
   - case-by-case regulations regarding foreground rights and remuneration

2. Collaborative research (i.e. co-financed by government and industry):
   - case-by-case contracts
   - foreground usually exploited by companies without remuneration to the university

3. Contract research (fully financed by industry):
   - buyer (industry) has all rights, except publication rights that are retained by university

IIT Roorkee, India: Disclosure rules: 'Disclosure is a critical part of the IP protection process for claiming the inventorship. The information shall constitute a full and complete disclosure of the nature, particulars and other details of the intellectual property, identification of all persons who constitute the creator(s) of the property, and a statement of whether the creator believes he or she owns the right to the intellectual property disclosed, or not, with reasons'.
Confidentiality: 'All Institute personnel and non-Institute personnel associated with any activity of the Institute shall treat all IP related information which has been disclosed to the IPR Cell and/or whose rights are assigned to the Institute, or whose rights rest with the Institute personnel, as confidential. Such confidentiality shall be maintained till such date as is demanded by the relevant contract, if any, between the concerned parties unless such knowledge is in the public domain or is generally available to the public'.
Commercialization through licensing of rights by third parties: 'The Institute will license at its discretion the Institute-owned intellectual property for commercialization through third parties who may or may not be the creator through the grant of exclusive/ non-exclusive licenses, or assign its ownership rights to third parties/ creator safeguarding the interests, financial or otherwise, of the Institute.'

Reflections and analysis

Almost all of the HEI have defined conditions for IP ownership. This at least indicates some understanding on the value of these questions in general on HEI level. Chalmers in Sweden has e.g. defined by-laws for IP ownership on different situations of conducting research such as through collaborations with other actors through e.g. contract research.

IIT Roorkee has very developed norms on IP clearance in the disclosure which shows that the importance of clearing out ownership of IP at an early stage is understood. Furthermore, IIT Roorkee appears to have thought about the importance of having stable confidentiality structures in order to build innovation and IP strategies as also this is further explained according to the suggested example. Finally IIT Roorkee appears to have thought quite carefully about the terms in license contracts and how these best can benefit the HEI optimally.

7.2.2.3 Do the HEI's IP policy and norms / regulations / by-laws guide relationships (contracts) between the HEI and other stakeholders?

8 of the 14 HEIs have norms that regulate the relation between the HEI and the industry. 6 of the 14 HEIs have norms that regulate the relation between the HEI and the government. 8 of the 14 HEIs have norms that regulate the relation between the HEI and other universities. 3 of the 14 HEIs have norms that regulate the relation between the HEI and other actors.

The HEIs whose norms do not target any of the actors mentioned (including other actors) are CUST in China, St Petersburg Electrotechnical University and Novosibirsk State Technical

University, Russia, University of Surrey, England and KU Leuven, Belgium. The distribution between HEIs from the EU and from the BRIC countries that do not have norms targeting these actors is thus fairly equal (3 BRIC countries and 2 EU countries). This equal distribution can also be found amongst those that target more than one actor of the ones mentioned (4 BRIC countries and 3 EU countries). (Table 10 – page iv)

Interesting examples

IIT Roorkee, India: *The Institute encourages its faculty, scientists, technicians and students to interact with industry in all possible ways with the spirit of deriving mutual benefit. The few major modes of interaction are listed below:*

- *Joint research programs and field studies by faculty and people from industries*
- *Visits of industry executives and practicing engineers to the Institute for seeing research work and laboratories, discussions and delivering lectures on industrial practices, trends and experiences*
- *Workshops, conferences and symposia with joint participation of the faculty and the industries.*
- *Participation of experts from industry in curriculum development.*
- *R&D Laboratories sponsored by industries at the Institute.*

Scholarships/fellowships instituted by industries at the Institute for students

UJ, Poland: General consent for launching and maintaining cooperation between industry and university is needed.

USP, Brazil: Towards the industry: R&D collaborative projects and sponsored research
Towards the government: Teaching and Research Projects
Towards the universities: Collaborative research in strategic areas, whether they are areas from the government or not.

Reflections and analysis

Judging from the results, the norms between the HEIs and actors in their environment seem to be better developed towards other universities and industry. This may be interpreted as a sign on the fact that these relationships are of greater importance than those to the government and other actors. This is envisioned in the examples above from the Jagiellonian University in Poland, USP in Brazil as well as IIT Roorkee, India where the university-industry collaboration norms are mentioned all of the examples.

7.2.2.4 Do the IP policy and norms / regulations / by-laws stipulate to whom the HEI based IP can be assigned?

9 out of the 14 HEIs had norms stipulating to whom the ownership of IP can be assigned. In the case of Alicante University in Spain such rules can also be found on national level instead where it is stated that the HEI owns the rights to results. As Germany abolished the Professor's Privilege in 2002, one can assume that the rules on how IP ownership can be assigned may thus also lie on a national level. When it comes to the HEIs in Great Britain, India and Russia, no information has been provided on whether they have norms that regulate these questions on a national level instead of at a HEI level. (Table 11 – page v)

Interesting examples

UJ, Poland: In principle, the IP generated within the university belongs to the university (except scientific copyrighted works). The aforementioned regulation does not introduce any constraints regarding further assignment.

Campinas, Brazil: The entitlement is from the University, but co-entitlement is possible. Federal law for innovation 10.973/2004 in government decree 5563/2005 that says that intellectual property and participation in the results mentioned in the second paragraph will be assured, since it is written in the contract, in proportion similar to the amount of the added value of the knowledge already existing in the beginning of the partnership and of the human, financial and material resources allocated by the contracting party.

USP, Brazil: The entitlement is from the University, but co-entitlement is possible. Federal law for innovation 10.973/2004 in government decree 5563/2005 that says that intellectual property and participation in the results mentioned in the second paragraph will be assured, since it is written in the contract, in proportion similar to the amount of the added value of the knowledge already existing in the beginning of the partnership and of the human, financial and material resources allocated by the contracting party.

Reflections and analysis

In general, all of the HEI- except Chalmers University of technology in Sweden -own the rights to all of the HEI based IP. In Sweden, usually it is the researcher that owns the results of his/her research due to the Professor's privilege however this is negotiable and therefore why other kinds of stipulations regarding ownership also appear.

In general it appears as if the responding HEIs assume that the one owning the IP has full decision power to assign it further even if it has not been exemplified to which such assignment generally is being done.

One should however be aware of the fact that even if the situation when IP is to be assigned to other actors look clear as there are norms regulating how this may be done, there is still a risk that the results that are to be assigned have been burdened with uncertainties at an earlier stage. As an example e.g. researchers may form teams with other researchers without having managed the question on who owns the results and thus results might not be able to transfer at all since the parties may conflict over this at the time for transfer. Also, even if ownership has been regulated in advance between two collaborating partners a potential legal ownership construction such as co-ownership of results may hinder full exploitation and thus further assignment of results if this ownership structure does not work optimally in both parties' jurisdictions.

7.2.3 DISTRIBUTION OF INCENTIVES, BENEFITS AND COSTS

It is obviously not the HEI itself that has the ability to create inventions generating IP- but the people employed at the HEI to conduct research and other activities inside the HEI. In order to motivate the people employed inside the HEI to create such inventions that- in best case- will bring economic value and recognition to the HEI primarily, a set of incentives for the researchers to participate in value creating activities can be put in place.

One common driver for individual researchers is to publish research results in order to gain funding and recognition in the research community. This however, may destroy the possibility for controlling the research results for other potential or strategic opportunities, ie: if the HEI wants to utilize the results in creating an innovation. In order for the researchers to continue to generate publications or to consider alternative activities that can lead to more funding and recognition, it is therefore vital that incentives exist to support the procedures inside the HEI that support the researchers to know to how to move forward with research results – that can both lead to publications and innovation.

Furthermore, if the HEI decides to commercialize research results, the individual researcher or research team that has been involved in creating these results will probably be vital to have in the team when the HEI pursues this commercialisation route (as the inventors usually understand the uniqueness of the invention better than anyone else). Thus, further incentives for the researcher team - e.g. in terms of shared remuneration - may be appropriate.

A HEI that ignores these facts may not be an optimal collaboration partner as there is a risk that the individual researchers will not contribute enough with their knowledge and thus the results from the cooperation will be flawed. The likeliness that such a situation would occur of course also varies due to what individuals inside a certain culture are used to expect when they perform work tasks but also from research team to research team inside a HEI as the drivers may vary also due to existing micro cultures inside teams/departments.

The section that follows, gives an overview of the incentives that the participating HEIs utilize to spur innovation amongst their employees. Each section begins with a question on the theme, after which the responses of the consortium as a group will be presented. Following this, interesting examples will be given from the HEI consortium as well as reflections on the results aiming to guide the reader in how to interpret these.

7.2.3.1 Does the HEI provide incentives for researchers and professors to evaluate if it is necessary to seek protection of research results before publishing?

All of the collaborating HEI provide some kinds of incentives for researchers and professors -to evaluate if it is necessary to seek protection of research results before publishing. Only Chalmers University in Sweden indicated that there were no systematic offers of incentives, and that there is no centralized body at Chalmers that provides such incentives. Examples of incentives can be found – but no information is compiled – as the experiences are spread across several actors and compiled on the HEI level. (Table 12 – page vi)

If yes, what incentives exist?

9 out of the 14 actors provide **sharing of licensing incomes** as an incentive for seeking protection of research results before publishing. 4 out of the 14 actors provide **equity sharing in start-ups** as an incentive for seeking protection of research results before publishing. 3 out of the 14 actors has a culture that provides **moral-prestige** as an incentive for seeking protection of research results before publishing. 4 out of the 14 actors provide **going to conferences** as an incentive for seeking protection of research results before publishing. 4 out of the 14 actors provide **training** as an incentive for seeking protection of research results before publishing. 5 out of the 14 actors provide **other kinds of incentives** for seeking protection of research results before publishing.

NML Jamshedpur is the only HEI that does not provide any incentives to the researchers. None of the HEIs provide all of the incentives mentioned, except for Novosibirsk State Technical University in Russia, which provides all incentives except sharing of licensing incomes which is otherwise the most common incentive (9 out of 14 HEIs provide sharing of licensing incomes as an incentive).

Interesting examples

KUST, China: An agreement to the requirement of seeking protection prior to publication is a precondition for applying for a research project granted by HEI; and the effort to seek protection of research results would be considered in the subsequent research funding.

KU Leuven, Belgium: General understanding which is more like a mechanism than an incentive structure- knowing that you can gain a lot if you get hard IP. There is a dedicated structure for generating university IP.
'For each member of the research group we have a certain account which we can work to structure one's own activities. When a research project is contracted by a company, the money often goes in to the special account. The professor can thereafter decide how and where to invest – eg: into new IP, staff, or lab equipment for further developments.
This individualized approach for getting money from IP generation is an incentive on both a structural as well as an individual level. And University has an incentive due to revenue generation- has to gain a certain part of the budget through IP generation'.

Reflections and analysis

The most common incentive for looking into protecting research results before publishing is the offer of sharing licensing incomes. The reason for this may be that licensing of research results traditionally has been the most common way of making money from research results in HEIs.
Some interesting examples of other incentives for evaluating protection possibilities before destroying potential IPR control mechanisms through publishing have however been found. E.g. at KU Leuven in Belgium, the incentive structure is individually designed for each researcher as this person receives an account where financial means flows in related to this person's innovation activities. This incentive structure can efficiently handle the fact that researchers are motivated by different things as the researcher can choose what to spend the money from the account on.

7.2.3.2 Does the HEI provide incentives for researchers and professors to transform research into innovations?

All of the 14 HEI provide incentives to researchers for transforming research into innovation. (Table 13 - page vi)

If yes, what incentives exist?

11 out of the 14 HEIs provide sharing of licensing incomes as an incentive for transforming research into innovation. 9 out of the 14 actors provide equity in start-ups as an incentive for transforming research into innovation. 6 out of the 14 actors provide a culture inside the HEI where moral-prestige works as an incentive for transforming research into innovation. 4 out

of the 14 actors provide going to conferences as an incentive for transforming research into innovation. 6 out of the 14 actors provide training as an incentive for transforming research into innovation. 6 out of the 14 actors provide other incentives for transforming research into innovation.

It is exciting to see that the HEIs provide many and varied incentives for transforming research into innovation – many more than what they provide as incentives for the evaluation of research results before publishing (see the question above). For transforming research into innovation 42 incentives are provided against 29 incentives for evaluating research results before publishing.

Interesting examples

IIT Roorkee, India: The Institute maintains a unique scheme of personnel development funds for its faculty members by transferring some amount from the research and consultancy projects. The fund can be utilized by the faculty members for their professional development.

KU Leuven, Belgium: see above.

Reflections and analysis

The actors use several incentives aimed at turning research into innovation. Beside those incentives mentioned as examples in the questionnaire, some actors also have other interesting incentive activities in place. For example, both IIT Roorkee and KU Leuven have accounts for the individual researchers where some amounts from the researchers' activities are being placed. This money is then intended to be used for the researchers' personal development.

It is also interesting to note that the University of Alicante, Jagiellonian University and KUST all three include the researchers' activities in innovation as an evaluation parameter of their work in general.

7.2.3.3 Does the HEI provide incentives for researchers and professors for other activities related to innovation?

Half of the HEIs offer other incentives related to innovation (than the incentives mentioned above in relation to protecting results before publishing and transforming research into innovation). The distribution amongst BRIC and EU HEIs that have such incentives is fairly equal (4 BRIC countries against 3 EU countries). (Table 14 – page vii)

If yes (above, question X), what incentives exist?

3 out of the 14 HEIs provide sharing licensing incomes as an incentive for other activities related to innovation. 3 out of the 14 actors provide getting equity in a start-up as an incentive for other activities related to innovation. 3 out of the 14 actors provide a culture where moral-prestige work as incentives for other activities related to innovation. 2 out of the 14 actors provide going to conferences as an incentive for other activities related to innovation. 4 out of the 14 actors provide other kinds of incentives for other activities related to innovation, for example: to participate in other R&D projects, opportunity to create spin offs, salary increases, etc.

São Paolo Federal University in Brazil and University of Alicante in Spain are the two HEIs that provide most incentives for other activities related to innovation (4 incentives each).

Interesting examples

Alicante, Spain:
1)to motivate participation in R&D projects or contract R&D
Regular evaluation of professor's work takes into account publications, PARTICIPATION IN RESEARCH PROJECTS OR CONTRACT RESEARCH WITH INDUSTRY, and IP rights commercialized: Possible rise in salary and position

2)to motivate university staff to set-up spin-off companies.
For spin-off companies the UA staff can get a period of 5 years while: *staff can come back to their post at the university, *seniority will be counted as if the person had never left, * participation in income/benefits.

KU Leuven, Belgium:
Each individual accumulates money on an account for his/her research/innovation activities which may be spent relatively freely see above.

Saarland University:
The University offers the opportunity to their researchers to take a sabbatical leave to allocate their time for start up activities.

Reflections and analysis

Fairly few actors provide incentives for other innovation activities than evaluating protection possibilities before publishing and for transforming research into innovation. However, some interesting examples exist on other incentives than those mentioned in the schedule for incentivizing other innovation activities.

A noteworthy example is the sabbatical leave that University of Alicante and Saarland University offer their personnel if they would like to start/work in a spin-off company. For spin-off companies the UA staff can get leaf period of 5 years and staff can either come back to their post at the university or if they retire during this period one will count it as if they had never left.

Also, as mentioned above, KU Leuven provides individual researchers with accounts where parts of the money they have earned on innovation are being placed. This amount can then be spent by the individual researcher in the way he/she is best incentivized.

7.2.3.4 Does the HEI stipulate the distribution of incomes from innovation activities in the HEI (i.e.: royalties) in percentage?

12 out of 14 HEI stipulate the distribution of incomes from innovation activities in the HEI. The only ones that do not do this are Novosibirsk State Technical University, Russia and CUST China.

If yes (on question X above), what is the distribution among stakeholders – in percentage?

The distribution of incomes differs quite much between the 14 HEIs. The only model of distribution that appears twice is the model when the HEI, the research center and the individual researcher receives a third each of the incomes generated. This model is used by both University of Campinas and Chalmers University of Technology. The distribution of KU Leuven is also similar to this model where 35 percent is granted to the HEI and the research center, 30 percent is granted to the individual researcher and 35 percent is granted to the IP Office.

HEI	HEI centrally	Department/Research center	Research group	Individual Researcher	Other- who?
Universidad de Campinas, Brazil	33	33		33	
São Paolo Federal University, Brazil	50			50	
KUST, China	30	10	60		
CUST, China					
Indian Institute of Technology Roorkee, India	20	20		60	
NML, Jamshedpur, India	15	10	35	40	
St Petersburg Electrotechnical University, Russia	100				
Novosibirsk State Technical University, Russia					
Jagiellonian University, Poland	25	15		50	10
University of Surrey, England					
Alicante University, Spain	40			60	
Saarland University, Germany	35			30	35 (IP office)
Chalmers University, Sweden	33	33		33	
KU Leuven, Belgium	17 (8,5% to LRD & 8,5% to HEI)		Gets up to 60	Gets up to 40 (can only double your salary)	

Table 2- Distribution of income for innovation activities

Comments about those who diverge from 'usual' distribution:

Chalmers, Sweden: At Chalmers, the rule is very rarely applicable as the HEI owns very little IP due to the Professor's privilege.

Alicante, Spain: option 2: HEI 20%, Research group 80%. In case of international extension of the IP: UA 20 % after deducting costs of extension from the first income generated

UJ, Poland: The 10% in "Other" goes into a fund.

ETU, Russia: The HEI is owned by the state so the 100% that the HEI gets goes directly into the state.

University of Surrey, Great Britain: Utilizes a progressive scale for deciding on the shares.

Cumulative Net Proceeds	Inventor(s)	University
Up to £50,000	70%	30%
Next £50,001-£100,000	50%	50%
Next £100,001-£500,000	40%	60%
Over £500,000	35%	65%

Reflections and analysis

It is interesting to note that almost all of the HEIs have different ways of distributing the income from innovation activities. Another noteworthy observation is that it appears that the current and former communist countries do not include individual incentives for researchers, i.e. revenues go back to the HEI, Department and Research group.

7.2.3.5 Does the HEI stipulate the distribution of equity in the case of company start ups in the HEI?

Out of the 14 responding HEI only five of them stipulate the distribution of equity in the case of company start ups in the HEI. It is worth noting that the HEIs that state that they have stipulation in these cases are exclusively from Europe. In fact all European HEI in this study except Saarland University in Germany has this kind of stipulation. (Table 15 – page viii)

If yes (on question X above), what is the distribution among stakeholders – in percentage?

HEI	HEI centrally	Department/Research center	Research group	Individual Researcher	Other
Universidad de Campinas, Brazil					
São Paolo Federal University, Brazil					
KUST, China					
CUST, China					
Indian Institute of Technology Roorkee, India					

NML, Jamshedpur, India					
St Petersburg Electrotechnical University, Russia					
Novosibirsk State Technical University, Russia					
Jagiellonian University, Poland	At least 20%			Theoretically same level as HEI	
University of Surrey, England					
Alicante University, Spain	Depends			Depends	
Saarland University, Germany					
Chalmers University, Sweden					100
KU Leuven, Belgium	18 (for costs)			40	Lab gets up to 60

Table 3- Distribution of equity in the case of company start-ups in the HEI

Comments about those who diverge from this schedule/divide money to other actors

Chalmers, Sweden: A Chalmers encubating entity distributes 20% to an encubator holding company, 10% to the students driving the incubation, up to 45% to the idea provider and 25% to engaged key persons.

Alicante, Spain: HEI participates but % is decided on a case-to-case basis when the EBT is approved by the Council. Individual researcher participates if the EBT was approved by the Uni-Council, % are decided on a case-to-case basis. Other university staff – e.g. Administrative can participate only up to a limit regulated by law (LOU).

UJ, Poland: The creator of the IP on which base the company can have the right to hold shares or options to subscribe for shares in a spin-off company, participate in spin-off company authorities, be a consultant in a spin-off company. The university profits from the equity possessed is than distributed among central budget, IP fund and the unit where the researcher works (worked)

University of Surrey, Great Britain: HEI 66.6%, Named inventors 33.3%.

Reflections and analysis

It is interesting to see that there is a distinction between BRIC countries and EU countries. None of the BRIC countries have distribution models for start-up companies, while some of the EU countries do. This may imply that the EU countries have come longer in the development of company creation as a means to capture innovation activities at the HEI. However this thesis does not match entirely with the statistics in the historical data chapter below.

When it comes to the distribution of incomes in those countries that have procedures for this, the distribution models are usually not very rigid. The reason for this is most likely that the distribution needs to be set in relation to the value and needs of support for each invention.

7.2.3.6 For which situations does the HEI stipulate who should bear the costs for IPR (e.g. patents, trademarks, design patent, plant variety protection, etc)?

All of the participating HEI have rules on who should bear the costs for applying for and maintaining IPR. However, as will be seen below, the stipulations regarding these activities vary.

Interesting examples

Chalmers, Sweden: In Sweden it is stated indirectly in the way that the Professor's privilege grants the IPR to the individual researcher. This person thus always bears the cost if nothing else is agreed.

KUST, China: HEI affords part of cost for applying for IPR and the maintenance costs are divided proportionally.

Saarland University, Germany: The university pays the costs for application/maintaining the patent. Ministry of Science and Innovation =BMWi pays 50% of the maintenance costs.

Reflections and analysis

Even though all HEIs have rules on who is responsible for the payment for applying and maintaining IPRs, the conditions for who is responsible for these activities vary. One extreme can be found at Chalmers University in Sweden where the researchers are responsible for both these processes. This is so since Swedish researchers own the rights to their inventions and no culture for support from a HEI level has been established to very large extent until this day. On the other extreme, Saarland University in Germany can be noted. There, the HEI is responsible for both applying for and maintaining IPR with support of 50% of the maintenance costs from the Ministry of Science and Innovation. In between these two extremes, an example can be found at KUST in China where the HEI pays for the application costs and the maintenance costs are being divided between the HEI and the researchers.

7.2.4 CRITERIA FOR GRANTING LICENSES AND SOLVING INTERNAL CONFLICTS

Even in the most well functioning innovation systems, it is likely that conflicts may arise. From a collaboration partner's point of view, it is of course important that both parties have the foresight and capacity to manage their own internal conflicts so that they do not risk destroying value in the collaboration. Therefore, it is of high interest to find out which structures a potential partner has to solve such situations. Also, if the HEI lacks such structures, there are a number of interesting examples for how to solve these kinds of questions will be illustrated below.

7.2.4.1 Does the HEI stipulate any judicial body (e.g. committee) for solving internal conflicts?

There are as many HEIs that do stipulate a judicial body for solving internal conflicts as there are HEIs that do not. Also, this distribution is equal amongst the HEIs from the EU- as well as the BRIC-countries. (Table 16 – page viii)

Interesting examples

IIT Roorkee, India: In all the cases, issue shall be referred by the Institute Intellectual Property Committee to an Arbitration Committee constituted by the Board of Governors of the Institute. The Arbitration Committee must communicate its decision on the matter to the creators within one month of the referral of the issue to the Committee. The decision of the Arbitration Committee will be final and binding on the creator(s) and the Institute.

University of Surrey, Great Britain:
If the Parties fail to reach an amicable settlement of the dispute in accordance with the standard University Grievance procedures, it shall be referred to arbitration by a single arbitrator to be appointed by agreement between the Parties or in default of such agreement within thirty (30) days of the notification of a dispute, upon the application of either Party, by the Chairman of the Bar Council for the time being or his nominee.
Such arbitration shall be conducted in London in accordance with Rules of the Chartered Institute of Arbitrators and in accordance with the Arbitration Act 1996 or any successor legislation in force in England and Wales.
To the extent permissible by law, the determination of the Arbitrator shall be final and binding upon the Parties.

Reflections and analysis

It is interesting to see that half of the HEIs do not regulate which judicial body is to solve potential disputes arising in the HEI related to innovation activities. Also, few of those that have such procedures appear to have very detailed regulations. Of course, lack of such stipulations may cause difficulties when working with innovation and entrepreneurship as one risks losing control of where the dispute will be settled and how much it will cost. HEIs in general can be expected to have quite small amounts to put into legal disputes as this is not their core activity. By being aware of this, the HEI can hinder expensive dispute resolution methods e.g. by inserting mediation clauses in all of the contracts that covers research and innovation. This becomes even more important when collaborating outside the internal HEI system which however is outside the scope of this question. Of course, the lack of dispute

resolution stipulations may not be a problem in reality since many HEIs probably operate inside cultural framework where it is uncommon to settle disputes by legal means. However, as international collaborations increase, the importance of clearing out these questions on all levels of course gain in importance in order to not fall victim of the other party's more litigious culture.

Out of those that have judicial rules for settlement of disputes arising in relation to the HEI innovation activities, only two out of these 14 actors have provided examples on fully developed clauses for settling of disputes. These two actors are IIT Roorkee and University of Surrey. Both of these HEIs have chosen to use arbitration as a dispute settlement method; however the format for this procedure differs slightly between the two actors. While IIT Roorkee chooses to let an Intellectual Property Committee settle the question, University of Surrey stipulates that the arbitration procedure shall be solved by one arbitrator. The latter is generally referred to as a simplified arbitration procedure and is generally chosen when less complicated matters are to be solved and/or one wants to keep costs down. In the case of University of Surrey it is also stipulated that arbitration shall be entered into only after the parties have tried to reach an amicable settlement. This is a common writing which also aims at keeping costs down as much as possible as arbitration is generally very expensive. Such stipulation is lacking in the case of IIT Roorkee however, the culture of the HEI may imply that such amicable settlement is always sought before attempting further trial why in reality there might not be a difference between the two HEIs in this aspect.

7.2.5 SELF ASSESSMENT OF HEI – MISSION, STRATEGIES, POLICIES AND REGULATION

In general, the HEIs show strong capacities in including innovation and IP in their mission, strategies, policies and regulation. As an example, 11 out of 14 HEIs include innovation in their mission/vision which implies that it is prioritized as a highly important question for the entire HEI. The fact that the formal environment inside the HEIs is so strong indicates that the concepts of innovation at least have been understood to good extent at the highest level of the HEI which is necessary in order to drive these questions in HEIs of more centralized character.

Some weaknesses at this level can however also be detected. The first weakness is in the incentive system for spin-off creation in which only 5 out of the 14 HEIs have systems for how to share revenue. Furthermore, these five HEIs all come from within the EU. The second weakness that has been found is that only half of the HEIs have a judicial body for solving internal conflicts. As stated above, this can of course create situations where inventions get stuck in the system and can never reach the market due to conflicts internally which would be too expensive to settle through the regular legal system but are still too complex to be settled by the parties themselves.

7.3 HEI Innovation System – Organizations / Units / Functions / Departments

In order to successfully run innovation and IP activities inside a HEI, it is necessary to allocate resources to these issues. Being able to do this in a systematic way generally requires the establishment of internal units that can manage these resources. These units can have diverse goals such as managing the HEI IP portfolio or creating contacts with researchers and industry. In a well functioning innovation system, all of these activities are aligned and follows a logic which leads to the largest extent the fulfillment of the HEI's internal norms e.g. stated in the vision and mission of the HEI. The number of units and how they are organized in order to achieve this optimal output can however vary as the goals of the HEIs are diverging to some extent and also the culture, resources and amount of planning put into designing the system.

To create understanding for each of the HEIs unique innovation systems and to create opportunities to learn from others' examples this chapter therefore outlines all or some of the innovation units that manage the innovation and IP activities inside the participating HEIs.

This section is organized as follows: 1) a summary of the results is presented, 2) a graphical representation will illustrate the results (in some cases), 3) a number of interesting examples from individual HEIs are highlighted, and finally 4) a reflection on the results and examples will be offered.

7.3.1 NUMBER OF ENTITIES AND LEGAL STATUS

The number of entities that handles the innovation activities inside the HEIs of course varies. Partly because of the different sizes of the HEIs in general and partly because different HEIs see different choices to satisfy their needs of organization in the innovation system differently. The focus of the entities as well as the legal status may, as will be seen below vary to the same extent and affect the output of the innovation activities as some entities are more designed towards market output than others. This is necessarily not a problem as the entities inside the system can complement each other as well as other departments inside the HEI which suits the vision and mission of the HEI.

7.3.1.1 How many entities are responsible for managing the HEI's IP, TT, BD, incubation, contract research and other innovation activities?

All HEI except Chalmers in Sweden have between 1-5 units inside the HEI managing IP, innovation and entrepreneurship questions.

HEI	Number of entities
Universidad de Campinas, Brazil	1
São Paolo Federal University, Brazil	1
KUST, China	1
CUST, China	3
Indian Institute of Technology Roorkee, India	4
NML, Jamshedpur, India	2
St Petersburg Electrotechnical University, Russia	3
Novosibirsk State Technical University, Russia	5

Jagiellonian University, Poland	3
University of Surrey, England	1
Alicante University, Spain	1
Saarland University, Germany	2
Chalmers University, Sweden	7>1000[9]
KU Leuven, Belgium	1

Table 4- Number of entities inside the HEI managing the innovation related activities

7.3.1.2 What is the legal status of the entities dealing with the HEI's IP, TT, BD, incubation, contract research and other innovation activities?

a) Internal or external

All of the HEI have entities working with innovation and IP that are constructed as internal entities belonging to the HEI. Five out of the fourteen HEIs have additional units dealing with these issues that are external to the HEI structure. Chalmers University is the only actor that has units that have another ownership structure. (Table 17 – page ix)

Reflections and analysis

A reflection in relation to the results is that there are more external entities linked to HEIs among the EU countries (4 out of 6) than there are external entities linked to HEIs amongst the BRIC countries (1 out of 8). This may imply that those HEIs in the EC countries have come further in viewing research inside HEI as something that can provide benefit to society through creating various structures targeting external actors.

b) Legal classification

11 out of the 14 responding HEI have a unit that handles Innovation and IP questions that can be referred to as a public unit. Only three HEIs have units with these tasks that are private. KU Leuven, Belgium is the only HEI that has a unit that is non-profit private while Chalmers University is the only actor that has units that can be classified as foundations. Three out of the thirteen answering actors have units that can be defined differently from the stated options. (Table 18 – page x)

Reflections and analysis

It is interesting to see that so many of the units are public. This is most likely so since HEIs traditionally have been public institutions due to their important role in creating societal benefits. However, it is of course not certain that this construction is the most beneficial way to drive a unit for innovation activities. In Sweden, e.g. CIT which is a unit managing contract research is a foundation where the HEI has ownership but not full control. This implies that this unit can be run as a company and act as a separate unit towards their customers at the same time as it is keeping brand benefits from being connected to a famous HEI.

[9] At Chalmers University and generally in Sweden the number of entities dealing with IP and innovation issues is countless as the professors own the rights to their own inventions and thus deal with these questions inside their research teams. For the sake of this study, we have focused on some actors that do this kind of management in a more sophisticated way- but also looked at one research team to get insight in how these issues are usually handled.

7.3.1.3 Are the entities internally or externally oriented?

6 out of 14 HEI responding to this question have units working with innovation and IP that offer services only internally as well as both internally and externally. 3 out of the 14 actors have units that only offer their services internally while 2 actors only have units that offer their services both internally and externally. All of the six EU HEI have units that are externally oriented while only three out of the eight BRIC country HEIs have units with external orientation. (Table 19 – page x)

Reflections and analysis

A reflection in relation to the results is that there are more externally oriented entities inside HEIs among the EU countries than there are externally oriented entities inside HEIs amongst the BRIC countries. This may imply that those HEIs in the EC countries have come further in viewing research inside HEI as something that can provide benefit to society through targeting of external actors.

7.3.2 HUMAN RESOURCES

It is has been found that more heterogeneous organizations are often more stable than less diverse ones – hence, diversity of personnel and competence is advisable for managing the key activities in IP and Innovation. Information on how many and which sort of persons are employed to manage the HEI's innovation activities says a lot about which the strengths and capacities and also which weaknesses and incapacities can be expected inside the HEI. Choosing a collaboration partner may help bridge one's own weaknesses but also enforce already possessed strengths. Having insights in this fact enables awareness in the choices to be made. It also creates opportunities for improving weaknesses inside the own HEI before they grow to problems and to enforce strengths when communicating internally as well as externally.

7.3.2.1 How many persons are employed inside the units that are responsible for managing the HEI's IP, TT, BD, incubation, contract research and other innovation activities?

The HEI have between 15-512 persons managing the HEI's IP and Innovation practices.

HEI	Number of employees
Universidad de Campinas, Brazil	54
São Paolo Federal University, Brazil	30
KUST, China	15
CUST, China	100
Indian Institute of Technology Roorkee, India	19
NML, Jamshedpur, India	512
St Petersburg Electrotechnical University, Russia	70
Novosibirsk State Technical University, Russia	116
Jagiellonian University, Poland	33
University of Surrey, England	30
Alicante University, Spain	36
Saarland University, Germany	15
Chalmers University, Sweden	89
KU Leuven, Belgium	55

Table 5- Number of employees inside the HEI innovation units

7.3.2.2 Profile of people employed in these entities

a) Academic background

In total about 9% of the persons who are working in the innovation systems (in 11 of the responding HEI out of 14 HEIs in total) have a background in economy and business. 4.5% have a legal background, 16% have a science background, 23% have an engineering background, 0.5% have a psychology background, 4% have a marketing background and, and 42% have a 'different' background. Out of those backgrounds that have been specified here, there is a dominance of individuals with either and engineering or science background.

HEI	Economy	Law	Science	Engineering	Psychology	Marketing	Other
Universidad de Campinas, Brazil	6	7	3	15		2	21
São Paolo Federal University, Brazil	3	2	3	2		3	17
KUST, China	1		1	13			
CUST, China	-	-	-	-	-	-	-
Indian Institute of Technology Roorkee, India	2		63	93	2	3	359
NML, Jamshedpur, India			2	6			4
St Petersburg Electrotechnical University, Russia	12	8	13	16		17	
Novosibirsk State Technical University, Russia	42	20	15	19		11	9
Jagiellonian University, Poland	14	1	11		1	1	5
University of Surrey, England		4	9	1		1	13
Alicante University, Spain	X		X	X			
Saarland University, Germany	4	1	1	1			8
Chalmers University, Sweden	13	6	51	83	2	9	11 (9 ICM 1 BA 1 Mgmt)
KU Leuven, Belgium	-	-	-	-	-	-	-

Table 6- Profile of employees by academic discipline - inside the HEI innovation units

7.3.2.3 b) Professional experience

19% of the persons working inside the innovation systems of the ten responding HEIs (out of 14 HEIs in total) have previous business experience, 33% of the persons have research

experience, 6% have legal experience, 13% have management experience, 22% have administration experience and 7% have other kinds of experiences.

HEI	Business	Research	Legal	Management	Administration	Other
Universidad de Campinas, Brazil	3	11	11	6	5	18
São Paolo Federal University, Brazil	4		4	7	3	12
KUST, China		4		5	6	
CUST, China	-	-	-	-	-	-
Indian Institute of Technology Roorkee, India					6	9
NML, Jamshedpur, India	17	208		22	171	8
St Petersburg Electrotechnical University, Russia	14	18	10	19	9	
Novosibirsk State Technical University, Russia	39	43	30	2	4	
Jagiellonian University, Poland	22	3	1	7	8	
University of Surrey, England	11	1	3	1	7	5
Alicante University, Spain	X	X			X	
Saarland University, Germany	-	-	-	-	-	-
Chalmers University, Sweden	85	53	6	63	14	20
KU Leuven, Belgium	-	-	-	-	-	-

Table 7 – Professional Experience of employees inside the HEI innovation units

Reflections and analysis

The most common academic background amongst those that work inside the HEI innovation system is engineering and science. The least common academic background of the alternatives mentioned is psychology. However, it is also worth mentioning that out of the 49 persons with legal academic background, 20 of these can be found in one HEI (Novosibirsk University). When it comes to previous work experience, the results are similar to those related to academic background. The largest group consists of persons with research experience while the smallest groups is consists of people with previous experiences of legal practice.

This is fairly remarkable since this background is generally necessary to have in order to be able to fully understand the control mechanisms of research results. One explanation to the

lack of people with this background could be that the HEIs buy this service from external partners.

7.3.2.4 How is the staff inside these entities compensated?

All of the thirteen HEIs responding to this question compensate their employees through base salary. KUST, China is the only HEI that also compensates their employees with royalty percentage while Chalmers University is the only actor that compensates some of its employees through company equity. CUST China, IIT Roorkee India, Jagiellonian University Poland as well as Chalmers University Sweden also compensate their employees through other means. (Table 20 – page xi)

Interesting examples on other remuneration types

IIT Roorkee, India: In some instances faculty members receive an honorarium and the salary of office staff is paid by the institute.

UJ, Poland: Additional remuneration from projects conducted.

Chalmers, Sweden:

- Bonuses for president and VP at an incubation company.
- Compensation for turning over inventions that are patented- not as much as in industry but something at least.

Reflections and analysis

The fact that all of the HEIs compensate their employees with base salaries imply that there are at least some basic funding for having people work under more stabile conditions. On the other hand, having people working for base salary indicates a less innovative culture where people expect to get compensation from a higher level to perform their work. Thus, it does not indicate that the employees see themselves as entrepreneurs where they have to earn the money through each activity they take on.

7.3.3 WHAT ARE THE INNOVATION ORIENTED ACTIVITIES OF THESE ENTITIES?

In order to lead and link the innovation functions inside the HEI and between the HEI and its stakeholders, a vast range of services and activities need to be managed and continuously updated. Which activities the Innovation units are conducting of course depends on what mandate the units have as well as if they are working alone or in collaboration with other internal units dedicated innovation. In the section that follows, we review they key activities the participating HEI in this study have stipulated that are important to successfully fulfilling their key goals and responsibilities.

Chalmers, Sweden:
The unit CIT which is one of many innovation units inside the Chalmers innovation system, has a mandate to generate and manage contract research & development activities: as a result,

many of the activities inside CIT are associated with providing R&D on demand from companies outside the Chalmers University border through linking companies to the right researchers inside of Chalmers. The key customers are the large industrial companies in Sweden and local and regional SME's.

KUST, China:
There is only 1 key unit in KUST that has the mandate to work with IP and Innovation, hence their key activities include: IP Management, protection and stimulation and seeking and seeking channels for technology transfer.

Alicante, Spain:
There are a number of units in Alicante that are dedicated to IP and Innovation activities. One of the units identified 8 key activity areas they are engaged in:
Public calls for R&D: Dissemination of information on public subsidies and calls for projects from state and regional bodies

- Funding possibilities and Calls monitoring
- Updating website on open calls
- Information and personalized assistance and consulting to researchers
- Assistance for preparing proposals
- Negotiation of contracts and participation of UA in projects
- Managing fellowships

R&D contracts with enterprises: Information on possibilities of cooperation, personalized assistance, networking – finding partners
Economic research management: Assistance to researchers for financial management of projects and subsidies for research, handling university-internal bureaucratic requirements, control and verification of reports for R&D funds.
Technology offer and transfer: Visiting research groups to detect potential technology offers, elaboration of exploitation plans, finding right way of transferring / cooperating with enterprises, promote the technologies at fairs and sectoral events, manage and intermediation with enterprises and other cooperative partners
Intellectual Property management: * information on IP rights, * information on technology transfer options, * technical assistance and services for researchers, * information on exploitation and enforcement of IP rights, *Patentability studies, *patent applications, *state of the art reports (individual technologies), * technology vigilance reports (sectoral), *mediation in conflicts of IP.
Spin-off creation: First phase: * Identify projects * scientific evaluation of the project * identify business ideas * access to first financial sources. Second phase:* market studies,* Business plan development,* IP protection assessment (IP unit),* training of entrepreneurs,* formation of management team of the firm,* access further financial resources.
Evaluation and documentation of R&D
Statistics: Technical support, IT, Data bases and statistics
International R&D Projects:

1. information on international research funding opportunities
2. Networking and finding the right partners
3. development of proposals
4. management during the entire project lifespan
5. final reporting etc.

UJ, Poland: UJ has 3 key units dedicated to innovation and IP. They have distributed their activities as follows:
CITTRU applies for the funds through projects co-financed by EU or state or assists researchers to apply for it. Bigger grants and projects aiming at - improving university facilities and infrastructure are managed by CITTRU - cooperation with bigger stakeholders. Supervising the process in order to ensure the IP protection
JCI Venture Ltd manages the Life Science Park. So far this seems to be main part of JCI activity.

Campinas, Brazil: The Unicamp Innovation Agency (INOVA) acts through the following actions:

- Encouraging new partnerships and articulating the activities already existing at Unicamp with society: companies, public sector, institutes and foundations;

- Developing the potential and the synergy of the actions of the several agencies at Unicamp that work with external relationships. Extension and specialization courses, cooperative R&D projects, consultancies, technical assessments, patent licensing, essays and certification, hiring of people graduated from Unicamp and offering qualified periods of probation are usual forms of relationships between the University and companies and government.

- Extending these forms of cooperation and facilitating access of companies and public agencies to activities that the University performs or can perform, trying to make this relationship more effective and profitable for everyone, encouraging the presentation of demands and the identification of new common interest opportunities, developing a true system of strategic partnerships, including through more specialized attention and in the assistance in the creation of agreements.

- Accounting for the management of intellectual property (IP) generated within Unicamp – protection of brands, products, processes and creation of license agreements – and for the creation of a proposal of IP politics at Unicamp, which emphasizes its strategic characteristics for the University. This is an action targeted, mainly, for the search of opportunities of licensing and partnership with companies, and that aims at encouraging the research activities of the University.

- Helping the researchers in the licensing of the innovations also in the writing and patent files, in software registration and in other forms of IP, in the identification of products or patentable and licensable processes, trying to reinforce the culture of protection of technology and simplifying the commercialization and registration of IP procedures, also accounting for partnership activities with the government and private sector in the encouragement of the creation of technology-based companies, and in the strengthening of R&D activities of the private sector, by working along with agencies and venture capitalists, as well as for the action of incubation of companies and acting, on behalf of Unicamp, in the implementation and development of the technology park surrounding the University.

University of Surrey, Great Britain:
The Research Development Team provide advice and support in generating income for the University through research collaborations with industry, consultancy, knowledge transfer partnerships, bid support and expert services.
The Projects, Programmes and Entrepreneurship Team provide project management support across the University and manage strategic partnerships.

Their Technology Transfer Office manages the University's Intellectual Property portfolio, working to transfer technology from the University to industry.
RES have a Legal Team of qualified lawyers to provide legal advice to academics and negotiate contracts on behalf of the University.

USP, Brazil:

- Emphasis for innovation at USP: To promote interactions with Institutions, enterprises and people – locally, nationally and internationally; strength collaboration creating networks to increase the flux of knowledge to enterprises; promote entrepreneurship and creation of spin-off enterprises from the science-driven innovation generated at USP.
- Enterprises and entrepreneurship: To promote the culture of entrepreneurship through activities with students and faculty members; to Identify opportunities to support the creation of spin-out enterprises; to Interact with the Venture Capital; to support the development of incubators and Science and Technological Parks; responsible for promoting and support the liaison University/Enterprise.
- Help Desk for Small Business Enterprises: Responsible for the Disk-Technology Program, a technological Help Desk – via Internet and phone, supported by SEBRAE and SBRT-MCT to elaborate Technical Responses and Technical Reports based on problems raised by entrepreneurs at the micro and small enterprises and rural producers.
- Prospecting innovation competences: To map the research developments at university laboratories to identify technologies and processes with innovation potential; to identify the portfolio of available technologies and technical knowledge; to Indentify researchers and infrastructures to support technological routes; to promote coaching for capacity building on innovation management within the USP community.
- Protecting the intellectual property: To guide researchers to protect the knowledge generated at USP; to identify prior art in the registering processes of patents and trademarks; to define the strategy to protect the inventions; to elaborate reports for patent applications; to develop training courses for innovation managers to perform analysis and quality control of application reports; to register trademarks, software, plants and copyright.
- Analysis and Project Management: To support the USP community for the development of University/Enterprise partnership projects for the establishment of agreements and contracts.
- Promoting Innovation Initiatives: To promote courses, lectures, workshops, seminars and conferences on innovation aiming for capacity building and to spread the innovation and entrepreneurial culture to the USP community.
- Innovation for Sustainability: To consolidate the university policy towards sustainability articulating the waste reduction, water conservation, rational energy uses and reduction of CO2 emissions – USP Sustainability; to stimulate and promote the development of socio environmental management models and the transference of sustainable efficient technologies or methodologies; to coordinate the USP Recycle Program – a reference experience for environmental education and waste management.

CUST, China:

Collection and analysis for University leaders: of scientific information in order to create research plans

Drafting for University researchers: drafting research-related policies and regulations

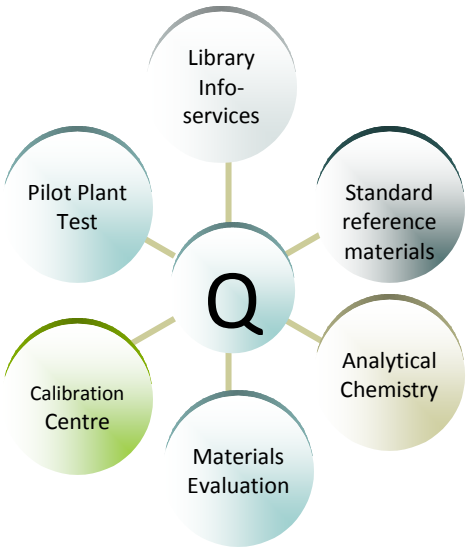
Assessment and rewarding for University researchers: assessment research achievements and reward the researchers

Accelerating and promoting for University researchers: promoting the transformation of research achievements

NML Jamshedpur, India:

The activities of the Business Development Division are: R&D Management, Intellectual Property Management & Acquisition, Scientific & Technical Services, Quality Management Implementation and Customer Satisfaction Evaluation. The division supports the activities to sustain and improve the techno-commercial competitiveness of the laboratory through its knowledge and know-how marketing efforts, so as to maximize benefits from IP assets, R&D products and services by employing quality management system and genuine customer selection. The key customers are Internal Project Leaders, Innovators and Scientists.

The activities of the R&D Divisions/Centers are: R&D Projects, Testing and Analytical services:



The key customers are: Government Departments like DST, DBT, ISRO, Ministry of Environment and Forest, Ministry of Steel, Earth Sc, Mines, Electronics and Telecom, DAE, Tata Steel, CPRI, GTRE, ISTM, SSNNL, Sterlite Industries, MECON, KIGAM, etc.

7.3.4 ORGANIZATION MAPS

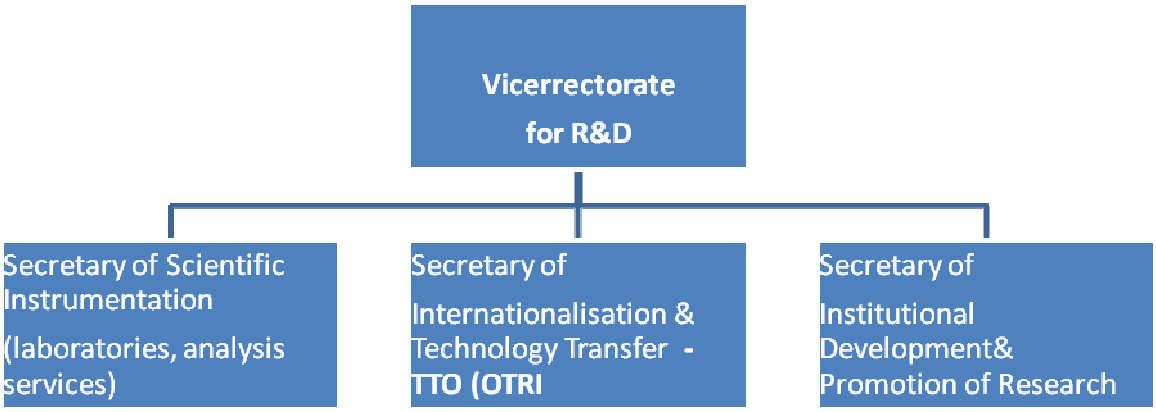
A HEI innovation system can be structured and organized in an almost infinite number of ways. In the best case, the system is set up to fulfill the mission and vision of the HEI and its innovation activities. Below, three examples from the participating HEIs' innovation systems are presented and briefly commented. Further examples on organizational maps from the different HEIs can be found in annex 9.5.

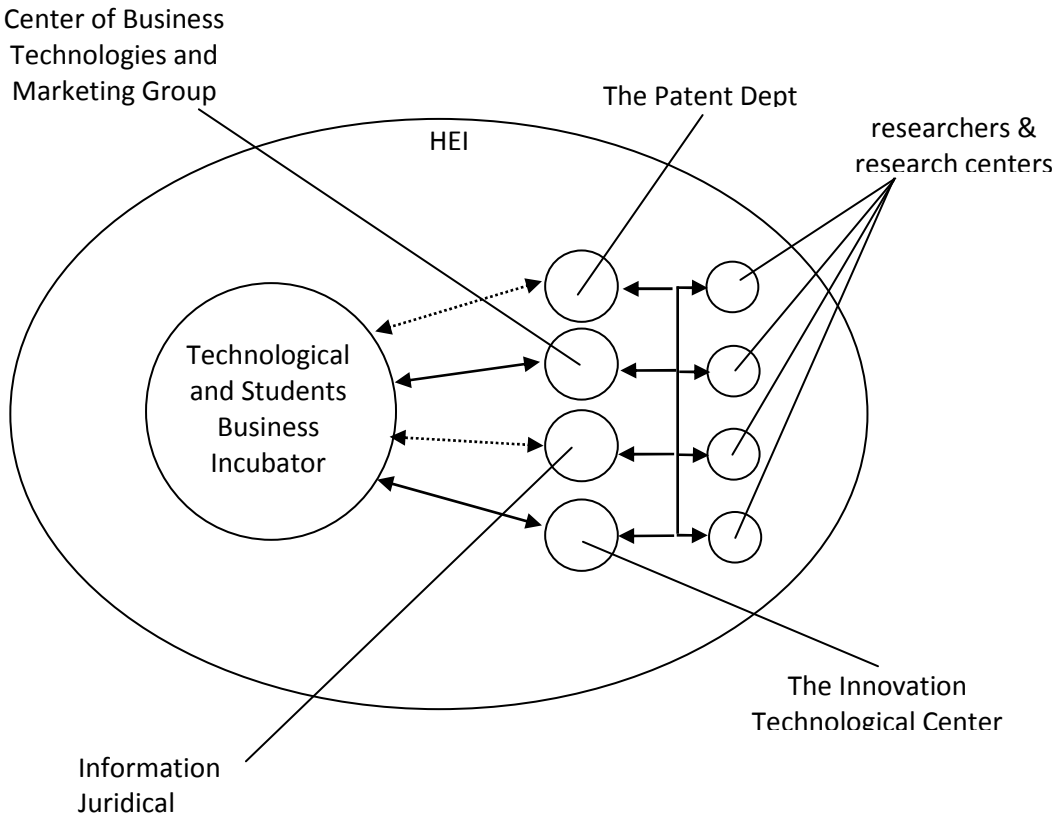
7.3.4.1 Novosibirsk State Technical University, Russia

The environment for innovation and IP creation and utilization inside Novosibirsk State Technical University in Russia can be viewed below. The outer circle represents the HEI which shows how the focus of this innovation system is on the internal units of the HEI only and not on the potential external collaboration partners. The largest function inside the HEI is the incubator named the Technological and Students Business Incubator. The Center of Business Technologies and Marketing Group and the Innovation Technological Center are strongly connected to this unit. The Patent Department and the Information Judicial Center are also connected to the incubator function but to a lesser extent. The individual researchers and research centers are connected to all of these four functions and thus, in the long run also to the incubator.

The picture below shows a very organized environment where not so many actors are involved in the internal operations. The fact that all of the units have separate areas of responsibility may create a good overview for the researchers when navigating where to go when research results are to be handed over for further utilization efforts. However, the organization appears to lack a wider perspective on IP and value creation as it is not clear where the support is for the identification of the research results that are worth protecting and creating business models around is being done.

On the one hand there is a business and technologies group where a technology's business potential probably is being assessed. This process might however not be connected to an analysis of which parts of the technology that can be controlled on the market through intellectual property rights/other kinds of IP strategies. On the other hand, there is a patent department but this division might not be at all focused on making wider assessments on which intellectual property to protect for the sake of protecting a technological business idea optimally. It can also be noted that this function only covers patents and none of the other possible IPRs such as e.g. copyrights and trademarks.

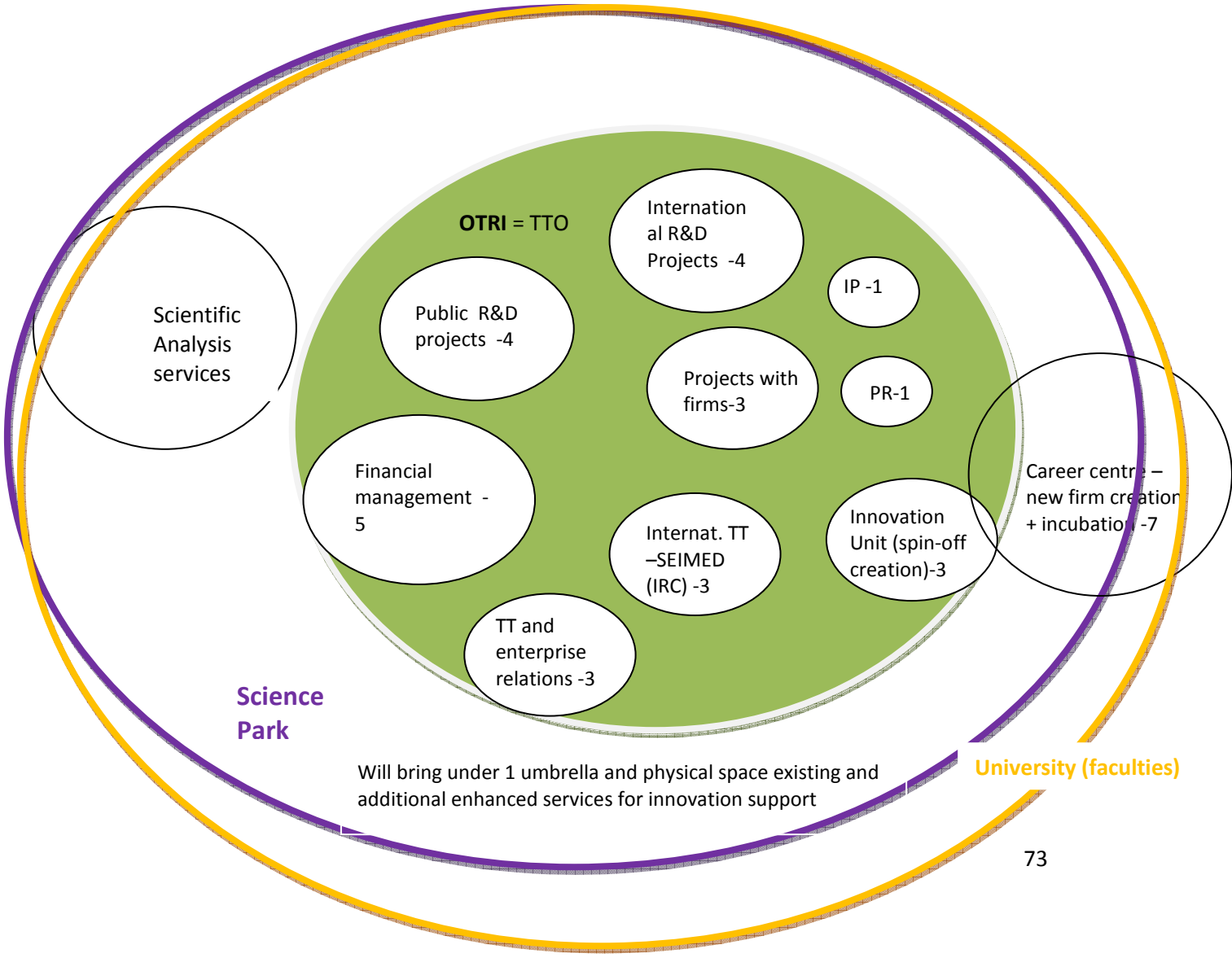

Vicerrectorate
for R&D
Secretary of Scientific Instrumentation
(laboratories, analysis services)
Secretary of
Internationalisation & Technology Transfer - TTO (OTRI
Secretary of
Institutional Development& Promotion of Research


Center of Business Technologies and Marketing Group
The Patent Dept
researchers & research centers
HEI
Technological and Students Business Incubator
The Innovation Technological Center
Information Juridical

7.3.4.2 University of Alicante, Spain

The environment for innovation and IP inside University of Alicante, Spain consists of several units where there is no clear hierarchy between these units, judging from the picture below. The biggest unit inside the HEI that includes all of the innovation activities named here is the Science Park. The two next biggest units are the Scientific Analysis services and the Career centre for creation of new firms and incubation.

Inside the Science Park, there is a TTO which includes public R&D projects, internal R&D projects, projects with firms, IP function, PR function, innovation unit (spin-off creation) international technology transfer, technology transfer and enterprise relations and financial management. The biggest function inside the TTO is the financial management section while the smallest sections are dedicated to IP and PR functions. A comment to this is that the IP function seems to be very small in relation to the many innovation focused units there are inside the TTO. One possible explanation to this could be that several of the other units also handle IP questions related to their specific task. Another explanation could be that IP is understood as IPR registration and that this activity is not so well integrated in the general business model creation why few registrations need to be made.



7.4 HEI – Innovation Activities, Processes, Practices and Procedures

In order to fully enable and strengthen innovation inside the HEI, several processes to support innovation activities need to be in place. There is no one solution on how to design such innovation related procedures as much of their appearance depends upon the culture that is in place inside the specific HEI. By being aware of which processes are in place and which are not, a HEI can more easily analyze where the weak and strong points in their innovation system lie. Also, by learning from others examples, inspiration can be had to make changes necessary to spur the innovation climate further. However, just because one procedure is successful in one HEI, it is not certain that it would be equally successful elsewhere as it is the combination of processes and the culture supporting these processes that make up the full picture.

In this study – we have prioritized to explore the following processes related to the management of innovation and IP in each HEI:

- Information and Communication Processes
- Awareness building and communication
- Searching for and Identifying Value in Research
- Assessing the Value identified in Research
- Evaluating possibilities for protection and seeking protection
- Commercializing the innovation
- Managing innovation and IP management and continuous assessment and improvement

This section is organized as follows: 1) a summary of the results is presented, 2) a graphical representation will illustrate the results (in some cases), 3) a number of interesting examples from individual HEIs are highlighted, and finally 4) a reflection on the results and examples will be offered.

7.4.1 INFORMATION AND COMMUNICATION

Innovation has not always been an integrated part of the HEI and this implies a need for communicating internally why these kinds of processes are necessary and what the HEI has achieved. Also, it is of course vital that the HEI is able to communicate its capacities externally in order to gain reputation, funding as well as increased collaboration with industry in case the HEI is aiming at increasing commercialization opportunities.

Below, it is presented how the HEIs manage these kinds of information and communication processes. First, an overview in relation to the question posed will be provided. Second, interesting examples on these processes from within the HEIs are given. Concluding this, some analysis and reflection in relation to the results and examples (where applicable) is provided.

7.4.1.1 How does the HEI communicate and diffuse its formal commitment to innovation and IP to faculty and staff?

All of the HEIs except NML Jamshedpur communicate their formal commitment to innovation and IP internally through the HEI website. 6 out of the 14 HEIs communicate their commitment through publications. 8 out of 14 HEIs communicate their commitment through news magazines. 8 out of 14 HEIs communicate their commitment through board meetings. 10 out

of 14 communicate their commitment through staff meetings. 11 out of 14 communicate their commitment through seminars. 3 of the 14 HEIs communicate their commitment through other means. (Table 21 – page xii)

8 out of 13 responding HEIs use more than five communication channels to distribute its commitment to innovation and IP to faculty and staff.
The HEIs that use the highest number of communication channels to diffuse its formal commitment to innovation and IP to faculty and staff are São Paolo Federal University, Brazil (7 channels), St Petersburg Electrotechnical University, Russia (6), Jagiellonian University, Poland (6), Alicante University, Spain (6).

The HEIs that use the lowest number of communication channels to diffuse its formal commitment to innovation and IP to faculty and staff are University of Surrey, England and CUST, China with two channels each and KUST, China with three channels.

Interesting examples of 'other' ways to diffuse the formal commitment

KUST, China: To give public lectures to disseminate primary content of IP.

Alicante, Spain: Conferences and round tables with industry participation, 'technology brunches', expositions at the university museum on new technologies.

USP, Brazil: Communicate to society in general the impact and benefits of innovations driven by the science developed by researchers at USP.

Reflections and analysis

It is interesting to note that so many as 8 out of the 13 responding HEIs use more than five communication channels to communicate their engagement in innovation and IP questions internally. However, in spite this high number of several channels used, it is of course not certain how well the message is being communicated and further on- implemented.

In the end, it is however still interesting to note that so many HEIs use a diversity of ways to communicate when spreading the formal commitment of innovation and IP to their employees as this may increase the chance of reaching through with the message due to pure quantitative advantages of using many ways to communicate.

Interesting examples on how the HEI IP Policy is communicated and diffused

UJ, Poland: The university policy in IP is reflected in the Regulations covering IP and the creation of spin-offs and is communicated via website, publications, newsletters as well as seminars and workshops.

USP, Brazil: The Communications Department contributes to the dissemination of activities and results, sending suggestions to the staff college at USP media (Newspapers, USPOnline, Radio USP, Revista USP and USP Agency) and to the media outside.

CUST, China: Publish in web, important information would be explained in staff meetings and at congresses.

Interesting examples on how the HEI innovation policy is communicated and diffused:

Alicante, Spain: *Website & E-mailing *when developing the plan Workshops were organized with participation of staff and students in the design of the policy and implementation plan

UJ, Poland: As already indicated university does not have separate document for innovation policy. The innovation policy is communicated indirectly through activities of CITTRU in form as indicated in the previous table.

ETU, Russia: It is communicated and diffused by HEI Web site, Publications, News magazines, Board meetings, Staff meetings and Seminars.

USP, Brazil: See above.

Reflections and analysis

It is interesting to see that the most common way to diffuse the innovation and IP is through a website. Diffusion through a web page has its limits though. For example, often people need to be informed – that this 'is' a web site' in order to know to 'look there. In addition, just having a website may not be forceful enough to actively and systematically diffuse the policies in order to attain new norms and to transform the policies into their daily activities. In those cases it might be necessary to complement such policies by e.g. education seminars where the issues relevant to this kind of party are specifically highlighted. Such processes appear to be in place at Alicante University, Spain, Jagiellonian University, Poland, ETU, Russia and CUST, China.

7.4.1.2 How does the HEI communicate/market and diffuse its "technological offer" and IP to society and commercial markets?

12 out of the 14 HEIs communicate their technological offer and IP to external actors through a HEI website. 6 out of the 14 HEIs communicate their technological offer and IP through 3rd party websites. 12 out of the 14 HEIs communicate their technological offer and IP through newspapers and magazines. 3 out of 14 HEIs communicate their technological offer and IP through the radio. 5 out of 14 HEIs communicate their technological offer and IP through TV. 4 out of 14 HEIs communicate their technological offer and IP through public procurement. 11 out of 14 HEIs communicate their technological offer and IP through events, fairs and workshops. 11 out of 14 HEIs communicate their technological offer and IP through visits to partners. 4 out of 14 HEIs communicate their technological offer and IP through other activities. (Table 22 – page xiii)

The HEIs that uses most channels for communicating their technological offer and IP to society are Novosibirsk State Technical University, Russia (8 channels), Saarland University, Germany (7) and Alicante University, Spain (6). The three HEIs that use the fewest communication channels out of those named here, are University of Surrey, England (3 channels) KU Leuven, Belgium (4) St Petersburg Electrotechnical University, Russia (4).

Interesting examples of other ways to distribute the technological offer externally

Alicante, Spain: Red OTRI – National Network of Spanish TTOs, Ruvid – Network of TTOs of the Region of Valencia

UJ, Poland: Market oriented publication (offers) disseminated during innovation events and other business meetings.

Campinas, Brazil: Technology and agreements are disseminated through press releases at the regional and national levels. Such releases are used as a means of stimulating materials in media such as external sites, TV, radio and others.

Reflections and analysis

It is interesting to note that such well known names in the area of HEI innovation such as KU Leuven in Belgium and University of Surrey, Great Britain do not use very many channels to distribute their technological offer externally. However it is highly important to stress that it is not the number of communication channels that decide on how efficient the communication is but rather how well aligned these alternatives are to the HEIs vision/mission and of course the type of offer it is. The national network for TTO: that is used by University of Alicante to distribute their research results appear to be an example of an innovative way to distribute a technological offer as it does not only target the regular industry actors for offsetting HEI innovations.

7.4.2 AWARENESS BUILDING AND COMMUNICATION

Creating awareness of the need for innovation and IP as means to support the full utilization of research results generally requires more than mere information, no matter how good the information channels are. In order to fulfill a mission and vision that includes innovation and IP as even one part of the HEI's activities therefore requires that there are some education processes in place. This section therefore explores what education on innovation and IP is offered by the participating HEIs. In order to give a good picture on what the education looks like, it is investigated both how it is being delivered and what audience it targets for this kind of education inside the HEI.

7.4.2.1 Does the HEI provide education on IP and innovation?

All of the HEIs except Novosibirsk State Technical University provide education on IP and innovation, however as will be further explored below, the kind of education provided varies to some extent between the different HEIs.

7.4.2.2 How is the education delivered?

10 out of the 14 HEIs provide ad-hoc based education on innovation and IP. 8 out of the 14 HEIs provide education on IP and innovation in a systematic way. Three HEIs only provide ad-hoc education; these HEIs are Universidad de Campinas, Brazil, Jagiellonian University, Poland and University of Surrey, England. CUST, China and IIT Roorkee, India on the other hand only provides education on these topics systematically.

7.4.2.3 For who is the education?

12 out of the 14 HEIs provide education in innovation and IP for students. 13 out of the 14 HEIs provide education in innovation and IP for researchers. 8 out of 14 HEIs provide education in innovation and IP for professors. 9 out of 14 HEIs provide education on innovation and IP to others. Thus, the groups that receive this kind of education to a larger extent are students and researchers. In fact, all HEIs except Novosibirsk State Technical University in Russia provide education on innovation and IP either to students or researchers. (Table 23 – page xiv)

Interesting examples on education on innovation and IP

Chalmers, Sweden: Chalmers has many examples of education of IP and Innovation – some are offered directly to the students through specific programs eg: ICM, CSE, GIBBS - for Masters Students. Chalmers Innovation (the Chalmers Incubator) provides a 3 day course for researchers across Chalmers on *IP* and the possibility of *creating start up companies* based on their research. CIP PS (a consultancy service on IP and Innovation) provides education to executives and in their collaboration with students offers a *hands-on idea finding/evaluation* in research projects. The academic departments of MORE and the Institute for Innovation and Entrepreneurship in Gothenburg provide *training for* PhD students and External actors, e.g. Innovation Bridge, and for researchers.

IIT Roorkee, India: IPR Elective courses for Undergraduate and Post Graduate students:

1. Fundamentals of IPRs-Copyrights, Patents, GIs, IDs etc.
2. International Agreements and Treaties
3. Economics of IP
4. Patent laws and regulations
5. Tutorial and Practice sessions for database search, Patent Drafting, Patent Filing etc.

The main aim of education at IIT Roorkee is to enable students to face the wide ranging changes taking place in the fields of technology, environment and management with confidence. This includes undertaking design, development, construction, production, managerial and entrepreneurial activities, and higher studies in their chosen or allied interdisciplinary fields of study. The institute lays great emphasis on assisting students in the development of character and self confidence with management traits. To achieve these goals, the curriculum lays more stress on learning rather than teaching. Efforts are made to lay more stress on self-learning, creative thinking, critical evaluation, spirit of inquiry and imbibing the culture of life-long learning.

Campinas, Brazil: The Unicamp Innovation Agency (*Agência de Inovação da Unicamp*) has a project titled *Inova Nit*, which offers several courses, seminars and workshops about several subjects linked to intellectual property, innovation and transfer of technology. For example:

- Preparation of courses for theoretical and practical training of TIC professionals (distance and person-to-person);
- Development of trainings for preparation, institutionalization and implementation of TIC;
- Specialized consultancy for TIC (on demand);
- Development of publications in subjects of TIC interest: manual of best practices for transfer of technology, management of intellectual property and STI-company interaction, articles and books;
- Support to *Fortec* activities, partnership with public and private institutions for development and offering of courses about subjects related to ST&I system

Reflections and analysis

It is interesting to see so many good examples of how HEIs provide education on innovation and IP- especially for their students and researchers. This gives an indication of how important the HEIs think it is to not only make their faculty and students aware – but to learn know how to apply and work with IP and innovation in practice. However, what this information does not portray is how good and efficient the education in IP and innovation given to the students and researchers really is. First, not all HEIs provide education systematically why it might be difficult to create long-term learning inside the HEI. Furthermore, the quality of the education is dependent on both the teachers' own understanding of innovation and IP and what pedagogic methods are used to teach innovation. As we know, a poor pedagogic approach can greatly diminish the value of the education and whereby the learning is not integrated.

7.4.3 SEARCHING FOR VALUE IN RESEARCH

What could be considered valuable or potential assets derived from an innovation is not evident judging only from the research results. If a HEI wants to pursue further packaging of research results in order to create innovations and commercial or societal value, it is therefore necessary to aid researchers to search for and to find value in their research.

7.4.3.1 Does the HEI have the processes for finding value in their research?

11 out of 14 HEIs have processes for supporting researchers in finding value in their research, and 12 out of 14 HEIs have processes for researchers to disclose inventions to the HEI internally. The only HEI that does not have any of these processes is Universidad de Campinas, Brazil. (Table 24 – page xv)

Interesting examples on processes

IIT Roorkee, India: When the researchers/inventors believe that they have generated patent-able or commercialize-able intellectual property using Institute-supported resources, they shall report it promptly in writing along with relevant documents, data and information, to the Institute through the appropriate authority using the Invention Disclosure Form of the Institute. Disclosure is a critical part of the IP protection process for claiming the inventor-ship. The information shall constitute a full and complete disclosure of the nature, particulars and other details of the intellectual property, identification of all persons who constitute the creator(s) of the property, and a statement of whether the creator believes he or she owns the right to the intellectual property disclosed, or not, with reasons. Where there are different creators of components that make up the 'invention group', the individual creators and their contributions must be identified and treated separately. In case of the sponsored and/or collaborative work the provisions of the contract pertaining to disclosure of the creative work is applied. By disclosure the inventor(s) shall assign the rights of the disclosed invention to the institute.

Alicante, Spain: There are specific processes for Finding value: *TTO collect information on research lines and talk to groups with innovation potential *3 staff of TTO regularly visit research groups to find out about their activities, and offer possibilities to participate in national and international projects or find application (i.e. business partners) for results * confidentiality measures and agreement handling for research groups *awareness raising actions such as seminars, conferences, on ad-hoc basis

There are also processes in place for Disclosing inventions internally based upon the results of the above mentioned actions. Furthermore there is information on the website and a form to be filled in for disclosing potentially patentable results. Finally, there is ongoing contact between the TTO staff and the most active research groups.

Reflections and analysis

It is very interesting to see that so many HEIs have processes for disclosing inventions internally as well as supporting researchers to find value in their research.

The fact that so many HEIs have processes in place for helping researchers to find value has the potential of creating great benefit for society as some researchers are not interested in doing this themselves as they just want to focus on their research. If they are not given some assistance in finding value, a lot of research thus risks staying at research level and never reach development which benefits the society.

When the HEIs own the right to the researcher's inventions, it is of course necessary to be able to control what kinds of research results are being created. This is important, as the HEI may otherwise risk losing their potential value as they would not have had the possibility of developing the insights needed – which could then be utilized further and commercialized. Thus, it is vital that these HEIs have disclosure processes in place.

7.4.4 ASSESSING THE VALUE IDENTIFIED IN RESEARCH

In conjunction with the processes for finding and disclosing the results found in the research, it is also important to have the processes in place to assess the – economical, market, legal and technical value (of these results) - in order to determine which assets (derived from the value) could be subject to further evaluation that can lead to commercialization and utilization; and what steps need to be taken in order to ensure that there are controls in these processes.

7.4.4.1 Does the HEI have the following (economic, legal, market, technical, etc) processes for assessing the value identified in research at the HEI?

13 out of 14 HEIs have a process for determining if there is a market for an invention. 13 out of 14 HEIs have a process for assessing the technical viability of an invention. 11 out of 14 have a process for assessing the economic viability of an invention. The only HEI that does not have any of the named processes in place is Universidad de Campinas, Brazil. (Table 25 – page xv)

Interesting examples on processes

KUST, China: The Division of Research and Development will organize an expert panel to make analysis for feasibility when necessary.

IIT Roorkee, India: The Intellectual Property Assessment Centre (IPAC) is an expert technical Panel that assesses the technical viability of the innovation.

KU Leuven, Belgium: In order to determine if there is a **market** for an invention, KU Leuven, asks the researcher questions about the potential customer base, market etc. After these preliminary questions, the department asks the researchers to conduct a deeper assessment and evaluate it.

KU Lueven assesses the **technical viability** of an invention – as a function inside the central administration. First a technological route map is written: What's the situation in terms of technology today? What is the business model going to be? What else is needed in order to get the technology out on the market in terms of development? As a result, a mutual understanding is developed between the university and the company on what has to be done next.

KU Leuven assesses the **economic viability** of an invention in conjunction with both the technical and the market assessment – and in conducting special financial assessments. For example: What is the price going to be etc.? The leaders have identified a number of criteria for these assessments, and while they are not formalized, they are clear to their experts.

Reflections and analysis

Almost all of the HEIs have processes supporting the commercialization of a technology. The character of these processes however varies quite a lot. E.g. at KUST in China and at IIT Roorkee, India there is an expert technical Panel that assesses the technical viability of the innovation. Others, such as KU Leuven, Belgium and Chalmers University, Sweden use a more systematic assessment approach involving the researchers and idea providers - in order to evaluate the market potential of the innovation.

7.4.5 PROCESSES FOR EVALUATING POSSIBILITIES FOR PROTECTION AND SEEKING PROTECTION

Once the assessment of the technical value has been completed, it is vital to assess the potential for controlling the assets through legal or economic means, in order to determine if it is be possible 'to transact this invention' on the market. The reason for this is that an invention that does **not** enjoy a 'control position' of any kind, whether it be through market control by e.g. first movers advantage or through a solid IPR strategy, may risk being destroyed or 'stolen' by competitors. And of course, without control, it is difficult for potential investors to see the value of investing in the invention, which is often necessary to enter the market.

The control functions below only consider processes for IPR protection with patent protection in focus. It is important to keep in mind that other control mechanisms could also be useful to support or in some cases replace patents, however, it is vital for a technical invention to enjoy some kind of IPR protection in order to be traded on the market. This applies also if the HEI decides to utilize open business models where the control position is used as a means to create openness and not to gain a competitive advantage from excluding others.

7.4.5.1 Does the HEI have the following processes for evaluating the possibilities for protection and seeking protection?

All of the 14 HEIs have processes to determine if an invention can be protected by IPR. 11 of the HEIs have processes for conducting prior art search. 12 of the HEIs have processes to support researchers to develop a technical description report. All of the 14 HEIs have processes to support the application of patentability evaluation at PTO:s. 12 of the HEIs have processes to draft an application and apply for protection of an invention. 13 of the HEIs have processes to monitor pending applications and registration. (Table 26 – page xvi)

Interesting examples on processes

IIT Roorkee, India: (To seek and apply for protection) When the creators believe that they have generated patent-able or commercialise-able intellectual property using Institute-supported resources, they shall report it promptly in writing along with relevant documents, data and information, to the Institute through the appropriate authority using the Invention Disclosure Form of the Institute. Disclosure is a critical part of the IP protection process for claiming the inventorship. The information shall constitute a full and complete disclosure of the nature, particulars and other details of the intellectual property, identification of all persons who constitute the creator(s) of the property, and a statement of whether the creator believes he or she owns the right to the intellectual property disclosed, or not, with reasons. Where there are different creators of components that make up a system, the individual creators and their contributions must be identified and treated separately. In case of the sponsored and/or collaborative work the provisions of the contract pertaining to disclosure of the creative work is applied. By disclosure the inventor(s) shall assign the rights of the disclosed invention to the institute.

Alicante, Spain: (to determine IPR protection) This process is carried out by the TTO at UA which follows a set of formal processes that were recently developed, including: a) decision process by a research commission (composition detailed earlier) b)confidentiality agreements developed c)decision and procedures for the: *receipt of petition by IP unit *decision to protect by IP unit, *Establishment of respective rights, *preparation of technical application for researcher and TTO, *outsourcing processes to expert group, *national application, *international application.

Reflections and analysis

It is very exciting to observe that all participating HEI have processes for determining IPR protection of research results. This shows that all HEIs have at least some basic understanding for the need of controlling innovations through IPRs. Many good examples were also shared that illustrate how to set up processes for both the protection of the results and assets are created.

7.4.6 PROCESSES FOR COMMERCIALIZATION

In relation to building a control mechanism, a process for commercialization or utilization needs to be carried out. This is of course also inter-linked with the technical assets that have been outlined in the previous value finding and value assessments steps above. Below, some general processes for commercialization are mentioned which may function as tools when developing which strategy best suits the innovation and its commercialization potential.

7.4.6.1 Does the HEI have the following processes to support the commercialization of research results / inventions?

12 of the 14 HEIs have processes to support researchers to create a business plan for their inventions. 12 of the 14 HEIs have processes to create a start-up company around an invention. 10 out of the 14 HEIs have processes to draft legal documents. 8 out of the 14 HEIs have processes to sell licenses. 11 out of the 14 HEIs have processes to offer or find a place for a start-up company in an incubator. 9 out of 14 HEIs have processes to offer business

development services. The only HEI that does not have any of the processes mentioned is St Petersburg Electrotechnical University in Russia. (Table 27 – page xvii)

Interesting examples on commercialization processes

Alicante, Spain: *Creating Spin-offs*. This process is carried out at UA by the TTO **– Innovation Unit.** Below is a Summary of the Process:
Idea → pre-evaluation of the technology by TTO (TRIP) → proposal spin-off → evaluation TTO +external experts (valuation of technology, participation UA) → report TTO → Decision by the Research commission & Spin-off commission → University Social council → University government council → formalizing agreements by TTO → creation of spin-off

Campinas, Brazil: *To create a business plan* - The responsible party for this process is *Incamp,* which is an incubator built of technology-based firms of Unicamp and incorporated in the Agency for Innovation (Inova) in Unicamp. Incamp follows the following steps: i) pre-selection (check if the proposed project is or is not technology-based), ii) offers training course for entrepreneurial development of the business plan, iii) assessment of the proposal and business plan by an *ad hoc* technical committee formed by consultants at Unicamp and / or similar entities when outside the jurisdiction of Unicamp iv) Assessment of the proposal by teachers of the Institute of Economics, Unicamp to analyze the economic viability, v) assessment of the proposal and business plan consultants to firms of venture capital, marketing analysis to the project, and vi) Interview and Approval and dissemination of final results.
To create a start-up company around an invention - The Incamp follows the following steps: i) pre-selection (check if the proposed project is or is not technology-based), ii) offers training course for entrepreneurial development of the business plan, iii) assessment of the proposal and business plan by an *ad hoc* technical committee formed by consultants at Unicamp and / or similar entities when outside the jurisdiction of Unicamp iv) assessment of the proposal by teachers of the Institute of Economics, Unicamp to analyze the economic viability, v) assessment of the proposal and business plan consultants for firms of venture capital, marketing analysis to the project, and vi) Interview and final approval and dissemination of results.

KU Leuven, Belgium: Business plan templates- are used encourage researchers to write BPs with the support from the innovation unit.

Reflections and analysis

It is interesting to note that all BRIC-country HEIs except St Petersburg Electrotechnical University, Russia and NML Jamshedpur, India, have processes for creating start-up companies. This result is interesting, because processes exist, in spite the fact, that none of the HEIs from the BRIC countries have a way to distribute the incomes from such activities. This may indicate that all processes mentioned are not practiced in reality or not yet fully implemented.

7.4.7 PROCESSES FOR INNOVATION AND IP MANAGEMENT

At the stage when a certain amount of IP -centered on the HEI innovations -has been developed and acquired by the HEI, the need to have processes in place that support the management of the innovation and IP grows stronger. Thus, it is interesting to see if and how the participating HEIs have reached this stage, to what extent they have processes for managing innovation and IP in place, and where applicable, what their processes look like.

7.4.7.1 Does the HEI have the following processes to support innovation and IP management?

10 out of the 14 HEIs have processes for managing a HEI IP portfolio. 9 out of 14 HEIs have processes for monitoring the HEI IP portfolio. 8 out of 14 HEIs have processes for evaluating and creating strategies around the IP portfolio. 8 out of 14 HEIs have processes for continuously linking research results to HEI teaching and research agenda. CUST, China and Jagiellonian University, Poland are the only two HEIs that do not have any of the mentioned processes. (Table 28 – page xviii)

Interesting examples on processes

Chalmers, Sweden: At Chalmers, there is a unit for managing and reviewing the HEI's IP portfolio.

KUST, China: Research results are continuously used in teaching materials – often presented by the inventor themselves.

University of Surrey, Great Britain: Patent Manager x 2 using Inteum software.

Reflections and analysis

In spite of the fact that as many as 10 out of 14 HEIs have processes for IP portfolio management, the size of this task appears to vary. For example, at Chalmers University in Sweden, the IP portfolio is difficult to systematize, as the HEI does not own most of the rights to the research results created inside the HEI and has not yet created a systematic way to organize the IP of the individual researchers.
At University of Surrey in Great Britain on the other hand, the process for managing university IP appears to be sophisticated as their Patent Managers use software named Inetum to help them survey their IPRs (patents).

7.4.7.2 What kinds of contracts and agreements are used to support innovation and IP management in the HEI?

All of the HEIs have used contracts covering R&D. 12 out of the 14 HEIs have used contracts covering patent licensing. 8 out of 14 HEIs have used contracts covering technology supply. 10 out of 14 HEIs have used contracts covering material transfer. 12 out of 14 HEIs have used contracts covering service provisions. 9 out of 14 HEI have used contracts covering clinical trials. 9 out of 14 HEIs have used contracts covering transfer of IPR. 8 out of 14 HEIs have used contracts covering employment. 9 out of 14 have used other kinds of contracts. (Table 29 – page xix)

Interesting examples of other contracts being used

Sweden, Chalmers: Have special agreements for: NDA:s, shareholder agreements, Vinnova-agreements (Vinnova is an external entity that is involved in innovation value creation) and customer agreements.

KU Leuven, Belgium: has also names special contracts that are more 'standard' in their HEI:
-NDA:s (Non Disclosure Agreements)
- Shareholders Agreement (the university engages a lot in these)

Reflections and analysis

It is interesting to note that very few HEIs stated that they use other contracts than the ones explicitly mentioned to manage their innovation processes. For most persons working with IP related questions they indicated that e.g. secrecy agreements of key assets., are available to use to protect the results at an early stage. However, only a few actors seemed to actually use secrecy agreements in their own work. So, if in fact secrecy agreements are not being used in those HEIs, then there is a risk that the quality of these HEIs IPRs is not as good as it could be.

7.5 Historical indicators

When assessing the innovation systems inside HEIs, it is of course not enough to merely look at which norms, processes and units in place today as these give no information about the historical success or failure of the HEI in its innovation activities. Without knowing the historical background, it is difficult to know how what has been working out well and how to move forward to improve. There are various measures and indicators to keep track of the quality and the quantity of the IP and Innovation generated.

In this section, various indicators are presented with the relevant data reported, for: historical creation of IP & Innovation; the ownership of the results; the results achieved in the various processes generating IP and Innovation – are presented. This section aims to present an overview of historical data which can give the reader a chance to compare the 14 HEI participants across the various parameters used. The section consists of six questions.

7.5.1 DOES YOUR HEI OWN ALL IP GENERATED WITHIN THE HEI?

Before going further into how the IP has been assigned at the HEI, it is interesting to know whether the HEI has the full disposition power over research results created at the HEI or if someone else also has the potential to acquire IP already at when it is being generated inside the HEI.

Summary of Results

9 out of 12 responding HEIs own all of the IP generated inside their HEI. Those HEI that do not own all of the IP inside their respective HEIs are: St Petersburg Electrotechnical University, Russia, Saarland University, Germany and Chalmers University in Sweden.

If no, are there other legal entities connected to your HEI that can maintain ownership of the IP they generate?

Chalmers University of Technology, Sweden: Yes, there are several legal entities that have the capacities to own the IP they generate; however very few IP generating units are able to do this.

Saarland University, Germany: FHG, is defined as an Institute (public research organizations located nearby)

St Petersburg Electrotechnical University, Russia: There are a number of technopark legal entities inside the HEI.

Reflections and analysis

The dominating model is that the HEIs own all of the IP generated in their HEIs. This of course creates what appears to be a clear ownership structure over results at least for research that has been exclusively created inside the HEI and by HEI researchers. However, for example, in research that has been developed in collaboration with other HEIs, the ownership structures are not always as clear, since as in these cases they depend on how well each collaborating case is regulated and managed.

In Sweden e.g. there is no centralized ownership of research results as the researchers own the rights to their own results. Instead in the latter years, several entities have been established to help the individual researchers to exploit their innovation through IP control. This has been heavily criticized during the last years as it appears to create even more mess in the ownership structures than if the HEI had own all of the results. Also, several persons have indicated that a lot of intellectual property value has been destroyed by putting all the responsibility for commercialization of research results on the individual researchers as they generally lack the resources for doing this.

However, the decentralized system which e.g. can be seen in Sweden may also have advantages which one risks losing with a more centralized system. One such advantage is that several nodes to get into the innovation system are created. Companies can target a lot of different parties if they want to create something together with the HEI. This can be assumed to lead to a lot of fruitful commercial activities that the society benefits from even though the HEI will not own the research results by itself (or at all). Furthermore, it creates incentives for researchers to commercialize their results as they can ripe the full financial benefits from the potential success of their ideas.

7.5.2 TO WHOM HAS THE OWNERSHIP OF THE IP GENERATED BY THE HEI BEEN ASSIGNED DURING 2008?

When the HEI generates IP through its innovation activities, there are several ways to distribute the ownership in the HEI, e.g. to the HEI, to the individual researchers or research group that created the research results underlying the IP and IPRs, or to industrial partners. In most countries, the foundation for the rules on the distribution of IPR ownership is decided on a national level. However, ownership assignment can also be defined by the participating parties through contract.

Summary of Results

8 out of 9 of the responding HEIs own more than half of the IP generated. 7 out of 9 HEIs own more than 90% of the IP generated inside the HEI.

Reflections and analysis

It is interesting to see that so many of the HEIs take on full ownership of the IP even through it might not always be an advantage to own all of the IP generated inside the HEI. E.g. incentives for researchers can be created through sharing IP with them.

7.5.3 INDICATORS – BY YEAR, TYPE OF IPR AND COUNTRY

The number of acquired IPRs can give an indication on how well the HEI has performed in its innovation activities as it gives information on how many innovations that the HEI has deemed important enough to protect. Furthermore, receiving information on which territory the IPRs cover gives information on which markets the HEIs assess to be of economic value for the invention generated. What this kind of data does not tell us is the quality of the IPR protection neither in terms of e.g. how well a patent is drafted or how likely it is that an IPR would be

validated in court. Therefore, the results in this question should be viewed as indicators and not data on the absolute truth on how well the HEIs have controlled their innovations during the 2008 and historically.

Summary of results

IIT Roorkee, India had the lowest number of IPRs applied for in 2008 (1 domestic patent). CUST in China had the highest number of IPRs applied for in 2008 (654 IPRs in total whereof 326 domestic patents, 149 registered utility models, 87 registered industrial designs or models and 92 registered integrated circuits topographies).

The same two parties also had the lowest and highest number of IPRs applied for historically. IIT Roorkee, India had the lowest number of IPRs applied for historically with 7 domestic patents. CUST in China had the highest number of IPRs applied for historically (5110 IPRs in total whereof 2022 domestic patents, 1636 registered utility models, 1026 registered industrial designs or models and 426 registered integrated circuits topographies).

However, these results do not take into account that several of the consortium members did not even submit data on this question why especially it especially can be questioned if IIT Roorkee really had the lowest number of IPRs applied for amongst the consortium members. E.g. in Sweden, basically no IPRs are applied for at HEI level as the researchers generally own all of the rights to the research results created in line of their employment at the HEI.

Summarizing from the results one also finds that the most common IPR to apply for is patents with domestic scope.

University of Surrey assembled their data in a different way where the following facts were found:

Between 1 August 2005 and 31 July 2006 15 patents applications were filed and 3 licenses were established. Between 1 August 2006 and 31 July 2007 14 patents applications filed and 5 licenses were filed. Between 1 August 2007 and 31 July 2008 9 patents applications filed and 8 licenses were filed.

The actors that did not submit data on this question were: Chalmers University of Technology, Sweden and KU Leuven, Belgium. Furthermore Universidad de Campina, Brazil and NML Jamshedpur, India did not submit any data on the historical level.

Jagiellonian University, Poland:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	16				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 3 2. 2 3. 1	1. 2. 3. 1	1. 2. 2 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications –					

appellations of origin					
Registration of Integrated circuits topographies					
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	30 (+7 application pending)				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 6 2. 5 3.	1. 2. 3.1	1. 2. 3.	1. 2. 3.
Registration of Utility model	1				
Registration of Industrial design or model					
Registration of Trademarks	1				
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Universidad de Campinas, Brazil:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	51				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

São Paolo Federal University, Brazil:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	77				
Patent for Invention – In other countries 1. via PCT*		1. 2.	1. 2.	1. 2.	1. 2.

2. via EPC* 3. directly via foreign patent office		3.	3.	3.	3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	482				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

KUST, China:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	349				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model	261				
Registration of Industrial design or model	7				
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other (Copyright in computer software)	2				

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	670				

Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model	404				
Registration of Industrial design or model	11				
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

CUST, China:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	326				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 1 2. 3 3. 1	2. 1	1. 1 2. 2 3. 1	
Registration of Utility model	149				
Registration of Industrial design or model	87				
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies	92				
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	2022				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 10 2. 8 3. 7	1. 5 2. 3 3. 2	1. 3 2. 4 3. 3	1. 2 2. 1 3. 2
Registration of Utility model	1636				
Registration of Industrial design or model	1026				
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies	421				
Other					

IIT Roorkee, India:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic (Applications)	1				
Patent for Invention – Domestic (Granted)	4				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic(Granted)	7				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

NML Jamshedpur, India:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	**10**				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. **7** 2. 3.	1. **2** 2. 3.	1. 2. 3.	1. **5** 2. 3.
Registration of Utility model	**9**				
Registration of Industrial design or model					
Registration of Trademarks					

Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

University of Alicante, Spain:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	8				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. **3** 2. 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model	1				
Registration of Industrial design or model					
Registration of Trademarks	9				
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	102				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. **15** 2. **3** 3.	1. 2. 3.	1. 2. 3.	1. 2. 3.
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Saarland University, Germany:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	10				
Patent for Invention – In other countries 1. via PCT* 2. via EPC*		1.: 7 2.: 6 3.: 1	1.: - 2.: - 3.: 1	1.: 7 2.: 6 3.: -	1. : - 2. : - 3.: -

3. directly via foreign patent office					
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	70				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1.: 31 2.: 19 3.: 7	1.: - 2.: - 3.: 1	1.: 31 2.: 19 3.: -	1.: - 2.: - 3.: 6
Registration of Utility model					
Registration of Industrial design or model					
Registration of Trademarks					
Registration of Plant cultivation or varieties					
Registration of Geographical Indications – appellations of origin					
Registration of Integrated circuits topographies					
Other					

St Petersburg Electrotechnical University, Russia:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	10				
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -
Registration of Utility model	4	-	-	-	-
Registration of Industrial design or model	-	-	-	-	-
Registration of Trademarks	-	-	-	-	-
Registration of Plant cultivation or varieties	-	-	-	-	-
Registration of Geographical Indications – appellations of origin	-	-	-	-	-
Registration of Integrated circuits topographies	2	-	-	-	-
Databases	1	-	-	-	-
PC programs	5	-	-	-	-

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	>1000				

Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		NO DATA			
Registration of Utility model	>500	-	-	-	-
Registration of Industrial design or model	-	-	-	-	-
Registration of Trademarks	-	-	-	-	-
Registration of Plant cultivation or varieties	-	-	-	-	-
Registration of Geographical Indications – appellations of origin	-	-	-	-	-
Registration of Integrated circuits topographies	12	-	-	-	-
Databases	6	-	-	-	-
PC programs	21	-	-	-	-

Novosibirsk State Technical University, Russia:

2008 ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	3	-	-	-	-
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -
Registration of Utility model	5	-	-	-	-
Registration of Industrial design or model	-	-	-	-	-
Registration of Trademarks	-	-	-	-	-
Registration of Plant cultivation or varieties	-	-	-	-	-
Registration of Geographical Indications – appellations of origin	-	-	-	-	-
Registration of Integrated circuits topographies	-	-	-	-	-
Other		-	-	-	-

Historical total – since HEI foundation ***Type of protection sought***	**National**	**Inter-national**	*USA*	*EU*	*Other countries*
Patent for Invention – Domestic	27	-	-	-	-
Patent for Invention – In other countries 1. via PCT* 2. via EPC* 3. directly via foreign patent office		1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -	1. - 2. - 3. -
Registration of Utility model	17	-	-	-	-
Registration of Industrial design or model	-	-	-	-	-
Registration of Trademarks	-	-	-	-	-
Registration of Plant cultivation or varieties	-	-	-	-	-
Registration of Geographical Indications – appellations of origin	-	-	-	-	-
Registration of Integrated circuits topographies	--	-	-	-	-
Other	2	-	-	-	-

Reflections and analysis

It is interesting to see that the HEIs that have the highest respectively the lowest number of IPRs applied for, in 2008 as well as historically, both are located in a BRIC country. Also, the same tendency can be found amongst the other two HEIs from India and China where JML Jamshedpur, India has a low number of acquired IPRs and KUST, China has a higher number of acquired IPRs. The countries that these HEIs are located in are furthermore of the same size why the size of the domestic market is not an applicable explanation model for why such a big difference may appear.

Furthermore, it is of course highly interesting to see that the interest for applying for IPRs to protect research results is so big in China in spite of the fact that the country is often criticized by other countries for the gaps in enforcement of intellectual property rights. Also, China has received a lot of criticism for censorship historically which clashes with the one of the foundations of the patent system aiming at disclosing inventions to the society in order to push openness as a tool for growth.

7.5.4 NUMBER OF LICENSES SIGNED IN 2008

An innovation and the IPR of an innovation do not have any value if it is not being put to use in a commercial or societal context. One way of creating value from innovations is to license them to other parties. The number of licenses assigned to other parties from the HEI is therefore examined.

(A HEI can of course also license 'in' innovations in order to e.g. build further on in-house and create new inventions, however, this is not the focus of this question).

Summary of results

The licenses covering innovation had the largest amount of signed licenses signed amongst the HEIs. In 2008, 142 innovation licenses were signed and 120 of these were signed by CUST; China.

Licenses covering industrial design amounted to 82 licenses, all of them signed by CUST, China.

The third highest amount of signed licenses covered integrated circuits, all 77 signed by CUST, China.

The fourth highest amount of signed licenses covered utility models with 64 signed licenses amongst all HEIs. 58 of these were signed by CUST, China and the remaining 6 were signed by KUST, China.

62 know-how licenses were signed in 2008 which makes this number five of the most signed licenses amongst the HEIs this year. Also all of these contracts were signed by CUST, China.

Furthermore, 45 software licenses were signed by CUST, China, which makes this the sixth most popular licensing field amongst the HEIs in 2008.

Finally, 24 brand licenses were signed this year. All of them were signed by CUST, China.
(Table 30 – page xx)

Reflections and analysis

Two main reflections can be made from this data. The first is that invention licensing is by far the most popular license amongst the HEIs as both the total number of licenses as well as the number of HEIs that used this form of licensing during 2008 is the highest in this survey. This may imply that the HEIs are very focused on patents as inventions as a more in depth out licensing of inventions usually covers also other of the suggested categories such as know-how.

The second reflection that needs to be made is that CUST in China portrays extremely superior statistics in relation to all of the other HEIs. Whether this depends on better processes for capturing data or more advanced processes for capturing innovations as IP in general is yet to be investigated.

7.5.5 NUMBER OF START UPS/SPIN OFFS

Another way, next to licensing in which a HEI can choose to package inventions and create commercialization opportunities is through the generation of start-up companies. In order to house such companies, several processes are needed as has been discussed previously in this report. The number of start-ups created by the HEI between 2006 and 2008 as well as historically can give an indication on how successful the HEI has been with commercializing innovations through these means. This data does however not give information on how viable the start-ups has been- how many years they have survived after being spun out, how much equity they generated and how many people that were employed. Unfortunately, the lifespan of spin outs is generally short and only about one out of 10 companies survive in the long term. However, the potential of gaining a lot of revenue from a successful spin out still makes the creation of spin-offs an attractive potential for packaging of HEI innovations.

Summary of results

In 2006, 61 companies were spun-out amongst the 10 answering HEIs. The largest amount of spin-outs was achieved by University of Alicante in Spain with 25 spin-outs in total.

In 2007, 62 companies were spun-out amongst the 11 responding HEIs. The largest amount of spin-outs was achieved by University of Alicante in Spain with 18 spin-outs in total.

In 2008, 172 companies were spun-out amongst the 10 responding HEIs. The largest amount of spin-outs was achieved by São Paolo Federal University in Brazil with 124 spin-outs in total.

In total, 511 companies have been spun-out amongst the 10 responding HEIs since they started spinning out companies. The largest amount of spin-outs was University of Alicante in Spain with 288 spin-outs in total.
(Table 31 – page xxi)

Reflections and analysis

It is interesting to note that University of Alicante in Spain is in top when it comes to spinning out companies while CUST in China that showed superior results when it comes to licensing almost have no spin-outs (8 in total since the start). Alicante on the other hand only signed 3 license contracts in 2008. Clearly different ways for commercialization of IP have been chosen and none of the HEIs have been successful in both ways this far.

7.5.6 ASSESSMENT OF THE HISTORICAL INDICATORS

When assessing the historical indicators, it is evident that most of the HEIs own the right to the results created inside the HEI. Furthermore, during 2008, the IP was most often assigned to the HEIs. This implies all in all that it is very common that the HEIs have ownership over IP at least at an early stage of the process when it comes to controlling innovations deriving from inside the HEIs.

The most common form to control the innovations then was through domestic patents. The fact that this is so is no surprise as the HEIs are heavily dominated by engineers and their inventions which traditionally have been protected through patents. This however only grants a limited protection to an invention and in some cases it would probably be good to build

more full strategies around how to protect an invention through IPRs (and other means) if the HEI plans to leverage from the IP without selling it to others that can build such positions.

Finally, the historical data shows that the number of licenses signed and spin-offs created varies a lot amongst the HEIs. In general there seems as if most actors still have some way before their innovation systems generate the kind of value they seek by setting up the innovation goals, rules, procedures, units and culture.

7.6 Culture

In each of the previous chapters, there has been a focus on examining the norms, procedures and general infrastructure of the HEI as well as presenting the details of the historical output resulting from these systems. This chapter has a different focus and tone, as it intends to explore the 'culture for innovation' inside each of the HEI. In contrast to the more concrete factors and numbers that were illustrated in the first chapters, this chapter will explore the underlying relations, perspectives and values that often play a big but more invisible influence on how innovation and IP are managed. Innovation culture can often be seen as the 'glue' that helps the processes, structures, relationships and norms, 'stick' and 'tick' – or 'unstick'. In this study we have identified the following 6 concepts to evaluate the 'innovation culture' in the collaborating partners.

These 6 concepts are now presented as questions we will try to answer: 1) To what extent is the commitment to innovation work integrated into the everyday activities of the HEI; 2) Who takes the key responsibility and initiative to drive the innovation work in the HEI; 3) To what extent do the HEI managers have the resources they need to drive their innovation and IP work?; 4) How conscious and systematic are the HEI working with innovation and IP? (eg: to what extent do the leaders and team: have clear goals to work from, reflect on their work and give each other feedback, or, search for continuous improvements in results and processes)**;** 5) What motivates the HEI to work with innovation and IP?; and, 6) What is the quality of the relationships that HEI professionals create – both internal and external to their HEI?

These above factors are among the interesting examples of the many forces that can support and hinder the management of the innovation and IP. It is therefore critical for the HEI leadership to rely on their managers and professionals to continuously assess the strength, weakness and shift of the key values, behaviors, competence and to continuously communicate the results of these assessments. Our review here is targeted to help us better understand how a more visible and transparent culture supports a more successful result in driving the innovation and IP processes in the HEI.

7.6.1 HOW CLEARLY HAS YOUR HEI COMMITTED TO AND PRIORITIZED INNOVATION AND IP INTO DAILY ACTIVITIES?

Research and experience has shown that there are various levels of sophistication and maturity that distinguish how far a HEI has come with integrating innovation and IP into their organization. Of course the HEIs in this study were selected because they were known to have IP and innovation activities in place. However with this said, it is still interesting to see the extent to which these HEIs actually have integrated innovation and IP in their organization. Six levels of maturity were identified by the Activity leader:

- 5 – fully integrated into all activities – clear priority
- 4 – wider organisation commitment, in the process of becoming fully integrated into activities
- 3 – there is a team working on it and resources dedicated – but not integrated into the rest of the organisation
- 2 – formal - integrated into mission/vision/policy – but no resources or priority
- 1 – thinking and talking about it
- 0 – not at all

Summary of results

NML Jamshedpur in India as well as University of Surrey in Great Britain indicate that they are the most sophisticated, as they do not only have formal policies on IP and innovation as well as dedicated teams working with these questions but have been able to diffuse the responsibility and commitment throughout their organization. In contrast, seven HEIs share the level of having allocated resources and a team to work with these questions but have not grounded this work into their daily activities. Five of these seven HEIs are from the BRIC countries while two are from Europe.

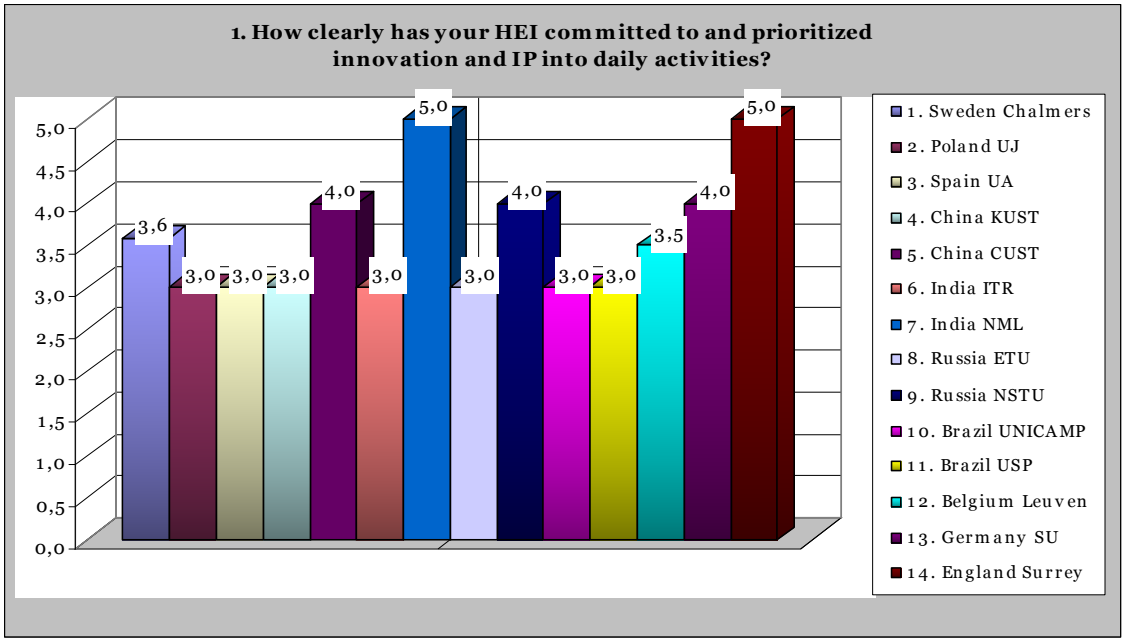


Diagram 1 - How clearly has your HEI committed to and prioritized innovation and IP into your daily activities?

Reflections and analysis

It does not come as a surprise that the HEIs in this sample have assessed themselves to have at least a team and resources dedicated to IP.

What is interesting to know is that the HEIs that have come furthest in becoming a true innovative HEI are equally represented by EU- and BRIC countries.

The challenge for the HEIs to continue their development in integrating IP and innovation into their organization needs to be prioritized in EU- and BRIC countries alike.

7.6.2 WHO TAKES RESPONSIBILITY FOR THE DRIVING OF THE INNOVATION AND IP PROCESS IN YOUR HEI?

Another way to examine the extent to which a HEI is engaged with integrating innovation and IP processes is to assess how the various stakeholders themselves are participating in these activities. Six stakeholders were identified as having an important role and responsibility. Each stakeholder was evaluated in relation to how much responsibility they take in driving these activities (see criteria below).

- 5 – fully 'owning' (taking responsibility for) the innovation work and process, take initiative, active in participating, communicating, supporting and leading the innovation work and team
- 4 – owning the innovation work and often active
- 3 – interested and motivated but only active upon request (there when you need them)
- 2 – interested but not always available
- 1 – not so available and hard to engage
- 0 – not at all active or responsible

Summary of results

The results show that the individuals that take on most responsibility for driving the innovation and IP processes inside the consortium members' HEIs is the TTO followed by the HEI Leaders. Out of the alternatives named, the ones that take least responsibility for driving these processes are the individual students.

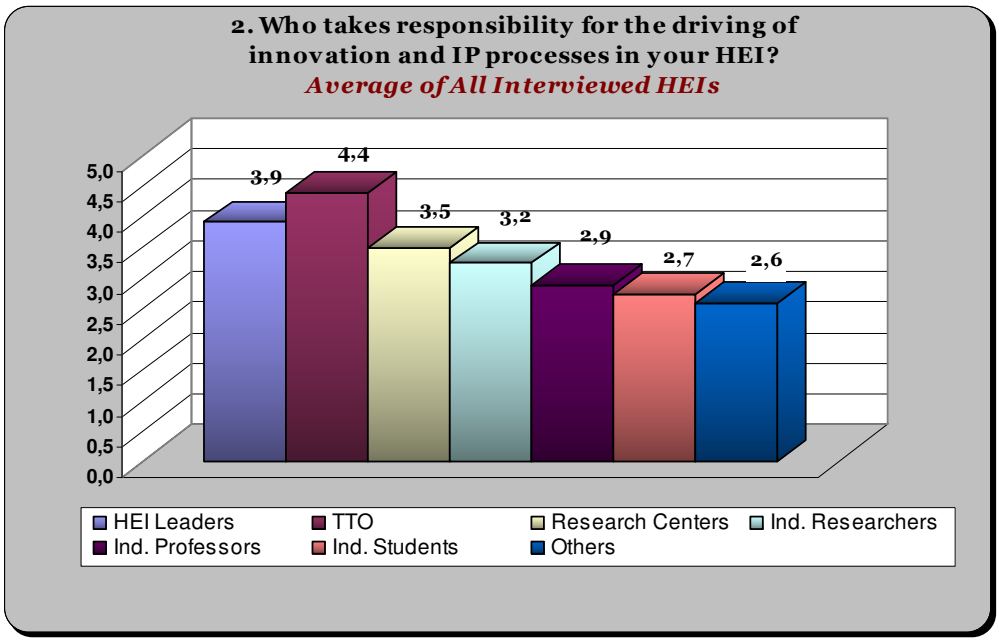


Diagram 2 - Who takes responsibility for the driving of innovation and IP processes in your HEI?

Highlighting examples

Two samples were selected to examine a similar response but that has very different meaning. At Jagiellonian University in Poland, the TTO clearly has full responsibility for driving the innovation and IP processes inside the HEI. Here the TTO is a centralized organization.

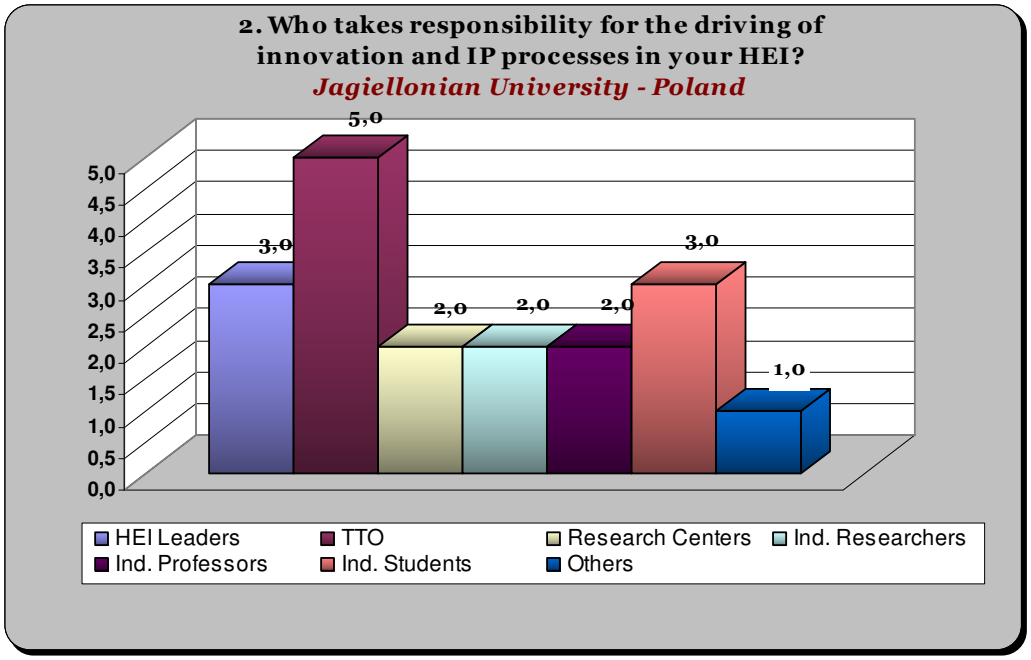


Diagram 3 - Who takes responsibility for the driving of innovation and IP processes at Jagiellonian University?

In the second example, Chalmers University of Technology in Sweden, the TTO is also selected as taking on the most responsibility. In contrast with Jagiellonian University, Chalmers is not a centralized organization but an assembly of many organizational units that work with TTO related tasks independently of each other.

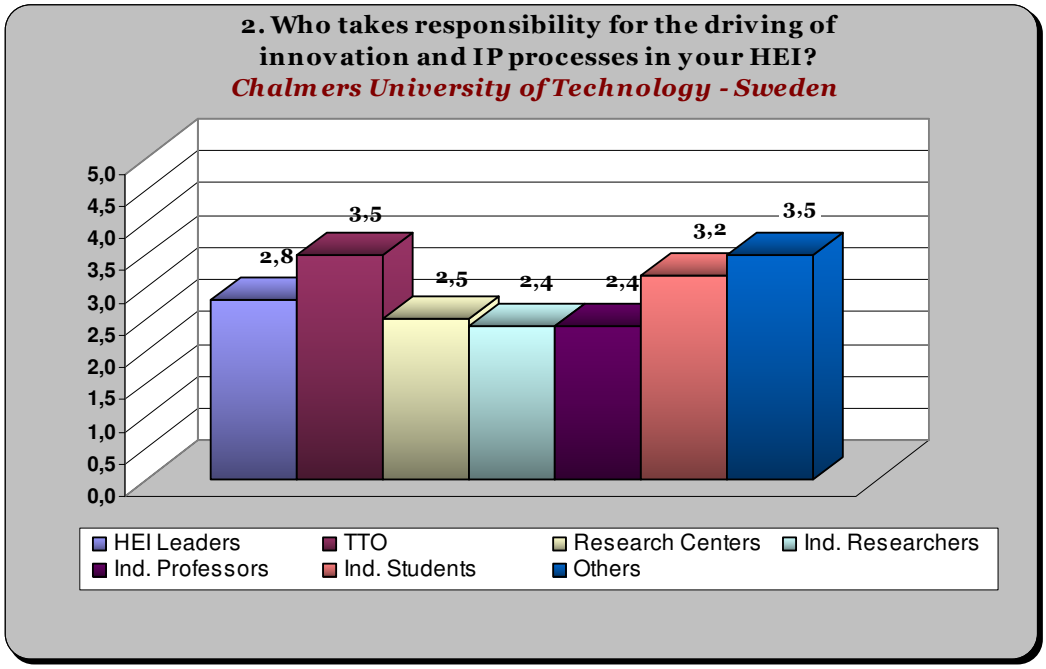


Diagram 4 - Who takes responsibility for the driving of innovation and IP processes at Chalmers University?

This array of organizations working with TTO assignments at Chalmers University in Sweden is not only placed in the TTO category but also in "others". Examples of such actors that fall into this category are Innovationsbron, Vinnova, Regional Government of Western Sweden, ALMI

Business Partner and Innovationskapital (VC) that all work with funding or aiding innovation processes in Sweden or regionally. These actors are all public organizations.

Reflections and analysis

It does not come as a surprise that the TTO takes on more responsibility for driving the innovation and IP processes. This confirms the finding above that most HEIs maintain the standard where responsibility still lies in certain functions only as opposed to being spread into all departments and positions.

It can be noticed that the individual researchers and professors inside the HEI are not as active when it comes to driving these questions. This may be a sign that the HEIs still operate with the paradigm of "publish or perish". The example of Chalmers University of Technology, Sweden is especially interesting as the individual researchers and professors take on even less responsibility than the average in spite of the fact that they own the rights to their own research results.

In relation to this it is furthermore interesting to see that in Sweden the public actors such as Vinnova and ALMI are to a great extent taking on the responsibility for driving innovation and IP processes even though they do not have an economical stake in the results achieved.

7.6.3 TO WHAT EXTENT DO YOU HAVE THE RESOURCES YOU NEED TO DRIVE AND MANAGE INNOVATION AND IP?

In addition to dedicated functions and positions, the resources allocated to the work with innovation and IP can also influence the success or failure of creating an innovative HEI. Seven categories of resources were identified and were evaluated on the extent to which they were available:

- 5 – 100% we have all the resources needed
- 4 – 75-99% we have most of the resource needed
- 3 – 50-74% we have enough resources to keep working
- 2 – 25-49% we are struggling without this resource
- 1 – 1-24% it is very hard to do the work without this resource
- 0 – 0% - we do not have this resource and therefore cannot do the job without this resource

Summary of results

All of the HEIs state that they have at least quite good availability of all of the named resources. The resources that were the most available were the motivation of the staff, the competence of the staff, having the authority/power to perform the work and having access to the information needed.

The resources that were the least available were having enough staff, budget and time to conduct the assignments.

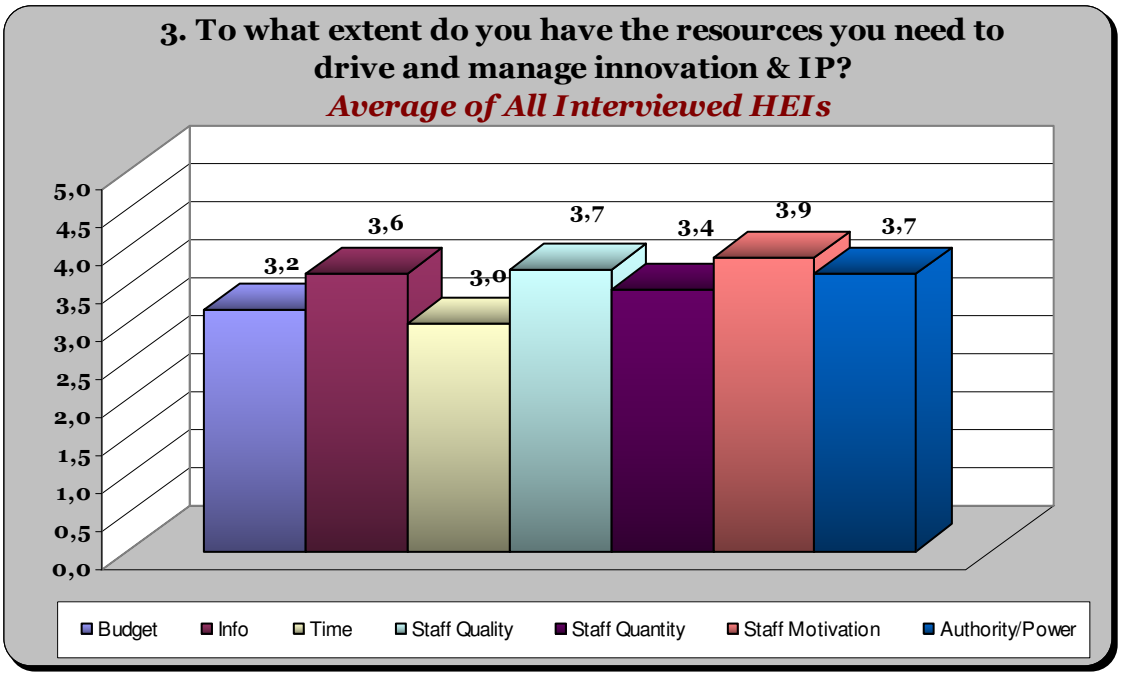


Diagram 5 - To what extent do you have the resources you need to drive and manage innovation & IP?

Highlighting examples

In the examples below, two very contrasting challenges when it comes to resources can be seen. KUST reports that they have sufficient competent and motivated staff but seriously lacks a sufficient budget to do the work assigned.

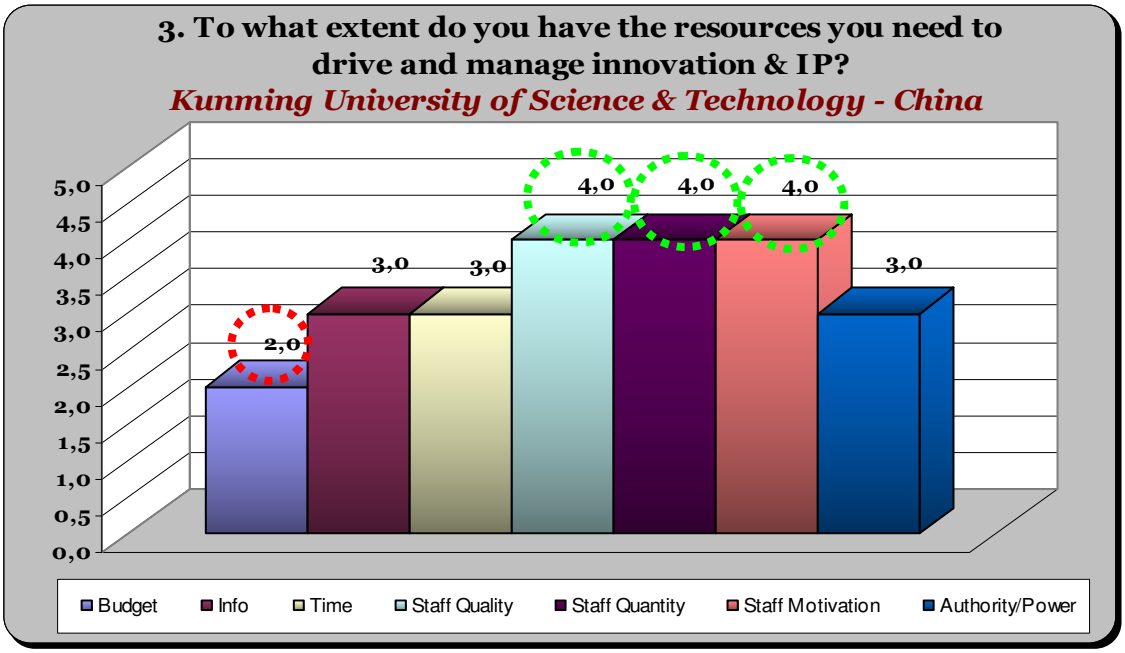


Diagram 6 - To what extent do you have the resources you need to drive and manage innovation & IP - KUST China

On the other hand, IITR in India has a sufficient budget and their staff is competent but they indicate that they do not have enough staff and that staff that they do have, while competent, are not motivated and do not have the time to perform their assignments.

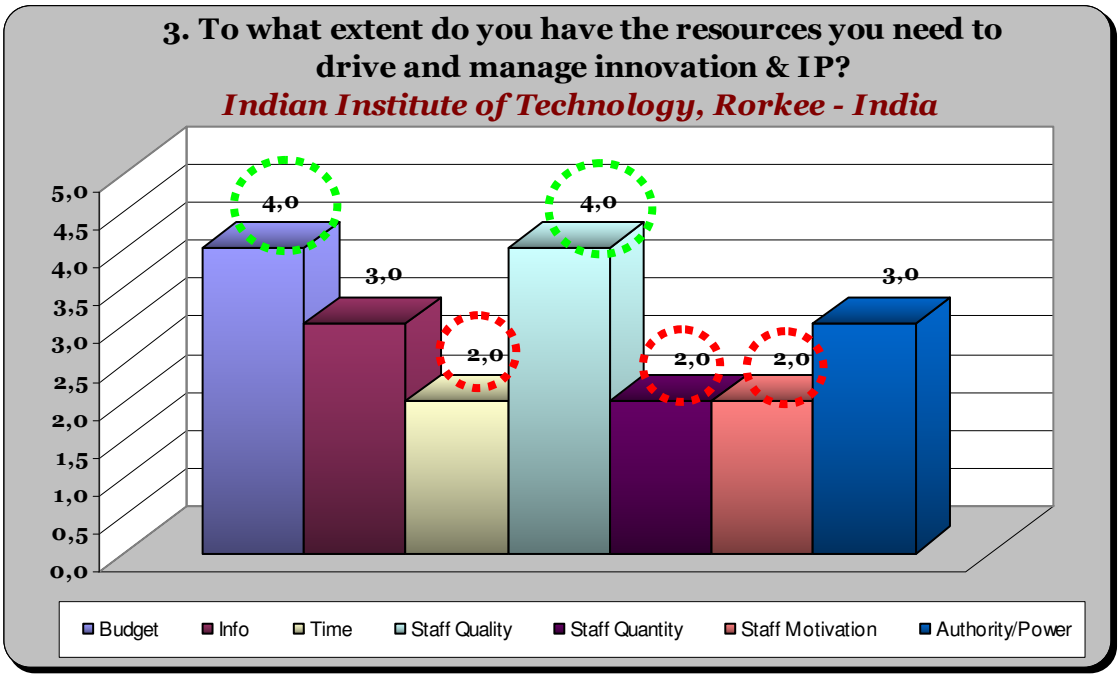


Diagram 7 - To what extent do you have the resources you need to drive and manage innovation & IP - IIT Roorke, India

Reflections and analysis

The fact that the HEIs state that the resources they lack most are budget and time may imply that the HEIs on a central level do not prioritize the activities related to innovation and IP enough.

Yet, the HEIs also state that the persons that work with these tasks are both qualified and motivated. In relation to this it is interesting to see how IIT Roorkee deviates from the average through having very good budgetary resources. The question then remains why is the staff quantity and motivation lower than average?

7.6.4 HOW CONSCIOUS AND SYSTEMATIC ARE YOU WHEN YOU ARE WORKING WITH INNOVATION AND IP MANAGEMENT?

A. TO WHAT EXTENT DO YOU HAVE CLEAR GOALS, MILESTONES AND INDICATORS TO SUPPORT YOU (AND YOUR TEAM) IN YOUR WORK?

Another important measure for evaluating the innovation culture inside the HEI is to examine how clear the goals are and how much learning is achieved in the pursuit of these goals. The HEIs in the study evaluated the extent to which they were able to achieve this measure using the criteria for assessment below.

- 5- follow goals, evaluate results and continuously integrate results and learning achieved into future processes, routines and decisions
- 4- follow goals and make continuous evaluations of results and learning achieved
- 3 -have goals, plan, resources and work according to plan
- 2- have set goals – but no plan or resources to achieve them
- 1- talked about goals and priorities – but not well defined
- 0- not clear goals or indicators

Summary of results

From the table below, it can be observed that nearly 60% of the HEIs have defined their work according to the goals, valuing an instrumental approach rather than a dynamic learning approach. 62% out of these HEIs are from Europe[10].

In contrast, four HEIs indicate that they work according to a very dynamic approach using goals, reflection and learning as a natural way of working. Three out of these four (CUST in China, IIT Roorkee and NML Jamshedpur from India) are from the BRIC countries. The only HEI from an EU country in this group is University of Surrey in Great Britain.

[10] Here, the University of St Petersburg Electrotechnical University is counted as a part of Europe as it is located in the European part of Russia.

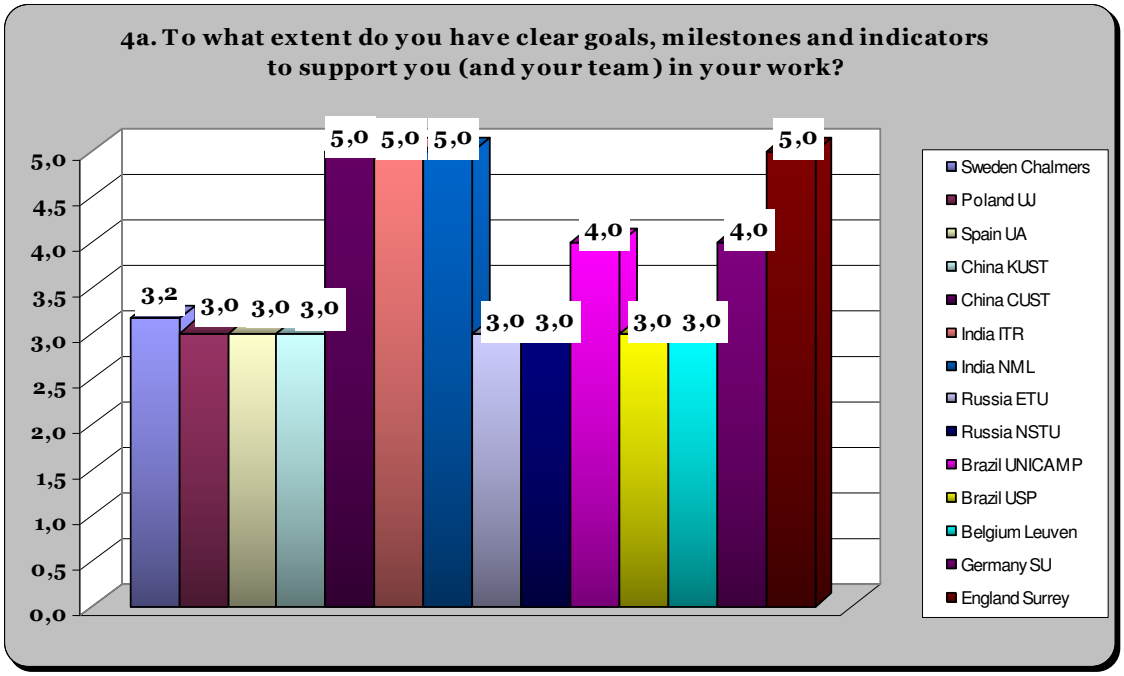


Diagram 8 - To what extent do you have clear goals, milestones and indicators to support you (and your team) in your work?

Reflections and analysis

It is fascinating to observe the results from this question as the majority of HEIs illustrating a more dynamic approach to their work are from the BRIC countries. A question to reflect upon is how the work culture in Europe which emphasizes effectiveness and lean management affects the work culture in the HEIs. Given the HEIs need to preserve and promote a work culture and learning maybe it would be useful for the European HEIs to exchange practices with and learn from the BRIC country HEIs.

B. TO WHAT EXTENT DO YOU (AND YOUR TEAM) REFLECT UPON YOUR EXPERIENCES IN WORKING WITH INNOVATION AND IP MANAGEMENT THAT LEAD TO BETTER WAYS OF WORKING AND RESULTS TO BE ACHIEVED?

As can be observed in the above findings, there is a variation in the extent to which we reflect and learn in our work. Research has shown that to generate innovation requires both time and ability to reflect. However, unfortunately the work culture- at least in the west- does not prioritize reflection which in the long run diminish skills in reflection which thereby creates discomfort around reflection which leads to avoidance (of the discomfort) which leads to further weakening around skills for reflection. One way to break this vicious cycle is to become more conscious on the areas of reflection and to develop an understanding of reflection in innovation work. One possible first step to break the cycle is to acknowledge the extent to which you reflect today, the degree of this reflection process is illustrated in the list below:

- 5 –can't live without reflection – essential for my way of working
- 4- reflect often in our work – and see the value of reflecting (as it leads to new ideas)
- 3 – have plan to actually reflect in some of our work
- 2- reflect on occasion – more ad hoc
- 1- talk about reflecting – but no time
- 0- do not reflect at all

Summary of results

The finding shows that in average the HEIs in this study plan to reflect and conduct some reflection in their work. In the graph below, it can furthermore be seen that where there is reflection, this is more focus towards the results of the work and work processes and less reflection on the meaning and relationships of the work.

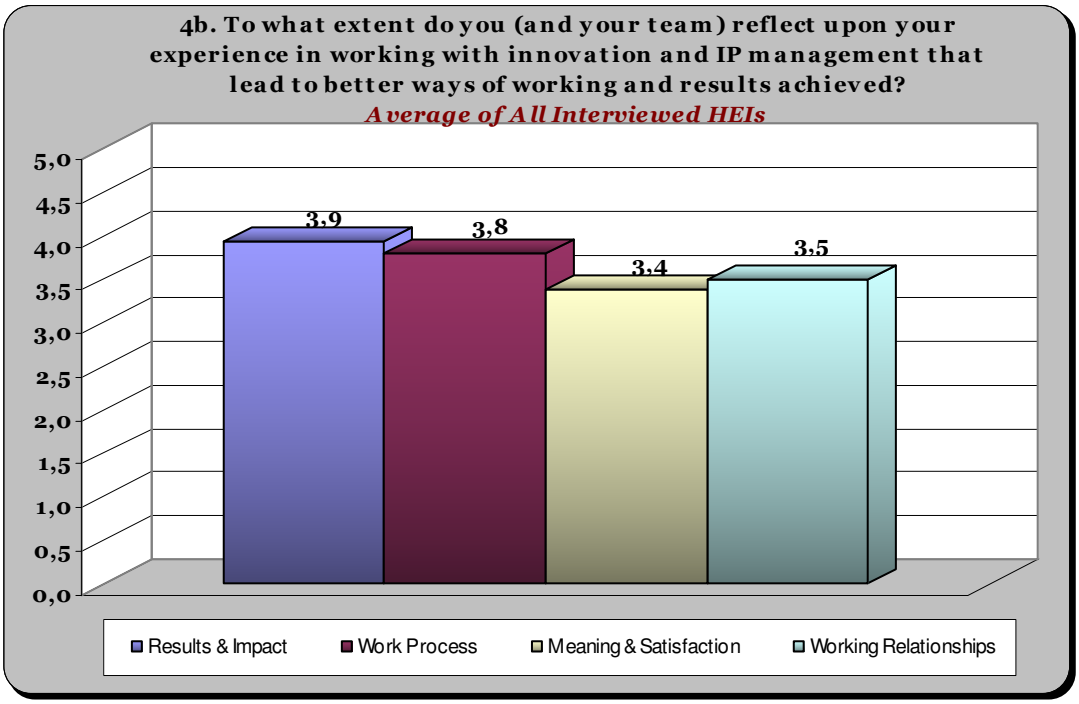


Diagram 9 - To what extent do you (and your team) reflect upon your experience in working with innovation and IP management that lead to better ways of working and results achieved?

Highlighting examples

Two HEIs have been elected to visualize two very different reflection environments. In the table below it can be observed that University of Alicante, Spain has little reflection in general with no area of reflection that seems to be more important than the other.

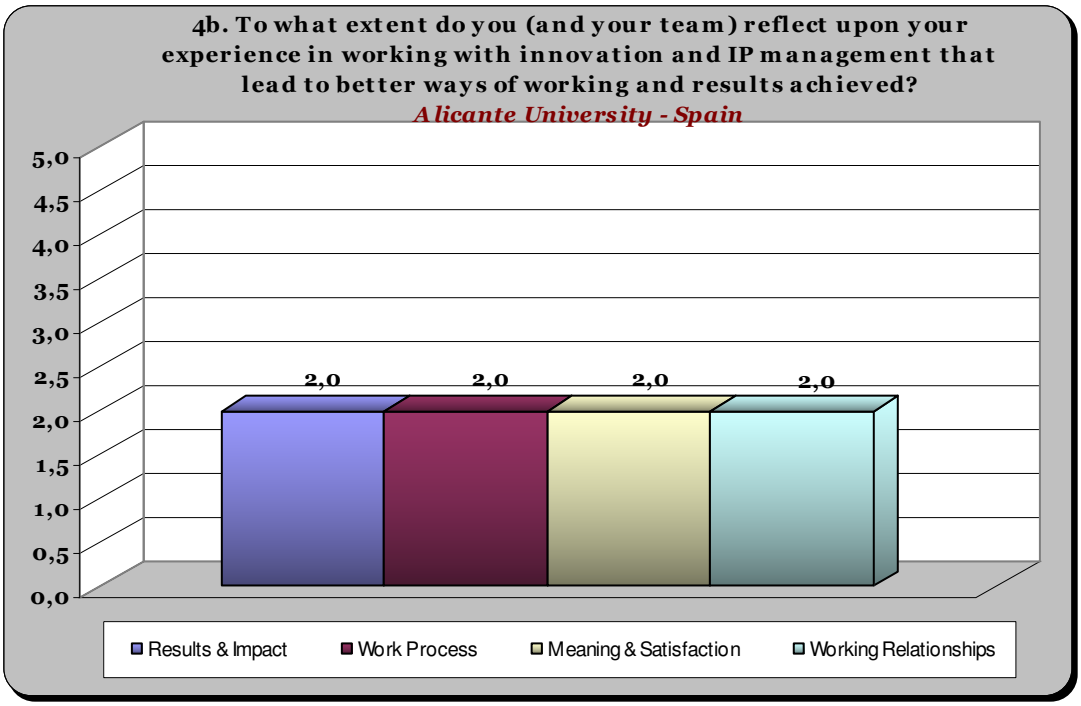


Diagram 10 - To what extent do you (and your team) reflect upon your experience in working with innovation and IP management that lead to better ways of working and results achieved – Alicante University, Spain

In contrast, as can be seen below that the Electrotechnical Univesity of St Petersburg, Russia includes reflection of work results and work processes but significantly less so when it comes to reflecting upon the meaning and relationships in the work.

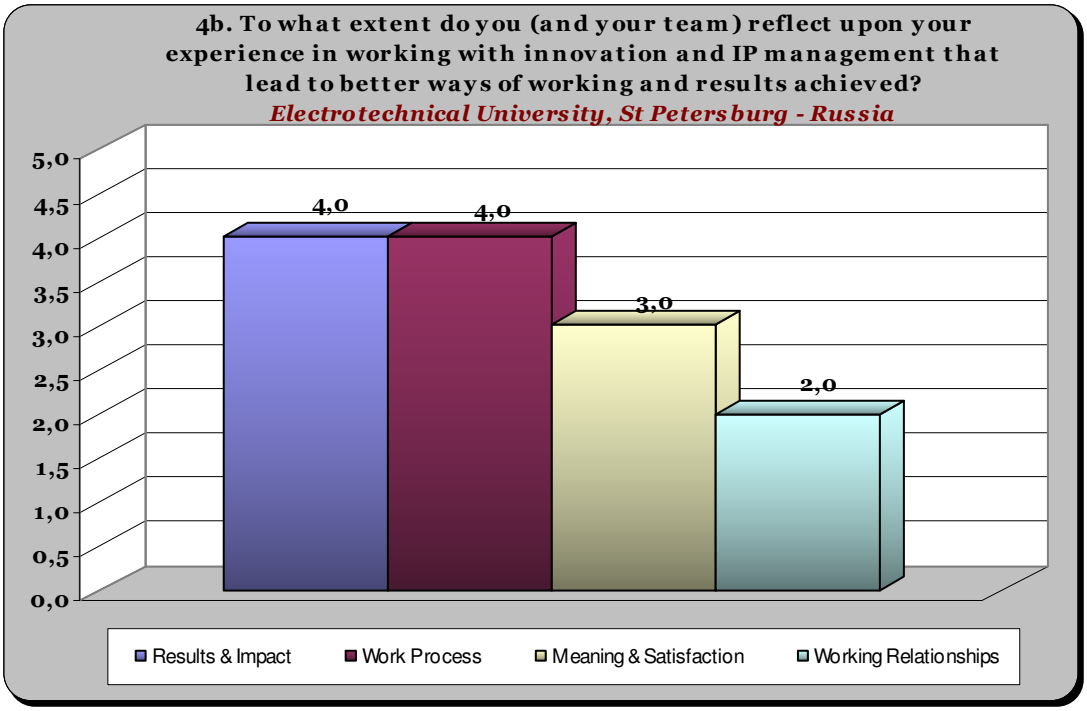


Diagram 11 - To what extent do you (and your team) reflect upon your experience in working with innovation and IP management that lead to better ways of working and results achieved - Electrotechnical University St Petersburg Russia

Reflections and analysis

It is commendable to see that there is reflection on the results & impact of the work as well as the work processes. This may be so since these aspects are seen as more core to the work than reflecting about meaning & satisfaction and working relationships are.

Research has been showing how important meaning, commitment and relationships are to the success of innovation activities. Thus, it is important to raise the question of what consequences could be if leaders do not include reflection on both the meaning and the relationships that are vital to innovation work. Not focusing on the human resource element risks disregarding a key asset (maybe the main asset) when it comes to create innovation in HEIs.

7.6.5 WHAT MOTIVATES YOU TO WORK WITH INNOVATION AND IP IN YOUR HEI?

Another measure that helps define the culture inside the HEI is what drives the leaders of innovation activities in the HEIs to work with innovation and IP. This is important because their motivation should be aligned and support the HEI's mission and strategy. Therefore it is important to know what motivates them as it either will affect the direction of the HEIs priorities or create tension if it is not aligned. The HEI leaders were given a long list of potential motivators and were asked to weigh the importance of each motivator.

5. What motivates you to work with Innovation and IP in your HEI?
i. To make a contribution to society
ii. To make a contribution to the HEI
iii. To make a contribution to my department
iv. To make a contribution to my scientific field
v. To get personal recognition and prestige
vi. To be a pioneer
vii. It is important for my career
viii. To get rich
ix. To feel challenged, stimulated and to learn a lot
x. To feel I do something meaningful
xi. To be part of a long term development process
xii. To work in cross-disciplinary teams
xiii. To work with people who 'want to make a difference'
xiv. It is easier to get a job in this sector
xv. Other

Summary of results

The biggest motivation factor amongst the leaders at the HEIs was to make a contribution to society and the second largest factor was to make a contribution to the department. The factor that was least motivating was to get rich.

A pattern was found during the analysis of the total average of the HEIs revealing three groups of motivators. The first group of motivators centered on the contributions back to society, HEI, department and science, the second group centered on motivation for personal/professional development while the third group centered on the longer term potential to be gained. The three motivating groups for the total average differed as follows:

1. The strongest of the three groups of motivators implied a tendency to be motivated for a contribution back including society, HEI, department and to science.
2. The second strongest motivation pattern is for the personal/professional development such as to feel challenged & stimulated, to do something meaningful and to work with people who wants to make a difference.
3. The third and weakest of the motivation groups was to be motivated by the potential that comes with a long-term processes and cross-disciplinary teams.

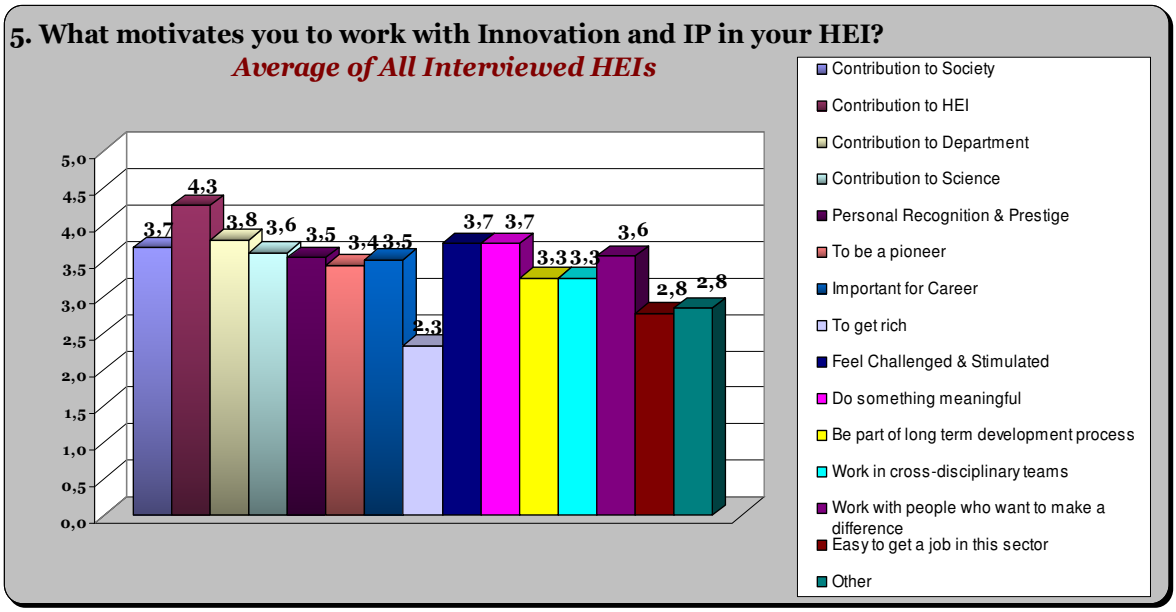


Diagram 12 - What motivates you to work with innovation and IP in your HEI?

Highlighting examples

In an effort to search for a deeper understanding of these motivating factors, the results were further analyzed to see whether there were any interesting distinguishing patterns between the EU and BRIC country HEIs. As can be seen below, there are big differences between what motivates the EU and BRIC country HEI leaders.

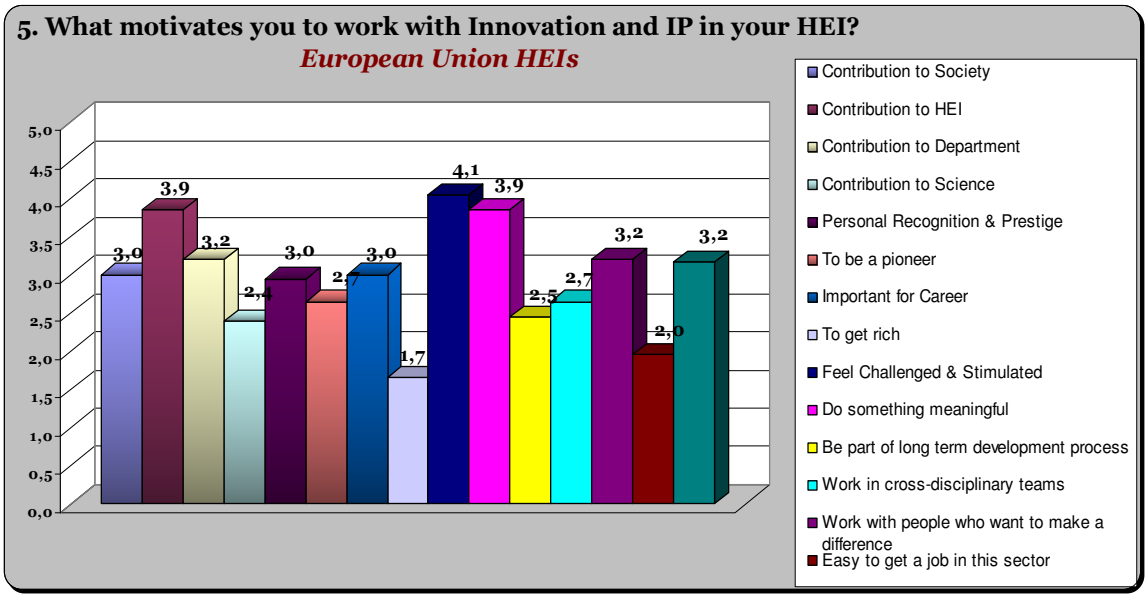


Diagram 13 - What motivates you to work with innovation and IP in your HEI - EU HEIs

The first big difference is that the European professionals tended to be more motivated by personal/professional development/gains such as feeling challanged than contributing back to society etc. This is in strong contrast to the BRIC country leaders who responded that they were most motivated by making a contribution back. Another difference is that while the EU HEI leaders did not value getting rich or having the opportunity to work long-term and in corss-disciplinary teams, the BRIC country HEI leaders indicated that all of these motivators were very imortant to them. Furthermore, to get personal recognition and being a pioneer were significantly more important for the BRIC leaders than for the EU leaders.

However, both BRIC country and EU HEI leaders are highly motivated by personal/professional development.

In general, when viewing the BRIC leaders table below, it illustrates how these leaders were motivated by many more factors simultaneously. When so many more factors are motivating, it leads to a more passionate way of working with innovation.

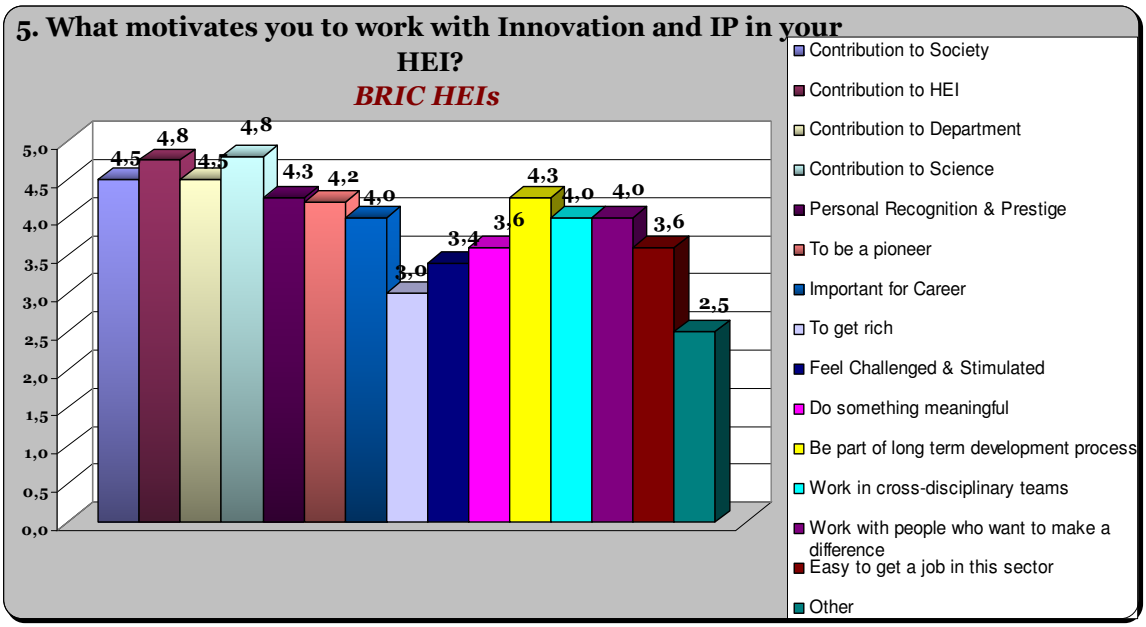


Diagram 14 - What motivates you to work with innovation and IP in your HEI - BRIC HEIs

Reflections and analysis

Reflections on the total average of motivators

The fact that the people answering this question were motivated by more idealistic goals such as making a contribution to the society than to get rich may imply that people in this field chose to work with these questions since they think they are of high importance. It may however also suggest (and confirm research that has found) that it is easier to get a job in a HEI since the big money only can be made somewhere else.

A few questions to reflect on for the future:

- If there is a tendency for innovation professionals in the EU leader HEIs to be motivated for more idealistic goals coupled with a much lower motivation to make money then how should the commercialization process be driven?
- What is needed to make the professionals or the HEIs aware that there is not necessarily a conflict between getting rich and making a contribution back to society, HEI, department and science?
- In the majority of cases, the HEI owns the rights to the research results created inside

the HEI (except for Sweden). As HEI need to develop policies for incentives and for revenue distribution – it is important to look at the effect on how they distribute the revenue among the HEIs, the individual researchers and the departments

- If there are few incentives that return revenue to the professionals – it might not attract professionals who are motivated to achieve economic gain from the innovation – which in turn, raises the questions – as to WHO in the university and how can a university optimize the gains and output from an innovation - which include sending this benefit back to society?

7.6.6 WHAT QUALITY OF WORKING RELATIONSHIPS DO YOU HAVE?

One of the vital dimensions of innovation and a key ingredient to making the culture sustain is the extent to which there is **commitment** between the leaders and teams to the innovation process and to each other. Because innovation often takes time and has to survive challenges and even set-backs it requires a persistence and engagement to the process that can be defined as commitment. So what is it that can help sustain the commitment needed to drive innovation and to shape the culture that prioritizes an innovative way of working? Research has shown (Scheinberg and Alänge 2000) that the kind of **relationships** we create have a very strong influence on our sense of commitment and engagement. Given that innovation is a complex set of activities, it is clear that we cannot always work alone but need to cooperate with several other stakeholders, competences and power bases. In order to develop the relationships needed to create and sustain innovation it is important to recognize that there are various dimensions of a relationship. The four possible qualities of a relationship that can be developed are:

- Polite - respectful, follow rules, formal, kind, superficial
- Instrumental - Task, goal and production oriented
- Affective - Care about each other, include feelings, motivation, ambition,
- Passionate - Share common vision, values, passions, ethics

None of the dimensions are superior to the other. Each of these dimensions has their own quality and importance to creating and maintaining relationships. For example it is important to be respectful in our relationships (polite), and it is important clear about our common tasks (instrumental). It is also important to feel cared for and appreciated in our work (affective) and to hold a common vision, share a common passion and hold have the same values and ethics (passionate). In our work relations it is possible to function with one of these qualities. However, in order sustain the long-term commitment needed for managing the challenges and sharing the excitement of innovation, more dimensions are needed. The ideal relationships are therefore those in which all of the four qualities are developed. This way of analyzing relationships can be applied to both relationships within the university as well as with external stakeholders.

Summary of results

All of the HEI leaders were asked to assess the relationships with four stakeholders. This included relationships with bosses, colleagues, subordinates and clients. The leader assessed each relationship in relation to how rich in qualities the relationships were. The scale of richness was as follows:

- 5 – all qualities included – very dynamic and rich
- 4 – 3 qualities included – dynamic

- 3 – 2 qualities included – working relation
- 2 – 1 quality included – limited relation
- 1 – no quality so clear – but meet on occasion
- 0 – no relationship

First, an average of all of the HEIs will be presented. Then, two examples are presented to highlight some interesting differences.

As can be observed in the table below, all of the HEIs state that they have dynamic working relationships with their bosses, colleagues and subordinates. The relationship to the clients is however ranked just above 3 which imply that their relationships are functioning but are not so rich in terms of qualities.

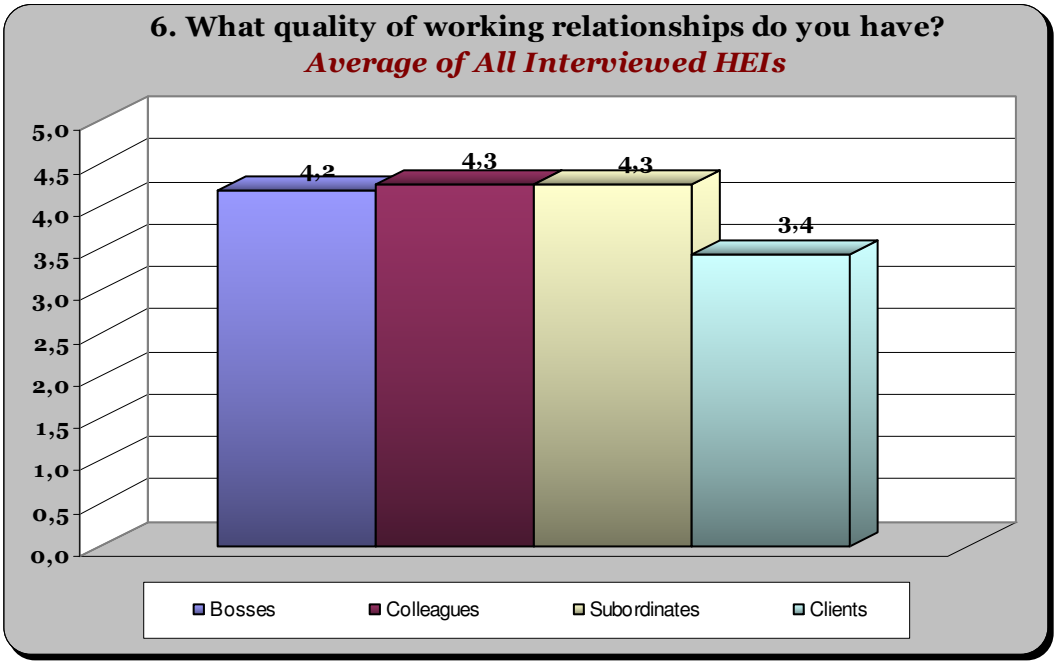


Diagram 15 - What quality of working relationships do you have?

Highlighting examples

As can be observed in the two tables below, there is not such a big difference between how the EU and BRIC country HEIs rank the qualities of their relationships with the various stakeholder groups. Both of the groups have indicated that they have rich relations (with the BRIC country HEIs indicating a slightly higher level of richness).

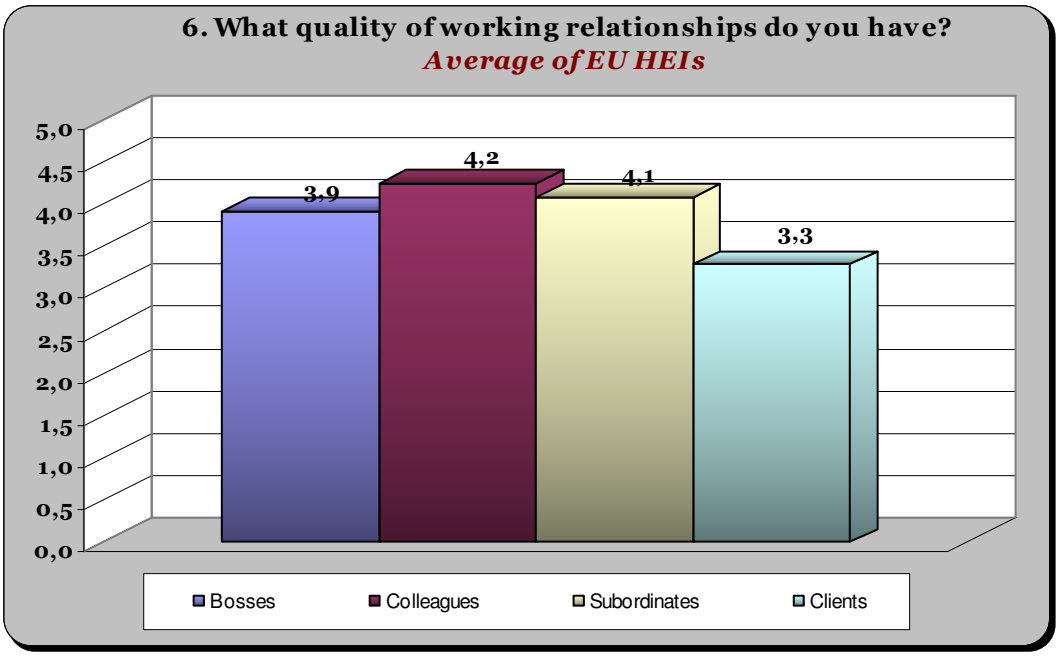


Diagram 16 - What quality of working relationships do you have - EU HEIs

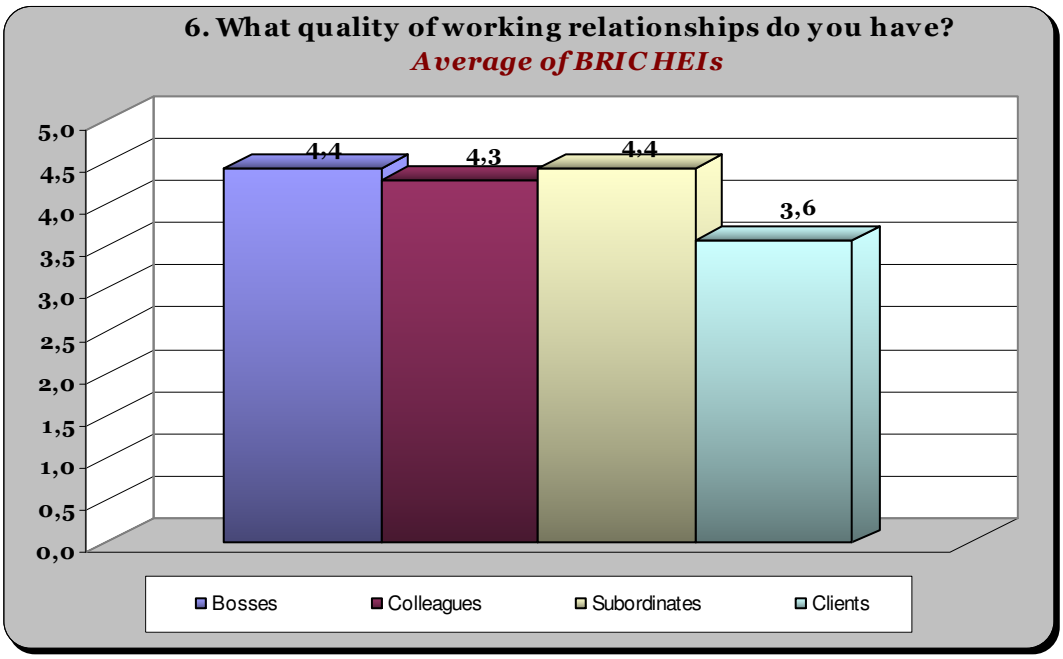


Diagram 17 - What quality of working relationships do you have - BRIC HEIs

The only deviation from the strong pattern of having rich and dynamic relations emerges when looking into the individual HEIs. An interesting deviation can be found in a HEI in India and a HEI in Europe. In the Indian example, the relationship with the clients were assessed to be weak (having no consistent qualities in the relation). The Polish example shows that only the relationship with the colleagues are dynamic whereas the relationships with the bosses has only one quality and is thus a more limited relation and the relationship with subordinates and clients was also functioning but was not so rich.

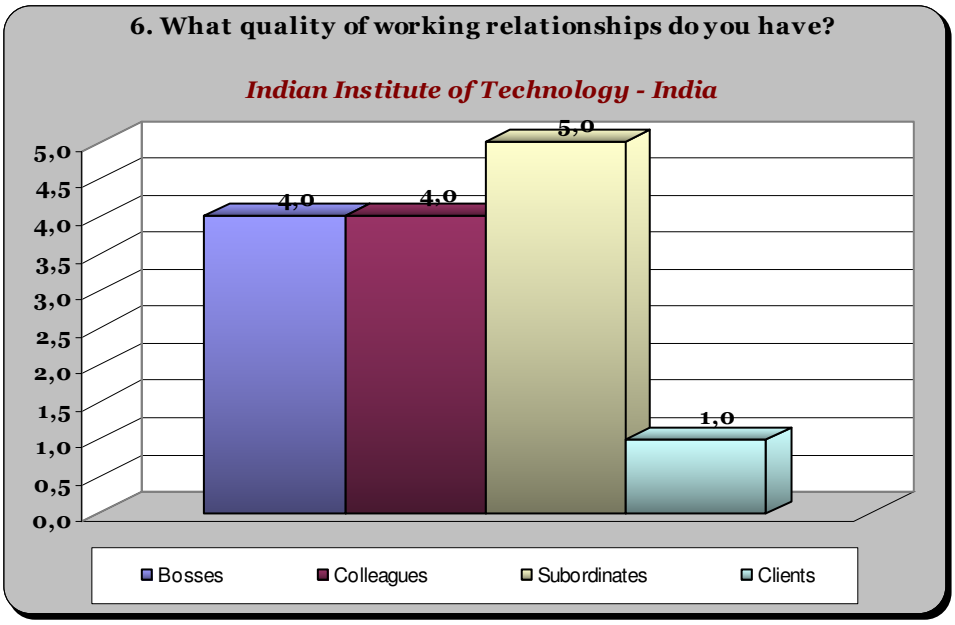


Diagram 18 - What quality of working relationships do you have - IIT Roorkee India

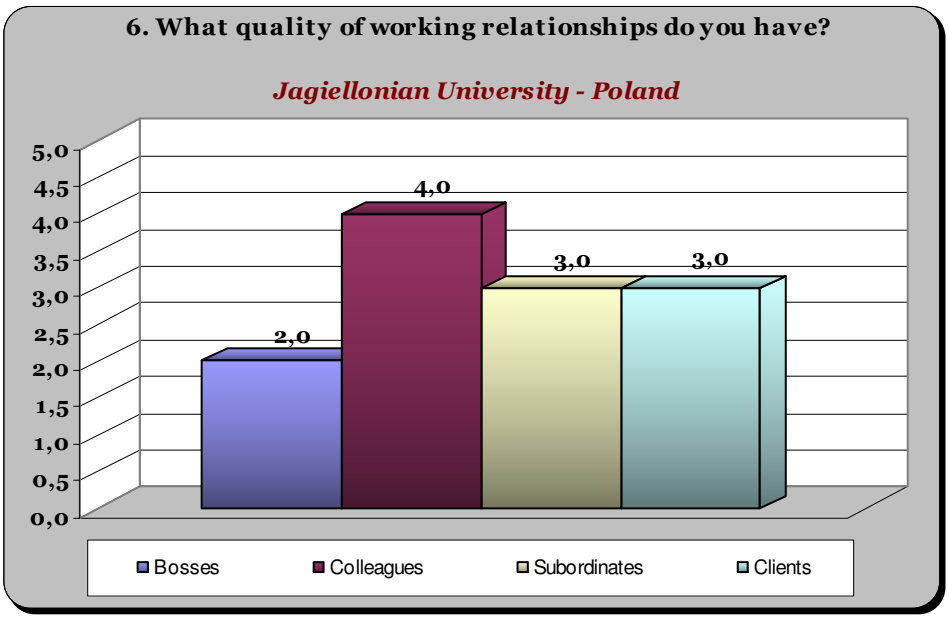


Diagram 19 - What quality of working relationships do you have - Jagiellonian University Poland

Reflections and analysis

Comment on the average

Most of the HEIs rank their relationships to be very dynamic and with nearly all qualities. Two questions could be raised regarding the reliability of the responses to this question. First, given that we know that relations inside HEIs are usually more hectic it can be questioned whether the professionals working with innovation (that have ranked their relationships to be very rich) constitute a sub culture inside the HEI. If there is a sub culture, it would be interesting to explore further how these innovation professionals manage relationships inside their larger HEI.

Second, the question about relationships is very personal and potentially exposing. This can

lead the respondents to give more socially desirable answers in order to e.g. “save face”. Further discussion and exploration around this question would be interesting.

Comment on the HEI examples

It is interesting to see the deviation offered by the both the Indian and Polish HEIs in the types of relationships they develop with the different stakeholders. In light to the above-standing reflection on “saving face” it would be interesting to explore whether the culture in India and Poland have national cultures that allows more openness or if it in fact is a true deviation in this specific HEI.

8 ANNEX

I. Tables outlining detailed findings

HEI	Research Results	Teaching Materials	Services	Others
Universidad de Campinas, Brazil	X		X	
São Paolo Federal University, Brazil				
KUST, China	X		X	X
CUST, China	X	X	X	
Indian Institute of Technology Roorkee, India, India	X		X	
NML, Jamshedpur, India				
St Petersburg Electrotechnical University, Russia	X	X	X	
Novosibirsk State Technical University, Russia	X	X	X	
Jagiellonian University, Poland	X	X	X	
University of Surrey, England	X	X		
Alicante University, Spain	X	X		X
Saarland University, Germany	X	X	X	
Chalmers University, Sweden	X	X	X	X
kU Leuven, Belgium	X	X	X	

Table 6- Which HEI outputs can be commercialized?

HEI	Research Results	Teaching Materials	Services	Others
Universidad de Campinas, Brazil	X	X	X	
São Paolo Federal University, Brazil	X	X	X	
KUST, China			X	
CUST, China	X			X
Indian Institute of Technology Roorkee, India	X	X	X	
NML, Jamshedpur, India	X	X	X	
St Petersburg Electrotechnical University, Russia	X	X	X	
Novosibirsk State Technical University, Russia	X	X	X	
Jagiellonian University, Poland	X	X	X	
University of Surrey, England		X	X	
Alicante University, Spain	X	X		X
Saarland University, Germany	X	X	X	
Chalmers University, Sweden	X	X	X	X
KU Leuven, Belgium	X	X	X	

Table 7- Which HEI outputs can be defined as public goods?

HEI	Innovation	IP	Entrepreneurship
Universidad de Campinas, Brazil	X	X	X
São Paolo Federal University, Brazil	X	X	X
KUST, China	X	X	X
CUST, China	0	X	X
Indian Institute of Technology Roorkee, India	X	X	0
NML, Jamshedpur,	X	X	X

India			
St Petersburg Electrotechnical University, Russia	X	0	X
Novosibirsk State Technical University, Russia	X	X	X
Jagiellonian University, Poland	0	0	0
University of Surrey, England	X	X	0
Alicante University, Spain	X	X	X
Saarland University, Germany	X	X	X
Chalmers University, Sweden	0	0	0
KU Leuven, Belgium	X	X	X

Table 8- Does your HEI have policies for innovation, IP and Entrepreneurship?

HEI	Yes	No
Universidad de Campinas, Brazil		X
São Paolo Federal University, Brazil	X	
KUST, China	X	
CUST, China	X	
Indian Institute of Technology Roorkee, India	X	
NML, Jamshedpur, India	X	
St Petersburg Electrotechnical University, Russia	X	
Novosibirsk State Technical University, Russia	X	
Jagiellonian University, Poland		
University of Surrey, England		X
Alicante University, Spain	X	
Saarland University, Germany		X
Chalmers University, Sweden		
KU Leuven, Belgium		

Table 9- If the HEI has policies for innovation, IP and Entrepreneurship, is there a strategy for implementation (i.e. in the working plan)?

HEI	Industry	Government	Universities	Other
Universidad de Campinas, Brazil	X	X	X	0
São Paolo Federal University, Brazil	X	X	X	0
KUST, China	0	0	0	X
CUST, China	0	0	0	0
Indian Institute of Technology Roorkee, India	X	X	X	0
NML, Jamshedpur, India	X	X	X	X
St Petersburg Electrotechnical University, Russia	0	0	0	0
Novosibirsk State Technical University, Russia	0	0	0	0
Jagiellonian University, Poland	X	0	X	0
University of Surrey, England	0	0	0	0
Alicante University, Spain	X	X	X	0
Saarland University, Germany	X	0	0	0
Chalmers University, Sweden	X	X	0	X
KU Leuven, Belgium	0	0	0	0

Table 10- Do the HEI's IP policy and norms / regulations / by-laws guide relationships (contracts) between the HEI and other stakeholders?

HEI	Yes	No
Universidad de Campinas, Brazil	X	
São Paolo Federal University, Brazil	X	
KUST, China	X	
CUST, China	X	
Indian Institute of Technology Roorkee, India	X	
NML, Jamshedpur, India		X
St Petersburg Electrotechnical University, Russia		X
Novosibirsk State Technical		X

University, Russia		
Jagiellonian University, Poland	X	
University of Surrey, England		X
Alicante University, Spain	X	
Saarland University, Germany		X
Chalmers University, Sweden	X	
KU Leuven, Belgium	X	

Table 11- Do the IP policy and norms / regulations / by-laws stipulate to whom the HEI based IP can be assigned?

HEI	Share licensing incomes	Get equity in start-up	Moral-prestige	Going to conferences	Training	Other
Universidad de Campinas, Brazil	X					
São Paolo Federal University, Brazil	X			X	X	
KUST, China						X
CUST, China	X			X	X	
Indian Institute of Technology Roorkee, India	X					X
NML, Jamshedpur, India						
St Petersburg Electrotechnical University, Russia			X	X		
Novosibirsk State Technical University, Russia		X	X	X	X	X
Jagiellonian University, Poland	X	X				
University of Surrey, England	X	X				
Alicante University, Spain	X	X			X	X
Saarland University, Germany	X					
Chalmers University, Sweden			X			

KU Leuven, Belgium	X					X

Table 12- Which incentives does the HEI provide for researchers and professors to transform research into innovations?

HEI	Share licensing incomes	Get equity in start-up	Moral-prestige	Going to conferences	Training	Other
Universidad de Campinas, Brazil	X		X			
São Paolo Federal University, Brazil	X	X	X	X	X	
KUST, China						X
CUST, China	X			X	X	
Indian Institute of Technology Roorkee, India	X	X				X
NML, Jamshedpur, India	X					
St Petersburg Electrotechnical University, Russia		X	X		X	
Novosibirsk State Technical University, Russia		X	X	X	X	X
Jagiellonian University, Poland	X	X	X			X
University of Surrey, England	X	X				
Alicante University, Spain	X	X	X		X	X
Saarland University, Germany	X					
Chalmers University, Sweden	X	X			X	
KU Leuven, Belgium	X	X		X		X

Table 13- Which incentives does the HEI provide for researchers and professors for other activities related to innovation?

HEI	Share licensing incomes	Get equity in start-up	Moral-prestige	Going to conferences	Training	Other
Universidad de Campinas, Brazil						
São Paolo Federal University, Brazil	X	X	X	X	X	
KUST, China						
CUST, China						X
Indian Institute of Technology Roorkee, India			X	X	X	
NML, Jamshedpur, India	X	X				
St Petersburg Electrotechnical University, Russia						
Novosibirsk State Technical University, Russia						
Jagiellonian University, Poland						
University of Surrey, England						
Alicante University, Spain	X	X	X			X
Saarland University, Germany						X
Chalmers University, Sweden						
KU Leuven, Belgium						X

Table 14- Does the HEI provide incentives for researchers and professors for other activities related to innovation?

HEI	Yes	No
Universidad de Campinas, Brazil		X
São Paolo Federal University, Brazil		X
KUST, China		X
CUST, China		X
Indian Institute of Technology Roorkee, India		X
NML, Jamshedpur, India		X
St Petersburg Electrotechnical University, Russia		X
Novosibirsk State Technical University, Russia		X
Jagiellonian University, Poland	X	
University of Surrey, England	X	
Alicante University, Spain	X	
Saarland University, Germany		X
Chalmers University, Sweden	X (for a certain unit inside CU)	
KU Leuven, Belgium	X	

Table 15- Does the HEI stipulate the distribution of equity in the case of company start ups in the HEI?

HEI	Yes	No
Universidad de Campinas, Brazil	X	
São Paolo Federal University, Brazil		X
KUST, China	X	
CUST, China		X
Indian Institute of Technology Roorkee, India	X	
NML, Jamshedpur, India	X	
St Petersburg Electrotechnical University, Russia		X
Novosibirsk State Technical University, Russia		X
Jagiellonian University, Poland	X	
University of Surrey, England	X	
Alicante University, Spain	X	
Saarland University, Germany		X
Chalmers University, Sweden		X
KU Leuven, Belgium		X

Table 16- Does the HEI stipulate any judicial body (e.g. committee) for solving internal conflicts?

HEI	Internal entity belonging to HEI	External entity	Other
Universidad de Campinas, Brazil	1		
São Paolo Federal University, Brazil	1		
KUST, China	1		
CUST, China	2	1	
Indian Institute of Technology Roorkee, India	4		
NML, Jamshedpur, India	2		
St Petersburg Electrotechnical University, Russia	3		
Novosibirsk State Technical University, Russia	5		
Jagiellonian University, Poland	1	2	
University of Surrey, England	1		
Alicante University, Spain	1	1	
Saarland University, Germany	X	X	
Chalmers University, Sweden	2	1	2
KU Leuven, Belgium	1		

Table 17- What is the legal status of the entities dealing with the HEI's IP, TT, BD, incubation, contract research and other innovation activities?

HEI	Public	Private	Non-Profit Private	Foundation	Other
Universidad de Campinas, Brazil	1				
São Paolo Federal University, Brazil	1				
KUST, China	1				
CUST, China	3				
Indian Institute of Technology Roorkee, India					4

NML, Jamshedpur, India	2				
St Petersburg Electrotechnical University, Russia	3				
Novosibirsk State Technical University, Russia					5
Jagiellonian University, Poland	1	2			
University of Surrey, England	X				
Alicante University, Spain	2				
Saarland University, Germany	X	X			
Chalmers University, Sweden	1	1		2	1
KU Leuven, Belgium			X		
Total:					

Table 18- What is the legal status of the entities dealing with the HEI's IP, TT, BD, incubation, contract research and other innovation activities?

HEI	Internally	Externally and Internally
Universidad de Campinas, Brazil	1	
São Paolo Federal University, Brazil	1	
KUST, China	1	
CUST, China	2	1
Indian Institute of Technology Roorkee, India	3	1
NML, Jamshedpur, India	1	
St Petersburg Electrotechnical University, Russia	2	1
Novosibirsk State Technical University, Russia	5	
Jagiellonian University, Poland	1	2
University of Surrey, England		X
Alicante University, Spain	1	1
Saarland University, Germany	X	X
Chalmers University, Sweden		5
KU Leuven, Belgium		X
Total:		

Table 19- Are the entities internally or externally oriented?

x

HEI	Base salary	Commission	Royalty percentage	Company equity	Other
Universidad de Campinas, Brazil	X				
São Paolo Federal University, Brazil	X				
KUST, China	X		X		
CUST, China	X				X
Indian Institute of Technology Roorkee, India	X				X
NML, Jamshedpur, India	X				
St Petersburg Electrotechnical University, Russia	X				
Novosibirsk State Technical University, Russia	X				
Jagiellonian University, Poland	X				X
University of Surrey, England	X				
Alicante University, Spain	X				
Saarland University, Germany	X				
Chalmers University, Sweden	5			2	2
KU Leuven, Belgium	-	-	-	-	-
Total:					

Table 20- How is the staff inside the innovation entities compensated?

HEI	HEI Web site	Publications	News magazines	Board meetings	Staff meetings	Seminars	Other
Universidad de	X	X	X			X	

Campinas, Brazil							
São Paolo Federal University, Brazil	X	X	X	X	X	X	X
KUST, China	X				X		X
CUST, China	X				X		
Indian Institute of Technology Roorkee, India	X			X	X	X	
NML, Jamshedpur, India	Unclear	Unclear	Unclear	unclear	unclear	Unclear	Unclear
St Petersburg Electrotechnical University, Russia	X	X	X	X	X	X	
Novosibirsk State Technical University, Russia	X			X	X	X	
Jagiellonian University, Poland	X	X	X	X	X	X	
University of Surrey, England	X					X	
Alicante University, Spain	X	X	X	X		X	X
Saarland University, Germany	X		X	X	X	X	
Chalmers University, Sweden	X	X	X		X	X	
KU Leuven, Belgium	X		X	X	X	X	
Total:	13	6	8	8	10	11	

Table 21- How does the HEI communicate and diffuse its formal commitment to innovation and IP to faculty and staff?

HEI	HEI Web site	3rd party web site	Newspapers, magazine	Radio	TV	Public Procure-ment	Events, fairs & workshops	Visits to partner	Oth-er
Universidad de Campinas, Brazil	X		X			X	X		X
São Paolo	X		X		X		X	X	

Federal University, Brazil									
KUST, China	X	X	X				X	X	
CUST, China		X	X	X	X			X	
Indian Institute of Technology Roorkee, India	X		X		X		X	X	X
NML, Jamshedpur, India	unclear	uncl ear	Unclear	unclea r	Un cle an	Unclear	Unclear	unclea r	Unc lean
St Petersburg Electrotechnical University, Russia	X		X				X	X	
Novosibirsk State Technical University, Russia	X	X	X	X	X	X	X	X	
Jagiellonian University, Poland	X		X				X	X	X
University of Surrey, England	X	X					X		
Alicante University, Spain	X	X	X				X	X	X
Saarland University, Germany	X	X	X	X	X		X	X	
Chalmers University, Sweden	X		X			X	X	X	
KU Leuven, Belgium	X		X			X		X	
Total:	12	6	12	3	5	4	11	11	4

Table 22- How does the HEI communicate/market and diffuse its "technological offer" and IP to society and commercial markets?

HEI	Students	Researchers	Professors	Others
Universidad de Campinas, Brazil	X	X	X	X
São Paolo Federal University, Brazil	X	X	X	X
KUST, China	X	X	X	X
CUST, China	X	X	X	X
Indian Institute of Technology Roorkee, India	X	X		
NML,		X		X

Jamshedpur, India				
St Petersburg Electrotechnical University, Russia	X	X	X	X
Novosibirsk State Technical University, Russia				
Jagiellonian University, Poland	X	X	X	X
University of Surrey, England	X	X		
Alicante University, Spain	X	X		X
Saarland University, Germany	X	X	X	
Chalmers University, Sweden	X	X	X	X
KU Leuven, Belgium	X	X		
Total:	12	13	8	9

Table 23- For who is the education in innovation and IP?

HEI	**…for supporting HEI researchers to find value in their research**	**… for researchers to disclose an invention to the HEI (internally)**
Universidad de Campinas, Brazil	0	0
São Paolo Federal University, Brazil	X	X
KUST, China	X	0
CUST, China	X	X
Indian Institute of Technology Roorkee, India	X	X
NML, Jamshedpur, India	X	X
St Petersburg Electrotechnical University, Russia	0	X
Novosibirsk State Technical University, Russia	X	X
Jagiellonian University, Poland	0	X
University of Surrey, England	X	X
Alicante University, Spain	X	X
Saarland University, Germany	X	X
Chalmers University, Sweden	X	X
KU Leuven, Belgium	X	X

Total:	11	12

Table 24- Does the HEI have the following processes for finding value in their research?

HEI	… to determine if there is a market for an invention	… to assess the technical viability of an invention	… to assess the economic viability of an invention
Universidad de Campinas, Brazil			
São Paolo Federal University, Brazil	X	X	X
KUST, China	X	X	X
CUST, China	X	X	X
Indian Institute of Technology Roorkee, India	X	X	X
NML, Jamshedpur, India	X	X	
St Petersburg Electrotechnical University, Russia	X	X	
Novosibirsk State Technical University, Russia	X	X	X
Jagiellonian University, Poland	X	X	X
University of Surrey, England	X	X	X
Alicante University, Spain	X	X	X
Saarland University, Germany	X	X	X
Chalmers University, Sweden	X	X	X
KU Leuven, Belgium	X	X	X
Total:	13	13	11

Table 25- Does the HEI have the following processes for assessing the value identified in research at the HEI?

HEI	… to determine if an invention can be protected by IPR	… for conducting prior art search	… to support researchers to develop a technical description report	… to support the application of patentability evaluation at PTO:s	… to draft and application and apply for protection of an invention	… to monitor pending applications and registration
Universidad de Campinas, Brazil	X		X	X	X	

São Paolo Federal University, Brazil	X	X	X	X	X	X
KUST, China	X	X	X	X	X	X
CUST, China	X			X		X
Indian Institute of Technology Roorkee, India	X	X	X	X	X	X
NML, Jamshedpur, India	X	X	X	X	X	X
St Petersburg Electrotechnical University, Russia	X	X	X	X	X	X
Novosibirsk State Technical University, Russia	X	X	X	X	X	X
Jagiellonian University, Poland	X			X		X
University of Surrey, England	X	X	X	X	X	X
Alicante University, Spain	X	X	X	X	X	X
Saarland University, Germany	X	X	X	X	X	X
Chalmers University, Sweden	X	X	X	X	X	X
KU Leuven, Belgium	X	X	X	X	X	X
Total:	14	11	12	14	12	13

Table 26- Does the HEI have the following processes for evaluating the possibilities for protection and seeking protection?

HEI	… to support researchers to create a business plan for their inventions	… to create a start-up company around an invention	… to draft legal documents	… to sell licenses	… to offer or find a place for a start-up company in an incubator	… to offer business development services -
Universidad de Campinas, Brazil	X	X			X	
São Paolo Federal Univ, Brazil	X	X	X	X	X	X
KUST, China	X	X	X	X	X	X
CUST, China		X			X	
Indian Institute of Technology Roorkee, India	X	X		X	X	
NML, Jamshedpur, India	X		X	X		X
St Petersburg Electrotechnical University, Russia						
Novosibirsk State Technical University, Russia	X	X	X	X	X	X
Jagiellonian University, Poland	X	X	X			X
University of Surrey, England	X	X	X	X	X	X
Alicante University, Spain	X	X	X		X	
Saarland University, Germany	X	X	X	X	X	
Chalmers University, Sweden	X	X	X		X	X
KU Leuven, Belgium	X	X	X	X	X	X
Total:	12	12	10	8	11	9

Table 27- Does the HEI have the following processes to support the commercialization of research results / inventions?

HEI	… for managing a HEI IP portfolio	… for monitoring the HEI IP portfolio	… for evaluating and creating strategies around the IP portfolio	… for continuously linking research results to HEI teaching and research agenda
Universidad de Campinas, Brazil	X	X	X	
São Paolo Federal University, Brazil	X	X	X	X
KUST, China	X	X	X	X
CUST, China				
Indian Institute of Technology Roorkee, India				X
NML, Jamshedpur, India	X			
St Petersburg Electrotechnical University, Russia	X	X	X	X
Novosibirsk State Technical University, Russia	X	X	X	X
Jagiellonian University, Poland				
University of Surrey, England	X	X	X	
Alicante University, Spain	X	X		
Saarland University, Germany	X	X	X	X
Chalmers University, Sweden	X	X	X	X
KU Leuven, Belgium				X
Total:	10	9	8	8

Table 28- Does the HEI have the following processes to support innovation and IP management?

HEI	R&D	Patent license	Tech. supply	MTA	Service provision	Clinical trials	Transfer of IPR	Employment	Other
Universidad de Campinas, Brazil	X	X	X	X	X	X	X		
São Paolo Federal University, Brazil	X	X	X	X	X	X	X	X	
KUST, China	X	X			X		X		

CUST, China	X	X	X		X		X	X	
Indian Institute of Technology Roorkee, India	X	X		X	X				
NML, Jamshedpur, India	X	X	X	X	X	X	X	X	X
St Petersburg Electrotechnical University, Russia	X								
Novosibirsk State Technical University, Russia	X								
Jagiellonian University, Poland	X	X		X	X	X	X	X	
University of Surrey, England	X	X	X	X	X	X			
Alicante University, Spain	X	X		X	X	X		X	X
Saarland University, Germany	X	X	X	X	X	X	X	X	X
Chalmers University, Sweden	X	X	X	X	X	X	X	X	X
KU Leuven, Belgium	X	X	X	X	X	X	X	X	X
Total:	14	12	8	10	12	9	9	8	9

Table 29- Agreements used to support innovation activities

HEI	Inven-tion	Utility Model	Industrial Design	Softw-are	Brand	Industrial Secret – know-how[11]	Cultivars	Geogra-phical Indicat-ions	Integr-ated circuit	Oth-ers
Universidad de Campinas, Brazil	-	-	-	-	-	-	-	-	-	-
São Paolo Federal University, Brazil	-	-	-	-	-	-	-	-	-	-
KUST, China	1	6								
CUST, China	120	58	82	45	24	62			77	

[11] In some countries and institutions it is accepted to record know-how supply contracts made in practice, at the National IP office. Under these circumstances an Industrial secret could be licensed.

Indian Institute of Technology Roorkee, India	0	0	0	0	0	0	0	0	0	0
NML, Jamshedpur, India	4									
St Petersburg Electrotechnical University, Russia	-	-	-	-	-	-	-	-	-	-
Novosibirsk State Technical University, Russia	-	-	-	-	-	-	-	-	-	-
Jagiellonian University, Poland	2									
University of Surrey, England	-	-	-	-	-	-	-	-	-	-
Alicante University, Spain	3									
Saarland University, Germany	12									
Chalmers University, Sweden	-	-	-	-	-	-	-	-	-	-
KU Leuven, Belgium	-	-	-	-	-	-	-	-	-	-
Total:	142	64	82	45	24	62			77	

Table 30- Number of licenses 2008

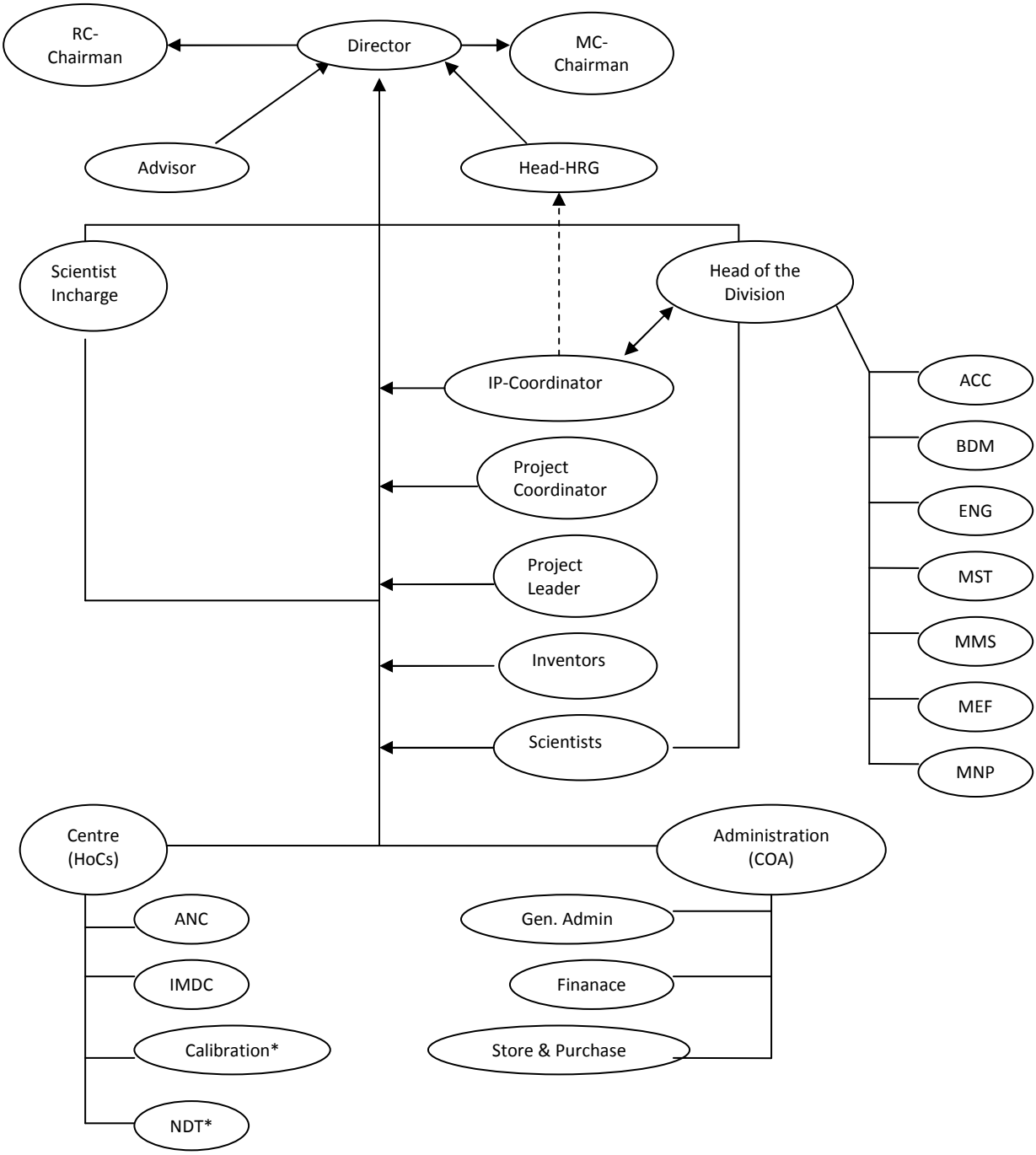
HEI	2006	2007	2008	Historical total
Universidad de Campinas, Brazil	11	10		
São Paolo Federal University, Brazil			124	
KUST, China	5	7	8	36
CUST, China	2	0	0	8
Indian Institute of Technology Roorkee, India	0	0	0	0
NML, Jamshedpur, India	-	-	-	-
St Petersburg	3	2	3	45

Electrotechnical University, Russia				
Novosibirsk State Technical University, Russia	2	2	3	16
Jagiellonian University, Poland		2		3
University of Surrey, England	5	1	2	26
Alicante University, Spain	25	18	26	288
Saarland University, Germany	3	0	1	4
Chalmers University, Sweden	-	-	-	-
KU Leuven, Belgium	5	10	5	85
Total:	61	62	172	511

Table 31- Number of spin-offs 2006-2008 and historically

II. Organizationational charts

NML, JAMSHEDPUR, INDIA

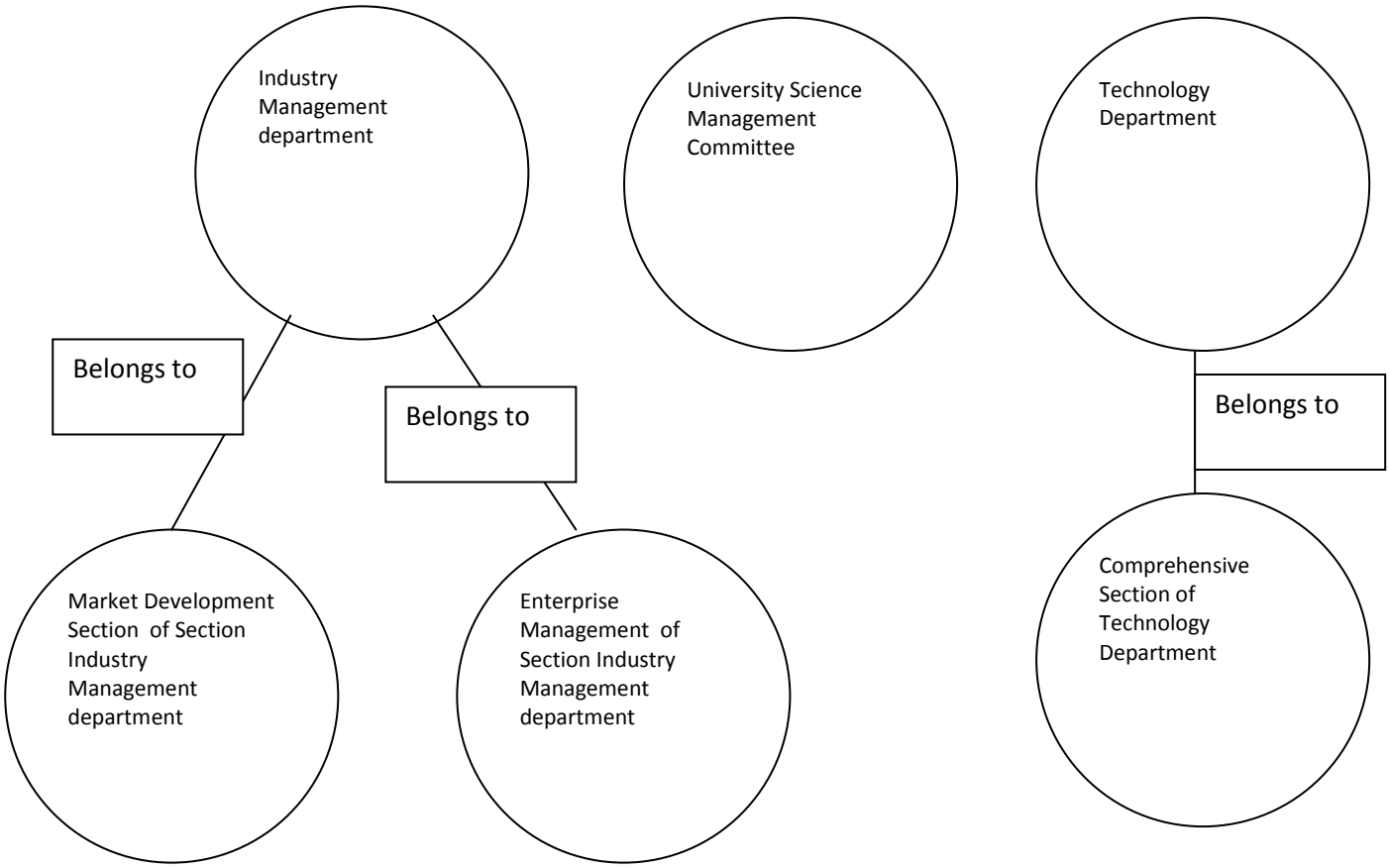


Abbreviations Used:

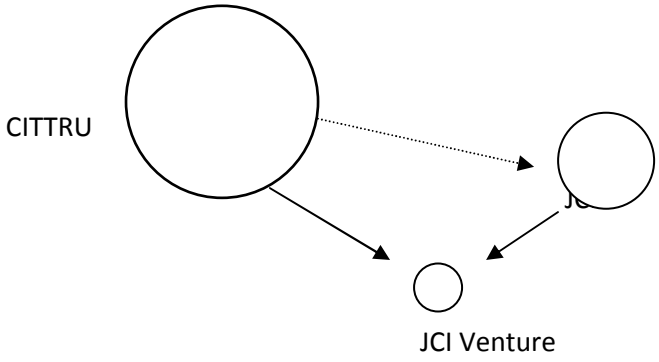
- RC :Research Council
- MC :Management Council
- ACC: Applied Chemistry and Corrosion

- BDM: Business Development and Monitoring
- ENG: Engineering
- MST: Materials Science and Technology
- MMS: Mathematical Modeling
- MEF: Metal Extraction and Forming
- MNP: Mineral Processing
- ANC: Analytical Chemistry Centre
- IMDC: Information Management & Dissemination Centre
- NDT: Non-Destructive Testing Centre

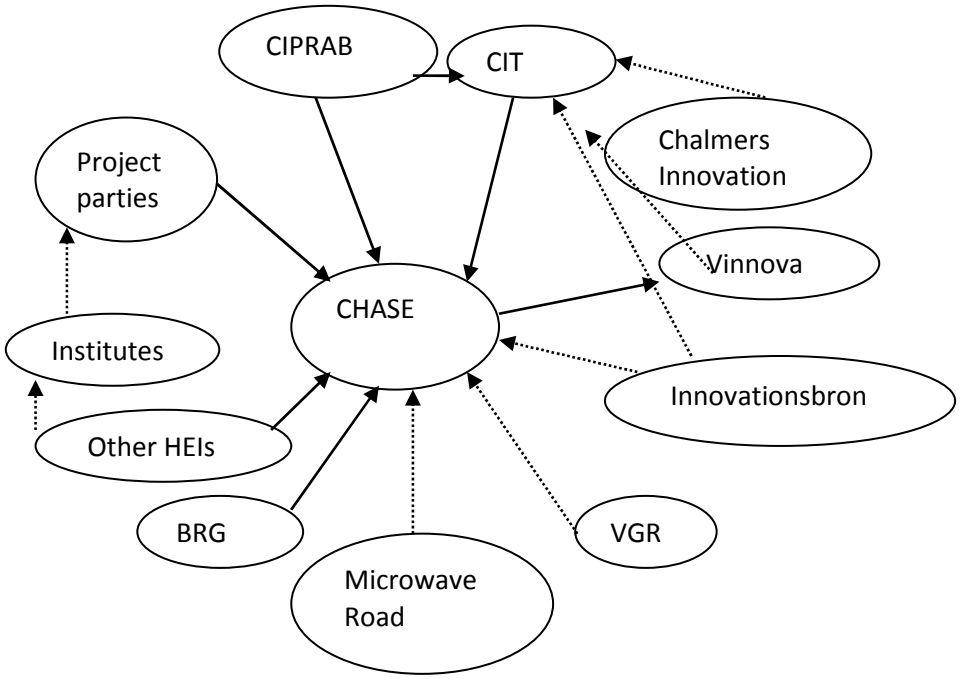
CUST, CHINA


Industry Management department
University Science Management Committee
Technology Department
Belongs to
Belongs to
Belongs to
Market Development Section of Section Industry Management department
Enterprise Management of Section Industry Management department
Comprehensive Section of Technology Department

JAGIELLONIAN UNIVERSITY, POLAND



CHALMERS UNIVERSITY OF TECHNOLOGY, SWEDEN[12]



[12] The map is from a unit inside Chalmers University that deals with research. This research team is a part in a bigger innovation system as can be seen here.

III. Funding for HEI Entities Working with Innovation and IP

Research & Enterprise Support (RES)University of Surrey, Great Britain

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments (any conditions linked to funding)
			HEI	Government	Donations	Other	
Base funding	2006			100			FROM HEIF (Higher Education Investmant Fund)
	2007			100			HEIF
	2008			100			HEIF
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation)				Other
			Licences	Contract research	Services	Spin-off / Start-up	
Income generation	2006						
	2007						
	2008						

CITTRU, Jagiellonian University, Poland

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments
			HEI	Government	Donations	Other	
Base funding	2006	810871 €					
	2007	674754 €					
	2008	527994 €	27%	73% - government funds, and other EU and national funds			
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation)				Other
			Licences	Contract research	Services	Spin-off / Start-up	
Income generation	2006						No statistic describing the total income related to CITTRU activities
	2007						
	2008		Yes	yes	yes	yes	

Chalmers Industrial Technologies Foundation, Chalmers University of Technology, Sweden

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding) HEI	Government	Donations	Other	Comments
Base funding	2006						
	2007						
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation) Licences	Contract research	Services	Spin-off / Start-up	Other
Income generation	2006			100			
	2007			100			
	2008			100			

KU Leuven, Belgium

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding) HEI	Government	Private sector	Other (donations, endowments)	Comments (e.g. any conditions linked to funding)
Base funding	2006						
	2007						
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation) Licences	Contract research	Services	Spin-off / Start-up	Other
Income generation	2006						
	2007						
	2008						

TTO Unit, Alicante University, Spain

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding) HEI	Government	Donations	Other	Comments
Base funding	2006	60	100				
	2007	60	100				
	2008	60	100				
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation) Licences	Contract research	Services	Spin-off / Start-up	Other
Income generation	2006	40			25		75 - projects
	2007	40			25		75 - projects
	2008	40			25		75 - projects

University of Saarland, Germany

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding) HEI	Government	Private sector	Other (donations, endowments)	Comments (e.g. any conditions linked to funding)
Base funding	2006						
	2007						
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation) Licenses	Contract research	Services	Spin-off / Start-up	Other
Income generation	2006						
	2007						
	2008						

KUST, China

Type of funding	Amount (in Euros)		Source (amount in Euros) HEI	Government	Donations	Other	Comments
Base funding	2006	66,000		66,000			
	2007	66,000		66,000			
	2008	66,000		66,000			
	Amount (in Euros)		Licences	Contract research	Services	Spin-off / Start-up	Other Government
Income generation	2006	12,100,000	1,210,000	6,050,000	960,800	240,200	3,630,000
	2007	16,500,000	1,650,000	8,250,000	1,320,000	330,000	4,950,000
	2008	23,100,000	2,310,000	11,550,000	1,848,000	462,000	6,930,000

CUST, China

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding) HEI	Government	Private sector	Other (donations, endowments)	Comments (e.g. any conditions linked to funding)
Base funding	2006						
	2007	0.9 billion					
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation) Licenses	Contract research	Services	Spin-off / Start-up	Other
Income generation	2006						
	2007						
	2008						

Innovation Technological Center, Novosibirsk State Technical University, Russia

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments (e.g. any conditions linked to funding)
			HEI	Government	Private sector	Other (donations, endowments)	
Base funding	2006	100 %	100 %	0 %	0 %	0 %	
	2007	100 %	100 %	0 %	0 %	0 %	
	2008	100 %	100 %	0 %	0 %	0 %	
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation)				Other
			Licences	Contract research	Services	Spin-off / Start-up	
Income generation	2006	100 %	0 %	100 %	0 %	0 %	
	2007	100 %	0 %	100 %	0 %	0 %	
	2008	100 %	0 %	100 %	0 %	0 %	

Saint Petersburg Electrotechnical University "LETI" (ETU), Russia

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments
			HEI	Government	Donations	Other	
Base funding	2006						
	2007						
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation)				Other
			Licences	Contract research	Services	Spin-off / Start-up	
Income generation	2006						
	2007						
	2008						

R&D Division NML Jamshedpur, India

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments (e.g. any conditions linked to funding)
			HEI	Government	Private sector	Other (donations, endowments)	
Base funding	2006	2542Lakhs		2542			
	2007	4280Lakhs		4280			
	2008	6835Lakhs		6835			
	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of income generation)				Other
			Licenses	Contract research	Services	Spin-off / Start-up	
Income generation	2006	637.566		214.813	115.258		
	2007	625.496		181.526	69.4959		
	2008	946.042		374.997			

Intellectual Property Right Cell, IIT, Roorkee, India

Type of funding	Amount (in Euros)		Source (amount in Euros)				Comments
			HEI	Government	Donations	Other	
Base funding	2006	17,966.5	✓	Ministry of Human Resourse Developm ent			
	2007	17,966.5	✓	Ministry of Human Resourse Developm ent			
	2008	17,966.5	✓	Ministry of Human Resourse Developm ent			
	Amount (in Euros)		**Licences**	**Contract research**	**Services**	**Spin-off / Start-up**	**Other**
Income generation	2006						
	2007						
	2008						

Agência de Inovação Inova Unicamp – Inova (Innovation Agency Inova Unicamp), Universidade Estadual de Campinas – UNICAMP, Brazil

Type of funding	Amount (% of total funding – i.e. Base funding vs. Income generation)		Source (% of base funding)				Comments
			HEI	Government	Donations	Other	
Base funding	2006	US$528.346,00	100%				
	2007	US$460.000,00	100%				
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		**Source (% of income generation)**				**Other**
			Licences	**Contract research**	**Services**	**Spin-off / Start-up**	
Income generation	2006	US$6.189.564,00	1,79%	98,21%			
	2007	US$4.376.559,42	3,54%	96,35%			
	2008						

USP Agency for Innovation, Universidade de São Paulo – USP, Brazil

Type of funding	**Amount** (% of total funding – i.e. Base funding vs. Income generation)		**Source (% of base funding)**				**Comments**
			HEI	**Government**	**Donations**	**Other**	
Base funding	2006						
	2007						
	2008						
	Amount (% of total funding – i.e. Base funding vs. Income generation)		**Source (% of income generation)**				**Other**
			Licences	**Contract research**	**Services**	**Spin-off / Start-up**	
Income generation	2006						
	2007						
	2008						