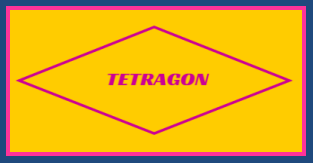
TETRAGON

Balance of the current situation of the support to SMEs in technology transfer within different organizations, external agencies and the private sector

DESIGN OPTIONS PAPER TO IMPROVE TECHNOLOGY TRANSFER MEASURES ADOPTED BY AGENCIES TO ENHANCE SMEs INNOVATION CAPACITY



TETRAGON Grant Agreement 692590

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European Commission
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for Research & Innovation

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1. INTRODUCTION: DESCRIPTION OF THE CHALLENGE AND THE PROPOSED APPROACH TO ADDRESS THE CHALLENGE

TETRAGON aims at **enhancing SME's innovation capacity by providing them with better innovation support in Technology Transfer** from public research to the market.

In order to better achieve the objectives at hand, TETRAGON focused on the following models of Technology Transfer (from now on referred also as TT):

- To foster an entrepreneurial environment at universities and research centres in order to increase the creation of spinoffs and to improve the exploitation of technology by existing companies.
- To foster demand driven collaborative projects, between public researchers and private SMEs.
- To look for innovative ways of licensing the technology, including open source, open innovation and user innovation.

The present Design Options Paper culminates all the research carried out by TETRAGON during its implementation, with the goal of helping place TT in the core of innovation, improving the TT measures, help the SMEs to grow, and, consequently, foster growth of the European economy.

TETRAGON, aims at **reaching innovation agencies all over Europe**, in order to **provide them with practical information for the adoption of TT practices** that may be of interest in their field of action.

For that purpose the present document presents a **selection of best practices** considered leading in the field of Technology Transfer, and novel for most of the European regions.

2. METHODOLOGY

For the elaboration of the present Design Options Paper, the methodology detailed in the present section was applied, based on the **Twinning Advanced Process**.

In order to create a solid foundation for the document, the process began with the analysis of the current situation of the support to SMEs in technology transfer within different organizations, external agencies and private sector, including three steps:

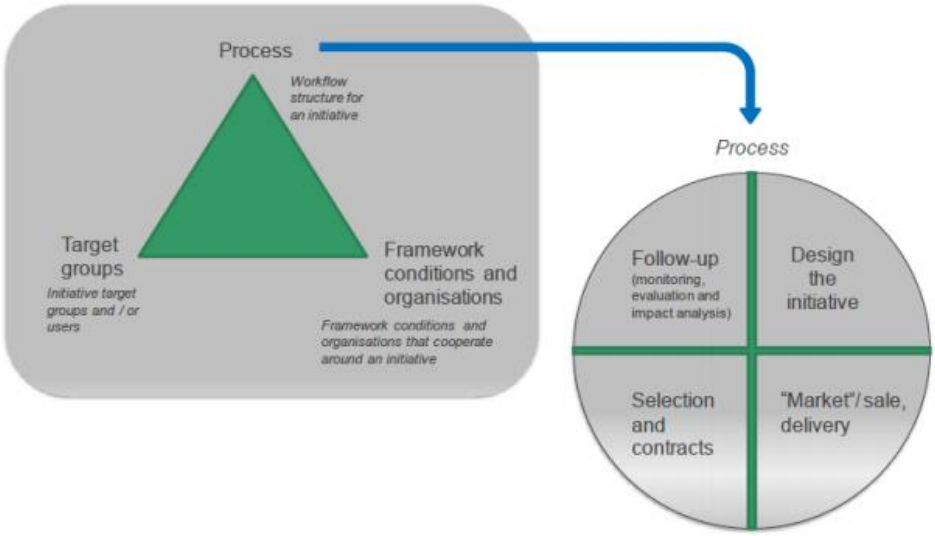
- An **internal diagnostic** of the actual conditions of the agencies and the regions where the partners are established, analysing topics such as the creation of spin-offs, businesses based on TT innovation, number of patents, TT Offices, Technology Brokers, calls launched and other relevant factors, concluding in a SWOT analysis.
- Analysis of the **external conditions**, such as measures adopted by agencies and organizations outside the consortium, study of companies specialized in TT and the services they provide as well as interviews to prominent Technology Brokers.
- The identification of **common objectives**, with the participating partners working together in the identification of ideas and key singularities.

After the analysis of all the above mentioned information, a second phase began, with the compilation, design and implementation of better practices:

- First, the participating organizations brainstormed, compiled and exchanged information, in order to have an initial pull of ideas to work with. These ideas were revised and enriched by a specialized TT consultancy firm.
- After all this relevant information was gathered, TETRAGON developed an approach to address the support challenge in a new and better way, by designing practices following the “service delivery system”, which has three major cornerstones:

  A) Target groups for the initiative.
  B) Framework conditions and organizations.
  C) Process by which the initiative operates, that can be split in four steps:
  - Initial design of the programme.
  - Market/sale respectively motivation of the target group and intermediaries.
  - Actual delivery within the agency.
  - Monitoring, evaluation and impact analysis the scheme.

Fig. 1. Service Delivery System



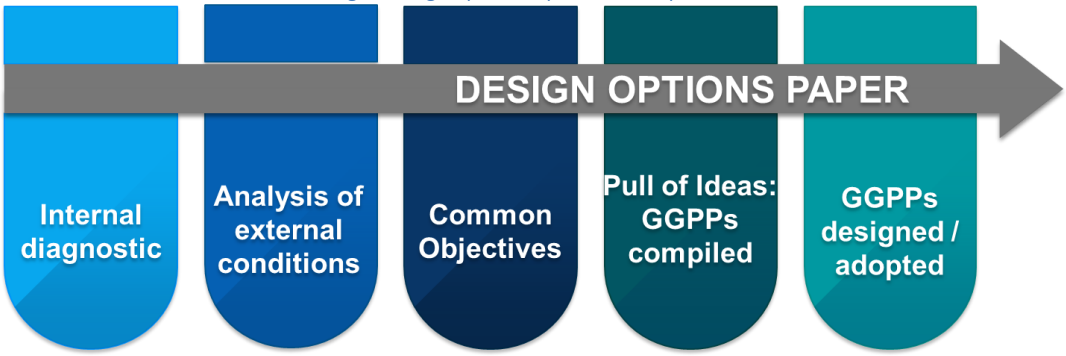
Source: EC Twinning Advanced Methodology Paper

The participating agencies, as key actors in TT in their respective regions, selected or adapted examples of the measures analysed during the implementation of the project, and began the process of adopting and validating some of the measures.

The measures designed / compiled by TETRAGON were presented in the three regions through workshops in order to get SMEs feedback on the measures or on the best and most urgent measures to be adopted in each region and other. This feedback was also incorporated in the DOP.

In summary, based on the results of all the previously defined actions, the present Design Options Paper (DOP) was compiled, including the measures that could be transferred among agencies, and the new and better practices designed. Last but not least, the final Paper was revised by a specialized TT firm.

Fig. 2. Design Options Paper definition process



Source: Tetragon partnership

Therefore, the DOP includes the gathered information with the following **structure**:

1. Introduction: Description of the challenge and the proposed approach to address the challenge.
2. Methodology applied for the elaboration of the study.
3. Framework conditions Including internal diagnostic with SWOT analysis and external diagnostics with Technology Brokers interviews.
4. Good Practices and Transference Measures compiled.
5. Good Practices designed/adapted by each organisation

3. FRAMEWORK CONDITIONS

3.1 INTERNAL FRAMEWORK CONDITIONS DIAGNOSTIC OF TETRAGON PARTNERS SYSTEM

3.1.1 PERFORMANCE INDICATORS OF THE REGION IN SCIENCE AND TECHNOLOGY

1 **General situation of the region in science and technology KPIs**

Scientific and technical research, development and innovation are key factors for economic growth and improved competitiveness. Science and technology (S&T) are key elements for territorial and business competitiveness. Also, Innovation, understood as the productive application of this scientific development and technology is therefore an important engine for regional development if the goal is an improved productivity and a change in the production model, thus occupying a preferential place the principles of the Europe 2020 Strategy.

Based on the average innovation performance, the EU Member States fall into four different performance groups, as classified by the Innovation Union scoreboard 2015 :

- Denmark, Finland, Germany and Sweden are “Innovation leaders” with innovation performance well above that of the EU average;
- Austria, **Belgium,** France, Ireland, Luxembourg, Netherlands, Slovenia and the UK are “Innovation followers” with innovation performance above or close to that of the EU average;
- The performance of Croatia, Cyprus, **Czech Republic**, Estonia, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovakia and **Spain** is below that of the EU average. These countries are “Moderate innovators”;
- Bulgaria, Latvia and Romania are “Modest innovators” with innovation performance well below that of the EU average.

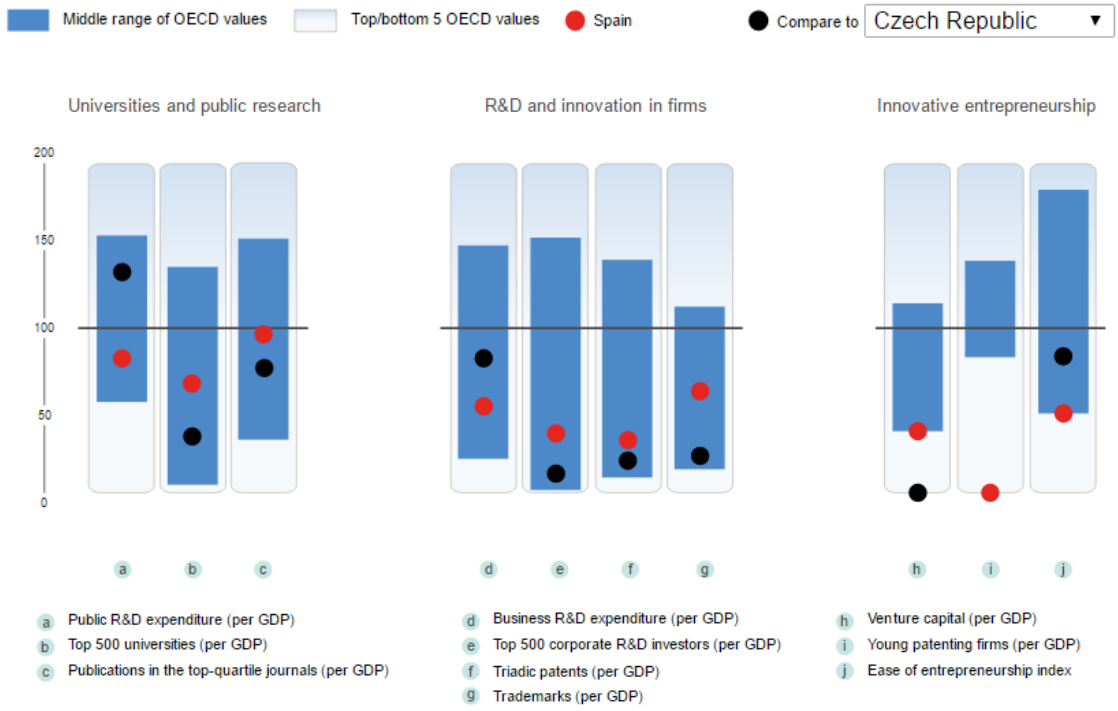
The measurement framework used by the Innovation Union Scoreboard distinguishes between 3 main types of indicators and 8 innovation dimensions, capturing in total 25 different indicators. Most of them are aligned with those analysed on the following pages, having to do with the quality of the Research and Development (R&D), human resources and the employment available or the regions’ R&D expenditure.

Following this Innovation Union Scoreboard classification, we can make a general assessment of the performance in science and technology of TETRAGON consortium, where the Flemish partner classifies as an “innovation follower”, while the Spanish and Czech partners both fall under the “Moderate innovators” category.

If we base the analysis of the regions’ situation on the OECD data on comparative performance of national science and innovation systems, we can make a general ranking of the relevant areas in Technology Transfer, with results matching, for the purposes of this study, those of the Innovation Union Scoreboard classification, with Belgium at the top and Spain and Czech Republic falling behind in two aspects:

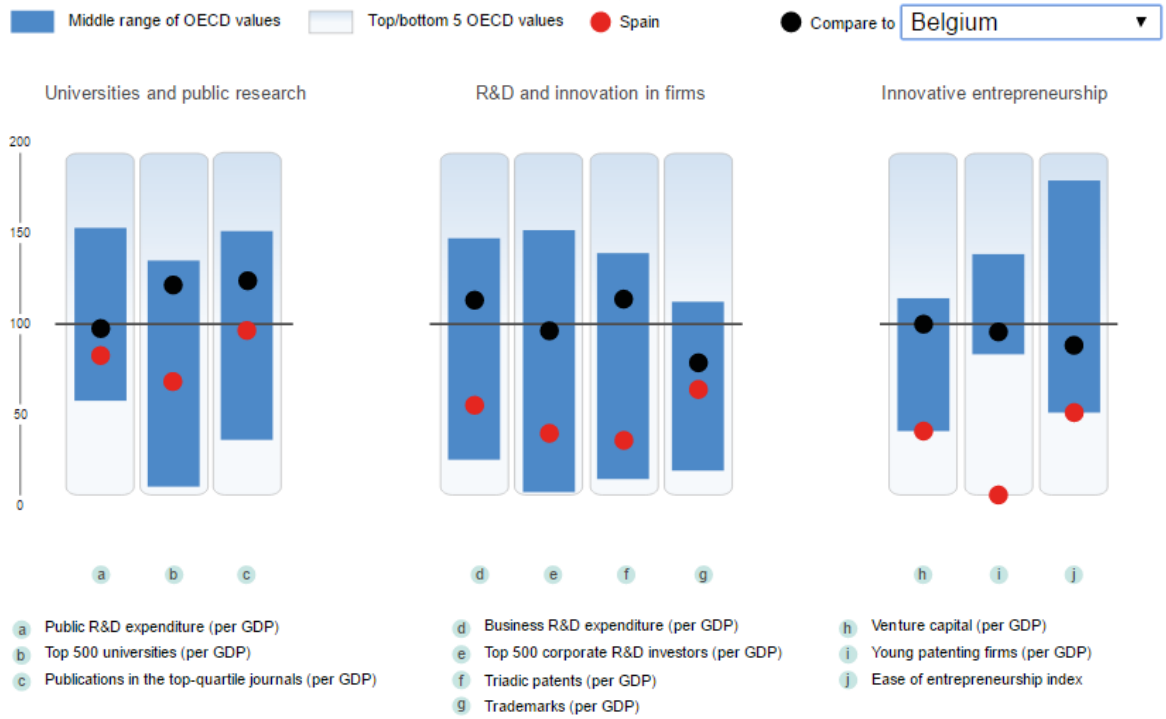
A. Competences and capacity to innovate:

Fig. 3. Comparison between Spain and the Czech Republic



Source: innovationpolicyplatform.org[1]

Fig. 4. Comparison between Spain and Belgium

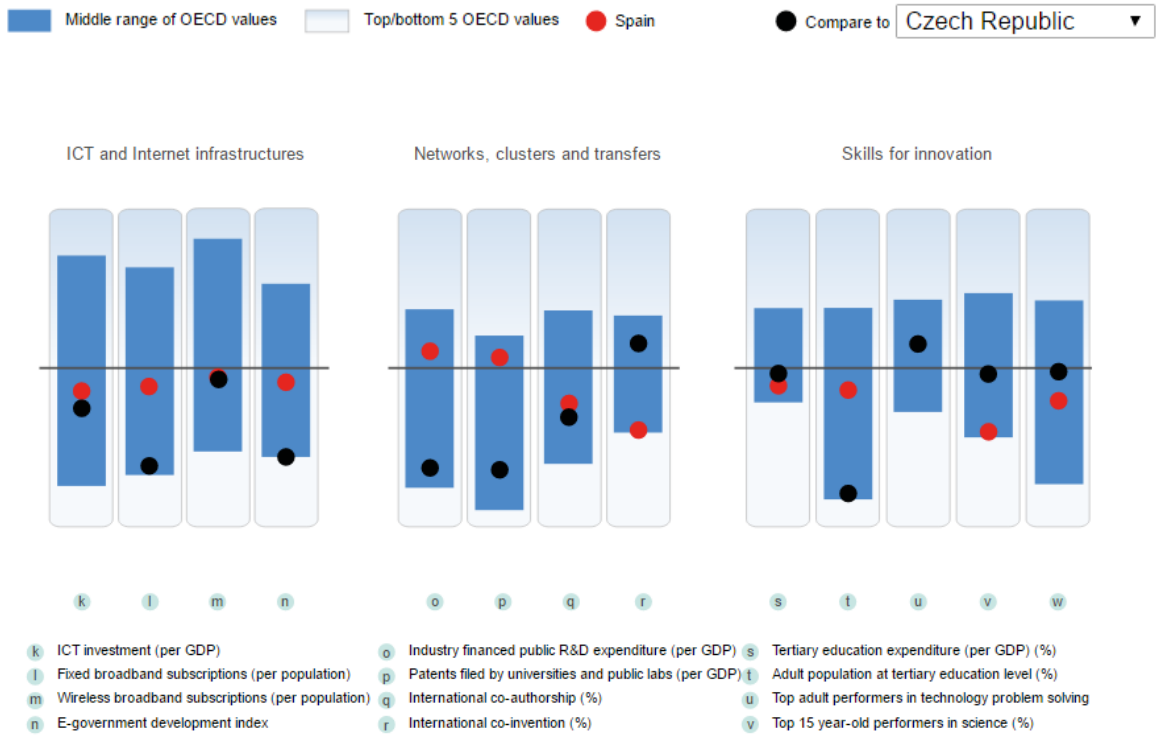


Source: innovationpolicyplatform.org

[1] http://innovationpolicyplatform.org/STICharting/benchmark.htm?iso=ES

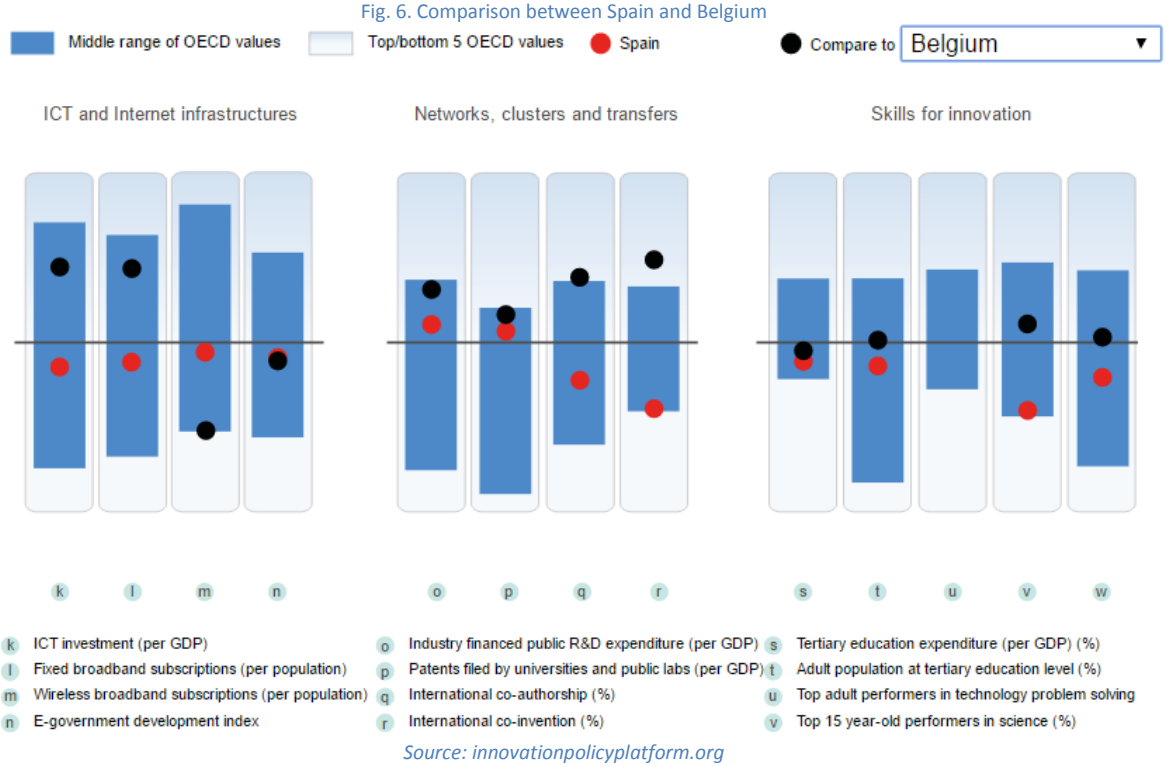
B. Interactions and skills innovation:

Fig. 5. Comparison between Spain and the Czech Republic



Source: innovationpolicyplatform.org

Fig. 6. Comparison between Spain and Belgium



Source: innovationpolicyplatform.org

Another useful indicator, for the purpose of this Paper, **is how much internal and external funding/grants the local SMEs receive**, which constitutes a valuable performance measure to assess the

current status of technology transfer in each of the participating regions. This also gives an indication about the competitiveness of the local enterprises.

For the Flanders region, and the period 2011 -2015 the amount adds up to 254,5M€, and has been increasing over the years, except in 2014:

- 2011: 37,8 million (out of 118 million)
- 2012: 47,4 million (out of 128 million)
- 2013: 58 million (out of 140 million)
- 2014: 53 million (out of 143 million)
- 2015: 58,3 million (out of 151 million)

For the Zlín region the amount of funding for SMEs is increasing every year. A few programmes are just for SMEs and in many others SMEs are financially privileged. In the period 2007-2013 the part of the budget booked for SME was 40-60%, and in the current period (2014-2020) it is supposed to be around a 80% to SMEs.
Regional SMEs programmes budgets are moderate, in the past years mostly dedicated just to innovation vouchers regional calls

- 2012,47 vouchers, spent aroung 150.000 EUR
- 2013, 43 vouchers, over 220.000 EUR
- 2014, 44 vouchers, more than 230.000 EUR
- 2015 – no regional call, because a national Innovation vouchers call was expected
- In total 400.000 Eur from regional resources to SMEs

National resources for SMEs funding:

- Operational Programme Enterprise and Innovation (2007 - 2013) –SMEs are financially privileged compared to large enterprises – almost 12 M€, out of it roughly 3M€ for SMEs.
- Operational Programme Enterprise and Innovations for Competitiveness (2014 – 2020) – a few programmes just for SMEs (e.g. Marketing and Innovation vouchers), in most SMEs are financially privileged comparing to large enterprises and in many progammes or there is a certain part of the budget reserved for SMEs.

Up to now used over 26 M€ at the national level (out of total budget of 1 billion EUR planned), it's about 1,8 M€ used in the Zlin region (a 40% increase). For funding of regional SMEs at the international level there are no public statistics available.

GALICIA (SPAIN)

Regarding the particular case of Galicia, this region shows moderate levels of development in the analysed indicators in comparison with the TETRAGON partners, although taking a strictly regional approach to the data analysis; we can see the region starting a positive direction after years of economic crisis, which was especially harsh for the countries of southern Europe. This evolution will be analysed in detail in the following sections.

In Galicia the domestic expenditure on Research Development and Innovation activities was close to 480 million € in 2014, (in Spain it was 12,821.8 Million €), representing a growth of 1.8%, compared to the decline of 1.5% nationally) over the previous year, representing an increase of 8.6 million euros[2].

FLANDERS (BELGIUM)

In Flanders the total public budget for STI policy is €1.88 billion, of which €1.23 billion are strictly R&D. In 2015, the total horizontal budget (across all policy domains) for the science policy of the Flemish Government reached 2.19 billion euros, of which 1.31 billion euros for R&D in the strict definition. In addition to this Flemish budget, research actors in Flanders annually have at their disposal about 300 million euros from federal budgets, 160 million euros from the EU Horizon 2020 Programme and about 23 million euro for initiatives on research and innovation within the EU Regional Policy 2014-2020 (an estimated 40% of the total ERDF budget available for Flanders).

Hence, the total public budget for R&D in strict sense available in 2015 to the various R&D actors in Flanders was over 1.7 billion euros. Furthermore, public and private actors jointly spent 5.827 billion euros on R&D (GERD) in 2013, which represents an R&D intensity of 2.54% for Flanders (2013). These are the highest values ever recorded, both in absolute and relative terms. In the latest Regional Innovation Scoreboard (RIS 2014), Flanders ranks among the innovation followers; consequently, its ambition to be among the top innovative regions in Europe requires further effort.

The new Flemish Government has confirmed in its governing agreement for the period 2014-2019 a focus on a growth path for the 3% target of R&D intensity, including the aim to achieve 1% R&D public outlays/GDP by 2020. To reach this goal, the government continues to stimulate various stakeholders from government, civil society, business organizations and STI actors in Flanders to join forces to develop initiatives, set policy targets, or maintain important efforts for the long term in the field of R&D and innovation.

Fig. 7. Key figures on Flanders, Belgium and EU-28.

Table 1: *Key figures on Flanders, Belgium and EU-28*

	Year	unit	Flanders	Belgium	EU-28
Surface area		km²	13,521	30,528	4,381,376
Population	1/1/2014	million	6.41	11.20	506.88
GDP in current prices	1/1/2013	million euro	229.8	395.3	13,518.1
GERD	2013	billion euros	5.827	9.014	271.559
GDP per capita	2014	euros PPP	35,200	32,300	27,300
R&D intensity	2013	%	2.54	2.28	1.91
Employment rate (20-64 years of age)	2014	%	71.9	67.3	69.2

Source: IMEC

ZLÍN REGION (CZECH REPUBLIC)

The total amount for RTD is increasing within the years and now basically all the support regardless the entity being supported is concentrated purely on the support of research, development and innovation.

[2] Galicia Strategic Plan 2015-2020. Diagnostic: http://www.planestratexico.gal/es/inicio

- The main programmes to support RTD
- Operational Programme Enterprise and Innovation (2007 - 2013)
- Operational Programme Enterprise and Innovations for Competitiveness (2014 – 2020)
- Operational Programme VVV (Research, Development and Education)
- Programmes of Technology agency of the Czech republic Alfa, Beta, Gama, Delta, Omega, Centres of Competences)
- International programmes (Eureka, Eurostars, FP7, H2020) etc.

At National level practically all the support is going to support RTD and Innovations Almost 36M€ funds to ZLín region within 20O7-2016. Also, Czech Republic is not very active in international funding and most of the support is going to the universities and research centres (10,5M€).

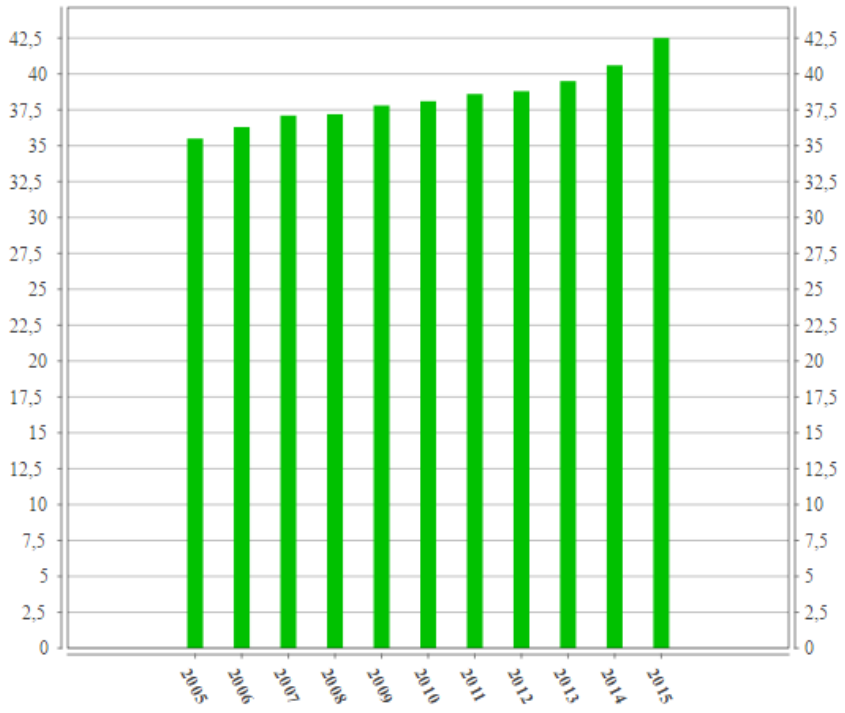
2 HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY

GALICIA (SPAIN)

Using the Eurostat data currently available at NUTS 2[3] level (regions), regarding Human resources in science and technology (HRST) in Galicia, and the information gathered by the Galicia Strategic Plan 2015-2020, we can state the following:

- The percentage of the total active population employed in Science and Technology jobs in 2015 was a 42,5% of the total active population. If we take this indicator and analyse its evolution in Galicia for the last decade, we see a very positive evolution, with a more than 7 points increase.

Fig. 8. Evolution on the HRST KPI in Galicia from 2005 to 2015.



Source: Eurostat

[3] The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU. NUTS 2 are the basic regions for the application of regional policies: http://ec.europa.eu/eurostat/web/nuts/overview

As for human resources linked to R&D in Galicia, per gender and sector, in 2014 a total of 9,405 people were dedicated to R&D, in full time equivalence (FTE), the 40.7 % were women. By sector, the largest female participation is in the Public Administration, with a 58.1 % followed by the Higher Education with 46.4% and finally in the business sector with 28.0% of female participation.

Fig. 9. Staff & researchers dedicated to R&D in FTE by sector and gender 2014

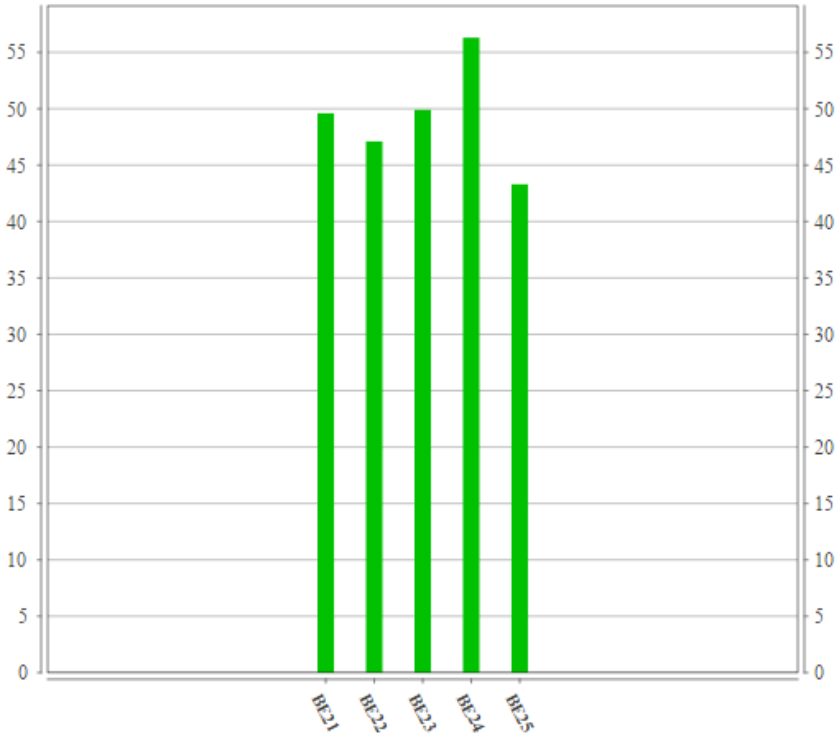
	SPAIN		GALICIA		EU28	
	Total	% Women	Total	% Women	Total	% Women
R&D Personnel	**200.233**	**39,9**	**9.405**	**40,7**	**2.755.636**	...
Companies	88.041	30,9	3.782	28	1.514.798	...
Public Administration	38.764	51	1.396	58,1	369.070	...
Higher Education	73.428	44,9	4.227	46,4	871.767	...

Source: Eurostat. Statistics on research and development

FLANDERS (BELGIUM)

The percentage of the total active population employed in Science and Technology in Flanders in 2015 was between 42,5% and 55,5% of the total active population, depending on the NUTS2.

Fig. 10. Evolution on the HRST KPI in Flanders in 2015.

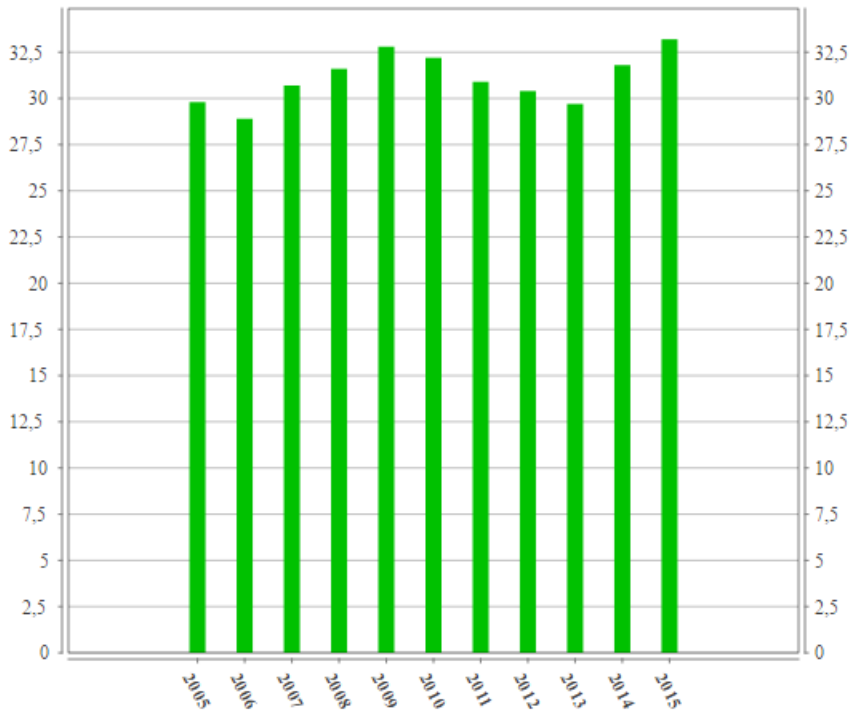


Source: Eurostat

ZLÍN REGION (CZECH REPUBLIC)

The percentage of the total active population employed in Science and Technology in Střední Morava (NUTS 2 where Zlín Region is located) in 2015 was a 32,5% of the total active population, with a positive evolution of almost 3 points in the last ten years.

Fig. 11. Evolution on the HRST KPI in Střední Morava from 2005 to 2015.



Source: Eurostat

In the Czech Republic is generally lack of qualified personnel, in particular technically educated personnel for research and development. In Zlín region is the situation reinforced by peripheral localization of the region, of low wage levels and generally lower quality of life (in terms of availability of required services in the areas of education, health, leisure activities, etc.) over some attractive regions.

In the Zlín Region is a selective migration, where particularly graduates and skilled workers are finding new opportunities in Brno and Prague. At the same time ZLín region is not attractive enough for the arrival of workers with the required skills from outside (from other regions of the Czech Republic and abroad). Prevent the outflow of skilled workers and increase their motivation to return to the region and to encourage the arrival of workers from elsewhere, it is a prerequisite for strengthening regional innovation performance. There is also problem with highly qualified researchers, who are finding employment in research teams in attractive locations / regions, and for this reason it may be difficult to occupy certain positions built centres of applied research in the ZLín region.

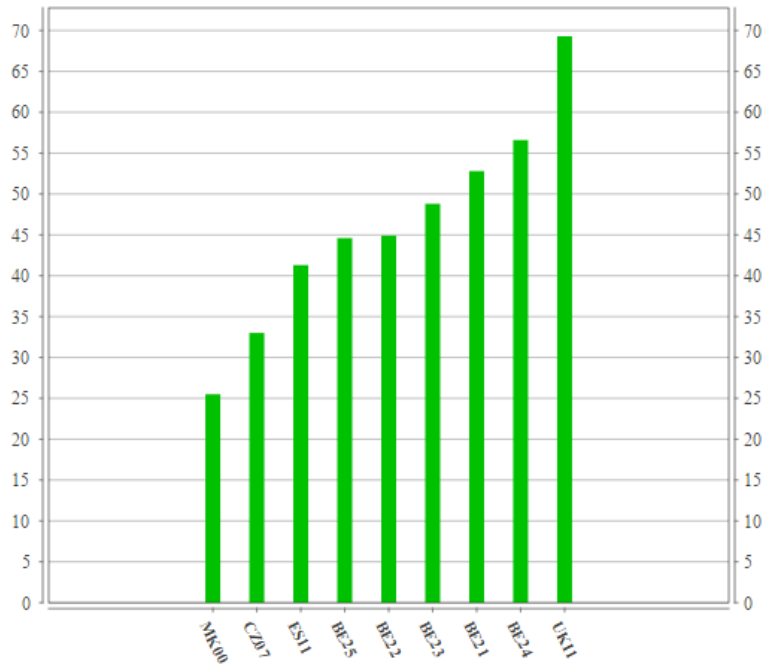
In general, it is important to view all the regions' data in the EU Regional context, analyzing the lowest and highest scoring regions in this KPI (with NUTS 2 MK00:Poranesna jugoslovenska – Macedonia- in the lowest part of the spectrum and UKI1:Inner London in the highest) as well as TETRAGON partners data:

- Axencia Galega de Innovación (GAIN): NUTS 2 ES11 Galicia
- iMinds (now IMEC): Flemish Region, formed by the following NUTS 2: BE21 Antwerp, BE22 Limburg, B23 East Flanders, BE24 Flemish Brabant and BE25 West Flanders.

With this in mind we can conclude that, despite the improvements of last decade, Galicia is still behind in employment in Science and Technology jobs, although TIC Zlin partner shows worst numbers in this particular KPI. All Flemish NUTS 2 score pretty high, but even they show a big difference with UK Inner London and other NUTS 2 areas such as NO01 Oslo og Akershus, with more than a 10 points difference.

- TIC ZLín: NUTS 2 CZ07 Střední Morava (Central Moravia), formed by NUTS 3 Olomuc Region and ZLín Region, where the partner is located.

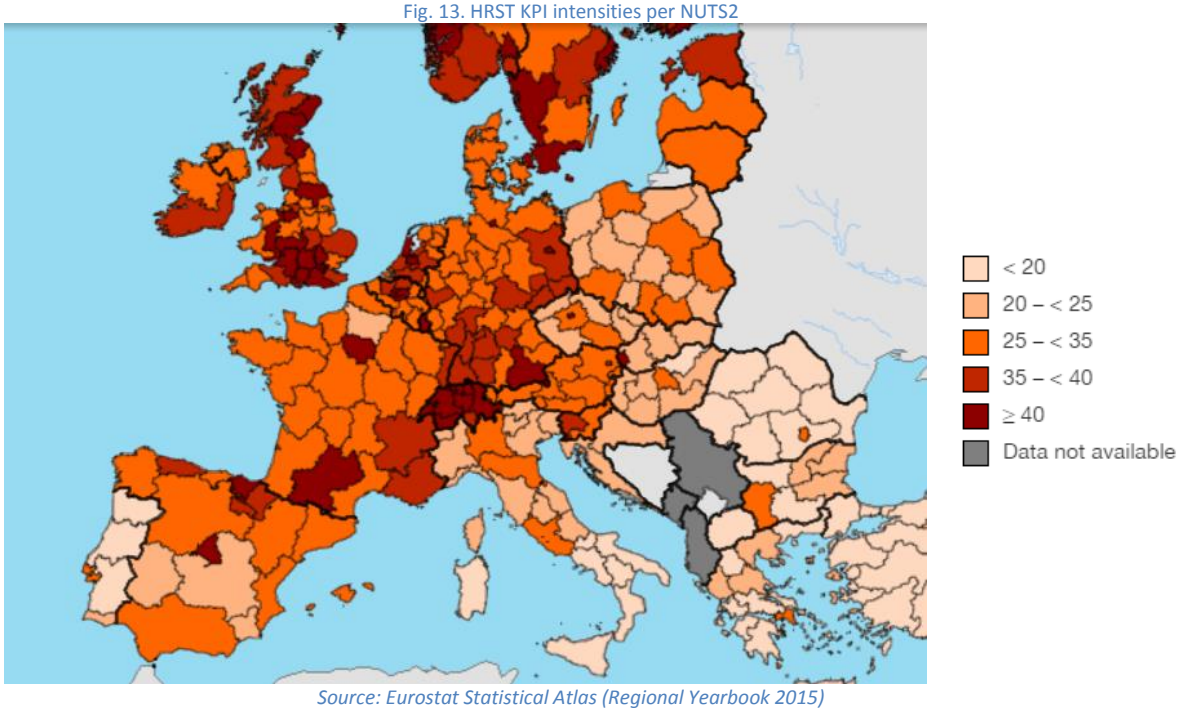
Fig. 12. Comparison between Tetragon partners and the worst and best performing EU Regions in terms of HRST KPI in 2014..



Source: Eurostat

As an easier way of identifying the various situations of TETRAGON partners in terms of S&T Employment, the Map hereunder classifies the different intensities in 5 categories, from less to more, being Galicia and Zlín Region in the third and fourth categories, whereas Flanders' NUTS2 are mostly in the first one.

Fig. 13. HRST KPI intensities per NUTS2



Source: Eurostat Statistical Atlas (Regional Yearbook 2015)

3 EMPLOYMENT IN HIGH-TECH SECTORS

The data analysed hereunder shows the employment in high-tech sectors (code HTC) as a percentage of total employment.

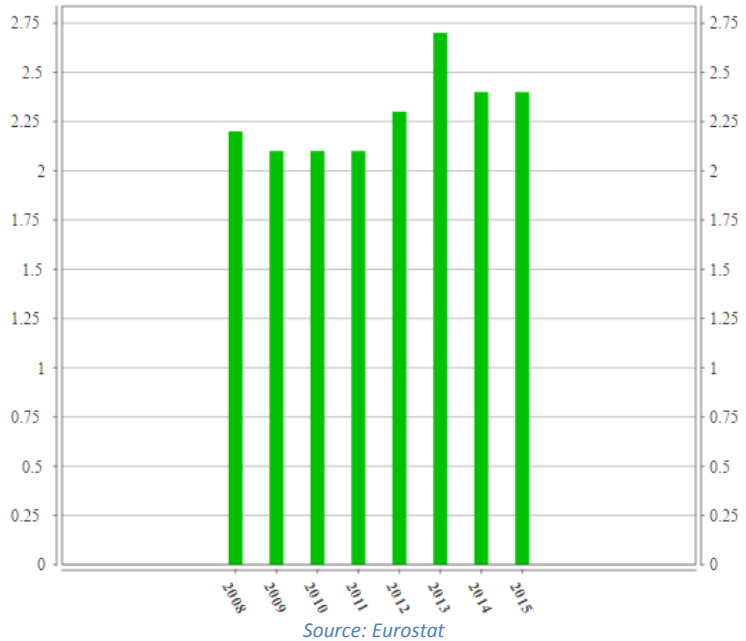
In relative terms, and following the data in the Eurostat regional yearbook 2015[4], those working in high-tech sectors accounted for 3.7 % of the total number of persons employed in the EU-28 in 2008. There was a modest increase in their share which peaked at 3.9 % in 2012 and remained at the same level in 2013. The share of employment in high-tech sectors was at least 5% in just less than one in five of the 239 regions for which data are available, and approximately one sixth of the regions reported a less than a 2 %.

The distribution of employment shares in high-tech sectors was often skewed, with the capital region recording a relatively high share and the majority of the other regions reporting much lower shares, often below their respective national averages. This is particularly true for Spain and Czech Republic, where high-tech sectors accounted for at least 8 % of total employment in the capital regions. Whereas the pattern in Belgium is different, with two regions surrounding the capital recording higher shares of employment in high-tech sectors than the capital itself [5].

GALICIA (SPAIN)

At Galician level, the data collected since 2008 (which marks the beginning of the economic crisis) shows a stagnation in the levels on HTC employment (going from 2,2 to 2,4 , with a sudden strong growth in 2013 (2,7) which decreases in 2014 and remains the same in 2015, as we can see in the following graph.

Fig. 14. HTC Employment levels in Galicia 2008-2015



Source: Eurostat

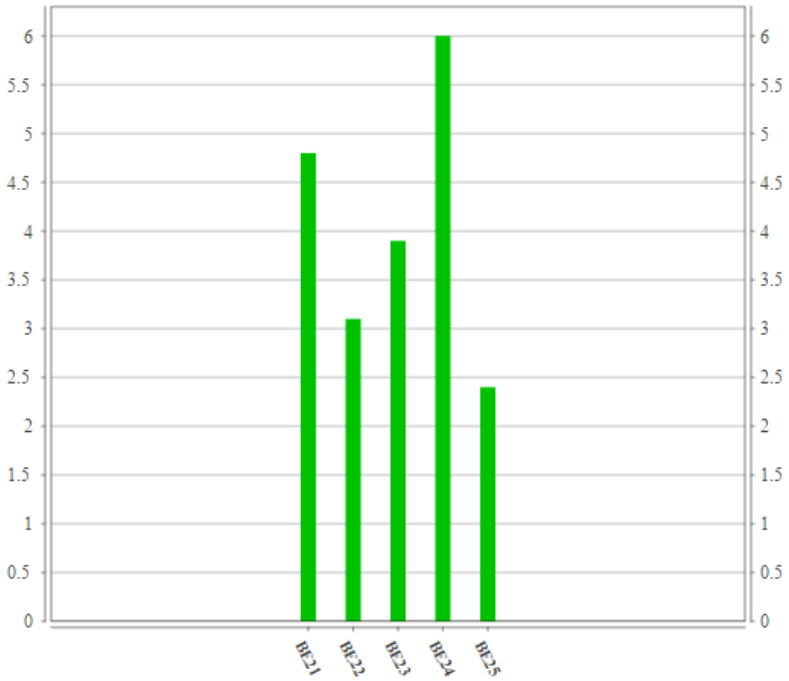
[4] http://ec.europa.eu/eurostat/documents/3217494/7018888/KS-HA-15-001-EN-N.pdf/6f0d4095-5e7a-4aab-af28-d255e2bcb395

[5] Innovation Union Scoreboard 2015: http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/index_en.htm

FLANDERS (BELGIUM)

The HTC Employment levels in Flanders in high-tech sectors are an average 4%, with intense differences between the different NUTS 2 of the region, scoring the highest a 6%.

Fig. 15. HTC Employment levels in Flanders' NUTS2 in 2015



Source: Eurostat

Fig. 16. Flanders statistics in high-tech employment 2007-2010

Indeling naar technologie- en kennisintensiteit

aantal_personen_tewerkgesteld		31/12/2007	31/12/2008	31/12/2009	31/12/2010	31/12/2011
Vlaams Gewest	Hoogtechnologische industrie	24.248	23.898	21.823	19.998	
	Medium-hoogtechnologische industrie	117.614	115.317	106.618	103.694	
	Medium-laagtechnologische industrie	111.903	112.498	105.820	106.932	
	Laagtechnologische industrie	139.562	136.440	130.391	127.711	
	Kennisintensieve HT diensten	47.937	50.011	49.052	48.779	
	Kennisintensieve financiële diensten	52.016	49.734	49.025	48.576	
	Kennisintensieve marktdiensten	176.344	175.983	176.424	180.489	
	Minder kennisintensieve diensten	601.200	609.644	601.366	626.803	
	Andere kennisintensieve diensten	704.533	720.778	739.585	736.807	
	Alle andere bedrijfstakken	164.521	165.769	166.852	170.308	

Tewerkstellingsgraad in de kennisintensieve diensten, in %

	31/12/2007	31/12/2008	31/12/2009	31/12/2010	31/12/2011
Vlaams Gewest	26,7	26,9	27,2	27,1	

Voor meer informatie (metadata): Tewerkstellingsgraad in de (Medium)-hoogtechnologische industrie, in %

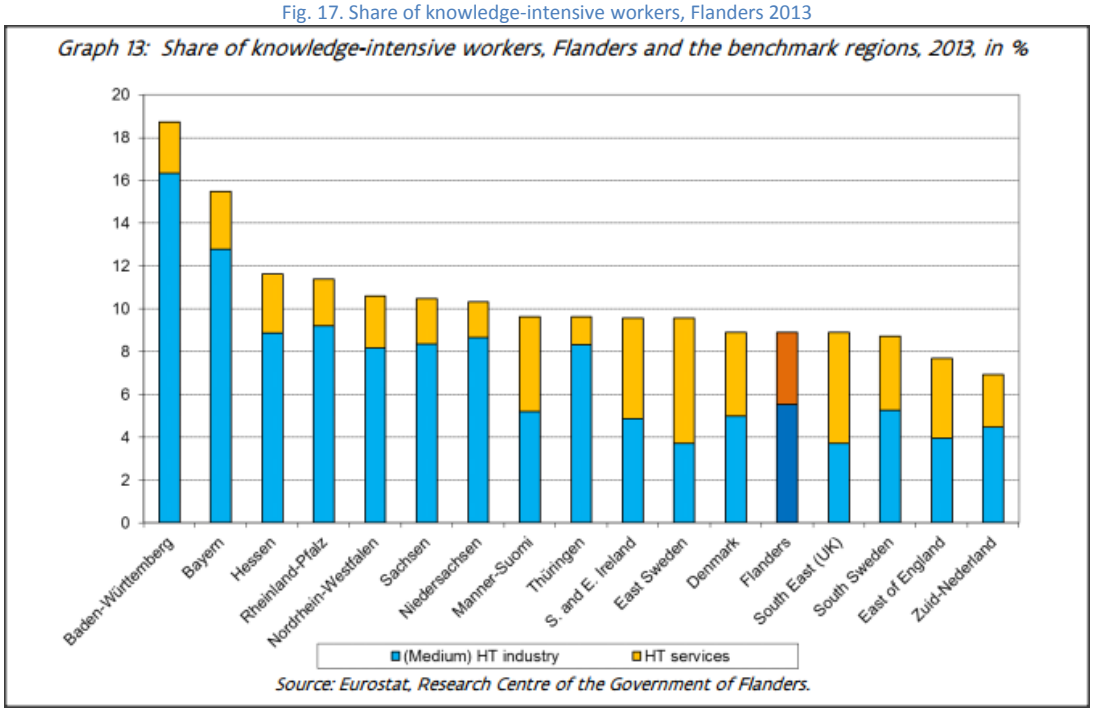
Tewerkstellingsgraad in de (Medium)-hoogtechnologische industrie, in %

2,6	31/12/2007	31/12/2008	31/12/2009	31/12/2010	31/12/2011
Vlaams Gewest	3,2	3,1	2,9	2,8	

Source: Local Statistics Flanders[6]

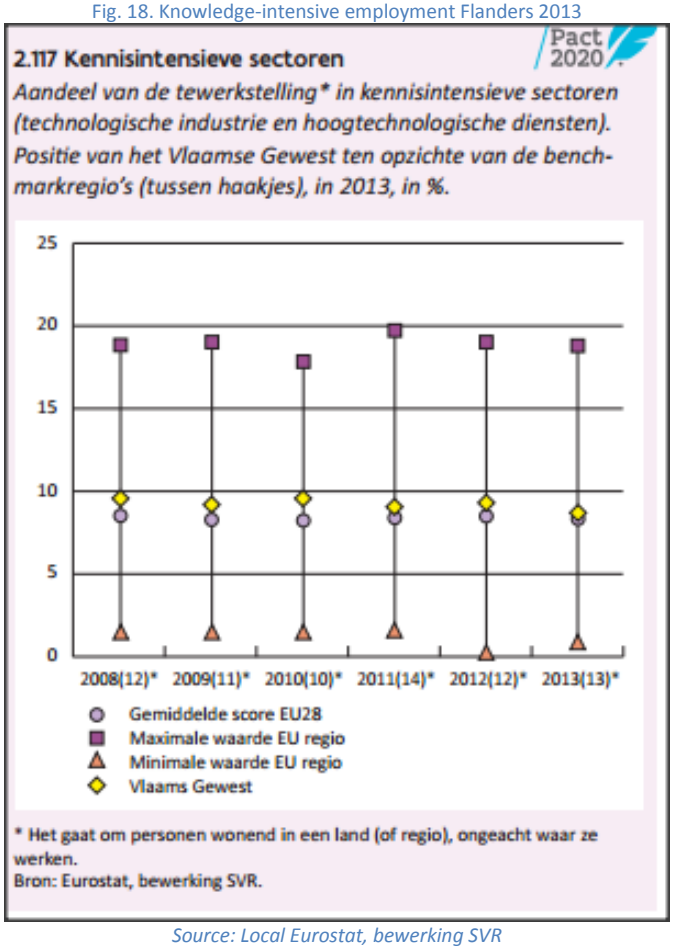
[6] http://aps.vlaanderen.be/lokaal/lokale_statistieken.htm

Fig. 17. Share of knowledge-intensive workers, Flanders 2013



Source: Eurostat Research Centre of the Government of Flanders

Fig. 18. Knowledge-intensive employment Flanders 2013

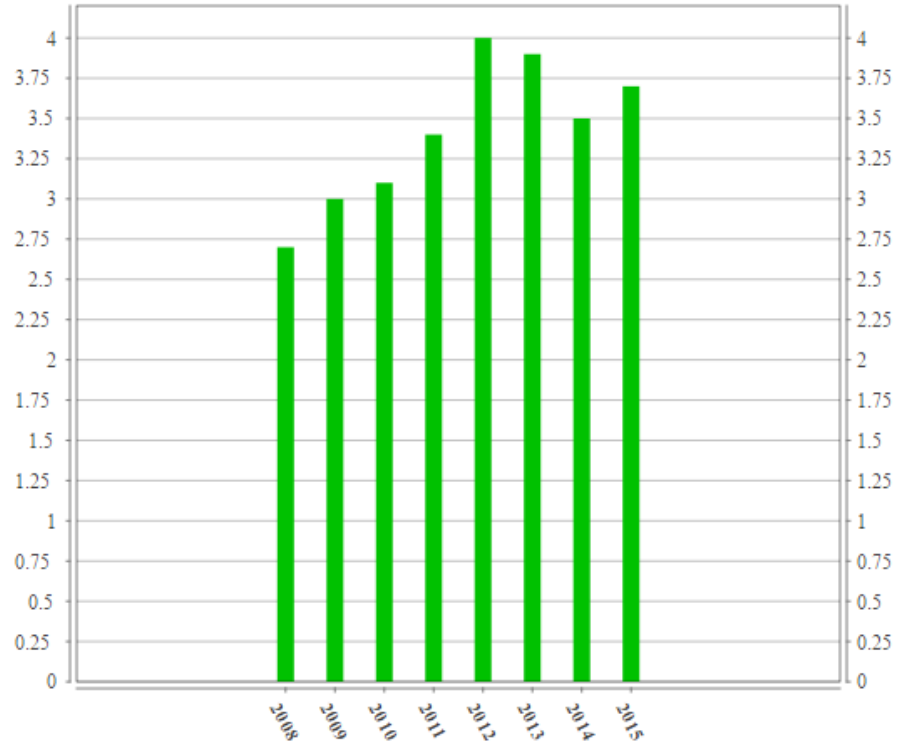


Source: Local Eurostat, bewerking SVR

ZLÍN REGION (CZECH REPUBLIC)

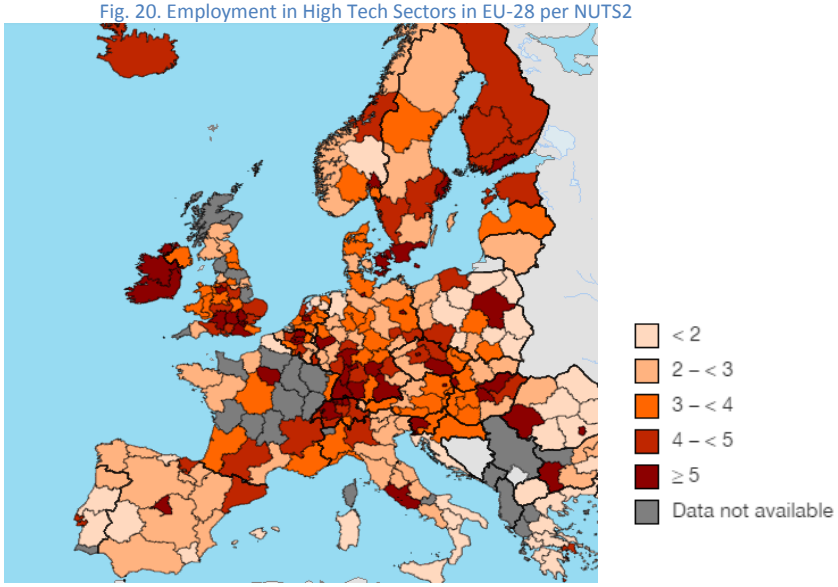
The share of workers in (medium) high-technology industry and high-technology services in Zlín region as a % of total employment is 3.75%, with an irregular evolution in the last few years (positive from 2008-2012 and negative from 2012-2015).

Fig. 19. HTC Employment levels in Střední Morava 2008-2015



Source: Eurostat

Fig. 20. Employment in High Tech Sectors in EU-28 per NUTS2



Source: Eurostat Statistical Atlas (Regional Yearbook 2015)

In conclusion, if we make a comparison of the three TETRAGON partner regions situation, in terms of their share of employment in high-tech sectors, we find that Flanders is ahead of them, with the Střední Morava NUTS 2 (ZLín Region) following and Galicia in last place

4 TOTAL INTRAMURAL R&D EXPENDITURE (GERD)

This indicator shows the Total intramural R&D[7] expenditure (GERD) by NUTS 2 regions as a % of the Gross domestic product (GDP).

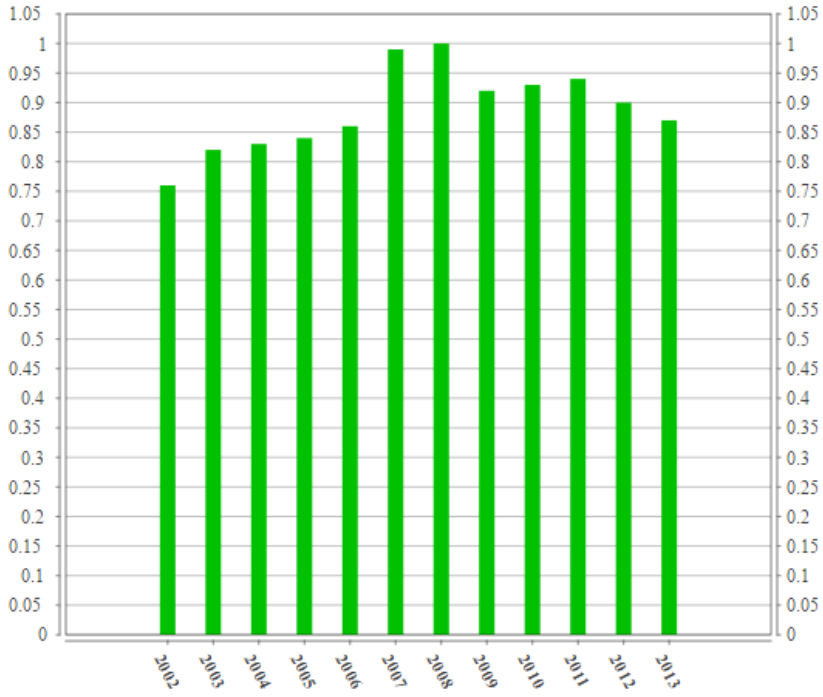
Gross domestic expenditure on R&D (GERD) includes expenditure on R&D by business enterprises, higher education institutions, as well as government and private non-profit organisations. It was estimated to be EUR 271.6 billion across the EU-28 in 2013; this equated to an average of EUR 536 of R&D expenditure per inhabitant.

The Europe 2020 strategy is the EU's growth strategy to become a 'smart, sustainable and inclusive economy'. It is composed of five headline targets, one of which covers research expenditure, namely, that R&D expenditure should be equivalent to 3.00 % or more of the EU's GDP by 2020.

This overall target is divided into a range of national targets, reflecting the position of each EU Member State and commitments agreed between the European Commission and national administrations through a series of reform Programmes. These national targets for R&D expenditure vary considerably between EU Member States and ranged from 0.50 % of GDP in Cyprus to 3.76 % of GDP in Austria and 4.00 % of GDP in the traditionally R&D-intensive Member States of Finland and Sweden[8].

GALICIA (SPAIN)

Fig. 21. GERD levels in Galicia 2002-2013



Source: Eurostat

[7] Research and experimental development (R) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications (Frascati Manual, 2002 edition, § 63). R intensity (R expenditures as a percentage of GDP) is an indicator of high political importance at the EU, national and regional levels.

[8] Eurostat regional yearbook 2015

In Galicia, the data available shows very low levels of R&D expenditure, peaking at 1% in 2008, although they were moving in a positive direction until the economic crisis began in 2008, where the direction shifted and became more unpredictable.

On a positive note, the domestic expenditure on R&D in Galicia in 2014 was nearly € 477.3 million (in Spain was 12,821.8 million), representing a growth of 1.8 % (compared to the decline of 1.5% nationally) over the previous year, representing an increase of 8.6 million euros[9].

Regarding the regional situation within Spain, there are major disparities between regions with Basque Country (2.03% of GDP); Navarre (1.75%); Madrid (1.68%) and Catalonia (1.47%) performing in 2014 higher than the national average (1.23 % of GDP) and Galicia considerably below (0.87% of its GDP). In the table hereunder we can see how Galicia scores considering EU28, Spain, and Spanish regions averages:

Fig. 22. Domestic spending and investment in R&D. 2014 (Thousands of € and %)

	R&D internal expenditure		R&D efforts
	Variation in K€	2013-2014 (%)	R&D expenses/GPD (%)
Basque Country	1.306.278	-1,66	2,03
EU28	283.009.388	3,08	2,03
Navarre	313.655	-1,10	1,75
Mdrid	3.312.342	-3,56	1,68
Catalonia	2.937.731	-0,77	1,47
SPAIN	12.820.756	-1,47	1,23
Andalusia	1.465.740	-0,38	1,03
Valencia Community	1.011.352	1,30	1,02
Castilla León	526.820	-0,79	0,98
Aragón	300.795	0,91	0,91
Rioja	71.369	16,48	0,91
GALICIA	477.270	1,83	0,87
Murcia	233.692	3,97	0,86
Cantabria	101.828	-7,47	0,83
Asturias	171.612	-6,59	0,80
Extremadura	116.010	-10,51	0,67
Castilla la Mancha	193.038	-4,18	0,51
Canary Islands	192.994	4,97	0,46
Balearic Islands	85.335	-1,89	0,32
Ceuta , Melilla	2.887	5,36	0,09

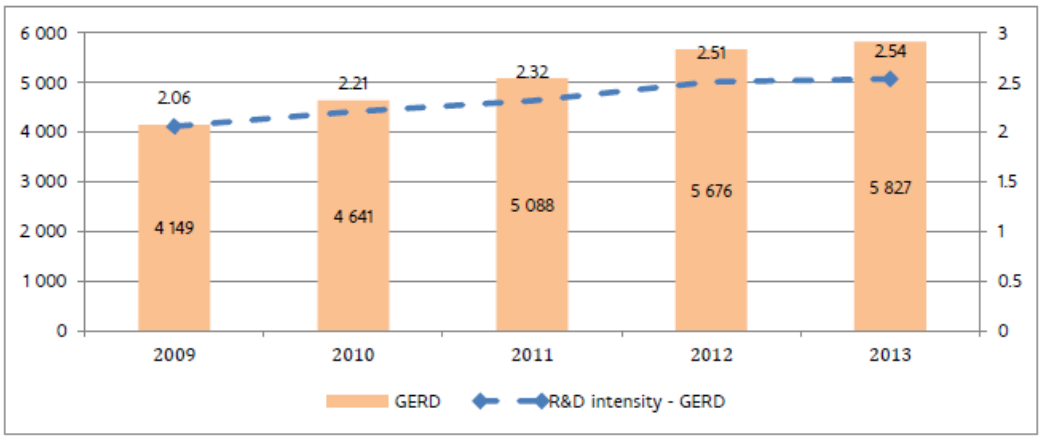
Source: INE. Statistics on R&D activities. Eurostat. Statistics on Research and Development.

FLANDERS (BELGIUM)

The R&D intensity (measured as the percentage of GERD related to GDP) of Flanders was 2.54% in 2013 (compared to 2.21% in 2010 and 2.32% in 2011 and 2.51% in 2012). Flanders ranks higher than the Netherlands, France and the EU-28 average, yet much lower than the USA, Germany and the Scandinavian top countries for the total R&D intensity of GERD in 2012.

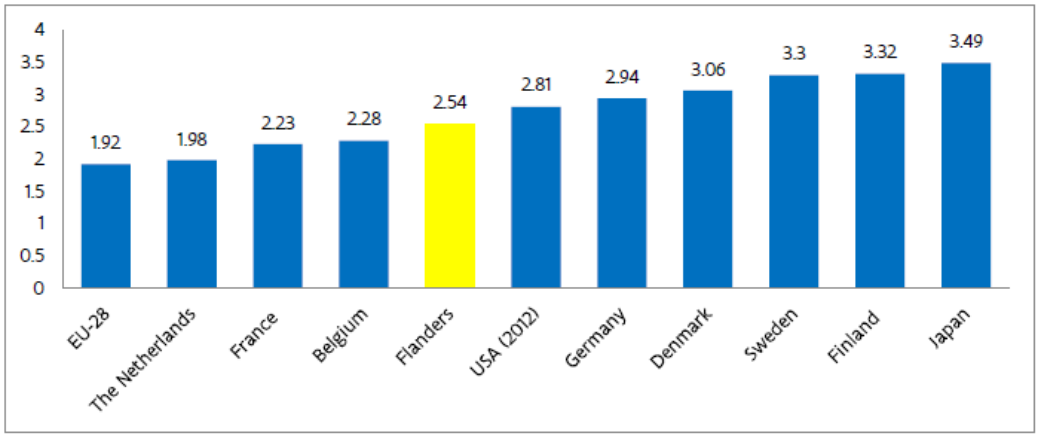
[9] Galicia Strategic Plan 2015-2020. Diagnostic: http://www.planestratexico.gal/es/inicio

Fig. 23. Evolution of total R&D spending (GERD) and the R&D intensity of the GERD in Flanders from 2009 to 2013 in M€.



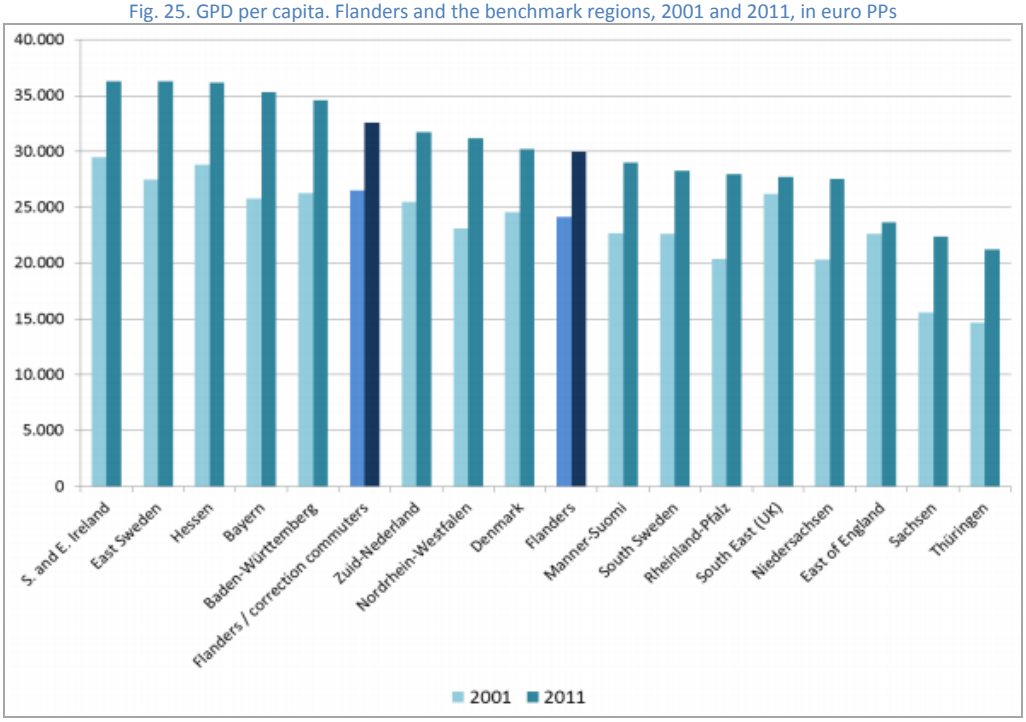
Source: OECD database. Main Science and Technology Indicators

Fig. 24. International comparison of the R&D intensity of GERD in 2013



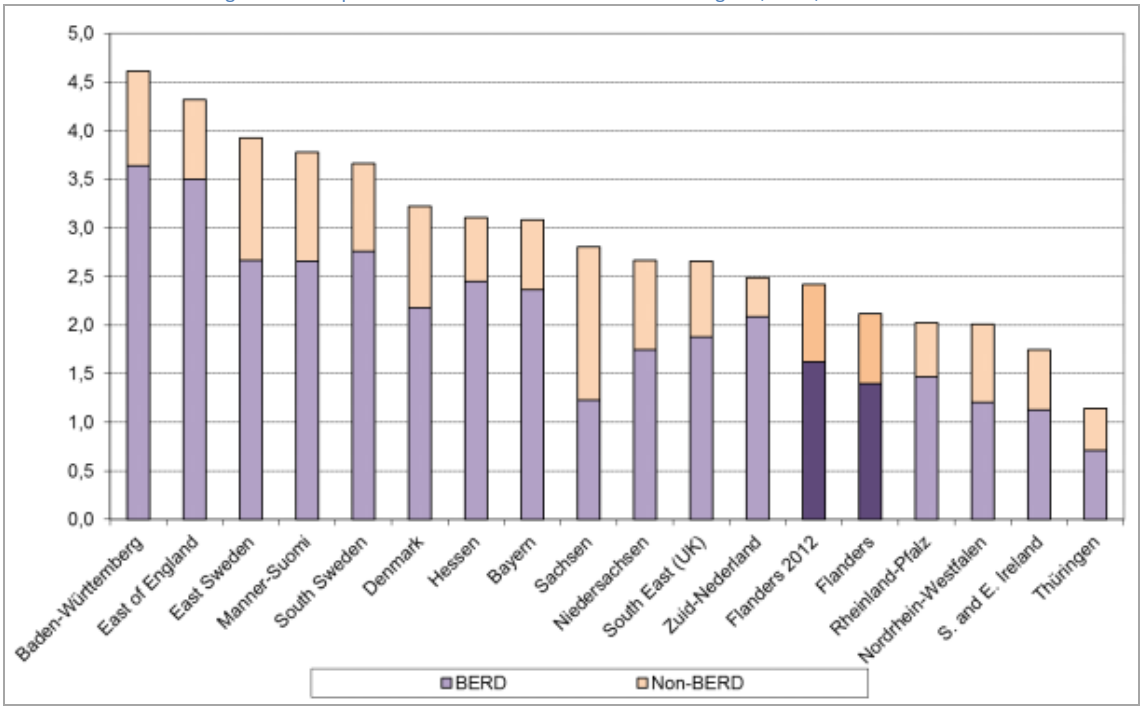
Source: OECD database. Main Science and Technology Indicators

Fig. 25. GPD per capita. Flanders and the benchmark regions, 2001 and 2011, in euro PPs



Source: Eurostat, Research Centre of the Government of Flanders

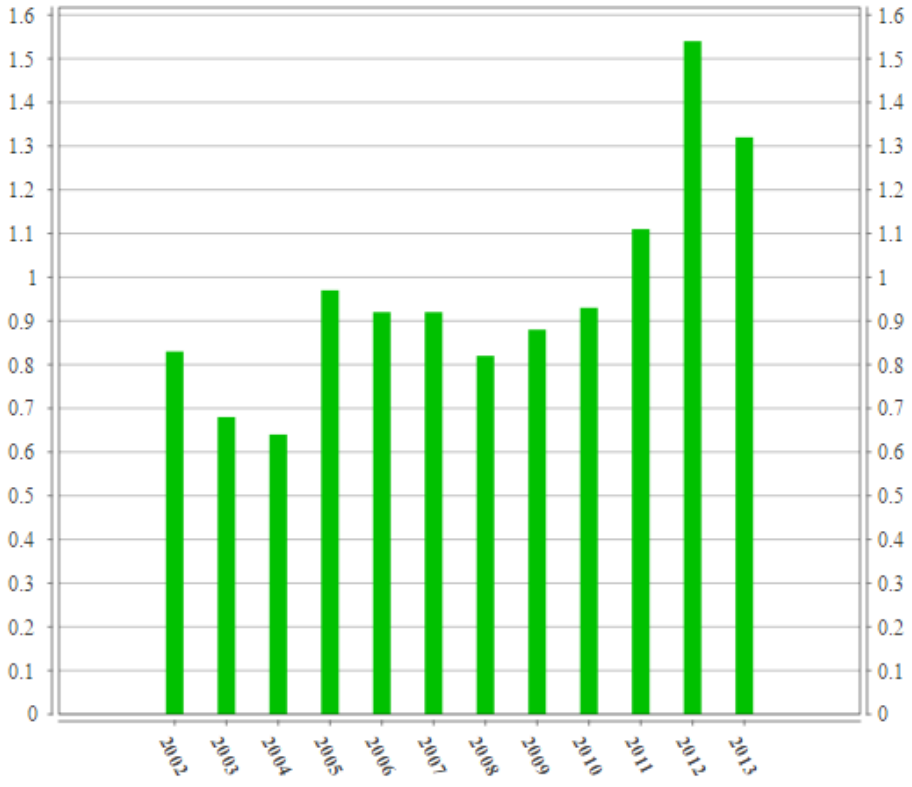
Fig. 26. R&D expenditures. Flanders and the benchmark regions, 2011, as % GPD



Source: Eurostat, Research Centre of the Government of Flanders

ZLÍN REGION (CZECH REPUBLIC)

Fig. 27. GERD levels in Střední Morava 2002-2013



Source: Eurostat

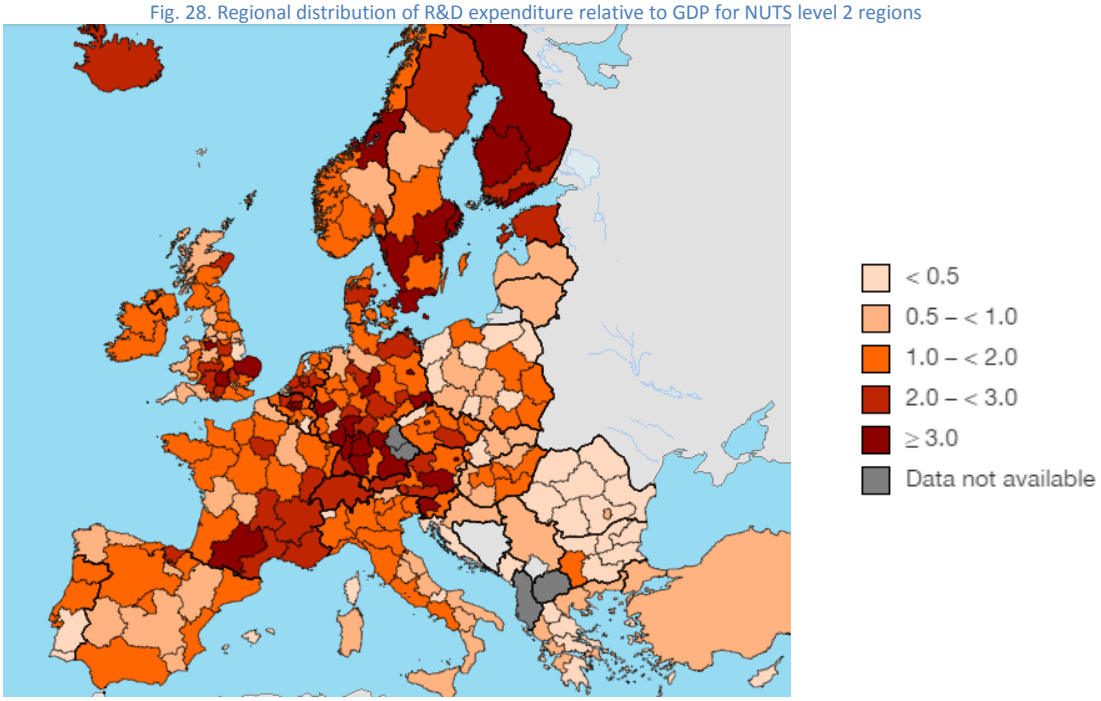
In Zlín Region, the data available shows medium to low levels of R&D expenditure, peaking at 1,5% in 2012, and with a strong reduction (0,3%) the following year.

In terms of the share of R&D expenditure in GDP reach the public sector in the Zlín region, only a fifth to a tenth of the values than in the private sector. While in the Czech R&D spending in recent years have grown significantly (including its share of GDP) in the Zlín region in the public sector stagnated and in private sector has been developed similarly as the business cycle the economy.

Currently, the public sector, which is represented mainly UTB, is rising in expenditure on R&D. The same situation is in the area of human resources for R&D, which in recent years has also been increasing. Here it is necessary to overcome the barrier of availability of qualified human resource.

On a more general note, we can see in the following map the regional distribution of R&D expenditure relative to GDP for NUTS level 2 regions. It shows that the most concentrated areas of research activity are often clustered together: there is a band of research intensive regions running from Finland through southern Sweden into Denmark; another band ran from the United Kingdom, through Belgium into southern Germany; while a final band ran from Slovenia, through Austria and Switzerland into southern France and northern Spain[10].

Fig. 28. Regional distribution of R&D expenditure relative to GDP for NUTS level 2 regions

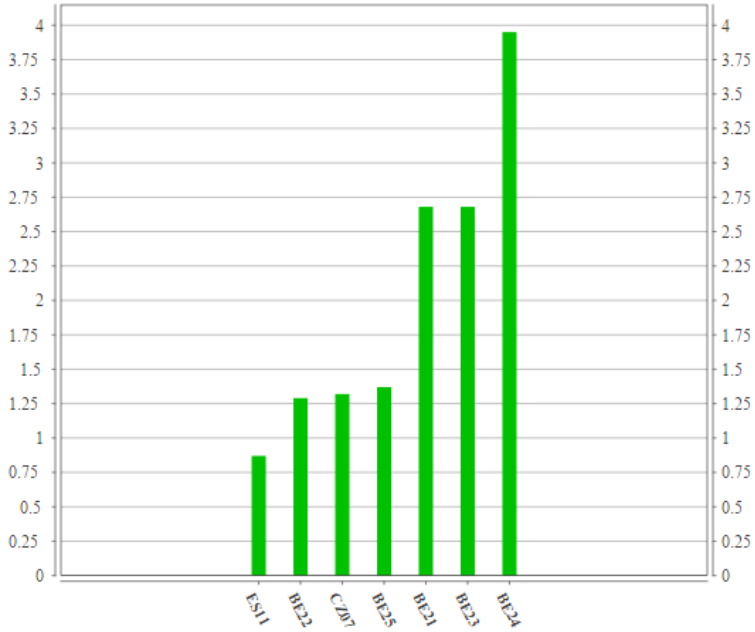


Source: Eurostat Statistical Atlas (Regional Yearbook 2015)

Taking into account the above mentioned geographical concentration of R&D activities, and that the Flemish neighboring Province of Brabant Wallon has the highest R&D intensity in the EU, the comparison between TETRAGON partners makes sense: Galicia and ZLín, in this order, score lower in the GERD indicator, whereas all of the Flemish NUTs 2 (except for one) score the highest.

[10] Eurostat regional yearbook 2015

Fig. 29. Comparison between Tetragon partners in terms of GERD in 2013



Source: Eurostat

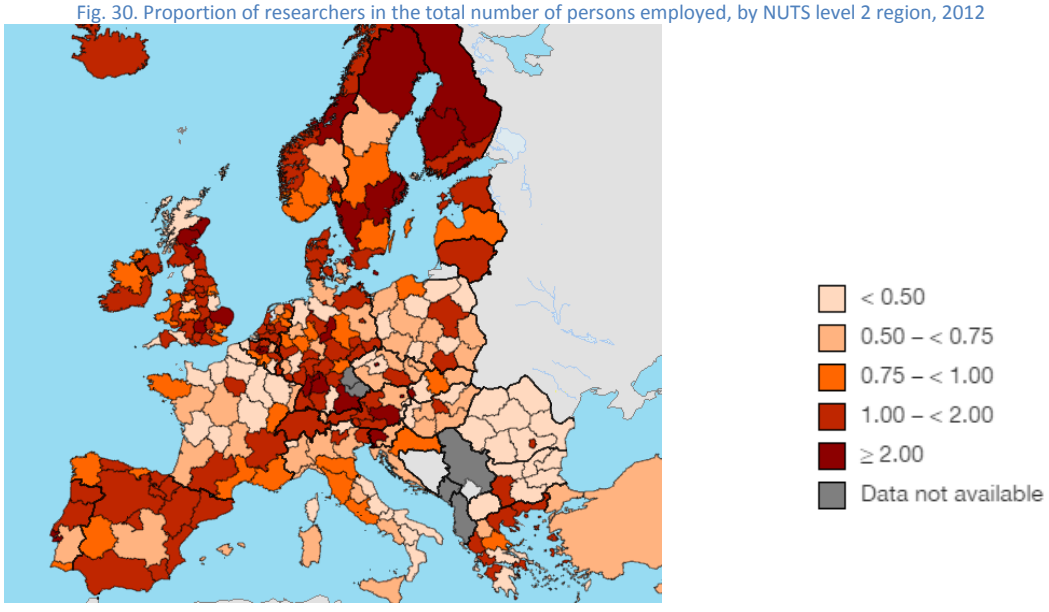
5 RESEARCHERS

This indicator shows the researchers, in all sectors, by NUTS 2 regions as a % of total employment.

As the Eurostat regional yearbook 2015 explains, researchers are directly employed within R&D activities and are defined as 'professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and in the management of the projects concerned'.

In general, the distribution of researchers across the EU is particularly clustered in capital regions whereas researchers accounted for a low share of total employment in peripheral and sparsely-populated regions, as we can see in the map below.

Fig. 30. Proportion of researchers in the total number of persons employed, by NUTS level 2 region, 2012



Source: Eurostat Statistical Atlas (Regional Yearbook 2015)

GALICIA (SPAIN)

As for the number of researchers in Galicia in 2014, it was 5.473, with a 40% / 60% female/male ratio, as we can see in the following table along with the distribution per employment sector, with more than a half of researchers employed by the public sector.

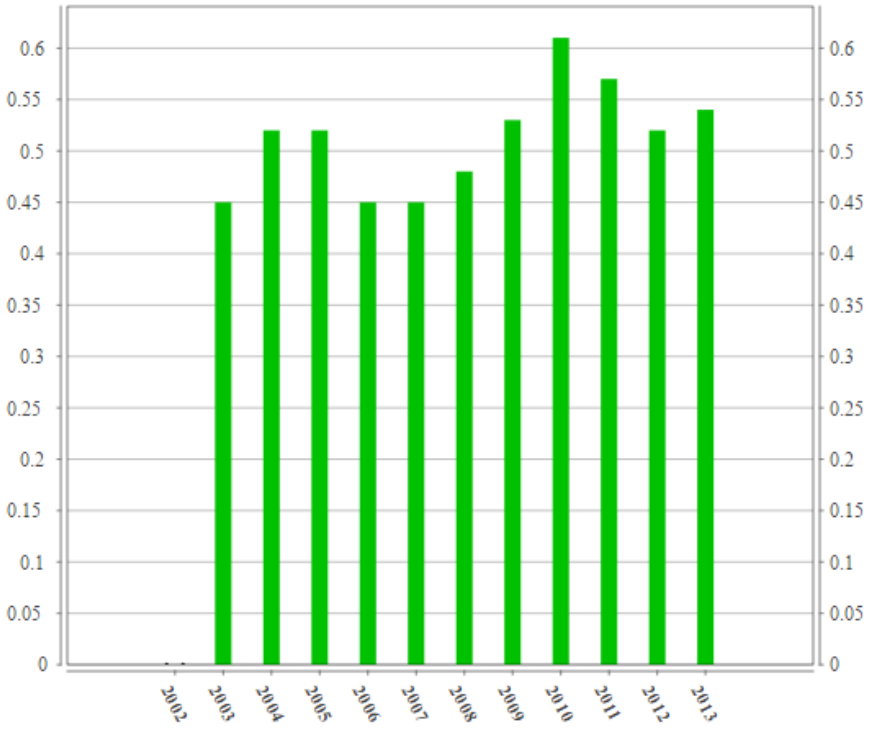
Fig. 31. Researchers dedicated to R&D in FTE by sector and gender. 2014

	SPAIN		GALICIA		EU28	
	Total	% Women	Total	% Women	Total	% Women
R&D Researchers	122.235	38,6	5.473	39,9	1.767.866	…
Companies	44.899	31	1.777	29,5	876.660	…
Public Administration	20.180	45,9	695	53,2	209.205	…
Higher Education	57.156	41,9	3.001	43	682.001	…

Source: Eurostat Statistics on research and development

When analysing the evolution of this indicator for the last decade in Galicia, we can see that the data shows a very irregular growth, but growth nonetheless (from a 0,45% to almost 0,55% of the total employment), where the effects of the beginning of the economic crisis can be seen in 2006 and 2007.

Fig. 32. Researchers in Galicia as a % of total employment 2002-2013

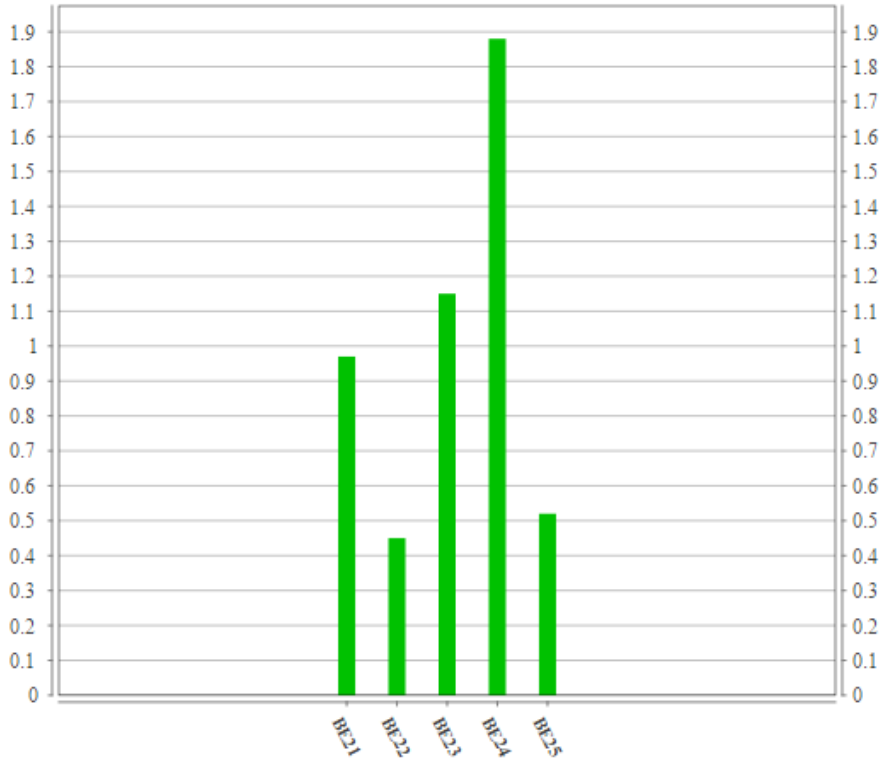


Source: Eurostat

FLANDERS (BELGIUM)

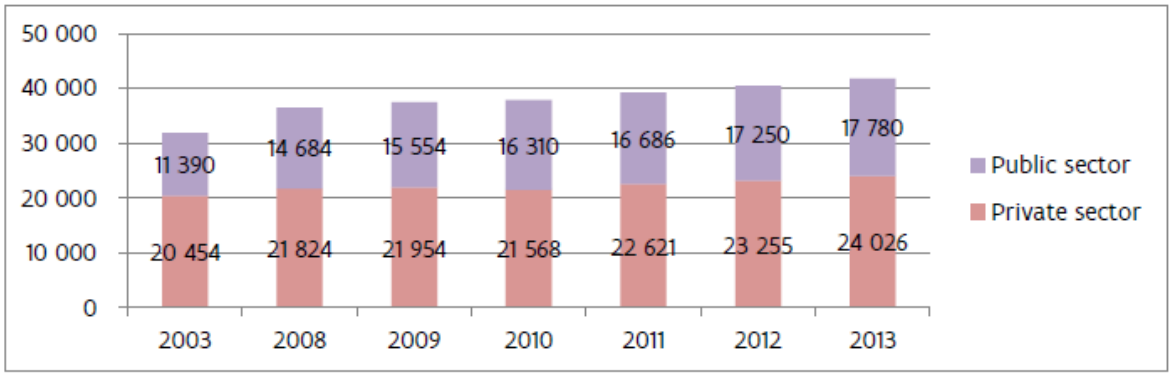
In Flanders data shows big disparities between NUTS 2, with the highest levels of researchers as a % of total employment in Flemish Brabant (almost 1,9%).

Fig. 33. Researchers in Flanders as a % of total employment 2013



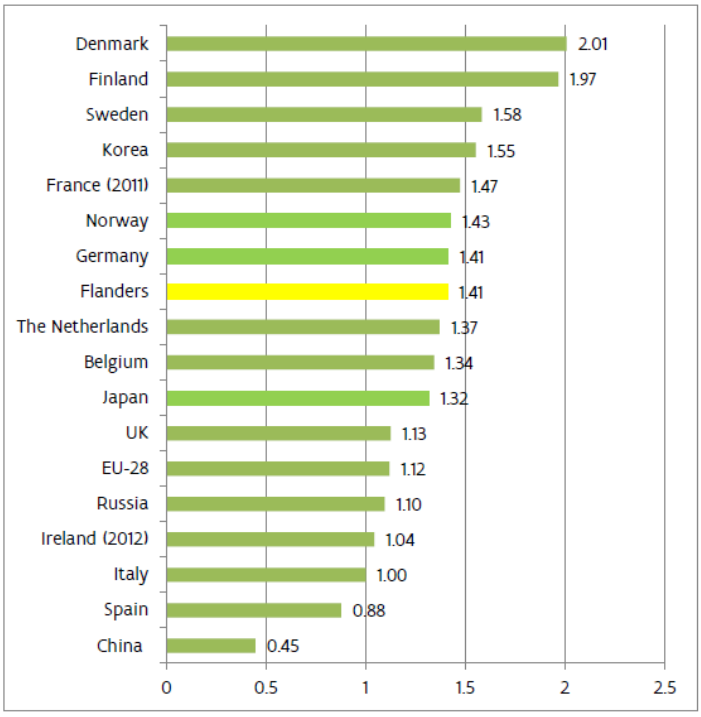
Source: Eurostat

Fig. 34. Evolution of the R&D personnel from 1993 to 2013



Source: OECD database. Main Science and Technology Indicators

Fig. 35. International position of Flanders for total R&D personnel (% of the labour force) 2013

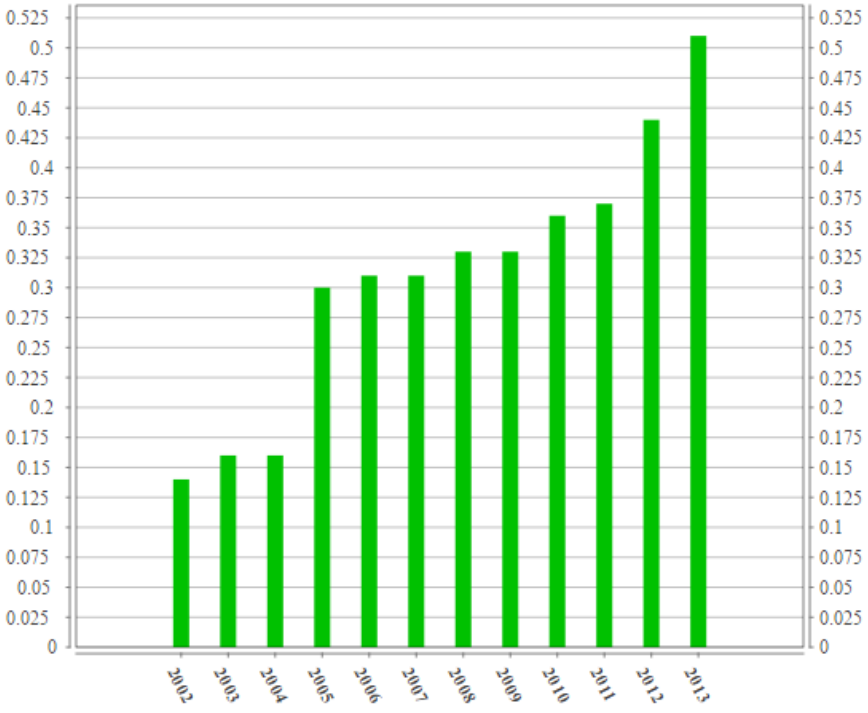


Source: OECD database. Main Science and Technology Indicators

ZLÍN REGION (CZECH REPUBLIC)

The evolution of this indicator for the last decade in Střední Morava shows a constant growth, going from a 1,3% of total employment in 2002 to a little over 0,5% in 2013.

Fig. 36. Researchers in Střední Morava as a % of total employment 2002-2013



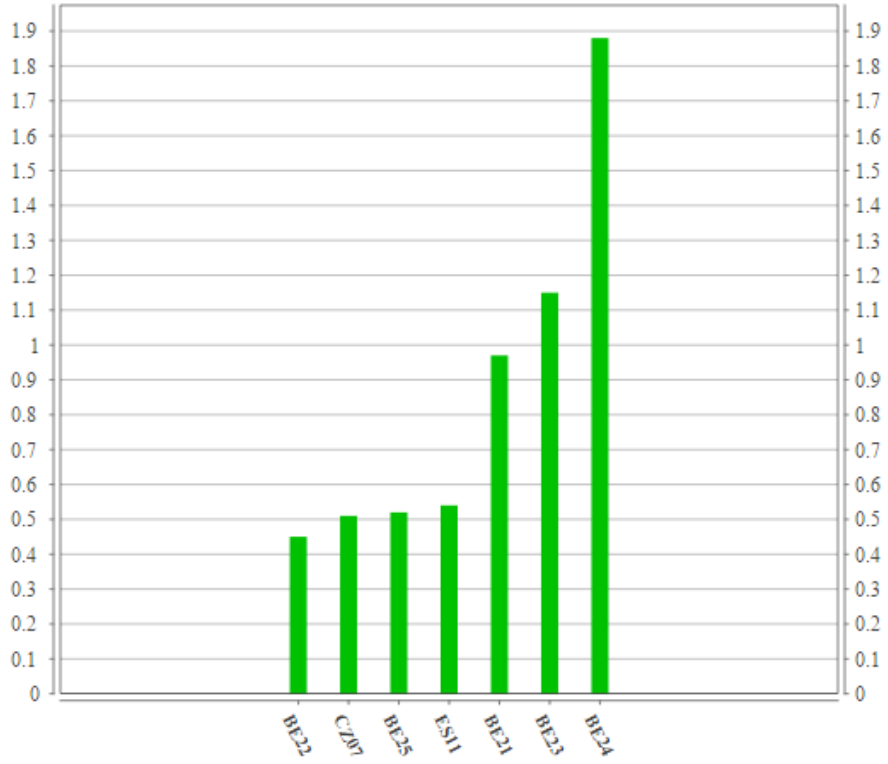
Source: Eurostat

In the corporate sector operating in the region a number of entities that are active in R&D. Successful significantly innovative companies can be found in the region particularly in the sectors of plastics, aerospace, engineering, electrical industry, but also in ICT, armaments and metalworking industries.

Despite of the dominant industrial orientation operates in the ZLín region several significant innovative players in the service sector, especially ICT. ICT is being developed at the Faculty of Applied Informatics University of Tomas Bata and from OP R&D supported Centre for Applied Research CEBIA-TECH.

In conclusion, when analyzing TETRAGON partners' situation in this indicator, we can see it follows in part the distribution of the previous indicator: the three highest scoring regions are three Flemish NUTS 2 with the highest expenditure in R&D. With the other partners falling quite far behind.

Fig. 37. Comparison between Tetragon partners in terms of researchers in 2014



Source: Eurostat

3.1.2 STUDY OF CONDITIONS OF AGENCIES AND REGIONS WHERE PARTNERS ARE ESTABLISHED

1 REGIONAL DEMOGRAPHICS

GALICIA (SPAIN)

Galicia is located in the northwest of Spain. With an area of 29,574 km2 and 2.7 inhabitants, its contribution to the national population and GDP is 5.9% and 5.4% respectively.

The population density of Galicia reaches 94.5 people per km2 and the most densely populated area is found in the West coast. The average age approaches 45 whereas life expectancy tops 82 years. Galician population features ageing and migration. In fact, 42% of the Galician population is older than 50 years old. Nevertheless, it is worthy to point out that there are important divergences between East and West. Business and industrial structures are more common in the Western areas; therefore the population is larger and younger than that of the Eastern ones. Galicia suffers significant migration movements between the provinces, but also to other national regions and to foreign countries[11].

FLANDERS (BELGIUM)

Flanders is the Dutch speaking northern part of Belgium. With an area of 13.522 km² and almost 6.5 million inhabitants, its contribution to the national population and GDP is 57.4%. The population density of Flanders reaches 474 people per km². Life expectancy tops 83,1 years for women and 78,1 for men.

Fig. 38. Main demographic statistics in Belgium

	Population	Population density (inhabitants/ km²)	Employment rate 20–64 y (in %)	Employment rate 55–64 y (in %)	Unemployment rate (in %)	Long term-unemployment rate (in %)	Youth unemployment rate (in %)
	1/01/2012	1/01/2012	2013	2013	2013	2013	2013
EU28	505.868.349	113	68,3	50,1	10,8	5,1	23,4
EU15	400.080.282	121	69,2	52,3	11,0	5,2	22,8
BE - Belgium	11.094.850	363	67,2	41,7	8,4	3,9	23,7
BE2 - Vlaams Gewest	6.372.575	471	71,9	42,9	5,0	1,6	16,6

[11] Regional Innovation Monitor Plus: https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/galicia

	Share of highly-educated workers (in %)	Share of adult population involved in lifelong learning (in %)	Total R&D expenditures / GDP (in %)	Business R&D expenditures / GDP (in %)	Government R&D expenditures / GDP (in %)	Regional Entrepreneurship and Development Index - REDI (in %)	Share of workers in knowledge-intensive sectors (in %)	Share of workers in creative sectors - new definition (in %)
	2013	2013	2011	2011	2011	2007-2011	2013	2013
EU28	31,8	10,5	1,93	1,19	0,26	n.d.	8,4	13,9
EU15	33,1	12,2	2,08	1,30	0,26	n.d.	8,4	14,5
BE - Belgium	41,3	6,7	2,02	1,36	0,18	n.d.	8,0	16,9
BE2 - Vlaams Gewest	40,5	7,1	2,11	1,40	0,25	62,1	8,9	15,4

Source: Eurostat

ZLÍN REGION (CZECH REPUBLIC)

The Zlín Region (Czech Republic) is situated in the eastern part of Moravia along the Slovakian frontier. Otherwise it borders with regions South Moravia, Olomouc and Moravia-Silesia. It is divided among four districts: Kroměříž, Uherské Hradiště, Vsetín and Zlín. Its area is 3,963 km2, which is 5.0 % of the national territory, making it the 11th largest region in the country.[12]

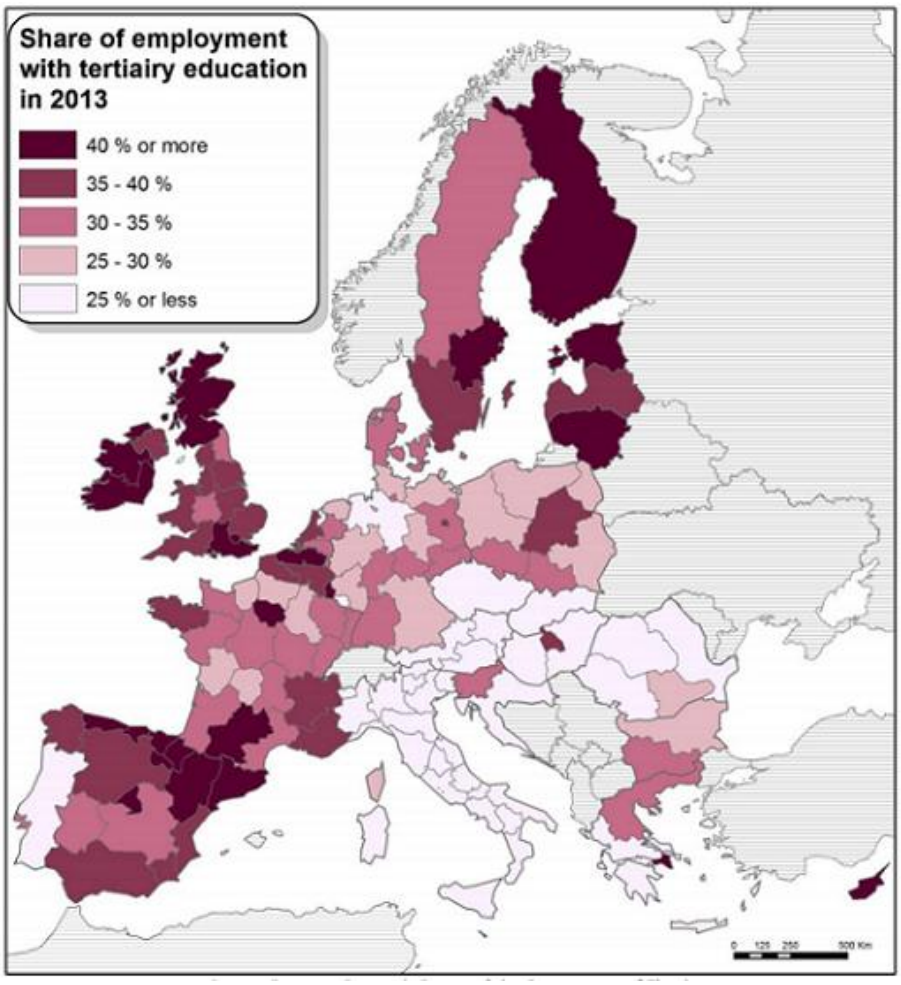
It has 591,357 inhabitants, around 5.7 % of the population of the Czech Republic making it the 8th most populated region in the country. Zlín, with a population of 78,122, is the regional capital.

Nearly 40 % of the region`s population is employed in industry – significantly more than in any other Czech region.

As a general comparison for TETRAGON partners, we can see hereunder the levels of employment with tertiary education per NUTS 2 in 2013, as a % of the total employment. In this indicator, the partners score, from higher to lower, in the following order: Flanders, Galicia and ZLín Region (clearly behind).

[12] http://www.czechinvest.org/data/files/cic-2010-zlin-160-en.pdf

Fig. 39. Share of employment with tertiary education in 2013



Source: Eurostat Research Centre of the Government of Flanders

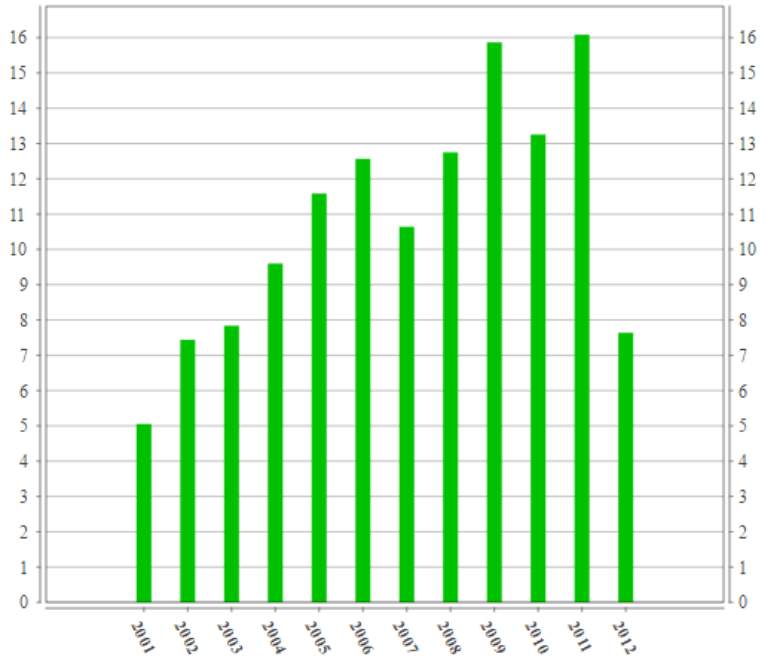
2 INTRODUCTION TO THE SITUATION OF THE REGION IN TECHNOLOGY TRANSFER AND BASIC TT STATISTICS

GALICIA (SPAIN)

The main TT statistics analysed will be the following two: Patent and high-tech patent applications to the European patent office (EPO) by priority year by NUTS 2 regions (Per million inhabitants)[13]. Both indicators show very low scores in terms of regional comparison with the more developed regions as well as a very irregular path with a pronounced decreasing in 2012.

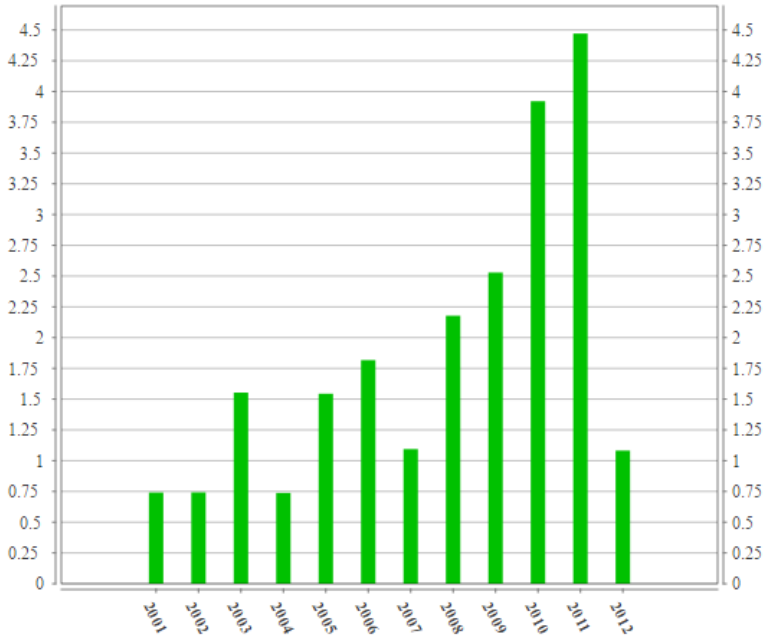
[13] Data refer to applications filed directly under the European Patent Convention or to applications filed under the Patent Co-operation Treaty and designated to the EPO (Euro-PCT). Patent applications are counted according to the year in which they were filed at the EPO and are broken down according to the International Patent Classification (IPC). They are also broken down according to the inventor's place of residence, using fractional counting if multiple inventors or IPC classes are provided to avoid double counting. http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00040&plugin=1

Fig. 40. Patent applications to the European patent office (EPO) in Galicia. (2001-2012)



Source: Eurostat

Fig. 41. High-tech patent applications to the European patent office (EPO) in Galicia. (2001-2012)



Source: Eurostat

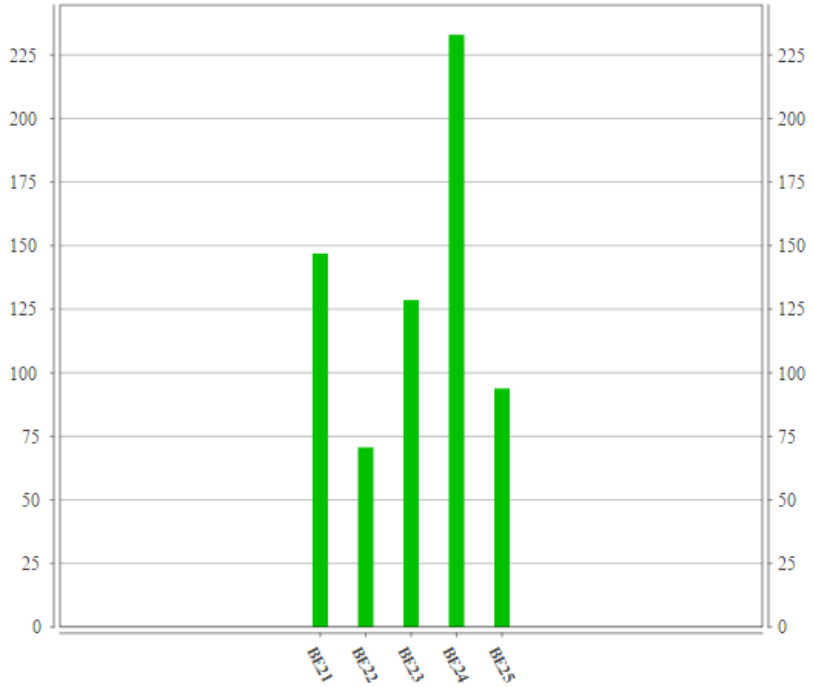
In Spain, OTRI's (agencies for technology transfer, integrated within the universities' structure) are being strengthened. Nevertheless, university research is, in many cases, performed without a clear view of industry's needs. In Galicia, the three technology transfer offices were created within the main Universities. Also, centres of innovation and services (CIS) were established for several specific areas (wood, design and technology…). These offer a range of services to industry[14].

[14] http://ec.europa.eu/regional_policy/sources/docgener/evaluation/doc/rdti/4.1f.pdf

FLANDERS (BELGIUM)

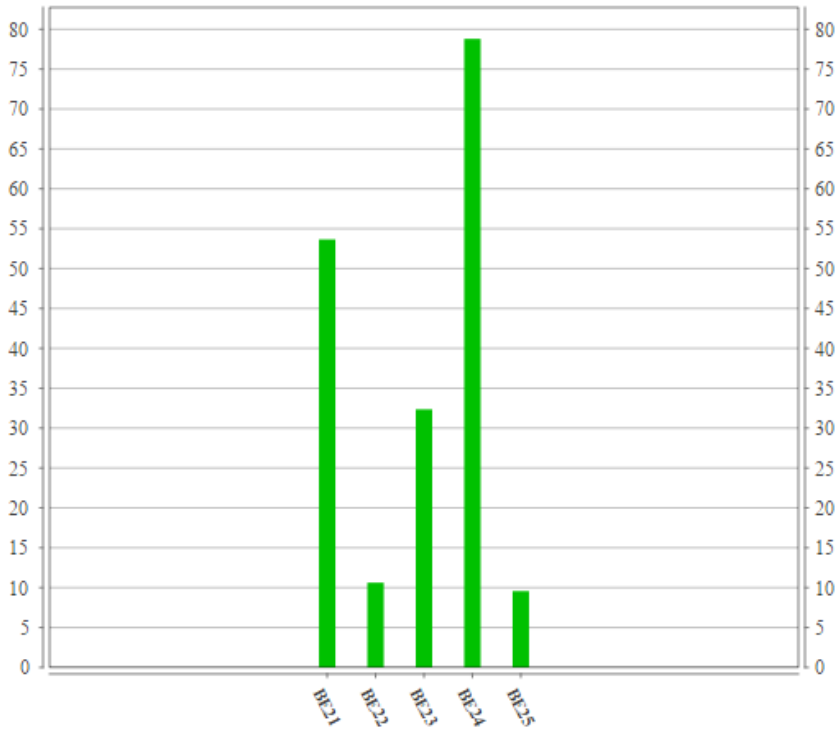
The previously main TT statistics explained (Patent and high-tech patent applications to the European patent office (EPO) by priority year by NUTS 2 regions per million inhabitants), show very high numbers in Flanders, with a noticeable disparity among NUTS 2.

Fig. 42. Patent applications to the European patent office (EPO) in Flanders 2012



Source: Eurostat

Fig. 43. High-tech patent applications to the European patent office (EPO) in Flanders 2012

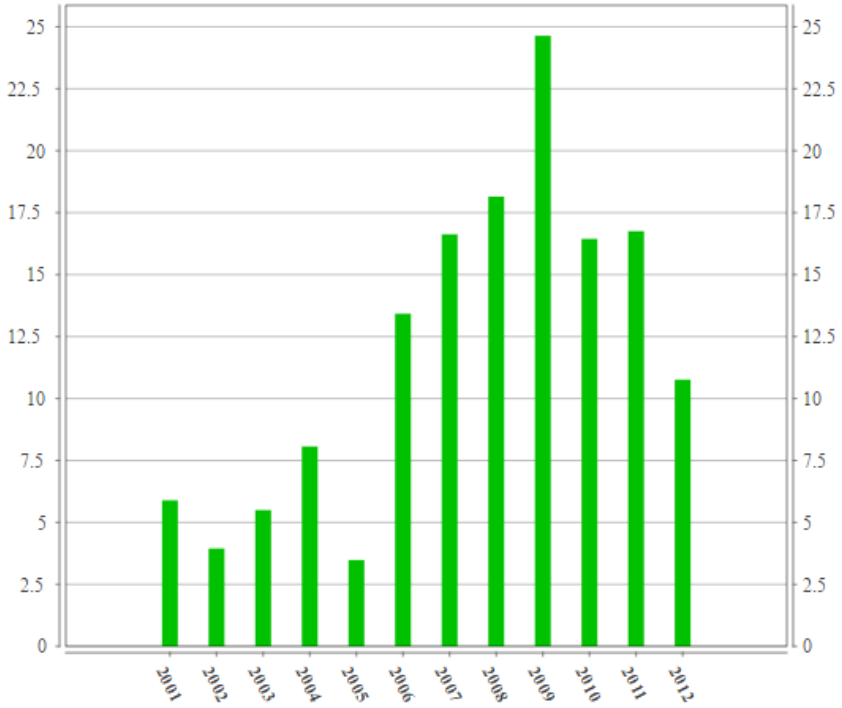


Source: Eurostat

ZLÍN REGION (CZECH REPUBLIC)

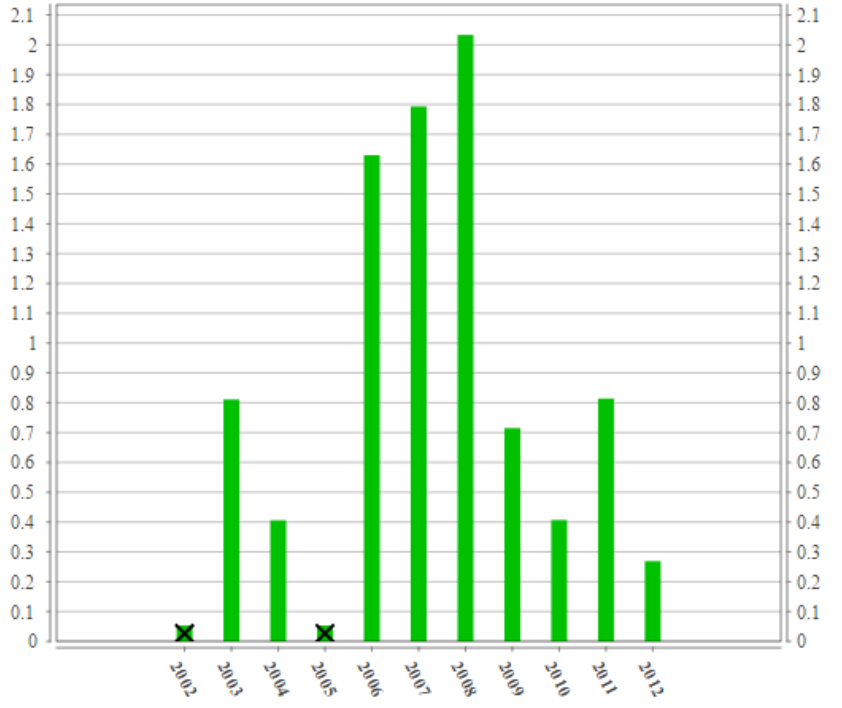
The same TT statistics analysed for the previous regions show in Strední Moravia low scores, like it happened before in Galicia, with an irregular evolution in the 10 years analysed.

Fig. 44. Patent applications to the European patent office (EPO) in Strední Morava (2001-2012)



Source: Eurostat

Fig. 45. High-tech patent applications to the European patent office (EPO) in Strední Morava (2002-2012)



Source: Eurostat

In order to make an introduction to the situation of the Zlín Region in Technology Transfer it is essential describing the ZLín region Technology Innovation Centre (TIC) and University of Tomas Bata (CTT TBU):

1. CTT TIC provided in 2013 following services:

- 5 provided consulting firms in the field of intellectual property
- 128 published offers and demands cooperation or technology and license
- 2 advice on international projects in FP7
- 28 consultations on the possibility of funding R&D activities of companies from grants
- 2 training workshops at national and international programs of cooperation in innovation, in cooperation with the Enterprise Europe Network, Business Development Agency Czech Invest and Plastic cluster.
- Presentation of innovative activities of firms in the corporate partners
- Online database "Catalogue Companies Zlín Region" with 546 registered companies www.katalogfiremzk.cz ; www.zlinregioncompanies.com
- 1 printed Czech-Chinese Export "catalogue Companies Zlín Region"
- Presentation 3 "Catalogue Companies Zlín Region" in international trade fairs in China and Hong Kong"
- Online database of innovative companies at the Innovation Portal Region has 199 registered firms; www.inovacnipodnikani.cz
- The General Meeting plastics cluster
- The possibility of corporate involvement in the system of Open Innovation for the development of interdisciplinary collaboration
- 6 courses at universities in the Czech Republic for the possibility of interdisciplinary collaboration
- 2 seminars at universities in the Slovak Republic for the possible development of interdisciplinary collaboration
- 3 workshops in industrial societies - introduction of Open Innovation, such as the possibility of interdisciplinary collaboration, creation of innovative products and increase competitiveness

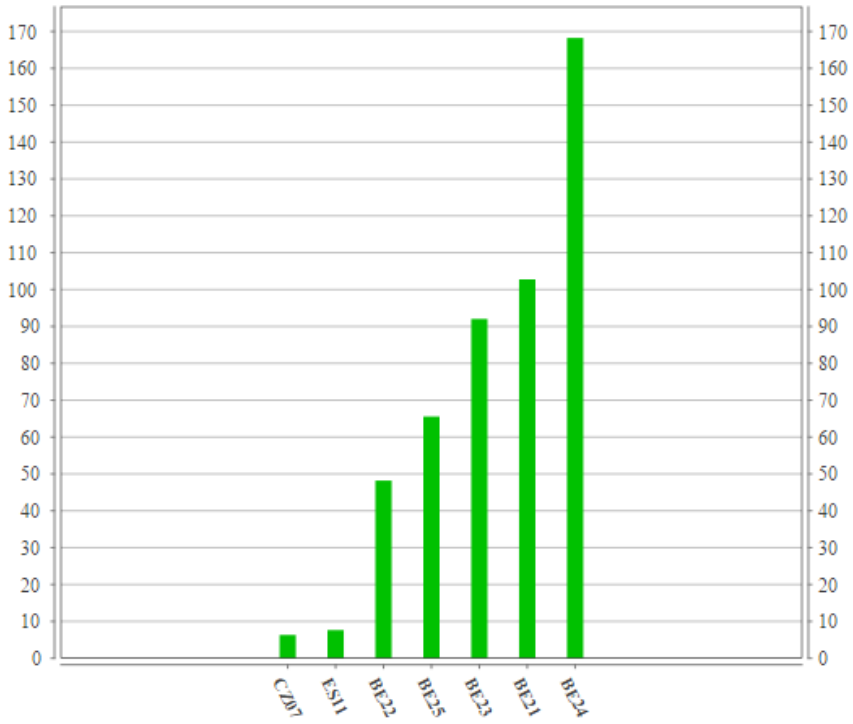
2. Regarding the services offered in technology transfer centres at UNI TBU, they are currently used actively by more than 190 companies. In 2013, with support from the CTT made a total of 101 cases aimed at protecting intellectual and industrial property, namely:

- 44 cases of protection by patents (including 32 in the Czech Republic and 12 abroad)
- 32 cases related to the protection as utility models in the Czech Republic,
- 14 cases related to the protection form designs,
- 11 cases of protection by a trademark registration for the country.

The Technology Transfer Centre at the same time is becoming increasingly focused on the transfer of specific research results into practice. During 2013 held numerous meetings with representatives of companies and owners of the scientific and technical solutions.[15]

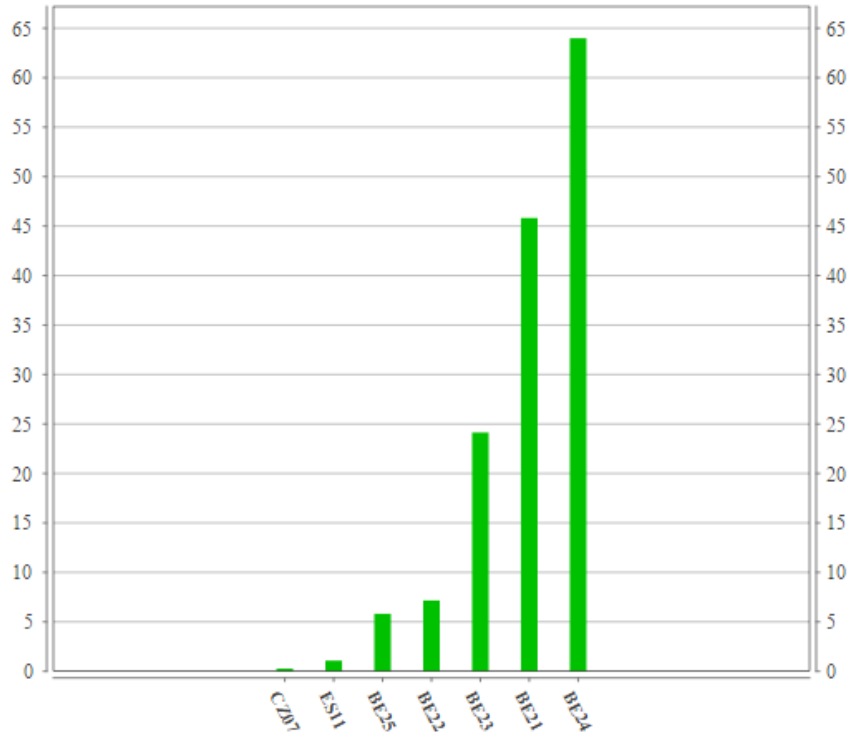
As we can see in the graphics hereunder, the comparison between TETRAGON partners, based on the main TT statistics (Patent and high-tech patent applications to the European patent office per million inhabitants), show that the general support for innovation and technology transfer is still not very well developed in Galicia and Zlín, with Flanders far ahead in this aspect.

Fig. 46. Patent applications to the European patent office (EPO) by Galicia and Flanders. (2012)



Source: Eurostat

Fig. 47. High Tech patent applications to the European patent office (EPO) by Tetragon Partners. (2012)



Source: Eurostat

3 TT IN THE REGIONAL S3 STRATEGY

GALICIA (SPAIN)

To achieve Galicia RIS3 Priorities there will be 4 Framework Programmes. One of them is GALICIA TRANSFERS, Programme addressed to support Knowledge transfer to the Market, which brings together instruments aimed at fostering the transfer of research from Knowledge Generation and Diffusion Agents, as main architects of talent fostering in the Galician innovation systems, into the market, within an open innovation framework.

The instruments used by the Galician S3 Strategy implementation related to Knowledge and Technology transfer are the following:

Fig. 48. Instruments for the Galician S3 Strategy implementation: GALICIA TRANSFERS

	Nº	Instruments	Acronym
GALICIA TRANSFERS	13	Scientific and Technological Centres Transfer Contract Programme	Sc. & Tech. Contract Program
	14	Investment in knowledge and technology assets in Scientific and Technological Centres	Sc. & Tech. Investment
	15	Test Concept	Test Concept
	16	Innovative Public Procurement	Innov. Publ. Procurement
	17	Fostering Industrial Property	Industrial Property

Source: RIS3 Galicia

These Instruments make up a clear commitment to foster the transference of knowledge by "Agents of the Subsystem of Generation and Dissemination of Knowledge" (Universities, Technological Centres, and Cluster Platforms) and to improve the absorption capacity of the "Agents of Exploitation Subsystem" (Companies). Hereunder there is a description of each one of the proposed instruments:

1. Scientific and Technological Centres Transfer Contract Programme:

PROGRAMME	**GALICIA TRANSFERS**
INSTRUMENT NAME	SCIENTIFIC AND TECHNOLOGICAL CENTRES TRANSFER CONTRACT PROGRAMME
ACRONYM	**Sc.& Tech. Contract Programme**
VALUE CHAIN	Stage 1: Knowledge generation Stage 2: Knowledge transfer
INSTRUMENT TYPE	Non-refundable Grants
FUND	ERDF, EAFRD, EMFF
DESCRIPTION	
This line has the objective of consolidating Science Centres and Technology Centres by financing their business overheads, with the mandatory condition for being able to access these funds of ensuring direct transfer of results to the market by means of enterprises or spin-off creation. The funds earmarked for each beneficiary entity will be calculated on the basis of results attained by the centre in the following areas: • Regarding the valued use of their R&D&I activities, their capacity to transfer them to the market • In the securing of competitive R&D&I resources in national and international programmes. And in general, any other measure that contributes to the achievement of the instrument's general objective	
BENEFICIARIES	
Knowledge generation centres	
INVESTMENT PRIORITY	
ERDF: a. - Foster research, technological development and innovation. b. - Foster R&D investment by enterprises, technology transfer.	

EAFRD: a. - Encourage knowledge transfer and innovations in the agroforestry sector. EMFF: a. - Stimulate an innovative, competitive fishing sector based on knowledge. b. - Promote innovative, competitive fish-farming based on knowledge.			
EXECUTING BODY			
Galician Innovation Agency (GAIN) and Competent Sectorial Bodies (where necessary)			
TENDERS:			
Start Date	01/01/2014	**End Date**	31/12/2020
Competitive and/or open calls			

2. Investment in knowledge and technology assets in Scientific and Technological Centres:

PROGRAMME	**GALICIA TRANSFERS**
INSTRUMENT NAME	INVESTMENT IN KNOWLEDGE AND TECHNOLOGY ASSETS IN SCIENCE AND TECHNOLOGY CENTRES
ACRONYM	**Sc.& Tech. Investments**
VALUE CHAIN	Stage 1: Knowledge generation Stage 2: Knowledge transfer
INSTRUMENT TYPE	Non-refundable Grants and/or Refundable Funding Instruments
FUND	ERDF, EAFRD, EMFF
DESCRIPTION	
Line for the consolidation of knowledge and technology centres by means of funding for investment aimed at generating R&D results that are transferable to markets and in line with S3 challenges. The awarding process will take into account results attained by the centre in valued use of their R&D activities, giving priority to those doing so most efficiently, and the possibility of shared use of investments. This instrument will take into special account cross-border research centres, currently the International Iberian Nanotechnology Laboratory in Braga, but also any other that may be created in the coming years. And in general, any other measure that contributes to the achievement of the instrument's general objective	
BENEFICIARIES	
Knowledge generation centres including Cross-border Centres	
INVESTMENT PRIORITY	
ERDF: a. - Foster research, technological development and innovation. Improvement in research and innovation infrastructures. b. - Foster R&D investment by enterprises, technology transfer. EAFRD: a.- Encourage knowledge transfer and innovations in the agroforestry sector EMFF: a.- Stimulate an innovative, competitive fishing sector based on knowledge b.- Promote innovative, competitive fish-farming based on knowledge	
EXECUTING BODY	
Galician Innovation Agency (GAIN) and Competent Sectorial Bodies (where necessary)	
TENDERS:	
Start Date	01/01/2014	**End Date**	31/12/2020
Competitive and/or open calls	

3. Test Concept

PROGRAMME	**GALICIA TRANSFERS**
INSTRUMENT NAME	TEST CONCEPT PROJECTS
ACRONYM	**Test Concept**
VALUE CHAIN	Stage 1: Knowledge generation Stage 2: Knowledge transfer Stage 3: Knowledge Absorption

	Stage 5: Commercialization
INSTRUMENT TYPE	Non-refundable Grants
FUND	ERDF / European Maritime and Fisheries Fund EMFF (for innovation in fish farming)
DESCRIPTION	
This instrument will be used to fund projects in collaboration with SMEs aimed at makes the developments needed to fine tune research results that are potentially transferable to the market by SMEs and were developed in a knowledge generation centre. Or any other measure that contributes to the achievement of the instrument's general objective Tests Concept are aimed at facilitating effective transfer of R&D results through the selection of those that are most appropriate. Several instruments can be used to define the best transfer method, including: analysis of technical and economic viability, definition of the potential business plan and risk analysis, "technological SWOT", development of a test prototype for trials in market-like conditions, etc. Definitely, it consists on making a validation of the developed technologies and showing that they can be used widely. They will be applied, between others, in the health sector, through organizations or entities dependent instrumental.	
BENEFICIARIES	
Enterprises, especially SMEs, Technology Centres, Knowledge Centres and Research Bodies	
INVESTMENT PRIORITY	
ERDF: a) Foster research, technological development and innovation b) Technology transfer c) Early validation actions for products EMFF: a) Stimulate an innovative, competitive fishing sector based on knowledge b) Support consolidation in technological development, innovation and knowledge transfer	
EXECUTING BODY	
Galician Innovation Agency (GAIN) and Competent Sectorial Bodies (where necessary)	
TENDERS:	
Start Date	01/01/2014 **End Date** 31/12/2020
Competitive and/or open calls	

4. Innovative Public Procurement

PROGRAMME	**GALICIA TRANSFERS**
INSTRUMENT NAME	INNOVATIVE PUBLIC PROCUREMENT
ACRONYM	**Innov. Publ. Procurement**
VALUE CHAIN	Stage 1: Knowledge generation Stage 2: Knowledge transfer Stage 3: Knowledge Absorption Stage 5: Commercialisation
INSTRUMENT TYPE	Non-refundable and Refundable Funding Instruments
FUND	ERDF and EARDF
DESCRIPTION	
Action to stimulate innovation through the capacity of Galician Public Administrations in their role as purchasers of knowledge-intensive products by means of pre-tender dialogue processes in accordance with what is laid down in current Law on Public Sector Contracts. An essential requirement will be later use of the developments procured, which means that this instrument will not be applied in a general manner, but only in those areas where there is a commitment to incorporate the R&D&I results generated. This instrument will include preparatory actions carried out by GAIN to select the areas in which it can be used. Later management can be undertaken by the bidding organization. And in general, any other measure that contributes to the achievement of the instrument's general objective	
BENEFICIARIES	
Enterprises and entities from the third sector	
INVESTMENT PRIORITY	

ERDF: a.- Foster research, technological development and innovation b.- Stimulate the demand for innovation EAFRD: a.- Encourage knowledge transfer and innovations in the agroforestry sector			
EXECUTING BODY			
Galician Innovation Agency (GAIN), AMTEGA,SERGAS, Regional Ministry of Rural and Sea and Competent Sectorial Bodies (where necessary)			
TENDERS:			
Start Date	01/01/2014	**End Date**	31/12/2020
Competitive and/or open calls			

5. Fostering Industrial Property

PROGRAMME	**GALICIA TRANSFERS**
INSTRUMENT NAME	PROMOTION OF INDUSTRIAL PROPERTY
ACRONYM	**Industrial Property**
VALUE CHAIN	Stage 1: Knowledge generation Stage 2: Knowledge transfer
INSTRUMENT TYPE	Refundable Funding Instruments
FUND	ERDF

DESCRIPTION			
This instrument is aimed at supporting the protection of industrial property in Galicia, by means of grants for industries created by Galician enterprises or registration of trademarks that will be used in the commercialization of their products. There will be specific support for both the application and the maintenance of industrial property rights and analysis of the how viable registration of industrial property rights will be. And in general, any other measure that contributes to the achievement of the instrument's general objective			
BENEFICIARIES			
Enterprises, especially PEMEs			
INVESTMENT PRIORITY			
ERDF: a.- Foster research, technological development and innovation b.- Stimulate demand for innovation			
EXECUTING BODY			
Galician Innovation Agency (GAIN) and Competent Sectorial Bodies (where necessary)			
TENDERS:			
Start Date	01/01/2014	**End Date**	31/12/2020
Competitive and/or open calls			

FLANDERS (BELGIUM)

The first major initiative with regards to the Smart Specialization strategy is the Flemish **cluster policy**, where Flanders is stimulating the creation of lightweight spearhead clusters in eight different smart specialization sectors. The show-case of this organic evolution in Flanders is the FISCH platform for sustainable chemistry. The platform has been recognized by the Flemish government as 'innovation hub' (in innovation policy) and a learning model for the evolution towards a targeted cluster approach on the basis of smart specialization (in industrial policy). This platform came out of a large mobilization of 300 stakeholder organisations, conducted over more than two years, to build a cluster programme with three components: a strategic research programme, an open infrastructure programme and a business model programme based on the sustainability principle. This platform was awarded a 'light management structure' (6 full-time equivalents) to implement the innovation programme with a yearly budget of 5 million euro that is earmarked for submitting projects to the innovation agency IWT. The present organization that is established in 2011 for the research programme only is challenged to evolve

towards a broad cluster platform that will be a connection point to all relevant government departments and agencies.

A second initiative, related to this cluster policy, was the establishment of a sixth strategic research organization: **Flanders Make**. Flanders Make is the strategic research centre for the manufacturing industry with establishments in Lommel and Leuven and structural collaborations with research departments of the 5 Flemish universities. The purpose of Flanders Make: realizing a top-level research network in Flanders that delivers full support to the innovation projects of manufacturing companies. This way, Flanders Make wants to contribute to new products and processes that help to realize the vehicles, machines and factories of the future.

As a third initiative, we can also refer to the **grant for strategic growth of SMEs**. The Flemish economy thrives for a large part on SMEs. To assist them in every stage of their development, the grant for strategic growth was developed. The fund is targeted at SMEs to assist them in their next step towards growth and scaling. This can be the transformation of their business model, the roll-out of a new product or the step towards internationalization. This grant can be used for two purposes: to seek external advice, or to hire a strategic profile. The grant percentage is set at 50% with a maximum of 25K.

ZLÍN REGION (CZECH REPUBLIC)

There is no regional S3 Strategy in the ZLín region. The national S3 Strategy of Czech Republic includes 14 regional annexes, one per each region. Annexes don't contain a strategy by itself; they just define regional domains of specialization. At the national level strategy deals with RTD and Innovation, not with TT specifically.

It was approved by the end of the year 2014, so there are no statistical outputs at the moment. The innovation performance of the region is rather low, but there is visible increase in the expenditure to RTD, so we can expect the outputs in the form of increased results of RTD which will lead to development in technology transfer.

There are few national Programmes in the context of technology transfer. The main Programme is called Operational Programme Entrepreneurship and Innovation for Competitiveness and Enterprise Support. The relevant Programmes are in the priority axe 1 (OP1) as follows:

Fig. 49. Czech Republic Operational Programme Entrepreneurship and Innovation for Competitiveness and Enterprise Support. The relevant Programmes are in the priority axe 1 (OP1)

Identification of the specific objective		OPEIC aid programmes	State-aid intensity	Focus of call				
Priority axis	Specific objective		De minimis, Financial tools	Supported activities/ Programme description	Recipients	Eligible costs	Aid amount per project	Programme specifics
PO 1	SC 1.1	Innovation - Innovation Project	25/35/45%	supports: * increase of technical and utility values of products, technologies and services (product innovation) * increase of effectiveness of production processes and provision of services (process innovation) * introduction of new methods for organising company processes by means of introducing new information systems that integrate and automate processes within the company with focus primarily on interconnecting R&D activities, innovation and production (organisational innovation) * increase of sales of products and services by means of significant changes to the design of products or packaging, better addressing of customers' needs, opening of new markets or introduction of new sales channels (marketing innovation)	* business entities, agricultural businesses (defined by Act No. 252/1997 Coll., on Agriculture) and food-industry businesses focusing on production of items outside the list set forth in Annex I of the Treaty on the Functioning of the European Union with a project in the area of R&D and innovation	* fixed tangible assets - machines, equipment, HW * fixed intangible assets - patents, licenses, know-how, SW * operating costs - certification of products, technologies and services (products) * mandatory project publicity	*subsidy of CZK 1 mil. – 200 mil.	The following activities are not supported: * projects involving simple alteration of a product, technology, machines or equipment, or rationalisation of production * projects connected only with increasing the efficiency of using energy or reduction of energy consumption on the part of the aid applicant * projects in the area of research and development in the meaning of Act No. 130/2002 Coll., on Support for Research and Development, as amended
PO 1	SC 1.1	Innovation – Project for Protection of Industrial Property Rights	50%	* supports activities focused on protection of industrial property rights	* public research institutes established pursuant to Act No. 341/2005 Coll., on Public Research Institutes, as amended * universities and other institutions of tertiary education performing activities on the basis of Act No. 111/1998 Coll., on Universities, as amended * business entities (with the exception of large enterprises)	* services of authorised representatives * translations * administrative fees	* the specific aid amount will be set in the call	
PO 1	SC 1.1	Potential	50%	* supports the establishment or expansion of centres for industrial research, development and innovation consisting in acquisition of land, buildings, machines/equipment and other equipment of such centres necessary for performance of such centres' activities * in the case of SMEs, the operating costs of the given centre are also a subject of support	* business entities, agricultural businesses (defined by Act No. 252/1997 Coll., on Agriculture) and food-industry businesses focusing on production of items outside the list set forth in Annex I of the Treaty on the Functioning of the European Union with a project in the area of R&D and innovation	* fixed tangible assets - land, buildings, machines, equipment * fixed intangible assets – patents, licenses, know-how, SW * selected operating costs – selected personnel costs, services of advisors and experts, studies - during the period of project implementation * mandatory project publicity	* subsidy of CZK 3 mil. – 200 mil.	The following activities are not supported: * simple refurbishment of assets * activities connected with support for exports to European Union member countries and to third countries, including support directly linked to the amount of exports or connected with the establishment and operation of a distribution network or other ordinary expenditures associated with export activities * activities connected with support for preferential use of domestic goods over imported goods * production activities
PO 1	SC 1.1	Application	Industrial research 50/60/70% Experimental development 25/35/45% In the case of effective cooperation, aid intensity is increased as follows: IR 60/75/85% and ED 60/50/40%	* supports industrial research and experimental development (including participation in international industrial R&D projects, e.g. via the ERA-NET scheme) in the meaning of Article 25 of Commission Regulation (EU) No. 651/2014	* business entities and organisations for research and dissemination of knowledge (i.e. entities meeting the definition of an organisation for research and dissemination of knowledge pursuant to Article 2(83) of Commission Regulation (EU) No. 651/2014 of 17 June 2014) * consortia composed of several partners from the ranks of companies and organisations for research and dissemination of knowledge	* personnel costs – research workers, technicians and other support personnel * costs of tools and equipment in the form of amortisations * costs of contract research, findings and patents purchased or acquired in connection with a license from external sources and costs of consulting services * additional overhead and other operating costs incurred as an immediate result of the project	*subsidy of CZK 1 mil. – 100 mil.	* supported activities do not include, for example, establishment or expansion of research and development centres, introduction of innovations, etc. * in the case of consortia, only one entity from a consortium can act as the applicant/ recipient; in all cases, such entity shall take on, in connection with the given project, the role of ordering party, owner of assets and aid recipient. The aid recipient shall conclude with other members of the consortium a contract on partnership governing the mutual relations ensuing from joint use of the assets, joint financing of the project and financial settlement of disbursed aid.
PO 1	SC 1.2	Knowledge Transfer	up to 70% (100% for specific	* supports the establishment of partnerships between small and medium-sized	* SMEs * organisations for research and dissemination	* personnel costs of workers participating in project implementation	* subsidy of CZK 0.5 mil. – 5 mil.	* partnerships between organisations for research and dissemination of knowledge
PO 1	SC 1.2	Knowledge Transfer Partnership	up to 70% (100% for specific activities of organisations for research and dissemination of knowledge)	* supports the establishment of partnerships between small and medium-sized enterprises and organisations for research and dissemination of knowledge for the purpose of transferring knowledge and related technologies and skills to which the given company does not have access. Knowledge transfer is carried out with the participation of a person holding a master's or doctoral degree directly in the company's operations facility under the supervision of a selected expert facility. * projects must be focused on at least one of the following activities and must have strategic significance for the company's further development: a) improvement of production processes b) development/innovation of new products and services or innovation of the process for development and introduction of new products c) improvement of company processes including the product certification process	* SMEs * organisations for research and dissemination of knowledge (i.e. entities meeting the definition of an organisation for research and dissemination of knowledge pursuant to Article 2(83) of Commission Regulation (EU) No. 651/2014 of 17 June 2014)	* personnel costs of workers participating in project implementation * services of advisors and experts, studies, participation in seminars * HW/SW acquisition costs * additional overhead and other operating costs	* subsidy of CZK 0.5 mil. – 5 mil.	* partnerships between organisations for research and dissemination of knowledge that do not meet the definition of knowledge transfer, i.e. mainly contract research and consulting activities, are not supported * support is not anticipated for activities connected with exporting of goods (export subsidies), for establishment and operation of distribution networks abroad or for other ordinary costs associated with export activities (customs duties, insurance, etc.), nor is support conditioned by the use of domestic goods to the detriment of imported goods * all profits from knowledge transfer carried out by an organisation for research and dissemination of knowledge must be reinvested in that organisation's primary activity. * within this aid programme, projects that are synergistic with the Operational Programme Research, Development and Education will be monitored
PO 1	SC 1.2	Cooperation	up to 75%	* clusters: a) collective research - research and development activities within a cluster and implementation of cross-border R&D projects b) shared infrastructure - establishment/ expansion and equipment of a cluster centres with open access for the purposes of industrial research, development and innovation c) internationalisation of clusters – establishment of cooperation in the European research environment, involvement in cross-border networks of clusters of excellence d) development of cluster organisations – activities leading to expansion of clusters and improvement of the quality of their management, improvement of cooperation, sharing of knowledge, marketing, networking, etc. * technology platforms - support for platforms' coordination activities, technological foresight, closer cooperation between local and European technology platforms and involvement of Czech research organisations and companies in their activities, coordination of Czech business entities and research organisations in accessing the Horizon 2020 programme and other European programmes * cooperative innovation networks – support for the establishment and development of cooperative networks based on cooperation of SMEs. Support is intended for administration and management of such networks and coordination of joint activities in the area of research, development and innovation	*clusters and technology platforms: specially established interest associations of businesses (especially SMEs) together with organisations for research and dissemination of knowledge and other organisations *cooperative innovation networks: business entities, organisations for research and dissemination of knowledge and entities of the innovation infrastructure (science and technology parks, innovation centres, sectoral associations, etc.)	* fixed tangible and intangible assets * services of consultants and experts, studies * costs of research and development projects – i.e. especially personnel costs of research workers, contract research (only in the case of the supported activity of collective research among clusters) * seminars, conferences, marketing	* subsidy of CZK 0.5 mil. – 80 mil.	* within this aid programme, projects that are synergistic with the Operational Programme Research, Development and Education will be monitored * the specifics will be the subject of individual calls of the programme

PO 1	SC 1.2	Innovation Vouchers	up to 100%	* supports the purchase of consulting, expert and supporting services in the area of innovation from organisations for research and dissemination of knowledge with the objective of initiating or intensifying the innovation activities of small and medium-sized enterprises. Consulting, expert and supporting services in the area of innovation activities include, in particular, measuring, testing, computing, consultation, cooperation with post-graduate students, services in the area of purchasing, transfer of intellectual property, etc. - activity a) * supports the supporting activities of innovation-infrastructure entities, specifically business-innovation centres and science and technology parks in the area of increasing absorption capacity, distribution and use of innovation vouchers – activity b)	* in the case of activity a), recipients are business entities that are small or medium-sized enterprises * in the case of activity b), recipients are operators of innovation infrastructure, such as science and technology parks, innovation centres and business incubators	* for activity a), external services provided by organisations for research and dissemination of knowledge * for activity b), personnel costs and selected operating costs of innovation-infrastructure operators, organisation of seminars, etc.	* for activity a): subsidy of CZK 80,000 – 500,000 * for activity b): subsidy of CZK 100,000 - 5 mil.	* in the case that an aid recipient fulfils the role of a so-called mediator in the meaning of Article 2.1.2 (22) of the Framework for State Aid for Research and Development and Innovation (2014/C 198/01), the maximum aid amount can be up CZK 60,000,000 * aid intensity can differ in individual calls of the programme and support can be provided also in the form of discounted services
PO 1	SC 1.2	Infrastructure Services	25% – 75% Aid intensity according to the type of activity; in the case of construction of shared infrastructure, according to the regional map of state aid	supports: * provision of specialised consulting services of science and technology parks, innovation centres and business incubators for incubated and innovative SMEs * operation of an existing science and technology park or business incubator or innovation centre (only in the de minimis regime) * in legitimate cases, also expansion of STP premises and acquisition of new equipment and improvement of capacities for joint utilisation of technologies * in extraordinary cases, also construction of new shared infrastructure in regions where there is a demonstrable lack of suitable research infrastructure for business entities	* legal entities that will function as operators of science and technology parks or innovation centres or business incubators * non-profit organisations (public benefit corporations, associations of legal entities) * municipalities * colleges and universities	* fixed tangible assets – especially purchase and modification of land plots, purchase of structures, newly built structures, demolition of structures, renovation/modernisation of structures, construction-engineering activities, project documentation, utilities networks and roads to structures, other machines and equipment including technical improvement, hardware and networks * fixed intangible assets - especially software, licenses and know-how * operating costs including personnel costs – especially services of consultants and experts, studies, training, seminars, workshops, utilities, etc. * mandatory project publicity	* projects involving construction works: subsidy of CZK 5 mil. – 300 mil. * projects not involving construction works: subsidy of CZK 1 mil. – 75 mil.	* ineligible costs: – costs associated with project administration – costs of purchasing real estate if the entity purchasing the real estate is or was, within two years of submission of the Registration Application, an entity related economically or through personnel to the entity selling the real estate
PO1		Proof of Concept	50%	* supports activities leading to commercialisation of research results through activities involving verification of feasibility; * activities connected with mapping applicability and market research and the interest of the application sphere * activities leading to the creation of a functional prototype/utility model, acquisition of a strategic commercial partner, patent and, as the case may be, establishment of a spin-off firm	* companies, business groupings, bodies of the state administration and local government, organisations for research and dissemination of knowledge (pursuant to the Framework for State Aid for Research and Development and Innovation), non-profit organisations	* feasibility studies, marketing studies, etc. * supporting services for R&D	* not specified	
		Pre-commercial Public Procurement	up to 100 %	* phased issuance of procurement orders for services in the area of research and development with sharing of risks and profits under market conditions when, in a competitive environment, several companies develop new solutions meeting the needs of the public sector	* companies, organisations for research and dissemination of knowledge (pursuant to the Framework for State Aid for Research and Development and Innovation), bodies of the state administration and local government	* not yet specified	* not specified	

Source: national S3 Strategy of Czech Republic

3.1.3 TECHNOLOGY TRANSFER REGIONAL SUCCESS MEASURES

3.1.3.1 GALICIA (SPAIN)

Description of the success measure: "Barrie Foundation Research Seed Fund"

Barrie Foundation Research Seed Fund bridges the gap by creating public-private partnerships to generate economic value from research and intellectual capital. The fund serves a double purpose:

- On the one hand, it would fund technological and science results to be developed to a stage where they could be transferred to industry.
- On the other hand, to ensure success, researchers and business professionals work together to build economic viable projects. This would be achieved by setting up new companies, or by licensing technologies to existing businesses.

For the selection process, the Foundation partnered with technology transfer offices seeking research projects that fit the purpose of the fund, and the initial selection of projects was reduced after evaluation by the investment committee.

For the chosen projects, a strategic partnership was launched, were Barrié Foundation earns a percentage of returns produced in order to create an evergreen fund.

For each project, a work plan with different milestones was developed, and each milestone provides an opportunity to stop or continue a project. During the initial stages a considerable amount of effort was devoted to verification, proof-of-concept, or prototyping work. Then it was time for commercial viability and marketing strategies to be analysed and implemented.

In less than four years the Programme has shown promising results: four validated proofs-of-concept, three new international patents, thirty non-disclosure agreements and five material transfer agreements signed, three licensing agreements, along with the founding of two new Galicia-based companies (Torus ware and NasasBiotech).

Now that the methodology to harness the innovative potential of academia has been tested, the Foundation is aiming to increase its reach with the launch of a new project to transfer the Research Seed Fund methodology to public authorities so that the model created by Barrie Foundation can be

replicated and scaled up. In 2016-2017 the Foundation will work with the Galician Innovation Agency to reproduce and improve the model we developed.

Description of the success measure: "Technology Transfer training grants in agroforestry"

Grants to finance training in technology transfer made by associations of agroforestry sector funded by IGAPE (Galician Institute for Economic Promotion).

This Grant funds technology transfer activities consisting of technical workshops, seminars and demonstrations.

The beneficiaries of the activities must be agricultural cooperatives or processing companies, associations and cooperatives of producers, professional associations in the field agriculture or linked to rural development established in Galicia.

The proposal must be related to activities taking place in the agricultural research centres of the regional Ministry of Rural Affairs

Description of the success measure "Industrial Property Grants"

Industrial Property Grants, funded by GAIN. The aim of this grant is to promote industrial property protection in Galicia, both nationally and internationally, to ensure full exploitation of the Galician innovation results. The idea is to boost the protection, not only for technical innovations (inventions), but also for industrial designs and distinctive signs.

3.1.3.2 Flanders (Belgium)

Description of the success measure "Technology Transfer Programmes"

1. TETRA-projects calls: projects to foster knowledge transfer between higher education and companies → enhance the innovative capacity of social profit organizations and to enhance the knowledge base of higher education and societal services.

Fig. 50. TETRA-project call general numbers

Tabel: aanvragen en gesteunde projecten in TETRA-oproep

	Aantal aanvragen ingediend	Gevraagde subsidie	Aantal projecten gesteund	Goedgekeurde subsidie
TETRA 2jr	41	14.541.861 euro	23	8.125.493 euro
TETRA 1jr voorbereiding	6	in totaal	3	in totaal

Source: IWT activiteitenverslag 2015

2. Baekeland-mandaten Programme: PhD in a company

Fig. 51. Baekeland-mandaten Programme general numbers

Tabel: Baekeland-oproep 2015

	Aantal geëvalueerde projectvoorstellen	Aangevraagde steun (in euro)	Aantal gesteunde projecten binnen voorhanden budget	Totaal toegekende steun (in euro)
Baekeland-oproep	59	14.272.601	30	6.478.842

Source: IWT activiteitenverslag 2015

3.Innovatiemandaten Programme: post-doc in a company

Fig. 52. Innovatiemandaten Programme general numbers

Tabel: Innovatiemandaten 2015

	Aantal geëvalueerde projectvoorstellen	Aangevraagde steun (in euro)	Aantal gesteunde projecten binnen voorhanden budget	Totaal toegekende steun (in euro)
Spin-off mandaten	26	6.564.476	11	2.775.519
Fase 1	19	2.222.427	7	858.105
Fase 2	6	873.017	1	120.001
Fase 2 (vervolg fase 1)	3	253.072	3	251.072
Totaal	**54**	**9.912.992**	**22**	**4.004.697**

Source: IWT activiteitenverslag 2015

Description of the success measure "Creation of spin-offs by Strategic Research Centres"

The Flemish strategic research centres (imec, VIB, VITO, Flanders Make) are active in specific research areas and have co-founded several spin-off or start-up companies (in total **109**), often based on breakthrough research.

Description of the success measure "Vanguard Initiative"

An important initiative in the development of a more focused demand-driven approach is the so-called "Vanguard Initiative", that was initiated at the end of 2013 by Flanders. The "Vanguard Initiative for new growth through Smart Specialisation" is a platform of European regions that strive to be frontrunners in applying "Smart Specialisation" as a strategic principle in the EU innovation and industrial policy to promote new growth by a bottom-up dynamics stemming from the regions. The EWI Department acts as the secretariat for the initiative.

Among these regions are for example Baden-Württemberg, the Basque Country, Lombardy, North-Rhine Westphalia, Rhône-Alpes, Catalonia, and Scotland. As a result, a number of EU regions are engaged into interregional cooperation based on clustering and the principle of Smart Specialisation.

The purpose is to contribute to the European agenda of industrial transformation by innovation, as well as set up networks among regions in a number of domains. The cooperation of the regions also aims at generating an evidence base to support the Commission in the development of Smart Specialisation Platforms in key growth areas. The first area of exploration has been Advanced Manufacturing. In "leading by example" these regions established 3 pilot lines of activity where the Vanguard Initiative seeks to develop pan-EU projects of scale, joining efforts with regions who share similar ambitions. Flanders takes part in the pilot line "High Performance Production with 3D Printing" aimed at developing a European demonstration and piloting network.

3.1.3.3 ZLÍN REGION (CZECH REPUBLIC)

Description of the success measure "Innovation Vouchers in ZLín region"

Innovation vouchers[16] are financial instrument supporting the cooperation between business entities and research institutions / selected universities. In this context, cooperation means the purchase of specific services supplied by a particular university (see offers of cooperation) business entity, helping to increase the innovative potential of entrepreneurs.

There have been 3 Innovation Vouchers' calls launched in ZLín region:

[16] Source: http://www.objevtesmer.cz/clanky/kategorie/2-inovacni-vouchery

1. Innovation Vouchers in ZLín region in year 2012
2. Innovation Vouchers in ZLín region in year 2013 – April 2014
3. Innovation Vouchers in ZLín region in year 2014 – April 2015

Business subjects in the ZLín region can gain innovative vouchers worth 60 to 149 thousand CZK, which they can use to purchase services worth 80-199 thousand. CZK. They support the initial collaboration of a business entity with a specific of the university to define the type of services performed by that department for a specific product innovation enterprise.

The Zlín Region innovation vouchers are funded by the European Regional Development Fund (Regional Operational Programme Central Moravia).

3.1.4 Regional Technology Transfer Offices and TTO support of entrepreneurs and SMEs

3.1.4.1 Galicia (Spain)

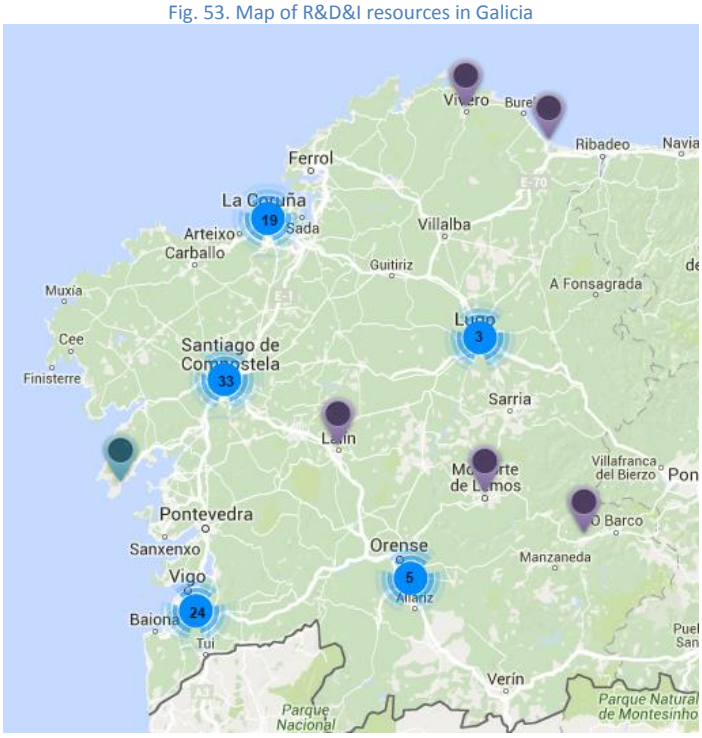
The Galician Regional Innovation System is made up of three sub-systems of players involved in interactive learning; all the components of this System at **involved at some capacity in Technology Transfer** and have departments assuming the related tasks:

1. **Sub-system for generation and spread of knowledge**, made up of Universities, Public Research Organisations (PROs and Research Groups linked to Hospital Centres) and Intermediate Technology Organisations, such as Technology Centres, Technology Parks, Enterprise Incubators and Associations, including the Platforms and the Clusters.

- Galicia has three **universities**, all of which are state run, and within them are the OTRI, interface structures that have the mission to stimulate the relations between the scientific world of the university and enterprises in order to make the most of R&D capacities and the results from university research activity.
- There are 2 **Public Research Organisations** in Galicia with 7 associated operations centres: the Galician branch of the State Agency of the Higher Council for Scientific Research (CSIC), which is the largest public institution devoted to research in Spain with 5 centres in the region, and the Spanish Institute of Oceanography, which has 2 centres in Galicia.
- 4 **university hospital complexes**, 9 health **research foundations and** 3 research **institutes** that have great potential as structures both for the generation of knowledge and its transfer.
- **24 Technology Centres** in Galicia, which act as strategic partners for enterprises and are a rapid and efficient link for support for R&D&I aimed directly at the productive sector, particularly at SMEs, although they also collaborate with Public Administrations to carry out activities related to technological innovation.

2. **Sub-system for knowledge exploitation or regional production structure**, made up mainly of companies, particularly those showing systemic features. Although the main enterprises in the region in terms of volume of operations do not have the same leading position as shown by employment and business in the field of knowledge transformation, this could be due to the small size of enterprises, which is a critical conditioning factor when referring to the capacity to carry out innovation activities, as the small scale makes it difficult to have specific budgets or specialised resources, which leaves only a small number of enterprises with the potential capacity for absorbing and exploiting knowledge.
3. **Sub-system or infrastructure for regional support**, in which government organisations and regional development agencies act. The Galician Agency for Innovation and the accompanying instruments for support for enterprises appear to complete the needs of the system in terms of coordination and collaborative governance.

Fig. 53. Map of R&D&I resources in Galicia



Source: FECYT / ICONO

3.1.4.2 Flanders (Belgium)

In Flanders all **five universities plus all five strategic research centres have some kind of Technology Transfer Office** (TTO):

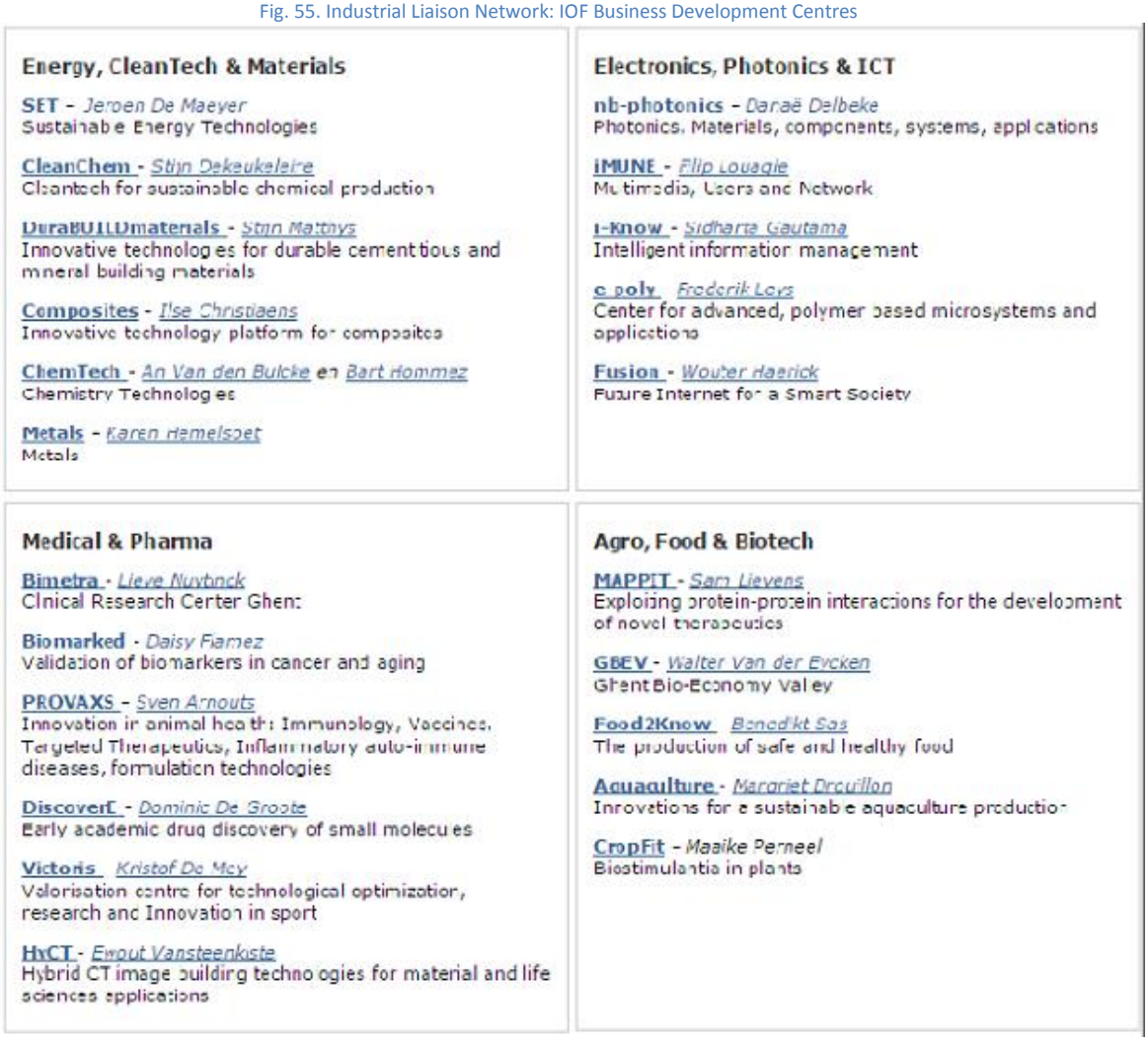
- TTO VUB – 20 active spin off companies
- TTO Ghent University - http://www.ugent.be/techtransfer/en - 32 active spin off companies and 9 pilot plants (http://www.ugent.be/techtransfer/en/pilotplantsugent)

Fig. 54. Technology Transfer ecosystem at Ghent University

Source: Ghent University

- Industrial Liaison Networks:

Fig. 55. Industrial Liaison Network: IOF Business Development Centres



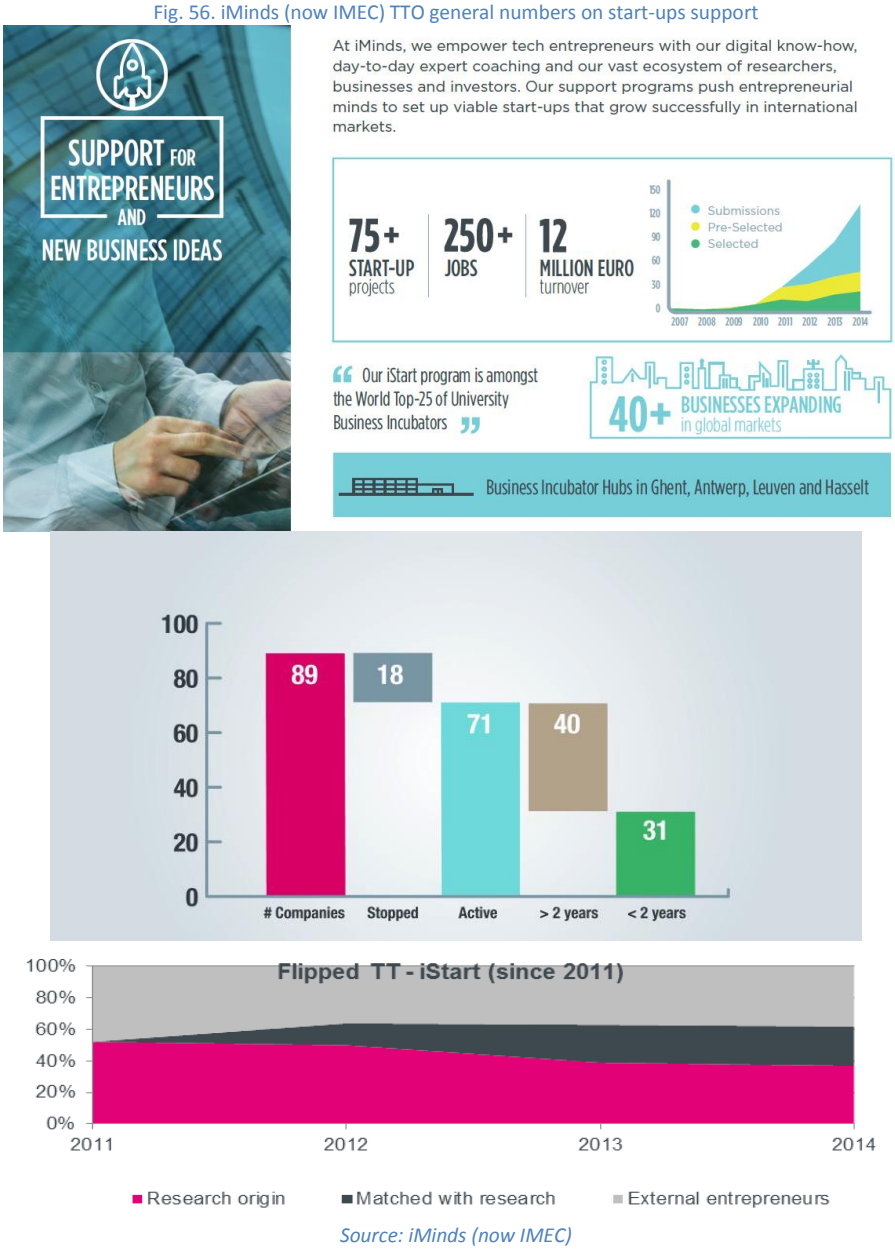
Source: OF

- TTO Leuven – KU Leuven Research & Development (LRD) - 92 active spin off companies
  - Innovatie -en Incubatiecentrum KU Leuven
  - Bio-Incubator Leuven
  - Innovatie- en Incubatiecentrum Kortrijk
  - Biogenerator Tienen
  - Wetenschapspark Arenberg
  - Wetenschapspark Haasrode

- TTO Hasselt - http://www.uhasselt.be/techtransfer - 10 active spin off companies
  - Zellik Research Park - www.researchparkzellik.be
  - Innovation and Incubation Centre (IICB) - www.iicb.be
  - Wetenschapspark Diepenbeek -www.uhasselt.be/WetenschapsparkDiepenbeek

- TTO iMinds (now IMEC) – more than 75 start-ups supported.

Fig. 56. iMinds (now IMEC) TTO general numbers on start-ups support



Source: iMinds (now IMEC)

3.1.4.3 ZLÍN REGION (CZECH REPUBLIC)

The **TBU Technology Transfer Centre** (TTC) was established on 1 January 2008 as an output of the project "Technology Park and Technology Transfer Centre at TBU in Zlín" co-financed by the European Regional Development Fund and by the Ministry of Industry and Trade of the Czech Republic.

The project was aimed at creating conditions for the development of efficient cooperation between research teams at TBU in Zlín and the application sphere, in order to extend and accelerate the transfer of knowledge from research units to industry.

The Technology Transfer Centre provides comprehensive professional services related to legal protection of research results and their fast and efficient transfer to business to researchers at both Tomas Bata University in Zlín and in co-operating companies. The services include:

- Counselling
- Counselling related to the utilization of R&D results

- Recommendation of suitable legal protection (utility model, industrial design, trademark, patent)
- Provision of methodical guidance to patent originators during the submission of invention patent applications
- Analysis of industrial legal status
- Investigation into the novelty of knowledge, patent search
- Assessment of patent situation and patent analyses
- Analysis of patent restrictions (material, regional, time limitations)
- Patent and trademark attorney services
- Elaboration of applications (utility models, industrial designs, trademarks, patents)
- Submission of applications
- Dealing with administrative issues (applications for patents, changes, prolongations, etc.)
- Direct representation of clients before the following authorities:
- Industrial Property Office (Czech Patent and Trademark Office)
- European Patent Office (EPO)
- Office for Harmonization for the Internal Market (OHIM)
- World Intellectual Property Organization (WIPO)
- Services related to technology transfer
- Licensing negotiations and contracting
- Negotiations with patent attorneys and offices both in the Czech Republic and abroad
- Transfer of experience, knowledge and know-how
- Educating researchers in the field of intellectual and industrial property protection

Application of intellectual property rights and legal protection of intellectual property at TBU in Zlín: The process of application of intellectual property rights and legal protection of intellectual property at TBU are described in the Rector's Directive SR/13/2011 "Application of Intellectual Property Rights and Legal Protection of Intellectual Property Arising from R&D and Creative Activities of Students and Staff of TBU in Zlín".

Activities of TTC at TBU in Zlín regarding IPR[17]:

1. TTC carries out specialized work done by patent attorneys for TBU – preparation and submission of applications for registration of industrial property rights on behalf of TBU and the subsequent activities aimed at acquisition and maintenance of legal protection.

2. TTC actively participates in the implementation of provisions, in particular: Keeps records of proposed subjects of industrial property protection, receives the proposed subjects, assesses and submits the relevant documents.

Technology transfer is also an important activity of the **Zlín Technology Innovation Centre**, which contributes to the commercial exploitation of research results and the implementation of innovations with the aim of increasing the competitiveness of industry, while applying the principles of sustainable development. Technology Innovation Centre focuses on cooperation with research institutes and industrial enterprises, especially small and medium-sized innovative companies. Clients are offered the following specialized services[18]:

1. Advice for cooperation projects with industry, providing:

[17] Source: http://www.utb.cz/uni-en/structure/profile-2

[18] Source: http://www.ticzlin.cz/transfer-technologii

- Information on domestic financial resources in projects that support research activities and innovation activities of small and medium-sized enterprises as well as on foreign sources of funding for research and development, in particular the 7th Framework Programme
- Partner search
- Management of the Innovation Portal of the Zlín Region (partners database, publication of cooperation offers)
- Administrative assistance and project implementation.

2. Facilitate cooperation between industry partners and the university sector:
   - Technological consultation in collaboration with external experts
   - Partner search for manufacturing cooperation.

3. Advice for the Protection of Industrial Property

4. Training on Technology Transfer and protection of Industrial Property Rights.

3.1.5 ENTREPRENEURIAL EDUCATION. MENTORING AND NETWORKING REGIONAL RESOURCES

3.1.5.1 GALICIA (SPAIN)

Description of the resource: "Barrie Foundation Training Programme on Technology Transfer"

The **Barrie Foundation Training Programme on Technology Transfer** for Galician public universities and researchers[19] in collaboration with the University of Oxford. Created in 2010, this Programme is aimed at professionals who work on the evaluation and commercialisation of technologies developed by universities, research results transfer office networks (OTRI), hospital foundations, technology centres and other R&D&I institutions.

With this Programme, the Foundation tries to foster the Galician science and the enhancement of its results, through a training Programme aimed at improving the capabilities of Galician researchers and the professionalization process of technology transfer.

Description of the resource: "Galactea Plus initiative"

Galactea Plus, within the Enterprise Europe Network, supports the northwest of Spain in several areas, with the fostering of TT among its objectives[20].

Among their services in Technology Transfer are the identification of technology demands and opportunities, the dissemination of technology portfolios and the search for new technological solutions, as well as professional assessment and representation in TT events.

Description of the resource: "Barrie Foundation Excellence Networks initiative"

The **Barrie Foundation Excellence Networks** initiatives[21]: Barrie Foundation leads several initiatives for the promotion of a stable network of international cooperation between the scientific and business areas, to promote the appreciation and the transfer to market of scientific groups in Galicia, and finding new ways to bring science to the market. The main objective is to promote the establishment of contacts in the international arena that could culminate in collaboration agreements.

[19] http://www.fundacionbarrie.org/index.php?V_dir=MCW&V_mod=showart&id=125
[20] http://www.galacteaplus.es/docs/transferencia.pdf
[21] http://www.fundacionbarrie.org/index.php?V_dir=MCW&V_mod=showart&id=126

Description of the resource: "BIC3T Technology Transfer Training Programme"

Technology Transfer Training Programme[22], by BIC3T is a t is a free training Programme aimed at introducing the participants in the marketing strategies and commercialization of research results and the management of these processes. BIC 3T is an initiative of the Ministry of Economy and Industry, launched by BIC Galicia in order to deploy in the Galician entrepreneurial fabric the best practices in technology transfer.

Other resources in TT implemented by relevant actors in the Galicia regional R&D arena:

- Conference on Valorisation of Research Results[23]: "Proof of Concept" Funds, organized by the Valorisation, Transfer and Entrepreneurship Unit (AVTE) of the University of Santiago de Compostela (USC), in collaboration with Uninova (USC's business incubator). The conference features a range of initiatives that aim to mature research results (commonly known as "proof of concept" funds) in order to facilitate their transfer. The USC has incorporated in its project Campus of International Excellence, Campus Life, an action intended to fund projects that advance the demonstration of potential commercial and utility of research results, enabling the attraction of investors and developers to complete the transfer process.
- Technology transfer in Health event[24], organized by the Telecommunications Technology Centre of Galicia (GRADIANT).
- Technology Transfer workshop[25], organized by the Foundation for the Promotion of Industrial Quality and Technological Development of Galicia.
- The Barrie Foundation has been co- promoter in Spain of events as relevant as the 9th edition of Technology Transfer Summit Europe held for the first time in Spain.
- Technology Transfer collaboration between clusters and research organisations: Case of **ICT Cluster and Gradiant**[26]. The regional government has noted as a good example in technology transfer the agreement signed between the Galician Technological Centre of Telecommunications (GRADIANT) and the Galician cluster of ICT companies. This agreement is expected to help improve competitiveness in these sectors. Moreover, cooperation in this field will facilitate the transfer of technology developed by Gradiant to the ICT sector in Galicia, as well as being a way of getting information on what the R&D businesses needs are.

3.1.5.2 FLANDERS (BELGIUM)

Description of resource: IMEC' Opportunity Recognition Workshop (ORW)

Committed to bridging the gap between the academic and the business world, IMEC'S Opportunity Recognition Workshops (ORW) are set up to help researchers explore new (market) opportunities in their work. Designed for researchers from doctoral schools and Strategic Research Institutes and PhD students, the IMEC'S Opportunity Recognition Workshops will arm participants with a set of skills and competences which will allow them to better explore their research potential and thus broaden the focus and the applicability of their projects to more business-oriented goals.

IMEC'S three-day workshops are led by renowned experts and coaches who will teach participants to look at their research from various strategic angles and recognize its underlying business opportunities.

[22] http://bic3t.bicgalicia.es/

[23] https://imaisd.usc.es/control/eventos/eventosver.asp?codigo=694

[24] http://www.clusterticgalicia.com/axenda.php?id=214&idioma=gl&sec=24

[25] http://ferrolterra.com.es/events/i-xornada-vindeira-transferencia-tecnoloxica/

[26] http://www.igape.es/gl/actualidade/item/612-a-xunta-destaca-a-colaboracion-entre-gradiant-e-o-cluster-tic-como-clave-para-transferir-a-innovacion-as-empresas-galegas

Armed with a new mind-set, participating researchers will be able to use their know-how to identify innovative solutions with a real economic and societal impact. In 2016, the ORW took place two times.

Part of the ORW runs through iMinds, an online platform designed for MOOC's, which also offers other entrepreneurial courses.

Description of resource: IMEC academy

IMEC also offers entrepreneurial courses through its IMEC academy programme.

The universities of Ghent and Leuven also offer entrepreneurial courses and master classes that are renowned.

3.1.5.3 ZLÍN REGION (CZECH REPUBLIC)

Description of resource: "Innovation Infrastructure of the Zlín Region Network"

Innovation infrastructure in ZLín region is a network of seven cooperating companies, whose common aim is to support innovative entrepreneurship in the Zlín region. The network was founded in 2008 in line with the Regional Innovation Strategy of the Zlín region for the period 2008-2013 as a regional network of business incubators, science parks and technology transfer centers.

Innovation infrastructure in the Zlín region itself focuses summary of support services for start-ups and innovative entrepreneurs, but also for students and the general public. Individual organizations have been actively cooperating engaging in joint projects and transfer of know-how and good practice from its functioning.

Fig. 57. Innovation infrastructure in the Zlín Region

Source: TIC Zlín

3.1.6 FUNDING OR INCUBATION AT THE REGIONAL / AGENCIES LEVEL

3.1.6.1 GALICIA (SPAIN)

Funding or Incubation at the Regional / Agencies level initiatives: "Galician Technology Transfer Awards"

Galician Technology Transfer Awards[27]**,** organised by the Galician Royal Academy of Sciences (RAGC) and the Galician Agency for Innovation (GAIN) of Xunta de Galicia.

In this first edition, the awards recognized projects which develop solutions related to brain health. The award for applied research work corresponded to a study conducted by researchers at the Health Research Institute of Santiago (IDIS), and the award for technology transfer business success story was awarded to the company QuBiotech.

Funding or Incubation at the Regional / Agencies level initiatives: "University of Santiago de Compostela Transfer Acceleration Programme"

Transfer Acceleration Programme, funded by the USC[28]. The programme aims at advancing the maturation process of search results, facilitating its transfer to the social and economic development following the practice of other national and international referents.

The Transfer Accelerator is open to USC research groups from all areas of knowledge which have identified some result of research with potential for transference.

Funding or Incubation at the Regional / Agencies level initiatives: "Campus do Mar Technology and Research Results Transfer Programme"

Campus do Mar Technology and Research Results Transfer Programme, promoted by the University of Vigo (UDV) and funded by the Ministry of Education in the framework of the International Campus of Excellence programme and the Ministry of Economy and Competitiveness in the framework of the National R&D&I Plan[29].

This programme aims at designing and developing an action framework for the sea-industry complex, in order to transfer the experience, capacity and specialised resources of the institutions that make up the R&D Campus do Mar grouping.

The programme is designed to encourage entrepreneurship culture for identifying, promoting, orientating and creating technologically based companies.

It is an initiative associated with the strategic transfer axis, to transfer research results to companies in their fields of specialisation. In order to achieve this objective, emphasis will be placed on the creation of technology based companies as a by-product of research.

Funding or Incubation at the Regional / Agencies level initiatives: "ARGOS Programme"

ARGOS Programme[30], funded by the USC, mixes business incubation with technology and research results transference. ARGOS is a joint initiative of the Valorisation, Transfer and Entrepreneurship unit at USC and UNINOVA business incubator, which has the support of the Faculty of Economics and Business Santiago and Administration and Management Lugo, municipalities of Santiago de Compostela and Lugo, IGAPE and GAIN.

[27] http://www.ragc.gal/es/noticias/convocados-los-ii-premios-de-transferencia-de-tecnologia-en-galicia-por-la-real-academia

[28] http://imaisd.usc.es/seccion.asp?i=es&s=-2-29-263

[29] http://campusdomar.es/en/transferencia/

[30] http://www.usc.es/es/investigacion/avte/emprendedores/argos.html

The Programme helps the participants in the process of defining a business idea, and reaching a compelling business project and it is aimed at recent graduates, last year students and research groups members.

The participants have access to a portfolio of research results at USC that will be the basis of their business plan.

3.1.6.2 FLANDERS (BELGIUM)

Funding or Incubation at the Regional / Agencies level initiatives: "QBIC fund – interuniversity seed capital fund"

The Qbic Fund is the first interuniversity seed capital fund in Brussels and Flanders. Its aim is to finance technology spin-offs from three university associations: Brussels University Association, Ghent University Association and the Association Antwerp University & Colleges.

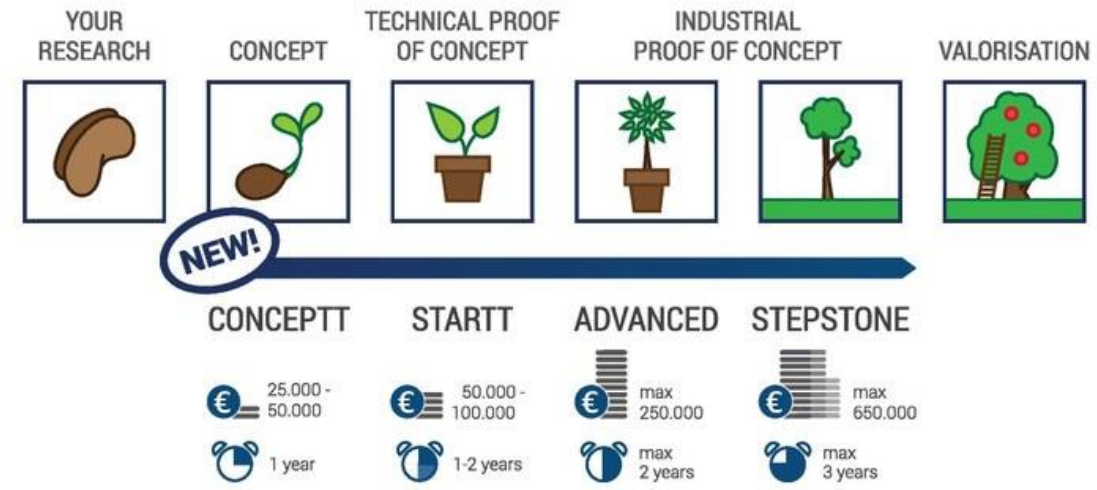
The Qbic Fund came into operation in June 2012. It is the successor of the VUB's BI3 Fund and Ghent University's Baekeland Fund II. These two universities have pooled the expertise of their respective tech transfer offices to improve the success rate of high-risk company creation.

Through this strong alliance, they have succeeded in more than doubling the capital, resulting in a €30 million fund at first closing, possibly even increasing after the second closing.

Funding or Incubation at the Regional / Agencies level initiatives: "Ghent University IOF project funding"

IOF project funding can be applied at crucial stages of the development track of valorization-oriented projects to offer valuable support to research results/technology with clear value-adding potential.

Fig. 58. Ghent University IOF project funding initiative



Source: Ghent University

A **ConcepTT project** can encompass the exploration of an innovative concept, as a first step towards demonstrating a technological feasibility or existing market need. ConcepTT projects are ideal for those projects which need a limited amount of funds within a reasonably short period of time.

StarTT projects form the transition from traditional funding channels for scientific research to the application-oriented development of a valorization project. It is a flexible module that can be used to identify and initiate the valorization track.

Advanced projects offer substantial funding for the maturation of technology or unique knowledge by supplying technical and industrial proof-of-concept and making them marketable.

Stepstone projects will preferably be applied for to incubate spin-off oriented projects. The aim of these resources is to close the funding gap between industrial proof-of-concept and the establishment of the spin-off company.

Funding or Incubation at the Regional / Agencies level initiatives: "SOFI fund of the Flemish government"

The SOFI fund of the Flemish government was established in 2011:

- SOFI1 grants are exclusively dedicated to tech transfer / spin-offs from the Flemish research centres.
- SOFI2 grants can also be applied for by universities.

The SOFI fund has resulted in 15 spin-off companies for a total amount of 8,7 million euro.

Funding or Incubation at the Regional / Agencies level initiatives: "IMECXPand"

IMECXPand is an IoT-related investment fund, worth 110 million euro, and is aimed at IoT starters that do not have access to other funds. Recently, the Flemish government announced an investment of 33 million in this fund.

Funding or Incubation at the Regional / Agencies level initiatives: "Gemma Frisius Fund - KUL"

Gemma Frisius Fund KU Leuven (GFF) is a seed capital fund, established in 1997 as a joint venture between KU Leuven, the KBC Group and the BNP Paribas Group. The objective of the fund is to stimulate the creation and growth of university related spin-off companies at KU Leuven by:

- Providing seed capital in the very early phases of research-based spin-off companies;
- Combining the research and technology transfer expertise of the university with the financial and investment expertise of the financial partners.

The Gemma Frisius Fund provides seed capital in the early phases of innovative, research-based spin-off companies. Investment is not restricted to a specific technology domain. Every opportunity in which the knowledge, technology or intellectual property of KU Leuven can be exploited in a spin-off company is eligible. Since the establishment of the fund in 1997, an excellent portfolio has been built up.

KU Leuven Research & Development (LRD) also has an extensive network of local and international investors and business angels, whose assistance is often sought to raise a higher starting capital from a strategically selected consortium of investors. Moreover, these investors often participate in subsequent capital rounds.

GFF's scope is not restricted to a specific technology domain. Instead it considers every spin-off opportunity where technology, know-how or intellectual property developed at KU Leuven is involved. The investment period typically ranges from seven to ten years;

As a seed capital fund, GFF mainly focuses on first round financing. However, in order to support a spin-off company's growth during the initial years, GFF also provides second round financing, if necessary, in co-operation with other external partners; Capital is invested in exchange for capital shares; GFF offers active guidance and support in the growth process of the spin-off company and is usually also involved in the company's board of directors. As an evergreen fund, GFF acts as a long term shareholder and partner.

The operation of GFF is strongly interlinked with the activities of LRD. Most opportunities are presented to GFF via the network of LRD. The operational units of GFF consist of two boards: the advisory board and the board of directors. The advisory board meets on a regular basis. It is responsible for the evaluation of the spin-off ideas and assists in the (further) fine-tuning of the business plan. Given the innovative nature of the products/services, the finalisation of the business model often requires several rounds of interaction. Next, the final business plan is presented for approval to the board of directors, which consists of members of LRD, BNP Paribas Fortis Private Equity and KBC Bank.

Through an extensive network of national and international contacts, the GFF and its partners look for potential commercial partners during the start-up and initial growth phase of the spin-off company. If necessary, the GFF contacts external funds and/or venture capitalists.

Funding or Incubation at the Regional / Agencies level initiatives: "IMEC iStart fund"

IMEC has its own **iStart fund** to support IT start-ups. These can be IMEC researchers or external parties. IMEC also engages in Flipped Tech Transfer, as IMEC technology is being matched with the needs of external entrepreneurs. Start is IMEC' Business Incubation Programme set up to support tech start-ups with coaching, facilities and funding. As a University Business Accelerator, our programme has been recognized as one of the world's best by UBI Global.

IMEC' iStart Business Incubation Programme offers you, as an entrepreneur, in-depth coaching, facilities and support, next to a safe and stimulating environment for you to develop and grow your business. Together with iStart's programme partners, we provide a range of supporting services and deals to help you get your start-up project off the ground:

- Pre-seed funding: when setting up a new business, finding sufficient resources to bridge the first months is a challenge. IMEC helps in overcoming this issue by providing pre-seed funding in the form of a convertible loan of up to 50.000 EUR
- Expert coaching
- Hands-on workshops and one-on-one support by industry experts in your field
- Support and counseling from experienced entrepreneurs through our Entrepreneur-in-Residence program
- Access to IMEC' unique network of industry members and research community
- Working facilities: access to IMEC's co-working spaces and incubation centers in major cities in Flanders and Brussels through our own co-working space in the Start-up Garage, partner facilities elsewhere or separate office space in iCUBES
- Support after the end of the program: as one of your first investors and future shareholders, IMEC helps your start-up company to acquire follow-up funding by third-party investors in Belgium and internationally.

With over 100 companies in its portfolio, IMEC is committed to helping young entrepreneurs get their idea off the ground. Our iStarters have already created more than 300 full-time jobs, with a total turnover of more than 16 million euro. Viewed by external investors as an attractive and secure asset, these start-ups have triumphed in securing follow-up financing: every euro invested by IMEC opens the door to 3.6 euro of external funding.

In 2015, iStart was granted second place in the European 'Top University Business Accelerators' ranking by UBI Global and was ranked fourth best in the world.

3.1.6.3 ZLÍN REGION (CZECH REPUBLIC)

Funding or Incubation at the Regional / Agencies level: "Innovation Infrastructure Network of the Zlín Region"

The network was established under the coordination of the Technology Innovation Centre Ltd. ("TIC") in 2008, signing a "Framework Agreement on cooperation to build a fully functioning network of business incubators, science parks and technology transfer centers to promote the development of innovative entrepreneurship in the Zlín Region". It was the establishment of the first regional network of this kind in the Czech Republic.

Its founding members were:

- Economic Development Agency Vsetinsko, o.p.s. ("AERV ')
- Regional Cooperation Center, Inc. ("RCK")
- Technology Innovation Centre Ltd. ("TIC")
- Business Centre Valašské Klobouky Ltd. ("VPC")

Acceding members:

- Business Incubator Kunovice - farmyard, Ltd. ("PIK-PD") (2009)
- University Institute of Tomas Bata University in Zlín ("UNI TBU") (2009)
- Industry Servis ZK Inc. project Technology Park Progress (TPP) (2011)

The aim of the network is the development of cooperation between business incubators ("BI"), science and technology parks ("VTP") and centers for technology transfer ("CTT") in the region, as well as:

- The generation and implementation of new joint projects aimed at supporting innovative businesses
- Sharing know-how and transfer of good practice between BI, STP and CTT and different networks at national and international level
- Establishing a network of professional consulting services in innovation

Fig. 59. Innovation Infrastructure Network of the Zlín Region

OPERATOR	INFORMATION ABOUT THE FOUNDERS	BI	STP	CTT
Agentura pro ekonomický rozvoj Vsetínska, o.p.s.	Vsetín (city)	yes	no	no
Podnikatelský inkubátor Kunovice – Panský dvůr, s.r.o.	Kunovice(city)	yes	yes	no
Regionální centrum kooperace, a.s.	Slavičín; INTEC s.r.o.; OMNIQA, a.s; Lipová; Vlachovice; Petrůvka; Rudimov; Šanov; Hostětín.	yes	yes	no
Technologické inovační centrum s.r.o.	Zlín region University of Tomáš Bata in Zlín	yes	yes	yes
Univerzita Tomáše Bati ve Zlíně, Univerzitní institut	University of Tomáš Bata in Zlín	no	yes	yes
Valašskoklobouckе podnikatelské centrum, s.r.o.	Valašské Klobouky (city)	yes	no	no
Industry Servis ZK a.s.	Zlín region	yes	yes	no

Source: TIC Zlín

3.1.7 REGIONAL TECHNOLOGY BROKERS

All research institutions mentioned in the sections above provide individualised information. Most of them present its results to the public. However, specific sites and institutions that specialise in aggregating information from several production institutions have been founded to facilitate the task of identifying technologies. The private business sector has been particularly active in this respect[31].

3.1.7.1 GALICIA (SPAIN)

One example of TT Brokerage in Galicia would be the ESA[32] Technology Transfer Network broker for Spain, managed by KIM (Knowledge Innovation Market)[33], with a delegation in Galicia and specialized in

[31] From research to market: key issues of technology transfer from public research centres to businesses. White paper: http://4.interreg-sudoe.eu/contenido-dinamico/libreria-ficheros/3D0ED325-A000-2BDC-F737-7534920D685C.pdf

[32] European Space Agency

[33] http://www.esa.int/Our_Activities/Space_Engineering_Technology/TTP2/KIM

helping companies, research centres, investors and governments to improve the return of their investments on R&D.

3.1.7.2 FLANDERS (BELGIUM)

An example of a Flemish technology broker is Verhaert. Verhaert acts as a broker for ESA in the aerospace industry: http://aerospace.verhaert.com/

The Brilliant innovation platform of VITO, in the clean tech industry, is an example of an online technology broker: https://brilliant.vito.be/en

At IMEC, the Flipped TT model also serves as a technology broker of IMEC technology towards the industry. Start-ups are major engines of economic development, yet they often lack research capacity to solve their key technical innovation challenges. Through 'flipping' the traditional research approach, IMEC puts digital entrepreneurs in the driver seat when collaborating with researchers. It arms them with the "R" in the R&D equation, providing them with knowledge and means to turn their innovative ideas into market-ready solutions.

3.1.7.3 ZLÍN REGION (CZECH REPUBLIC)

There are not specialized regional technology brokers in the Zlín region. Partly is this field covered by Tomas Bata University in Zlín Technology Transfer Centre.

TIC is involved in this activity as well. Technology Transfer at the Technology Centre is not the same as in universities. It acts at a support and consulting level in close cooperation with TBU CTT, where they take care of the further follow up.

At the national level universities have their CTTs and they act as Technology Brokers.

3.1.8 SWOT ANALYSIS

3.1.8.1 GALICIA (SPAIN)

STRENGTHS 1. Campus of Excellence. 2. 3 vectors with S3 potential: Marine, Health and Green Biotechnology 3. Strong clusters in the automotive and naval sector. 4. Universities well placed in FP7
WEAKNESSES 1. Small average size of Galician enterprises. 2. Limited capacity for corporate takeover 3. Culture based on costs and resources rather than knowledge and innovation. 4. Technological platforms with low dynamism and excessive dependence on public funds. 5. Specialization in medium-low technological intensity sectors. 6. Central prominence of Universities as Galician agents that best compete internationally in R&D&I support Programmes compared to enterprises and Technology Centres, symptomatic of a system that shows capacity to generate and spread knowledge that is not being transferred to the market. 7. Need to structure a funding offer for entrepreneurial actions based on technology, sufficiently transparent and specialized.

8. Change of model after 2013 due to European funding reduction for Galicia.
9. Deficit in technology transfer by the public sector R&D compared to their level of scientific production; and low absorption capacity by SMEs.
10. Technology Transfer Offices don't treat TT as their mail activity.
11. The administrative system is an obstacle to the transfer of technology from universities and public research centres to businesses.

OPPORTUNITIES

1.Constant increase in funds for innovation
2. Incipient public support towards demand (Pre-commercial Procurement)
3. Cross-border cooperation well established
4. Regional innovation policies are trying to promote technology-based companies; to encourage smart specialization; and to boost the cooperation between universities, companies and technological centres.
5. According to the Regional Innovation Scoreboard 2015, Galicia is a moderate innovator region and regarding future regional funding classification, Galicia has been considered as a Phase II region which means more than 60% of European Funding should be assigned to innovation Programmes, which could mean more investment in TT initiatives.

THREATS

1. Excessive concentration of HR in Universities
2. Brain drain
3. Weak Academia-Enterprise interaction, which prevents them from taking advantage of the mechanisms of technology transfer, scientific and technological infrastructure and funding instruments and innovation among different agents.
4. Universities lack international attraction.
5. More difficult for rural areas to develop entrepreneurial initiatives and communicate with TT centres.

Source: RIS3 Galicia, Galicia Strategic Plan 2015-2020, COTEC Report 2015[34] and ICONO/FECYT[35]

3.1.8.2 FLANDERS (BELGIUM)

STRENGTHS

1. A lot of TT initiatives with specialized domain specific-organizations at universities
2. A lot of initiatives and funding for start-ups
3. Strong specialization of scientific excellence in life sciences
4. Strong strategic research institutes (IMEC, VITO, VIB)

WEAKNESSES

1. Competition between TT offices
2. Less initiatives focusing on growth or scaling
3. The general Flemish TTO does not seem to be a very active or powerful organisation
4. Difficult to find official numbers and cases of successful TT
5. IMEC is too large for the industrial potential in Flanders

[34] http://www.cotec.es/pdfs/informecotec2015web.pdf
[35] http://icono.fecyt.es/informesypublicaciones/Documents/carencias2.pdf

6. The cluster of VIB spin-off research companies is of the largest in Europe, but vulnerable without companies that reach maturity
7. The Flemish innovation landscape is scattered and complex

OPPORTUNITIES

1. An overarching tech transfer organization focusing on collaboration
2. The challenge for the smart specialization strategy in Flanders is to find smart specializations in unique combinations of Flemish strengths
3. The central geographical position of the small open economy offers scope for through-put type of activities in the global value chains
4. The proximity to Europe should be exploited to leverage a prioritization process that helps to direct investments and decisions towards Flemish smart specializations for the future.
5. The smart specialization and spearhead cluster strategies can be intertwined with smart cities strategies that recognize the role of city-ecosystems as drivers of transitions and smart specialization.
6. More transparency and collaboration in the Flemish innovation ecosystem.

THREATS

1. Flanders faces a double challenge in terms of smart specialization of the economy: to accelerate the transformation of its core industries and to acquire a presence in new emergent industries
2. The transformation by innovation of industry and the modernization of education and training need both to be aligned to the social requirements of the 21st century.
3. The historical legacy has created a fragmented institutional environment in Flanders which hinders quick and efficient decision taking.

3.1.8.3 ZLÍN REGION (CZECH REPUBLIC)

STRENGTHS

1. Strong position and growth potential of some industries (especially plastics, rubber, electronics, metalworking, engineering, aerospace, chemical and food industry).
2. Industrial tradition of the region, positive relationship with residents to traditional fields.
3. Mostly domestic owned companies positively influencing the speed of reaction of businesses to the current situation and options markets.
4. Exceptionally high number of innovative companies in the industry in the Czech Republic.
5. Potential and initiated cooperation between companies in specific industries form clusters (Plastics Cluster, Aerospace Cluster) technology platforms (aerospace) and centers of competence (plastics, machinery).
6. Sufficient spatial and technical capacity built support infrastructure to support innovative projects.
7. Experience with financial instruments to support innovation (I.E. Innovation vouchers)
8. Experience in building infrastructure for entrepreneurs (science and technology parks, business incubators, development areas) as well as a range of support services
9. Exceptionally active firms in the region in implementing innovative projects supported by subsidies.
10. UTB with a wide range of fields of study and adequate R&D capacity, particularly in the field of plastics, ICT, materials and industrial engineering and industrial design.
11. Existence of corporate R&D capacities in the industry presence workplaces in testing and certification (particularly the Institute for Testing and Certification).
12. Experienced R&D teams and skill workers, especially in industrial companies in the region.
13. Matching network of technically oriented secondary schools interested in cooperation with

companies.
14. Increasing share of highly educated population in the region.

WEAKNESSES

1. Absence of effective dialogue at regional level (public, research, private sector) and limited knowledge of the real current needs of innovative companies (fragmentation of the innovation system).
2. Low attractiveness of the region for entering and maintaining skilled workers for R&D activities.
3. Nondescript profiling R&D potential of the region and its PR at international level.
4. Limited resources ZLín region (and other public budgets) to support R&D in the region.
5. Low effect of implemented innovations on the economic indicators of the region (interregional comparison of receipts and value added in industry in relation to innovating firms).
6. Distrust of companies in developing cooperation with R&D entities and other companies.
7. Lack of cooperation and coordination of subsidiary bodies in implementing projects to promote innovation Companies.
8. Insufficient capacity utilization or improper focus of business incubators, science parks and other supporting tools.
9. Low international commitment to R&D Zlín region, appealing to the influx of new players.
10. Low motivation academic sector to collaborate with innovative companies.
11. Low R&D institutions readiness to cooperate with companies (low number of cases of protection of intellectual property in the academic sector and its low ability to form marketable R&D outputs).
12. Low level of expertise and language skills of graduates in technical fields.
13. Low salary levels Zlín region compared to other regions of the country.
14. Lack of motivational tools for the arrival of talented human resources for R&D.
15. Continued selective migration of Zlín Region (exodus of talented, experienced staff and graduates - "brain drain").
16. Insufficient personnel capacities of TBU R&D cooperation with companies.

OPPORTUNITIES

1. Political / legislative influences:
Use of support resources of EU Cohesion Policy 2014-2020 to support innovative projects to improve competitiveness (sales) companies.
Use of support resources of EU Cohesion Policy 2014-2020 to adjust the effective functioning of innovation infrastructure.
Political decisions and legislative measures to increase the motivation of academia for R&D cooperation with companies in the region (the reform of university funding).

2. Economic/ financial influences: using of financial support instruments to support the plans and projects with a strong innovation potential.

3. Social/demographic influences
Arrival of investors implementing the R&D activities and able to establish cooperation with R&D capacities in the region.
Orientation distinctive European and non-European research programs in areas in which they are built R&D capacity in the Zlín region.

4. Technological influences: participation in international projects (e.g. Horizon 2020) with the option to participate in the excellent R&D in relevant fields.

THREATS

1. Political / legislative influences: the risk of inappropriate targeting of support tools in the area of R&D at national and European level to the needs of businesses in the Zlín Region.
2. Economic/financial influences: global decline in demand and associated lower interest existing markets (especially in the automotive and transport sector) about products and innovations from Zlín region.
3. Social/demographic influences: increasing competition in neighboring regions, with offer exciting career employment for qualified workers; transfer of R&D capacity company of ZLín region to region, with a stronger academic background.
4. Technological influences: isolation of regional companies to capture trends in key sectors.

3.1.8.4 TETRAGON PARTNERS SWOT: ANALYSIS OF COMMON GROUND

STRENGTHS

1. Well identified areas of excellence: Marine, Health and Green Biotechnology (Galicia), life sciences (Flanders), Industry (Zlín Region).
2. Strong clusters: Automotive and naval sector clusters (Galicia), Plastics and Aerospace Clusters (Zlín Region).
3. Well positioned universities and research institutes: Campus of Excellence (Galicia), IMEC, VITO and VIB Strategic Research Institutes (Flanders), UTB (Zlín Region)
4. Numerous initiatives of support and funding for entrepreneurs and start-ups

WEAKNESSES

1. TT support systems (TTO) don't work properly: Competition between them or TT not main activity.
2. Obstacles for TT from the public to the private sector: administrative obstacles, low cooperation, low dynamism of actors.
3. Scattered and complex innovation landscapes

OPPORTUNITIES

1. Smart specialization strategies to boost each region's strengths
2. Growth in funding for innovation and investment in TT initiatives
3. Regional and cross-border cooperation well established

THREATS

1. Brain drain (Galicia and Zlín Region).
2. Isolation of regional companies to capture trends in key sectors and communicate with the centres of technology transfer (Galicia and Zlín Region).
3. Fragmented institutional environment which hinders quick and efficient decision taking.

3.2 EXTERNAL IDENTIFICATION OF BEST PRACTICES

Initially, TETRAGON partners made an identification of Best Practices, for the identification of major trends and interesting initiatives which could be used as basis for the development of new measures.

3.2.1 DESCRIPTION OF BEST PRACTICES

3.2.1.1 SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) USA FEDERAL PROGRAMME

Description of the host organization of the best practice (country, age, type of organization,…)

Through the **Small Business Technology Transfer (STTR) USA Federal Programme**, Federal agencies with extramural research and development (R&D) budgets that exceed $1 billion are required to reserve 0.3% of the extramural research budget for STTR awards to small businesses. These agencies designate R&D topics and accept proposals. Currently, **five agencies participate in the STTR program:**

- Department of Defence
- Department of Energy
- Department of Health and Human Services
- National Aeronautics and Space Administration
- National Science Foundation

Each agency administers its own individual Programme for their Research Agencies, within guidelines established by Congress. These agencies designate R&D topics in their solicitations and accept proposals from small businesses. Awards are made on a competitive basis after proposal evaluation.
At least annually, each agency must issue a programme solicitation that sets forth a substantial number of R/R&D topics and subtopic areas consistent with stated agency needs or missions.
Agencies may decide to issue joint solicitations. Both the list of topics and the description of the topics and subtopics must be sufficiently comprehensive to provide a wide range of opportunities for SMEs to participate in the agency R&D programs.

Starting year of the programme / initiative

2004

Brief description of the programme / initiative (content, funding, target population,…)

SBIR · STTR
America's Seed Fund℠
POWERED BY SBA

The Small Business Technology Transfer (STTR) USA Federal Programme aimed at expanding funding opportunities in the federal innovation research and development (R&D) arena. Central to the programme is **expansion of the public/private sector partnership to include the joint venture opportunities for small businesses and non-profit research institutions.** The unique feature of the STTR programme is **the requirement for the small business to formally collaborate with a research institution in several Phases of the Programme**. STTR's most important role is to bridge the gap between performance of basic science and commercialization of resulting innovations.

Description, evaluation and analysis of each proposed measure:

STTR is a highly competitive Programme that reserves a percentage of federal R&D funding for awards to small businesses and Unites States nonprofit research institutions. Small businesses have long been where innovation and innovators thrive. But the risk and expense of conducting R&D can be beyond the means of many small businesses. Conversely, nonprofit research laboratories are instrumental in developing high-

tech innovations. But frequently, innovation advances theory, rather than the development of innovative practical applications. STTR combines the strengths of both entities by introducing entrepreneurial skills to high-tech research efforts. The **technologies and products are transferred from the laboratory to the marketplace. The small business profits from the commercialization**, which, in turn, stimulates the U.S. economy.

Target audience:

SMEs and nonprofit research institutions.

Process by which the initiative operates:

The STTR Programme is structured in three phases:

- **Phase I.** The objective of Phase I is to establish the technical merit, feasibility, and commercial potential of the proposed R/R&D efforts and to determine the quality of performance of the small businesses prior to providing further Federal support in Phase II. STTR Phase I awards normally do not exceed $150,000 total costs for 1 year.
- **Phase II.** The objective of Phase II is to continue the R/R&D efforts initiated in Phase I. Funding is based on the results achieved in Phase I and the scientific and technical merit and commercial potential of the Phase II project proposed. Only Phase I awardees are eligible for a Phase II award. STTR Phase II awards normally do not exceed $1,000,000 total costs for 2 years.
- **Phase III.** The objective of Phase III, where appropriate, is for the small business to pursue commercialization objectives resulting from the Phase I/II R/R&D activities. The STTR programme does not fund Phase III. In some Federal agencies, Phase III may involve follow-on non-STTR funded R&D or production contracts for products, processes or services intended for use by the U.S. Government.

Requirements:

- To receive STTR funds, each awardee of a STTR Phase I or Phase II award must qualify as an SME.
- For both Phase I and Phase II, not less than 40% of the R/R&D work must be performed by the SME, and not less than 30% of the R/R&D work must be performed by the single, partnering Research Institution.
- For both Phase I and Phase II, the primary employment of the principal investigator must be with the SME or the research institution at the time of award and during the conduct of the proposed project.
- For both Phase I and Phase II, the R/R&D work must be performed in the United States.
- An STTR awardee may include, and STTR work may be performed by, those identified via a "novated" or "successor in interest" or similarly-revised funding agreement or those that have reorganized with the same key staff, regardless of whether they have been assigned a different tax identification number. Agencies may require the original awardee to relinquish its rights and interests in an SBIR project in favour of another applicant as a condition for that applicant's eligibility to participate in the SBIR Programme for that project.

Impact of the best practice

The mission of the STTR programme is to support scientific excellence and technological innovation through the investment of Federal research funds in critical American priorities to build a strong national economy. The programs' expected impacts are:

- Stimulation of technological innovation.
- Foster technology transfer through **cooperative R&D between small businesses and research institutions.**
- Increase private sector commercialization of innovations derived from federal R&D.

Contact person(s)

Contact form: https://www.sbir.gov/feedback
E-mail: technology@sba.gov

Publications and sources

STTR Policy Directive: https://www.sbir.gov/sites/default/files/sttr_pd_with_1-8-14_amendments_2-24-14.pdf

3.2.1.2 SMALL BUSINESS VOUCHERS (SBV) PILOT

Description of the host organization of the best practice (country, age, type of organization,…)

The Office of Energy Efficiency and Renewable Energy (EERE) accelerates development and facilitates deployment of energy efficiency and renewable energy technologies and market-based solutions that strengthen U.S. energy security, environmental quality, and economic vitality.

Starting year of the programme / initiative

2015/16 – Pilot initiative

Brief description of the programme / initiative (content, funding, target population,…)

Small Business Vouchers Pilot
U.S. DEPARTMENT OF ENERGY

The Office of Energy Efficiency and Renewable Energy (EERE) puts the world-class resources of the national labs at the SMEs disposition with the **Small Business Vouchers (SBV) Pilot**. Through 2016, EERE is providing up to $20 million in vouchers so that small businesses can request technical assistance from national labs to help bring the next generation of clean technologies to market.

Description, evaluation and analysis of each proposed measure:

Through the SBV Pilot, eligible small businesses can tap into the reserve of National Laboratory intellectual and technical assets to overcome critical technology and commercialization challenges such as:

- Prototyping
- Materials characterization
- High performance computations
- Modeling and simulations
- Intermediate scaling to generate samples for potential customers
- Validation of technology performance
- Designing new ways to satisfy regulatory compliance

Eligible small businesses can request a voucher for use at a National Laboratory valued between $50,000 and $300,000.

Target audience:

SMEs in demand for clean energy technologies

Requirements:

- An eligible requester is a small business that is organized for-profit; has less than 500 employees; is majority (51%) owned by a U.S. citizen or lawfully admitted permanent resident alien, U.S. owned small businesses, or U.S. based venture capital, hedge fund or private equity companies; is organized according to the laws of and operates primarily within the U.S.
- Request assistance for a clean tech product or process in one or more of these nine areas: Advanced manufacturing; Bioenergy; Building technologies; Fuel cells; Geothermal power; Solar power; Water power; Wind power or Vehicles.

Process by which the initiative operates:

Small businesses operating in the clean energy sector can request assistance from one of the national labs collaborating in the initiative. If their request is accepted, a Small Business Voucher is issued. The voucher is like a coupon and allows the applicant to access a unique skill or facility at a lab to bring clean energy technologies to market. The funding represented by the voucher will not be provided to the applicant.

To be considered, eligible businesses must certify that they will adhere to the following:

- Unique Lab Capabilities: Request assistance that is not reasonably available in the private sector. Projects are intended to make available the specialized expertise and equipment at the national labs, not compete with the private sector.
- Cost Share: Commit to a 20% cost share, which can be in-kind. Examples: labor, travel, materials, equipment, or data.
- Agreements: Sign one of two short, non-negotiable agreements that govern intellectual property and other terms.
- Reporting: Commit to providing results during the project and for up to ~5 years after the project start date.
- Release of Information: Agree to allow non-proprietary information about your business and the success of the assistance to be featured in publicly available stories by the granting institution and the labs.

Impact of the best practice

The pilot will foster a strong partnership between the labs and clean tech small businesses, benefiting both. While small businesses receive access to state-of-the-art facilities and experts, the national labs broaden their service to private-sector technological development, supporting small business development, job creation and American competitiveness.

Contact person(s)

Contact info@sbv.org or call David Kistin at (505) 205-3598

Publications and sources

https://www.sbv.org/index.html

3.2.1.3 KANSAS CITY LIVING LAB

Description of the host organization of the best practice (country, age, type of organization,…)

The Living Lab is a joint proposal by Cisco and Think Big Partners for Kansas City to play a vital role in the innovation and commercialization of IoT technologies.

In Kansas City Living Lab, qualified and highly targeted emerging IoT technologies that can benefit big cities can be deployed, tested and validated in a full scale industrial user environment.

Starting year of the programme / initiative

2014

Brief description of the programme / initiative (content, funding, target population,…)

Kansas City Living Lab
BUILDING SMART CITIES OF THE FUTURE

With this initiative Kansas City is proposing a public-private partnership that will enable the city to build out the largest smart city network in North America, not only creating the most technologically sophisticated streetcar experience but providing new tools for the city to manage its infrastructure with greater efficiency.

The investment of $3.9 Million by the city over the next ten years will be matched and exceeded by nearly $12 Million in private investment by Cisco, the third-party provider and its growing list of partners. From public health to efficient infrastructure to better, safer streets, once Kansas City Municipal Office (KCMO) builds a platform for smart city technologies, the applications and benefits are unlimited.

Historically, emerging technologies, even if deemed to be highly useful and in demand, have faced complex challenges to successful market deployment. The initial research and development phase is often very slow, expensive and seeks feedback from the end user market to determine if proper product-market fit has been achieved. The amount of time it takes is dependent on many factors to include competing technologies, participation from relevant parties and access to market forces. This first phase alone can take years, in which many companies can find this process both daunting and cost prohibitive, which in turn can have an adverse impact on the number of companies willing to go through this innovation cycle.

The Living Lab will **create an opportunity for entrepreneurs to build high growth companies, partner with large companies needing assistance** and allow KCMO the ability to reap the financial and social benefits while improving the quality of life and reducing long terms costs.

Description, evaluation and analysis of each proposed measure:

Target audience:

Companies or entrepreneurs with developments applicable to the Living Lab initiatives.

Requirements:

N/A

Process by which the initiative operates:

Request of **collaboration by innovators** – people and companies who want this initiative in **developing new applications** that can help solve world problems associated with fast growing cities and the needs of its urban citizens around the globe, **offering the opportunity of testing the technology on the Kansas City's Living Lab.**

Impact of the best practice

Spur new economic activity in the technology sector in the area. KCMO anticipates the Living Lab will attract new businesses and entrepreneurs for the unprecedented opportunity to develop new technology in a real urban environment. While the smart city concept is not new, the proposal for the Living Lab creates an unique opportunity to make a significant, sustainable impact in this growing sector while

benefiting our residents, businesses and visitors with better infrastructure.
Contact person(s) http://kclivinglab.com/signup/
Publications and sources http://kclivinglab.org/

3.2.1.4 TECHNOLOGIST-IN-RESIDENCE PILOT

Description of the host organization of the best practice (country, age, type of organization,…)

The Office of Energy Efficiency and Renewable Energy (EERE) accelerates development and facilitates deployment of energy efficiency and renewable energy technologies and market-based solutions that strengthen U.S. energy security, environmental quality, and economic vitality.

Starting year of the programme / initiative

2016 (not yet implemented)

Brief description of the programme / initiative (content, funding, target population,…)

The Technologist-in-Residence Pilot will help catalyze strong Lab-Industry relationships that result in significant growth in high-impact collaborative research and development. The goals of the pilot are to

1) increase collaborative research and development between national laboratories and private sector companies, and

2)develop a streamlined method for companies to establish long term relationships with laboratories that result in collaborative research and development.

Description, evaluation and analysis of each proposed measure:

Target audience:

Companies or consortium of companies working on the clean technology sector.

Requirements:

No detailed information yet.

Process by which the initiative operates:

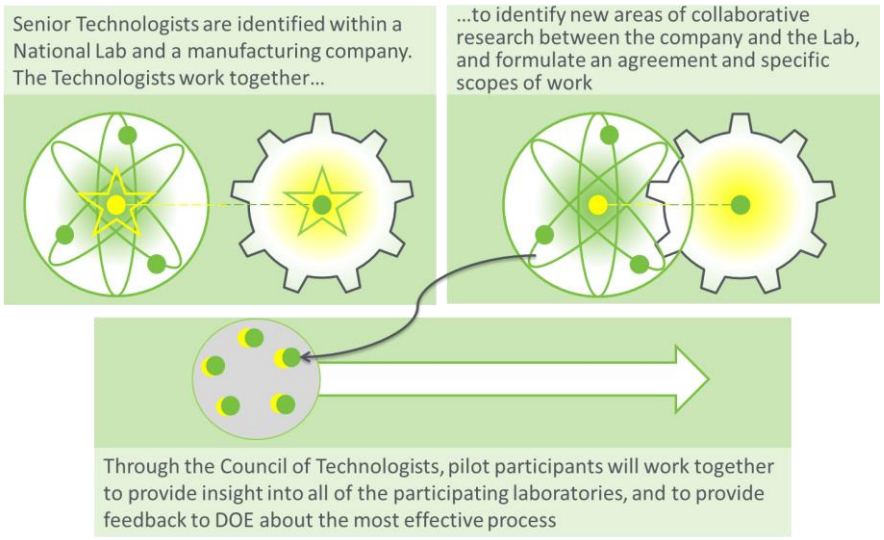
TIR pilot will involve the competitive selection of pairs comprised of a senior technical staff member ("Technologist") from a national laboratory and a senior technical staff member ("Technologist") from a clean energy manufacturing company or consortium of companies.

These pairs of Technologists will work together for a period of up to two years to:

- Identify the technical priorities and challenges of the participating company or companies and the resources and capabilities in the relevant national laboratories that may address them;
- Propose collaborative R&D efforts to develop science-based solutions to the company's most strategic scientific, technological, and business issues;
- Develop an agreement and specific scopes of work for the proposed collaborative R&D efforts.

Further, EERE will create a Council of Technologists (COT) comprised of the pilot participants and representatives from other laboratories to enable pilot participants to navigate resources throughout the national lab enterprise and to provide individual feedback that can be used to design the most effective process for establishing such relationships beyond the pilot duration.

Fig. 60. TIR pairing process



Source: Office of Energy Efficiency and Renewable Energy

Impact of the best practice

The TIR pilot aims to build deep relationships between **clean energy manufacturing companies and** the US Department of Energy (DOE) **national laboratories** that result in high-impact collaborative research and development. TIR will develop more open, transparent, and streamlined mechanisms than exist today for any clean energy company to establish such relationships with national laboratories beyond the pilot period.

Contact person(s)

http://www.energy.gov/eere/amo/contacts-advanced-manufacturing-office

Publications and sources

http://www.energy.gov/eere/lab-impact/downloads/technologist-residence-documents

3.2.1.5 PROTRANS PROGRAMME

Description of the host organization of the best practice (country, age, type of organization,…) Austria's PROTRANS is a programme that funds R&D transfer directed toward SMEs. It is run by Austria's Wirtschaftsservice (AWS), a public sector entity in charge of promoting the development of innovative companies and the commercialization of new technologies
Starting year of the programme / initiative 2007
Brief description of the programme / initiative (content, funding, target population,…) **description, evaluation and analysis of each proposed measure:** **ProTrans** is aimed at SMEs with proven need for strategic product research and innovation management. It will be funded primarily for research, development and Innovations. Supports raise potential for innovation and should preferably be done through technology transfer from universities, other research institutions and technology-related companies. **Target audience:** Micro enterprise (<10 employees), Small enterprise (<50 employees), Medium-sized enterprise (<250 employees) **Requirements:** PROTRANS projects must include some form of technology or innovation transfer from a third party. Thus, it is not simply a project done by the firm, but it must have a partner/cooperation with a university, research institute, or larger institute co-performing the research or co-developing the technology. **Process by which the initiative operates:** The selection of eligible projects is based on a set of criteria and after a thorough appraisal. Funding is provided in two phases: 1) Conception or design of the R&D project 2) Implementation phase (if the proposed concept passes an evaluation). The concept phase lasts six months, with the government providing a grant for half the cost of the concept evaluation. The support takes the form of a grant of a maximum amount of EUR 300,000. For the design phase max. 50% of eligible costs are supported and max. 35% for the implementation phase.
Impact of the best practice Foster Technology Transfer from the academia and research institutions to SMEs with a specific demand.
Contact person(s) -
Publications and sources www.awsg.at

3.2.1.6 NATURE SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA COLLABORATIVE TT GRANTS

Description of the host organization of the best practice (country, age, type of organization,…)
Natural Sciences and Engineering Research Council of Canada NSERC works with companies to help you find solutions and benefit your business through our suite of targeted partnership offerings that connect you to experts at Canada's universities and colleges.

Starting year of the programme / initiative
-

Brief description of the programme / initiative (content, funding, target population,…)
Collaborative Research and Development Grants

Description, evaluation and analysis of each proposed measure and requirements:

Fig. 61. Research Council of Canada TT Grants

Grant Type	Description	Private contribution	Benefits for the Private partner
Engage Grants	6 month R&D project with a university or college expert.	In-kind	Find solutions to address a specific, short term challenge.
Applied Research and Development Grants	up to 3 year R&D project at college.	1/3 to 1/2 of costs in cash and in-kind	Work with college research teams. Find solutions to a specific, short-term challenge.
Collaborative Research and Development Grants	Focused long-term R&D project with a university researcher.	1/3 of project costs in cash, matched by in-kind	80% of companies developed new products or services, improved processes or enhanced competitiveness

Source: Nature Sciences and Engineering Research Council of Canada

Target audience:
Canadian academia and related Canadian private sector / industry partners in Science and Engineering
process by which the initiative operates:
Proposals can be submitted at any time. All proposals undergo peer review.

Impact of the best practice
The Collaborative Research and Development (CRD) Grants are intended to give companies that operate from a Canadian base access to the unique knowledge, expertise, and educational resources available at Canadian postsecondary institutions and to train students in essential technical skills required by industry. The mutually beneficial collaborations are expected to result in industrial and/or economic benefits to Canada.

Contact person(s)
-

Publications and sources
http://www.nserc-crsng.gc.ca/Innovate-Innover/index_eng.asp
http://www.nserc-crsng.gc.ca/Business-Entreprise/FundingPrograms-ProgrammeDeSubventions/index_eng.asp

3.2.1.7 LAMBERT TOOLKIT

Description of the host organization of the best practice (country, age, type of organization,…)

The Lambert Working Group on Intellectual Property was set by the UK government May 2004 with the following objectives:

- highlight opportunities for business-university collaboration
- identify successful business-university collaborations that could serve as role models
- offer ideas to stimulate debate and shape policy

Members of the Working Group include key stakeholders such as The Association of University Research & Industry Links, CBI, Regional Development Agencies, PraxisUnico, UK companies, universities, and several government departments. The Intellectual Property Office is the secretariat to the Lambert Group.

Starting year of the programme / initiative

2005

Brief description of the programme / initiative (content, funding, target population,…)

The Lambert toolkit is for **universities and companies that wish to undertake collaborative research projects with each other.**

The toolkit consists of a set of 5 Model Research Collaboration (one to one) Agreements and 4 Consortium (multi-party) Agreements and documents that should help to use and understand those agreements.

Description, evaluation and analysis of each proposed measure and requirements:

The aim of the model agreements is to maximise innovation. They have not been developed with the aim of maximizing the commercial return to the universities; **but to encourage university and industry collaboration and the sharing of knowledge.** They do not represent an ideal position for any party; depending on the circumstances they are designed to represent a compromise for both or all parties.

Toolkit components:

- Model Research Collaboration Agreements (one to one): There are five model Research Collaboration agreements devised by the Lambert Working Group. Their use is optional, but they could help save time and money when negotiating.
- Model Consortium Agreements (multi-party): The four model Lambert Consortium Agreements use the same terminology and have the same structure as the five Research Collaboration Agreements, but contain additional provisions to cover some of the complications that arise as a result of having more than two parties.
- Decision guide: The Decision Guide consists of a series of questions to help you choose which of the five model research collaboration agreements most closely meets the participants' requirements.
- Guidance notes: The Guidance Notes are designed to help understand the terms of the model agreements and some of the legal issues.
- The Outlines: There are two Outlines, one for the Research Collaboration Agreements and one for the Consortium Agreements. The Outlines are designed to help identify the main issues that the participants may need to discuss internally and with collaborators before drafting an agreement, to ensure that they have similar expectations for the proposed project.

Target audience:

Universities and companies interested in undertaking collaborative research projects.

Process by which the initiative operates:

N/A

Impact of the best practice

- Facilitate negotiations between potential collaborators
- Reduce the time and effort required to secure agreement
- Provide examples of best practice

Contact person(s)

Email: lambert@ipo.gov.uk

Publications and sources

https://www.gov.uk/guidance/lambert-toolkit

3.2.1.8 DEMENTIA CONSORTIUM

Description of the host organization of the best practice (country, age, type of organization,…)

The Dementia Consortium aims to expedite the development of new drugs for dementia by supporting research into novel targets for neurodegeneration. It **brings together the voluntary, academic and private sectors** in order to tackle the growing dementia problem. The Consortium seeks to end the ten-year wait for a new dementia treatment **by closing the gap between fundamental academic research and the pharmaceutical industry's drug discovery programmes**. It provides funding, expertise and resources to support new drug targets emerging from academic research that hold the promise of patient benefit.

Starting year of the programme / initiative

-

Brief description of the programme / initiative (content, funding, target population,…)

The UK based Dementia Consortium, **seeks partnering opportunities with academic researchers, SME's and small biotech's** aiming at expediting the development of new drugs for dementia by supporting research into novel targets for neurodegeneration.

The consortium represents a new model for translating medical charity research into treatments. It brings together publicly backed funders of medical research, experts in scientific assessment, and the scale and strength of industry to support the development of promising research.

Description, evaluation and analysis of each proposed measure and requirements:

The Consortium will invest in research projects, typically 2-3 years in duration, to support target validation and explore the tractability of the target for drug discovery in collaboration with the Consortium members.

The Consortium will fund drug discovery programmes on selected targets in parallel with the basic research. Work will take place within academia, in collaboration with MRC Technology's dedicated small molecule and antibody drug discovery laboratories.

Target audience:

Academic researchers, SME's and small biotech' companies: **Applications to collaborate** with the Dementia Consortium are **open globally to academic researchers and SMEs.**

Process by which the initiative operates:

Submitted targets will be reviewed in a two stage process. Both stages will consider scientific, legal, intellectual property, and commercial aspects of due diligence. The initial triage reviews will take place every six to eight weeks and will consider brief, non-confidential applications. Projects that successfully pass triage will be taken forward to a second filter review. These reviews will take place every three to four months and Full Applications will be put together in close collaboration with the Consortium, examining the scientific rationale and providing a detailed experimental and project plan.

Impact of the best practice

- The consortium seeks promising research from academia and considers appropriate funding and development routes.
- Successful projects are moved towards the clinic by industry, and all parties (academia, charity and private sector) share in the success.

Contact person(s)

Contact form: http://www.dementiaconsortium.org/contact-us/

Publications and sources

http://www.dementiaconsortium.org/

3.2.1.9 THE INVENTION STORE

Description of the host organization of the best practice (country, age, type of organization,…)

TechnologieAllianz unites patent marketing agencies and technology transfer agencies in a single network – a nationwide association representing over 200 scientific institutes with over 100,000 scientists.

TechnologieAllianz is a modern sales partner for universities and R&D institutes and a competent business partner for industry, providing access to the entire range of inventions from German universities and other research institutes.

Starting year of the programme / initiative

-

Brief description of the programme / initiative (content, funding, target population,…)

The Invention Store is offered by the TechnologieAllianz in co-operation with the Federation of German Industries BDI e.V.

Users can define their fields of interest and register it at the website. As soon as patent-protected technologies from the selected branches of industry are available for licensing or sale users will receive an e-mail with information on the invention automatically and free of charge.

Description, evaluation and analysis of each proposed measure and requirements:

Target audience:

Start-ups, SMEs and large companies.

Process by which the initiative operates:

Fig. 62. The invention Store Programme

Source: TechnologieAllianz

Impact of the best practice

- Harmonize the demand and supply for technologies.
- Companies are immediately informed about the latest patented technology solutions with a proven business potential developed by German universities and research institutes.

Contact person(s)

E-Mail: info@technologieallianz.de

Publications and sources

www.inventionstore.de

3.2.2 TECHNOLOGY BROKERS INTERVIEWS

3.2.2.1 STANISLAS DE VOCHT

STANISLAS DE VOCHT

TECH TRANSFER AND TECHNOLOGY BROKERING RESPONSIBLE AT IMEC (EX-IMINDS)

Stanislas obtained a Master in Law at the UGent in 2005 and started his career as a lawyer at Ghent Bar where he combined his internship with a ManaMa Intellectual Property Rights. After that, he worked as an in-house legal counsel at UGent TechTransfer.
In 2011 he started as a self-employed Intellectual Property Consultant for SMEs and freelancers. He combined this with a function as Professional Support Lawyer in the IP/IT department of Allen & Overy LLP in Brussels where he monitored legal developments in the area of IPR and communicated these to the lawyers and external clients.
At IMEC, Stan is taking the function of IP & Technology Transfer. His responsibilities include Intellectual Property strategy, Legal advice for Research & Incubation, and relationships with TechTransfer offices of universities.

CURRENT STATE

Describe your current job. How is it evolving?

Before the merger between iMinds and imec I was the responsible for IP and legal in the research institute. My job evolved to pre-incubation manager, as I now assess whether imec research and researchers are suited to start an incubation programme in the organization. The change I have been witnessing the past few years is that more and more researchers start to be open for valorization of their research. This means more and more work, but at the moment I am still the only one who is doing this job in the organization. This might change in the future. Another change is that before, I was doing this pre-incubation process all by myself. Now, I try to involve other people with different skills and expertise as much as possible and try to structure the process instead of working on an ad hoc basis. I am now working with people from living labs, user research, business modeling, technology transfer from the universities and business development in these pre-incubation trajectories.

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?

In Flanders, the current innovation landscape is rather scattered. It is spread out among a variety of stakeholders and there is no harmonized approach. Regarding tech transfer, there is a central hub, called TTO Flanders. However, its role consists only of info sharing, and not actively stimulating and facilitating collaboration. All the tech transfer offices from the universities and research institutes are to my knowledge all looking to be more process based instead of working ad hoc. Now, more collaboration seems to be possible, but this this is something bottom-up and rather spontaneous, without a thoughtful strategy. I have had some previous experiences in multi-disciplinary projects, but we still have a long way to go in my opinion.

What do you consider current 'best practices'?

In my opinion, the tech transfer office of the University of Leuven is a best-practice in Europe. It is a very good and widely acclaimed organization in terms of tech transfer. They operate as a separate organization in the university and consist of around 80 people. It is called the KU Leuven Research & Development (LRD) and is operational since 1972. They are also very active in international projects and activities.

FUTURE STATE

What should the future of tech transfer look like?

The next step is improving and facilitating matchmaking between industry and universities. There are some instruments, but this should be much better. At the moment, there is no structural matching of university research and technology with industry partners and industry needs. There are some initiatives at universities and research centres, but these are scattered. To enable this matchmaking process, there is an urgent need for things like transparent conditions, clear IP regulations, pre-negotiated and checked contracts, etc. There are also still other questions to be resolved. How to get companies to know what is available at the universities? How can they express their needs and wants? And how to do the actual matchmaking? Will this happen online, offline, a mix of both? A more fundamental question that also needs to be resolved is whether this process comes from inside-out, where technology is pushed from research to industry, or outside-in, where the industry actively reaches out to academia for technologies based on their needs.

What are the 'next practices'? How can this be achieved in your region?

The 'newt practice' would be to achieve a two-way process in your region. This interaction between industry and university would enable to generate a lot of impact in the region. An example is the ESA, which has set-up a network of European technology brokers. It uses this network of technology brokers to assess the market needs in areas where there is a potential for exploitation of space technologies. However, I still feel that the threshold for companies is too high. The website itself is static, this should be improved. The offering and matchmaking process could be done online, but this requires more interactivity. Now there is a clickable map and a free search, but this can be done a lot better.

3.2.2.2 PATRICK VANKWIKELBERGE

PATRICK VANKWIKELBERGE

HEAD-BUSINESS DEVELOPMENT AT GHENT UNIVERSITY TECH TRANSFER OFFICE

Patrick Vankwikelberge joined Ghent University's Tech Transfer Office to help grow its start-up pipeline. Prior to UGent he worked in electronics industry, including positions in Belgium, France and the US. His 20 years of industrial experience mainly covers communication systems and microelectronics gained with companies like Alcatel, STMicroelectronics, and Barco. He was mainly involved with new product introductions, M&A, and partnering with various Startups. In 2005 he co-founded Essensium, an IMEC spin-off that raised 7M€ in funding and that focused on real time location systems. He further also served as non-executive director of Sigasi, an electronic design automation Startups, and as investment manager for UGent's Baekeland seed fund. Patrick holds MScEE and PhD degrees from UGent and an MBA degree from the Vlerick Business School.

CURRENT STATE

Describe your current job. How is it evolving?

Our role is to stimulate people at the university to become entrepreneurs and to help to find project funding. We also stimulate the collaboration between the industry and start-ups. This is mostly 'technical' guidance. We help starters with contracts; give them ad hoc advice, but not really coaching. Is they collaborate with companies; we help negotiate the contract, but do not coach them. Also, in terms of issues, we play an intermediary role between researchers and companies. So our role is to promote

entrepreneurship, to give technical support and to solve problems.
However, in general, the job of technology brokers is becoming more process-oriented and more coaching. Structuring start-ups is getting more and more common. This mostly happens in cohorts, so there is a certain group dynamic among the starters. In the US there are a few accelerators that take 10 start-ups every year and coach them for 6 months. Afterwards they are on their own to look for investment money because they have to leave the accelerator. Because of the contacts and network of the accelerator, they get access to financial support more easily. AirBnB is an example of a start-up that was selected by such an accelerator: Y Combinator.
In terms of coaching, I think there needs to be a fit between the coach and the start-up. Not just anyone can coach a starter; you need people with knowledge of the sector. This matchmaking process is crucial for the success. I have seen a lot of mismatches lately and they result in the eventual split-up between the coach and the start-up after a period of time, which looking back was a waste of time. For me, a coach needs to be able to comprehend and discuss the technical aspects of the innovation.

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?

We should work more process-oriented, that is why I am taking some courses and going to conferences. I want to start this with my colleague tech transfer Johan Bil who is also thinking the same, the rest of the colleagues are not really into the 'process'-thinking. I do not want to do this with the existing spin-offs, but start the new cohorts of starters.
At the Ghent University tech transfer office, we do not have the resources to coach starters for the whole process. There are a few IOF-people, I can also do some coaching, but there are not too many of my colleagues who are capable to do this. There is a lack of time and of people, and most important, we do not have a structured, disciplined process. If we had a clear process that we can 'enforce' on people and starters, we could provide this in a 'self-management' way, which would fit better the way we work today.
In terms of the innovation landscape, I agree that it is scattered, but that is not necessarily a bad thing to me. The fact that there are a lot of initiatives stimulates and motivates the people, as there is a lot of attention for innovation and entrepreneurship. So I would say let everybody come up with their own initiatives, and let entrepreneurs figure out which ones fit them best. It is a good thing that they have the choice and that there are plenty of initiatives, as long as the quality is ok.

What do you consider current 'best practices'?

I have been to MIT in the US. There they have a structured process, the 24 steps to a successful start-up. They provide only little incubation money, but focus on coaching and teaching the process. Most important is a solid business plan and knowing what they want to do and achieve, with a lot less focus on prototypes. From the start they are forced to have a clear focus, which is called the 'beachhead market' that they will target first. The author of the book with the process is Bill Aulet. All starters are required to read this book. You can use it to self-manage yourself during the process, or you can take the course and in it the entrepreneurial students get coaching. MIT has a whole department of coaches that are there to support students. These coaches force people as much as possible in this process, which should take about a semester to complete all steps.
At Ghent University, the IOF projects work the other way round, the same goes for EU projects. These are all focused at PoC development without prior thought how to put this in the market. The PoC should already be focusing at least to a certain extent towards some market segments. The MIT approach is also possible with some technology already developed, but the focus is on getting a clear picture of your road to market early on. A PoC is useful to show that you are on the right track, but market knowledge is evenly important.
At Delft university, there are also good initiatives. In Flanders, an incubator is almost purely office space. At Delft, they are very active in organizing events, meet-ups, activities,… There is also a good incubator in London. Here, there is office space, and random activities without much structure. For example, a lot of spin-offs do not know anything about sales. This is a large gap.
Another issue is that entrepreneurs are pampered too much over here. A lot of PhD students and post-docs are paid very well, whereas in a start-up you fall back to a basic to no income. You have to be very convinced of your story and there has to be support from professors that still focus too much on papers, publications and PhDs. These PhDs are not practical enough and not well aligned with the market needs. The government realizes this, but the measures are not adequate. The Baekeland-funds are mostly not awarded

to promising projects, do not get enough stage gates and are for one person individually. This does not match a start-up or facilitates entrepreneurial learning. An innovation mandate of two years is too long. These one-man-shows are rarely successful and not scalable. These mandates need reformation, it is a good try, but not well executed, with too little support or control.
This is a general problem of Flanders and the EU. They give money too easily to anyone. That's why everyone gives it a shot, resulting in too low success percentages when filing a proposal. A lot of the promising start-ups go straight to the US to accelerate faster. It requires so much effort to penetrate the diverse EU market. TeamLeader for example succeeded in Gent and Amsterdam, but failed in Germany and is now working on the Spanish market. This requires heavy investments and effort. This should be made easier. I think tax measures and tax incentives could solve this partly. This is an incentive, a carrot to make profit and go for it. Now, the support is given to only try, without much incentive if you eventually succeed. You should lower acceleration costs and provide tax incentives, so everyone could enjoy it when they are successful, providing an incentive for everyone. You could let starters save their tax bonuses, or let them deduct costs twice for example.
The problem of the EU is that it also supports itself. A lot of the people working there want to keep the system as it is because they are good in it. H2020 is too complicated, not aligned with public needs and made up by clerks that want to reinforce the system, as the complexity gives them their jobs. I think the US system is better, where there are departments that have their own research agenda and give funds to realize it. These departments work on their own and companies can apply for them, thus realizing these agendas and also benefitting from it themselves. This has resulted in a lot of innovation. The US is market driven and risk taking driven, the EU is technology driven. Tesla is an example of innovation where the technology was ready in Europe, but no one jumped, so an American entrepreneur was first.
Policy making aimed at incentives for risk taking and innovation should be installed more in EU, instead of focusing on support. EU is too much a comfort cushion whereas entrepreneurship requires getting out of your comfort zone. This is a continental problem, the British are also more US minded.

FUTURE STATE

What should the future of tech transfer look like? What are the 'next practices'? How can this be achieved in your region?

I believe in funding small teams instead of individuals. After one year, a thorough evaluation before continuation, with coaching along the way. With a VC or business angel, you are also required to show progress every three or four months, when you have a mandate sponsored by the government, this follow-up is not in-depth enough. You could also give this public money to the TT Offices to let them keep control. Now, TT Offices coach and support people to get this mandate, but afterwards, this support drops.
At the TT Office level we should deal with this in a better way. At the policy level, universities should be guided towards structuring research along certain lines: fundamental research or applied research. With applied research there is a Belgian problem. The PhD students are working on topics that do not have a market in Belgium, but instead focus on issues and problems of foreign large companies. There is a mismatch between the demand of technical skills and the offering in Flanders, especially in terms of PhDs. So at the moment, these PhDs go working abroad after they get their degree, or they can throw their PhD in the garbage bin and start doing something else. The answer from us is to stimulate PhD students and PhD holders to create their own company. We are doing too much research for which there is no market here. Or we send them to e.g. Germany, but European mobility is not that well organized in my opinion.
75% does nothing with his or her PhD. Also, one does not learn to work in teams during the PhD. In terms of policy making, there is a mismatch between the industrial sector and what professors want to investigate or do research on. Also, once you become professor, you get your title and job for life, which does not always match the fast pace of technological change. Does the professor want to keep up with the changes? Or will his laboratory get on a dead end track by his retirement? This way you create bottlenecks with professors not willing to keep up until their retirement. I have a clear view on this from my position as TT officer. From 40 years onwards, you get a distinction between dynamic professors and those we do not want to keep up.
What I will do more myself, is focus more on coaching. Individual coaching or teaching people a certain process and then supporting them within this process.
At the moment, there is competition between Flanders TT Offices. In Leuven they focus more on coaching, but they are a large organization that supports itself. Antwerp is not doing a lot lately. At the VUB they focus on communication of best practices and success stories. This is important as an example, we do this not

enough in Ghent. Success stories inspire potential starters. This is something that is also done at MIT. Also, they recruit their coaches from past start-ups, and they all know the MIT process, even though they already left MIT ten years ago. This illustrates the importance of a structured and well known process. Focusing on the alumni is also a good thing, keeping (past) university entrepreneurs close. This is also useful when providing entrepreneurial courses. We did it last year and the best courses were those that were given by entrepreneurs themselves. So focusing on alumni as best practices and examples is necessary and useful.

3.2.2.3 PIETER-JAN GUNS.

PIETER-JAN GUNS

RESEARCH AND INNOVATION MANAGER FOR EGAMI AT UNIVERSITY OF ANTWERP

Liaising academic research with (pharmaceutical) industry needs.
Combining an industrial mind-set with a solid scientific background.

CURRENT STATE

Describe your current job. How is it evolving? How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing? What do you consider current 'best practices'?

I am an IoF mandatory. The IoF consortia of the Flemish universities are established for tech transfer activities beyond individual research groups within certain domains. In the beginning, it was not that clear what I had to do. I am part of the consortium on medical imaging. This means a lot of expensive infrastructure, which is part of my role, to make sure that we can buy this kind of infrastructure for valorization and experimentation purposes of PhD students. My other part of the job is also strategic, how can we improve current technologies and valorize them, e.g. facilitate that MRI goes twice as fast. In my job, there is a large tension between project management and strategic projects. I have to write a lot of project proposals, especially EU-projects. When writing, you have the feeling that you are creating things, that you are giving structure to certain Programmes and future developments. The project management part is more operational in nature.

I recently got involved with Vision Lab. In terms of project proposal success ratio, in general this is 5%, with Vision Lab this is 75%. What is also different at Vision Lab, is that they have three concrete valorization lines. This is not the case amongst other research groups, where I also work for.

The collaboration of these groups with tech transfer is ad hoc. The IoF mandatory is the lead in this kind of projects. When you need advice, you contact the people from tech transfer, as we did in this project with Filip De Weerdt. I am closer to the Vision Lab team, the tech transfer people look more practical in terms of potential licenses and how the contracts should be made. I am also collaborating with the research group in terms of strategic research, whereas the TTO only looks at valorization.

There is no actual business development support. Also, I need to look where the applications are being used, as I work in the medical imaging consortium. When the valorization is more on the industrial side, my role should be smaller. I need to report to the consortium and motivate where I have spent my time every 6 months. When the valorization goes into different directions, it is sometimes hard to clearly delineate my role and input.

FUTURE STATE

What should the future of tech transfer look like? What are the 'next practices'? How can this be achieved in your region?

The tech transfer team is rather small in size, which limits the possibilities and the nature of activities. We have some master classes from time to time to mobilize people and to sharpen their skills, but this happens rather 'ad hoc'. Our normal way of working is that we are contacted in case there is a possibility to request a patent for one of the university technologies. We offer technical and practical support in defining and submitting the patent application. Afterwards, we sometimes engage in a coaching trajectory as well, where we offer support in valorizing the patents and the technology. This is rather new for tech transfer Antwerp and requires a lot of time and effort from the small team. End goal of this coaching process is to develop a business case.
For the coaching, we sometimes have 'master classes', as I already mentioned. This is a combination of theory and practice. We sometimes combine these classes together with other tech transfer offices. We already did this in the context of an Interreg project. However, we feel that there is a need for more overarching structure, some kind of a reference process. I feel that the current coaching remains too much ad hoc and based on the knowledge and gut feeling of the specific coach.

3.2.2.4 REBECA GUERRA GARLITO

REBECA GUERRA GARLITO

PROJECT MANAGER, INNOVATION & TECHNOLOGY TRANSFER AT MRI-INTERNATIONAL AND KNOWLEDGE INNOVATION MARKET (KIM)

Technology Broker of the European Space Agency (http://www.esa.int/Our_Activities/Space_Engineering_Technology/TTP2/Technology_Transfer_Network3). Technology scouting projects; Feasibility studies; Technology commercialization; IP and technology portfolio prioritization; Market research for potential investments; Evaluation of deal flow; Due diligence; Business cases; Company valuation and negotiation of transactions; Market research and business development.

CURRENT STATE

Describe your current job. How is it evolving?

My actual job in regard to technology transfer is in one hand focused on finding solution for these companies that are requiring a technology and on the other hand commercialize technology to those companies or research centres that are not using these technologies any more with the objective of getting back the R&D investment

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?

Technology transfer in Spain is far to be a concept that companies use. Thanks to technology transfer companies might be able to get the return in R&D invested but it is not a common activity. On the other hand technology scouting of technology watching is more usual within big companies. In the case of technology center, they are just using public or private funding for research activities but they do not think much about technology commercialization.

What do you consider current 'best practices'?

Best practices are these companies that find technology solutions outside their Company in order to save money and time and to be more competitive comparing their competitors.

FUTURE STATE

What should the future of tech transfer look like?

Tech transfer should be more accepted and used in companies and research centers.

What are the 'next practices'? How can this be achieved in your region?

Public funding for tech transfer activities might be useful in order to these companies to know the advantages of this activity.

3.2.2.5 ANDREA MARÍ SANCHIS

ANDREA MARÍ SANCHIS

PROJECT MANAGER, INNOVATION & KNOWLEDGE TRANSFER CONSULTANT AT KNOWLEDGE INNOVATION MARKET (KIM) - MADRID RESEARCH INSTITUTE (MRI)

Support in scouting and technology transfer projects: technology portfolios prioritization, business technology assessment, market research, design of business models for the exploitation of the intangible asset.

CURRENT STATE

Describe your current job. How is it evolving?

I am Innovation Project Manager, I manage innovation projects and collaborate as consultant in tech transfer and commercialization projects. Our projects belong to a huge rage of sectors and all types of customers: start-ups, SMEs, large enterprises, Universities, RTO, Public administrations. In tech transfer and commercialization projects my work is evolving as we are generating new methodologies to increase tech transfer transactions, as identifying real interested acquirers is not trivial.

How do you see the current innovation landscape in your region? The government is launching several programs to foster innovation in SMEs. The current state of the art is representing a high amount of R&D projects. The ones belonging to SMEs are usually launched into the market. A small amount involve tec transfer transactions, usually to large enterprises. In the RTO case, achieving the market it's harder than in the SMEs cases, as a spin-off model or tech transfer to companies should occur. **What is the role of tech transfer?** Tech transfer involves open innovation processes, developing a technology until a specific TRL and then transfer it to another entity for further development. The tech transfer could belong to the same or different sector as the one it was developed for. **What are positive aspects?** Tech transfer model offers the possibility to take the advantages of already developed technologies which implies reducing R&D costs. On the other hand, as technology provider, you could invest in R&D but not in marketing. **What are negative aspects?** Negative aspects are the ones related to the commercialisation process itself, which involves identifying potential acquirers, validate if the technology in the TRL developed and the conditions required by the provider are feasible for the acquirer and vice versa. **Is it changing?** In my opinion there is a lack of tech transfer culture in Spain. Nowadays there is more consciousness of the benefits of tech transfer.

What do you consider current 'best practices'?

It is key to stay in contact with the market, the technologies should cover markets' needs, so the tech transfer process should start from the need or challenge, and not from the technology provider side.

FUTURE STATE

What should the future of tech transfer look like? Public funding seems to be focusing on tech transfer opportunities, so the cases will increase, together with the culture of open innovation.

What are the 'next practices'? How can this be achieved in your region?

Maintaining dialogues both with technology providers and potential acquirers, in order to better know their interests, capacities and challenges to face tech transfer.

3.2.2.6 DANIELA SOBIESKÁ

DANIELA SOBIESKÁ

EXECUTIVE DIRECTOR OF TECHNOLOGY INNOVATION CENTRE

Head of Technology Innovation Centre Ltd. in Zlín, Czech Republic. Acting as Executive Director and IPR consultant of the Centre for Technology Transfer.

CURRENT STATE

Describe your current job. How is it evolving?

There are two major institutions in the region – the Zlín Regional Authority and Tomas Bata University in Zlín. The Zlín Regional Authority was set up in 1997 as a higher-level self-administering unit. Together with the Olomouc region it forms the wider Central Moravian region which can be taken as a coherent whole.

Tomas Bata University is a centre of educational and research activities. With its student population of over 10,000 it ranks among the medium-sized universities in the Czech Republic. . It was established in 2001, it's a successor of Faculty of Technology of the University of Technology in Brno.

In 2005 these two institutions established the Technology Innovation Centre, which has gradually become a key player in the field of innovation and innovative enterprise in the region. The company's mission is to set up conditions for the development of innovative businesses and enterprises, to support the commercial application of research and development and to facilitate the transfer of technologies into business practices. The TIC is an accredited member of the Science and Technology Park Association of the Czech Republic. It is responsible for co-operation within the Zlín region and for international co-operation between the Association and the Slovak Republic. In 2007 the Technology Innovation Centre won a Commercial Property Award for the greatest contribution to the development of applied research in 2006.

TIC is located on the same premises as the Business Innovation Centre and it is also responsible for its operations. Together they offer a range of comprehensive services to support innovative enterprise and regional development. The building provides office space for institutions concerned with the support for entrepreneurship, as well as for start-up innovative enterprises as part of the so-called business incubator.

TIC offers business incubator clients a prestigious address, modern offices with favourable rental arrangements, technical services other complementary services. Young entrepreneurs may hold meetings, seminars and other educational activities in various meeting rooms and a fully equipped training and presentation centre that can be adapted to meet the client's needs. Informal meetings can be held in the pleasant atmosphere of the café and restaurant within the building. Last but not least, the incubator offers its clients guidance and consulting services.

A company can be part of the incubator for a limited period of up to three years. After this period and upon meeting specific criteria the company may join the science and technology park which is also located in the Business Innovation Centre complex.

The business incubator and the science and technology park also include the Centre for Technology Transfer. It facilitates the commercial use and transfer of the results of research and development into

industrial practice. This is closely linked to consultancy for the protection of intellectual property and the development of patent reviews. The Centre also operates the Innovation Portal of the Zlín region. Moreover, it offers assistance in searching for partners for national as well as international research and development projects.

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?

The innovation potential of the ZLín region is at the mid of the Czech republic. The source of RTD results is mostly Tomas Bata University in Zlín, especially Faculty of Technology, Faculty of Management and Economy, Faculty of Applied Informatics, Faculty Multimedia Communications and Tomas Bata University two regional research centers - – Centre of the polymer systems and CEBIA-Tech, which produces a number of experts who produce RTD results and many of whom achieve successful careers both at home and abroad.

There are few other research centres outside university connected to the regionals major industries – rubber and plastic - Association of Rubber Technology and Testing, Plast service, Institute for Testing and Certification. Other research centres are from agricultural and wood sector and some of them focused on mechanical engineering. We have active Plastics and Moravian Aerospace Cluster.

Inspire of this the technology transfer is not high and the role of Technology Innovation Centre is to accelerate it and facilitate the communication of research and business.

The situation is getting better, but the regional subjects need constantly to encourage to utilize their RTD results, commercialize them and on the other hand outsource their innovation solutions and generally to benefit from cooperation.

There is still big fear of the competition and companies are afraid to share their knowledge even though all the parts could benefit from it.

What do you consider current 'best practices'?

As per Technology Innovation centre we are now adopting the new tool, Open Innovation System, which should encourage the cooperation of universities, research centres and innovators with companies, who are searching certain solution for their tasks in order to develop their products or processes. The companies through this system can get to the most suitable solution within the given budget.

At the moment, there is national program for sustainability of the national and regional research centres, which were founded from the EU sources and in the past time had troubles to paid their activities. This program is helping the research centres in the mean of getting operational costs covered and giving them chance to find their place in the innovation landscape.

FUTURE STATE

What should the future of tech transfer look like? What are the 'next practices'? How can this be achieved in your region?

It should be easier, faster and definitely higher. There should be institutional support in the mean of counseling capacities. There should be programs to encourage all the subject to participate in the process. Research centres as well as companies should understand their benefits of it. It's quite important for the regional development.

3.2.2.7 PŘEMYSL STRÁŽNICKÝ

PŘEMYSL STRÁŽNICKÝ

TECHNOLOGY TRANSFER AND LICENSE OFFICER AT TOMAS BATA UNIVERSITY IN ZLIN, CZECH REPUBLIC

CURRENT STATE

Describe your current job. How is it evolving?

I work as the Technology Transfer and License Officer at the University Institute (UNI) of Tomas Bata University in Zlín, established on September 1, 2003 pursuant to the decision of the Academic Senate of Tomas Bata University in Zlín. The University Institute is focused on science, applied research and related activities, especially on:

- Implementation of applied research and development
- Creating conditions for interconnecting basic and applied research with industry
- Co-operation with municipalities, regions, national and international organizations and institutions on R&D+I project preparation and implementation
- Support to creative and innovative activities both inside and outside the University
- Provision of expert services related to project preparation, management, evaluation and output monitoring
- Provision of intellectual and industrial property protection
- Provision of transfer of R&D results to industry (technology transfer)
- The University Institute runs the Technology Park at TBU in Zlín.

The Technology Transfer Centre (TTC), which I'm part of, was established on 1 January 2008 as an output of the project "Technology Park and Technology Transfer Centre at TBU in Zlín" co-financed by the European Regional Development Fund and by the Ministry of Industry and Trade of the Czech Republic. The project is aimed at creating conditions for the development of efficient cooperation between research teams at TBU in Zlín and the application sphere, in order to extend and accelerate the transfer of knowledge from research units to industry.

The Technology Transfer Centre provides comprehensive professional services related to legal protection of research results and their fast and efficient transfer to business to researchers at both Tomas Bata University in Zlín and in co-operating companies.

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?

The region doesn't have good transportation infrastructure, which is negatively affecting the business of the region. There is limited number of prospective industries in the region Traditional shoemaking industry has adjusted to Chinese competition and moved from mass production to specialized foot ware – e.g. for diabetics, custom made sport shoes and shoes for special purposes. The plastics and machinery industry works well in the region, civil engineering as well. The IT is on rise.

We provide patent and trademark attorney service like elaboration of applications (utility models, industrial designs, trademarks, patents), submission of applications and dealing with administrative issues (applications for patent investigations, changes, prolongations, etc.)

As per patents, their number is quite low. The most important factor for not applying for the patent is its cost. The situation with utility models, industrial designs, trademarks is better, since for the companies is sometimes necessary to go for this protection as well as the cost in not as high as per patents.

The demand for our services related to technology transfer - licensing negotiations and contracting,

negotiations with patent attorneys and offices both in the Czech Republic and abroad and transfer of experience and knowledge and know-how – is constantly increasing. Educating researchers in the field of intellectual and industrial property protection is often requested.
Negative aspect: the system of evaluation of RTD result changed since 2013 and for scientist is better to write articles than prepare utility models, industrial designs and patents.

What do you consider current 'best practices'?
The Operational program Research, development and education had on 2016 calls for establishing expert capacities in Technology Transfer offices.
The Technology agency of the Czech Republic is having a call called GAMA, which is giving to research centres subsidies for commercialization and the centres can decide by themselves, which part of the basic research they will push to the stage of verification phase. The Tomas Bata university is having such projects.

FUTURE STATE
What should the future of tech transfer look like? What are the 'next practices'? How can this be achieved in your region?
It is necessary to constantly contact all subjects involved in technology transfer and explain them the benefits. Companies don't know and are always in shortage of time. We have to investigate where the interests are and encourage the university to research such items which clients demand. The university should communicate better with commerce.

3.2.2.8 DAVID HAUSNER

DAVID HAUSNER

PROJECT MANAGER OF THE PLASTICS CLUSTER (PLASTR)

CURRENT STATE
Describe your current job. How is it evolving?
I'm the project manager and TT responsible for the Plastics Cluster (Plastr).
The plastics cluster was established in February 2006 as an Interest Association of Legal Entities with the aim to create a communication platform for its members – plastic product manufacturers. The main reason for cluster establishment was especially strong position of the plastics industry in the Zlín Region (together with rubber industry it represents the most productive sector of the region). Another reason is a shortage of qualified working labour force, missing research and development background for plastic product manufacturers, need of an appropriate negotiation position for services and products and effective enforcement of the sector interests.
Plastr activities focus on 4 priority sectors: education and human resources development and innovation, cooperation, common purchase and sale of services and promotion of Plastr. Very important is also the interaction with the important institutions of the region- Tomas Bata University in Zlín (applied research, specialized bachelor study program, cluster performance measurement, benchmarking), the Zlín Region (lobbying for plastics processing branch, regional innovation strategy, technical education in the region), Association for the Development of the ZLín Region (regional strategy), Technological Innovation Centre (competitions - Innovative company of the year, The best Student Business Plan). In cooperation with secondary school members we participate in modification of the study plans of vocational subjects and we promote a program of plastics processing to the target groups (children – parents - school counselors).
With significant cost savings for member companies we successfully buy electricity and gas. Common purchase of raw materials, indirect material and selected services has been in a preparatory phase.
I'm directly communication with our member companies as well as companies outside the cluster, if

needed. I'm trying to identify their needs, define them and trying to find a solution. Usually the solution is cooperation, outsourced research or technology transfer.

How do you see the current innovation landscape in your region? What is the role of tech transfer? What are positive aspects? What are negative aspects? Is it changing?
The plastic industry is one of the most important industry of the ZLín region. It employs a significant number of people, a big portion of the regional income is originating there. The cluster is based on cooperation, such as common purchases of materials, we have a system of using common equipment and devices for testing, the cluster is providing qualified researchers for this purpose. So in the cluster the cooperation and TT as well as knowledge transfer is working well, but it wasn't like this in the past. We had to work a lot to reach this status and it took quite a few years, till our members started to trust each other. I wish other industries will reach to this status. The machinery sector is trying to get together, as well as companies operating in the aerospace field. Also creative industries are starting to take this path.

What do you consider current 'best practices'?
For us the important factor is the funding. The cluster is using different resources to finance activities – part from member fees, but we are trying to co-finance our activities as well as equipment and services from the EU fund and another regional, national and international resources.

FUTURE STATE
What should the future of tech transfer look like? What are the 'next practices'? How can this be achieved in your region?
Definitely the future is in cooperation, outsourcing and sharing. Equipment as well as human resources. We have to consider that EU financial resources will be eventually reduced, even though there are still big amounts going to research and development. So all our projects should be able to survive without subsidies. We have to consider the semi-commercial model for our activities paid partly from own research and the rest will go from member fees. We would like to keep member fees low, so memberships are affordable.

3.2.3 CONCLUSIONS

There are a lot of barriers to overcome in order to attain successful tech transfer activities. In order to advance tech transfer activities, we looked for international best practices. In our external analysis and identification of these best practices, we looked into three different domains:

1. To foster an entrepreneurial environment at universities and research centers in order to increase the creation of spin-offs and to improve the exploitation of technology by existing companies.
2. To foster demand driven collaborative projects, between public researchers and private SMEs.
3. Looking for innovative ways of licensing: including open source, open innovation and user innovation.

As general conclusion, we identified the following trends over all three areas.

Leadership of the United States in terms of tech transfer activities and Programmes for all three domains, with in total 8 out of the 22 identified best practices originating in the US. The leading status of the US is also confirmed by scholars. All other initiatives originate in various European countries, but most of them are local and not cross-border, with some notable exceptions such as the European Enterprise Network. Another cross-border network is the Association of University Technology Managers which originates in the US, but includes members from all over the world. This is also an example of a **knowledge sharing and networking initiative**, where these focus mostly on the tech transfer professionals itself in a supra-national level, whereas these initiatives tend to remain national or local when aiming at bringing multiple actors together. The majority of best practices are also confined

to certain industries, locations and/or themes, which seems to **hamper cross-sector or multi-disciplinary tech transfer**. Two notable examples are Innocentive and Hypios, private-owned crowdsourcing platforms that enable matchmaking of problem owners and solvers from various backgrounds and disciplines. These initiatives, next to some information sharing initiatives and the emergence of databases for tech transfer matches, hint at **ICT as enabler for innovative tech transfer practices.**

We also notice that most of the best practices are **public actor or university-driven**, especially those that focus on fostering demand driven projects, but in the case of fostering entrepreneurial university environments and innovative ways of licensing, there are also more private-driven initiatives, where organizations are established to handle these matters, depending on the location and the industry. However, it appears to be a **general issue to create shared and comparable metrics and standards**, as it appears to be very difficult to find impact data of most of the identified initiatives.

For the three themes, we can formulate the following **sub-conclusions**:

1. To **foster an entrepreneurial environment at universities and research centres** in order to increase the creation of spin-offs and to improve the exploitation of technology by existing companies.

   In the best practices, the TTO is regarded as a one-stop-shop for industry that offers different services and guidance along the whole tech transfer process. Most of the initiatives and Programmes consist of grants, awards and collaboration models to foster tech transfer. The Fraunhofer best practice stands out as this is more aimed at the process of fostering university entrepreneurship in a bootcamp-like way. It is left open whether academics spin out of university or whether the technology is incorporated by private entrepreneurs.

   Some initiatives are more inside-out, aiming at university researchers and students becoming entrepreneurs, whereas others focus on outside-in, where existing companies benefit from university technology. Various models exist: inside institution, supra-institution, independent, public vs. Private. Mostly, this links with the specific situation. For the identified best practices, we see that the US initiatives (University of California & MIT) remain at the level of the universities themselves, whereas two European initiatives (ASCENION & Mi.To) are private initiatives that operate in a specific theme or industry. Whereas the University of California aims at decentralizing the tech transfer process, the European initiatives are pleading exactly the opposite.

   ICT is more and more used in the tech transfer process, such as for the creation of online databases and marketplaces for technology brokering in order to increase the chance of finding a match and also create critical mass which lowers the costs of the tech transfer process. However, there is an urgent need for better metrics and impact assessment instruments, as it is hard to find impact numbers and to compare them between countries, regions or institutions. Two initiatives gather tech transfer professionals for networking and information sharing, one US-based with international members and one local, in Sweden. These initiatives promise to provide better metrics and impact data, but these are restricted to their members.

2. To **foster demand driven collaborative projects**, between public researchers and private SMEs.

   Half of the best practices originate in the US and deal mostly with the usage of the National Laboratories assets and knowledge specifically for SMEs. These best practices consist of awards, vouchers, technologist-in-residence and a test bed infrastructure to foster academia-industry collaboration, mostly for specific sectors such as renewable energy. The Austrian and Canadian examples are not limited to specific sectors or themes, but offer grants and support for specific forms of university-industry collaboration and tech transfer. In the UK, a specific initiative was established to assist in the process of research collaboration and consortium agreements, the Lambert Toolkit.

3. Looking for **innovative ways of licensing**: including open source, open innovation and user innovation.

Regarding innovative ways of licensing, there are two types of best practices: some focus on the companies themselves, whereas others concern tech transfer professionals.

In the first category two platforms are mentioned that act as technology broker and crowdsourcing tool, connecting solution seekers and problem solvers. One European initiative connects SMEs with international ambitions to enable cross-border services and projects.

The other best practices deal with tech transfer professionals themselves. Three of the mentioned initiatives deal with networking and information sharing, attempting to establish tech transfer networks. Two of them operate at a supra-national level, whereas one is a national initiative. One initiative concerns a separate organization that takes care of IP issues and seed capital for university spin-offs.

4. GOOD PRACTICES AND TRANSFERENCE MEASURES

The design of new **measures to improve innovation support to SMEs in TT is focused on three areas** which have been prioritized by TETRAGON partnership, and are reflected in the present section. Some of the measures as explained separately, while others are explained in the context of the whole spectrum of Tech Transfer activities carried out by the innovation poles they are implemented in. The three above mentioned areas are the following:

- To foster an **entrepreneurial environment at universities and research centres** in order to increase the creation of spin-offs and to improve the exploitation of technology by existing companies.
- To foster **demand driven collaborative projects**, between public researchers and private SMEs
- Looking for **innovative ways of licensing**: including open source, open innovation and user innovation

Classification of the innovation support measures per specialization area:

Fig. 63. Classification of the innovation support measures per specialization area

No.	Measure	Area
4.1	**Technology Transfer Measures applied by the Division of University Corporate Relations (DUCR), University of Tokyo**	All 3 areas (global approach)
4.2	**Entrepreneurial University Model: National University Of Singapore**	All 3 areas (global approach)
4.3	**Oxford University Innovation Ltd. Technology Transfer Model**	All 3 areas (global approach)
4.4	**Cambridge Enterprise Limited (CEL) Intellectual Property Commercialisation**	All 3 areas (global approach)
4.5	**SCoRE Cymru Scheme (Supporting Collaborative Research and innovation in Europe) Scheme**	Demand driven collaborative projects
4.6	**Kibo Technology Matching System (KTMS)**	Licensing
4.7	**Malaysia National Innovation Agency: Six Approaches to Innovation**	All 3 areas (global approach)

Source: Tetragon

4.1 TECHNOLOGY TRANSFER MEASURES APPLIED BY THE DIVISION OF UNIVERSITY CORPORATE RELATIONS (DUCR). UNIVERSITY OF TOKYO

Brief description of the measure

The University of Tokyo aims to step up its efforts to return the results of its research to society through industry-academia partnerships, develop Knowledge Co-creation to link the University's knowledge to industries, and lead the results of such collaboration to innovations. Its unique management structure is composed of :

- the Division of University Corporate Relations (consisting of the three offices of Collaborative Research Development, Intellectual Property, and Science Entrepreneurship and Enterprise

Development);

- Today TLO, Ltd.;
- University of Tokyo Edge Capital Co., Ltd.

Using this structure, it has **established a system that enables it to provide integrated support ranging from the creation of collaborative research to the identification, evaluation, management, and utilization of the University's intellectual property and the start-up of businesses and industrialization**. Using these, it has carried out a wide range of support activities.

The University of Tokyo (UT) has over 4000 researchers in its faculty including professors, associate professors, assistant professors and Senior Researchers. Its research across various fields is characterized by a diversity fitting for a university. The University of Tokyo is a leader in producing world-class research results and has the advantage of being able to take a trans-disciplinary approach in dealing with a single research topic that spans several disciplines. The Division of University Corporate Relations (DUCR) manages major seven vertical segments according to the National Policy, and, with these as a firm foundation, the University of Tokyo has taken a proactive role in establishing a closer relationship with society.

Intellectual property may have a meaning but have no commercial value until practically applied. Their true value is thus only realized after they effectively contribute to society. It is only then that intellectual properties become a basis for a new scheme of intellectual production. The University of Tokyo proactively participates in creating new value structures and new values through collaborative research with private enterprises.

Target audience

1. University researchers
2. Company Representatives

Requirements

N/A

Process by which the initiative operates

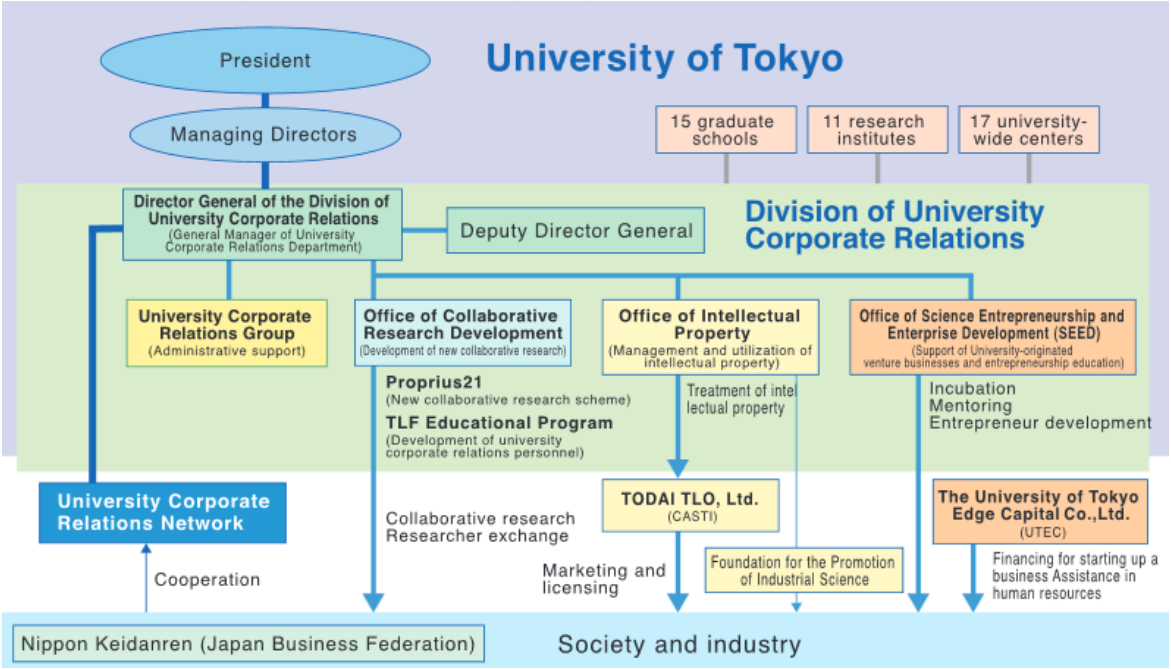
1) Initial design of the programme.

The Division of University Corporate Relations (DUCR) plays a central role in the industry-academia partnership programs that the University promotes. At the cutting edge of the University of Tokyo's industry-academia partnership programs are producing very good results:

- TODAI TLO, Ltd. (CASTI)
- University of Tokyo Edge Capital Co., Ltd. (UTEC)
- Foundation for the Promotion of Industrial Science (FPIS)

As Japan's top runner in terms of industry-academia partnerships, DUCR pushes forward with its technology-transfer strategy while maintaining close relationships with these related organizations. Furthermore, DUCR aims to make the University of Tokyo a university that is open to society through the University of Tokyo's University Corporate Relations Network, University Corporate Relations Proposal (UCR-Proposal) and other organizations.

Fig. 64. Overview of the University of Tokyo Industry-Academia Partnership System



Source: University of Tokyo

2) Market/sale respectively motivation of the target group and intermediaries.

The objective of research at university lies in further learning about and expanding knowledge of the world and to convert research results produced at the University into something transferrable (intellectual property) and return it to society.

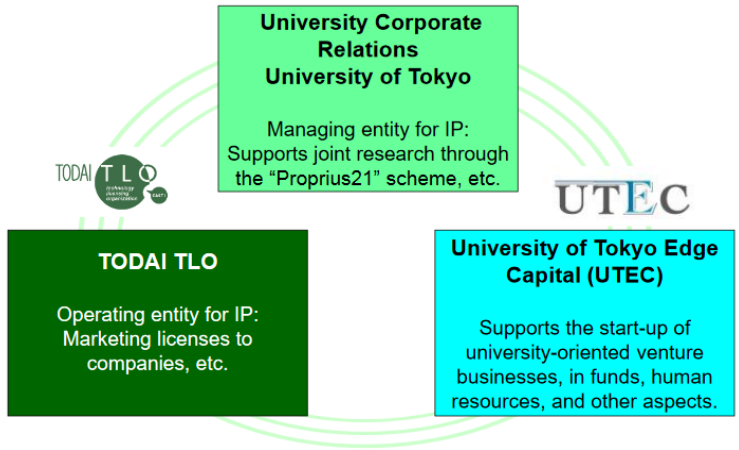
The University of Tokyo believes that the age has arrived in which universities should not only return the results of their research but also promote "Knowledge Co-creation" between universities and society. In order to ensure that the University and society work together to identify and share issues to be addressed and create new knowledge and innovations. DUCR strives with all its resources to promote "Knowledge Co-creation." Among the research results that universities return to society, the development of products using technology created by universities and its industrialization are the most dynamic of diverse industry-academia partnerships involving universities and have the largest impact on society.

A high level of technology-transfer and managerial strategies such as determining the marketability of technology, matching market needs with seeds of new technologies, and building new industrialization models with possible combinations of technologies in mind are indispensable for returning technology created by universities to society.

3) Actual delivery within the agency.

DUCR supports every department in the University of Tokyo in matters of collaborative research with private enterprises. It **forms a tripartite group with TODAI TLO and the University of Tokyo Edge Capital Co., Ltd. (UTEC)**, and has established an "intellectual" spiral that provides full support from applying the seeds sown at the University of Tokyo and creating intellectual properties, to its practical applications. The tripartite has a strategic organizational structure that is designed to promote the conversion of the intellectual properties of the University of Tokyo into a format that benefits society and becomes clearly visible.

Fig. 65. Support triangle for Industry-University Cooperation at the University of Tokyo



Source: University of Tokyo-TODAI TLO

The Office of Collaborative Research Development aims to create collaborative research between industry and academia and return the results of such research to industry and society in concrete forms and reflecting them in basic research as well. Major activities of the Office include **"Proprius21",** a feasibility study programme aimed at creating collaborative research that leads to innovations through repeated discussions between industry and academia starting from the stage of inspiration; **"Global Proprius21" Programs**, which strive for international cooperation with overseas industry in the global environment; UCR (University Corporate Relations)-Proposals, which are specific research results by university researchers who wish to have industry-academia partnership; and various activities whose objective is to open the way for industry-academia collaborations. In addition, the Office has an educational programme called **"Technology Liaison Fellows (TLF) Training System"** whose primary objective is to invite autonomous bodies of local governments to send their personnel to the University of Tokyo so that they may learn about industry-academia partnerships for one year in the form of on-the-job training and effectively use the results of fellowship to revitalize the region from which they come.

In order to return results obtained from research activities at the University of Tokyo to society and encourage society to make the most of them, **the Office of Intellectual Property** works closely with TODAI TLO, Ltd. (CASTI) and the Foundation for the Promotion of Industrial Science to engage in such operations as taking over intellectual property and protecting it as a right, utilizing it mainly through their licensing to industry and returning licensing revenue to the University, and establishing related rules to achieve these goals. Furthermore, from the viewpoint of promoting collaborative research as well as protecting and utilizing intellectual property, the Office ties up with law offices and other legal organizations in Japan and abroad to extend legal support such as reviewing and concluding contracts and providing consulting on the handling of intellectual property. Since the incorporation of national universities, the Office has put in place these management systems with the cooperation and understanding of parties inside and outside the University. In the future, it will make further efforts to gain the trust of researchers and research organizations in-house and of industry and support them in a way that meets their requests.

In close cooperation with the University Corporate Relations Group, TODAI TLO, and legal advisors as necessary, **Office of Intellectual Property** continued to be engaged in different functions, such as:

- Handling of Invention Reports and Utilization of Rights
- Contract-related services to collaborative research agreements and others
- Promotion of international industry-academia partnership
- Establishment and revision of industry-academia partnership-related rules, etc.

The Office of Science Entrepreneurship and Enterprise Development (SEED) is responsible for supporting university and student entrepreneurship, and aims to develop innovative business based on the results of research and education at the University. The strategic relationship with the University of Tokyo Edge Capital Co., Ltd. (UTEC), a venture capital management firm dedicated to the University of Tokyo, is a unique scheme that supports venture businesses that originate from the University. The Office is also engaged in:

- The **incubation of university start-ups** at three facilities: the "Incubation Rooms" located at the UCR Plaza and the Komaba Campus Collaborative Research (CCR) Building, as well as the "University of Tokyo Entrepreneur Plaza."
- **"Todai Mentors"** provides mentoring through a network of external professionals to support university entrepreneurship.
- The Office has also concentrated its energies on organizing and operating the University of Tokyo **Entrepreneur Dojo**, an entrepreneurship education programme for students. As it enters its sixth year in 2010, the programme has begun to see some of its graduates start a new business. The Dojo has also embarked on internationalization of entrepreneurship education by, for example, initiating an exchange programme for award-winning student teams of the business plan contests between Peking University and the University of Tokyo in 2008.

Todai TLO, Ltd. (CASTI) is a technology-transfer agency that handles all processes from application for intellectual property created by the University of Tokyo to its licensing. Todai TLO is a wholly owned subsidiary of the University of Tokyo, and aims to provide one-stop services as an agency for industry to communicate with the University with respect to intellectual property.

The University of Tokyo Edge Capital Co., Ltd. (UTEC)*:* is the only venture capital (VC) certified by the University of Tokyo as an agency related to technology transfer. Since 2004, UTEC has managed the "UTEC Limited Partnership 1," a venture capital fund. And in July 2009 established a new VC fund called the "UTEC 2 Limited Partnership." In the future, UTEC will continue to make investments that actively support new firms which utilize the University of Tokyo's intellectual property and human resources so that they contribute to society on a continuous basis. Also:

- **UTEC-EIR:** UTEC is implementing a comprehensive entrepreneurship support programme called **"UTEC Entrepreneurs in Residence** (UTEC EIR)." This programme offers offices at the University of Tokyo Entrepreneur Plaza and other facilities free of charge to budding entrepreneurs, researchers working to start a business, and so forth. It also examines intellectual property to ensure its effective utilization, verifies the concepts of technology to prove its feasibility, pays expenses required for market research and other undertakings to a certain extent, and helps draw up business plans with the support of UTEC's investment professionals.
- **UTEC Search:** UTEC is also carrying out "UTEC Search," a programme in which as part of UTEC's summer internship program, students, mainly graduate students at the University of Tokyo, work with UTEC's investment professionals to develop business plans based on seeds of business inside and outside the University. This program, too, continues to follow up on UTEC's projects and conducts additional research for them together with UTEC's investment professionals, providing UTEC with a source of excellent business deals.
- **Examination of inventions reported:** A system has been put in place in which UTEC's investment professionals' work with University researchers, who have just reported their inventions to the University, to explore possibilities of industrialization prior to the filing of applications for patents. These initiatives lay the foundation for UTEC to continue excellent investment activities in the future, and UTEC is active in advancing these initiatives mainly through close cooperation with the University of Tokyo.

4) Monitoring, evaluation and impact analysis of the scheme

More than 600 patents a year are made for technologies developed at the University of Tokyo (out of 4,000 researchers).

Estimated costs and other resources needed

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

4.2 ENTREPRENEURIAL UNIVERSITY MODEL: NATIONAL UNIVERSITY OF SINGAPORE

Brief description of the measure

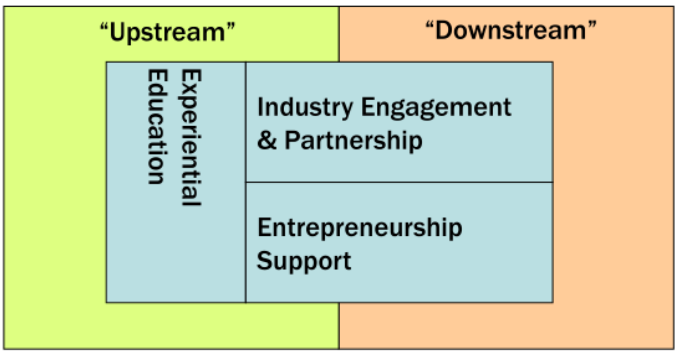
The **National University of Singapore** devised Strategic Changes to implement the new **Entrepreneurial University Model**:

- Incorporation of Enterprise as a "Third mission" in addition to the traditional missions of teaching and research.
- Creation of a new Organizational Division – NUS Enterprise. Broad mission to inject more entrepreneurial dimension to NUS education and research.
- Corporatization in 2006 to provide the university with greater autonomy and flexibility.

NUS Enterprise is embedding Entrepreneurial Learning as an integral part of NUS' Pursuit of Excellence in Education ("upstream" support).

It is Translating NUS' Excellence in research into significant innovation and commercialisation impacts ("downstream" development).

Fig. 66. National University of Singapore Entrepreneurial University Model



Source: National University of Singapore

NUS Entrepreneurship Centre is Asia's Think Tank for Enterprise and Innovation

- Provide thought leadership on innovation/entrepreneurship policies in Asian context
- Leverage on strategic links with leading innovation/entrepreneurship policy think-tanks.
- Complement & collaborate with innovation/entrepreneurship-related research programmes.
- Provide policy inputs to national innovation programmes and enterprise promotion agencies.
- Provide international benchmarking & policy analyses to NUS senior administrators on university-industry relations and academic entrepreneurship best practices.
- Commercialize knowledge through consulting & IP transfer services to other countries – e.g. Brunei, and Middle East

Also, NUS Enterprise is the primary vehicle for coordinating and managing all major activities related to technology commercialization and entrepreneurship promotion within NUS, shifting towards a **Entrepreneurial University Model**.

Target audience

1.University researchers

2.SME and large companies

Requirements

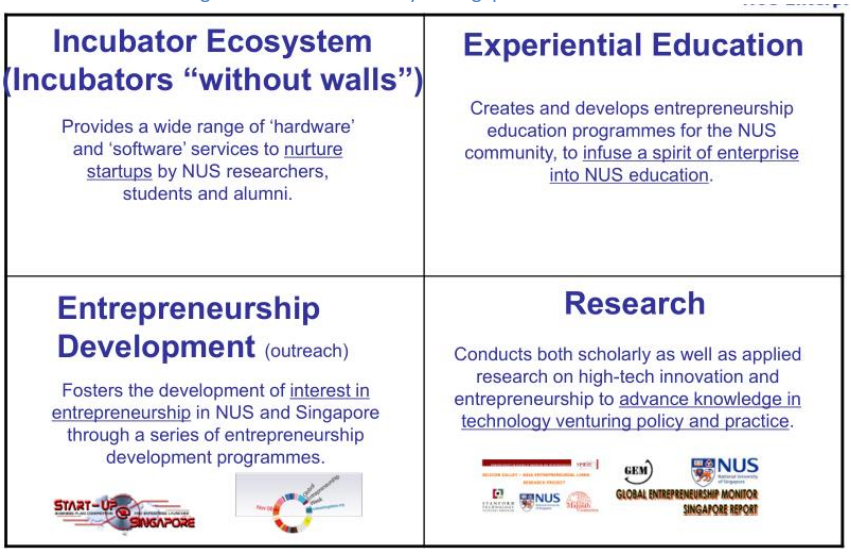
N/A

Process by which the initiative operates

1) Initial design of the programme.

NUS Entrepreneurship has been implementing **Initiatives** of interest for the transfer of technology developed by the University through the NUS Entrepreneurship Centre (NEC):

Fig. 67. National University of Singapore NUS initiatives

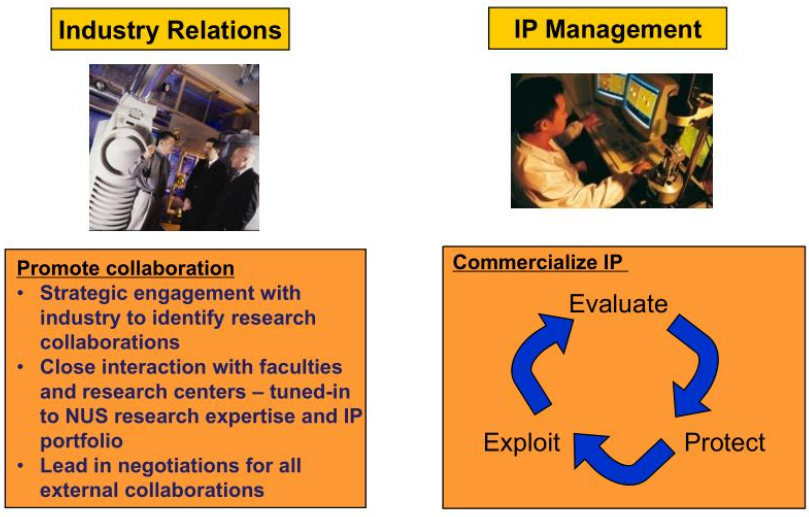


Source: National University of Singapore

These initiatives are being executed through two major initiatives:

- **Reforming university policies on technology commercialization:** Reorganized the Industry and Technology Relations Office (INTRO) to make it more inventors friendly. Subsequently re-named and re-organized as the **Industry Liaison Office (ILO)** to emphasize its dual role of industry collaboration as well as IP management and commercialization:

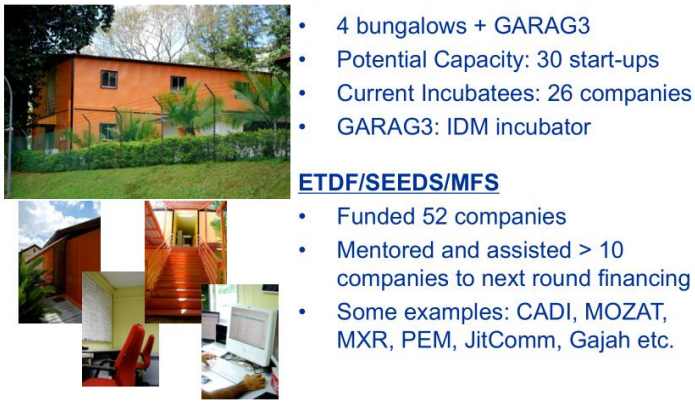
Fig. 68. Industry Liaison Office (ILO) functions



Source: National University of Singapore

- **Aligning with the university's vision of being a leading global university centred in Asia**, NUS Enterprise organises a variety of entrepreneurial education opportunities: Introduced significant entrepreneurship education programmes to inculcate entrepreneurial and global mind-set among NUS students:
- Technopreneurship Minor Programs.
- NUS Overseas Colleges (NOC) Programme: For those studying in NUS, this Programme is a unique and immersive means to gain entrepreneurial and international exposure. Participating students undertake full-time internships within start-up companies located around the world while concurrently attending entrepreneurship-related courses at prestigious partner universities.
- Innovative Local Enterprise Achiever Development (iLEAD)
- Extra Chapter Challenge programme
- NUS Enterprise Incubation (NEI) programme including incubator, seed funds, mentorship & investor-networking to nurture spin-offs by NUS professors, students and alumni:

Fig. 69. NUS Enterprise Incubation (NEI) programme



Source: National University of Singapore

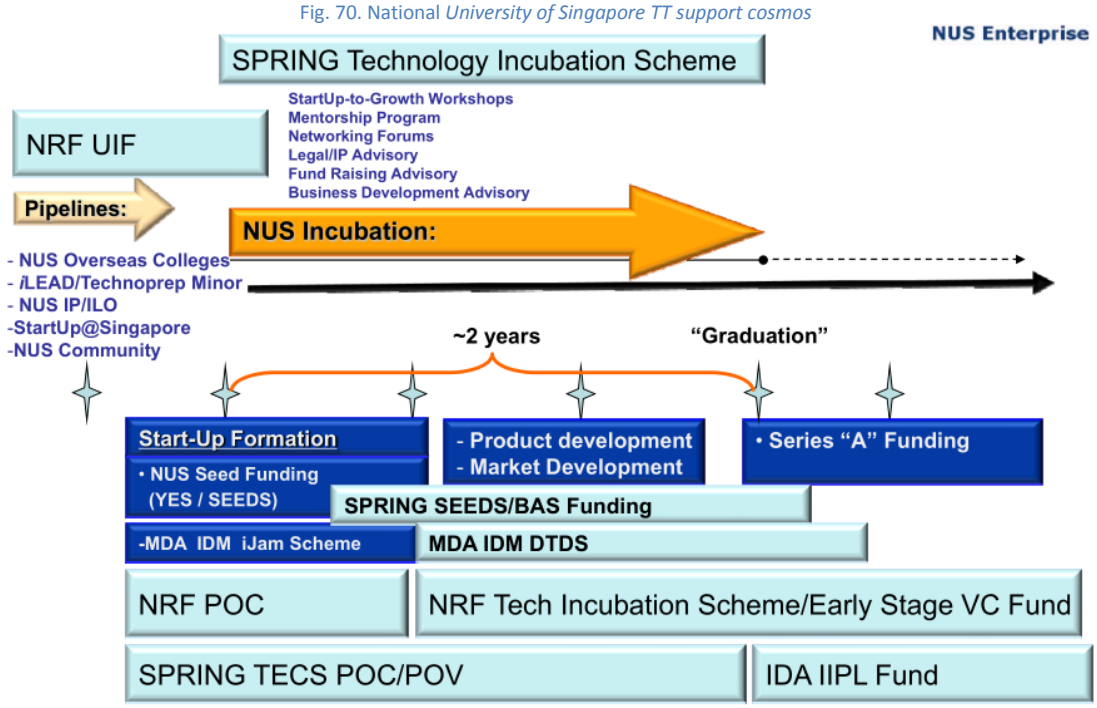
2) Market/sale respectively motivation of the target group and intermediaries.

Expanding the Entrepreneurship promotion role with educational, research, outreach and venture support functions.

Foster industry collaboration and IP commercialization.

3) Actual delivery within the agency.

Fig. 70. National *University of Singapore TT support cosmos*



Source: University of Singapore

4) Monitoring, evaluation and impact analysis of the scheme

Fig. 71. *Key Changes in NUS, Before and After Shift to Entrepreneurial University Model*

Indicator	AY1996/7	FY 2007/8
Teaching staff	1, 414	2,103
of which % foreign	39.0%	51.9%[1]
Research staff	843	1,710
of which % foreign	70.1%	78.6%[1]
Undergraduate students enrolled	17,960	23,330
Graduate students enrolled	4,478	7,020
Graduate students as % of total student enrolment	20.0%	23.1%
Percentage of foreign students studying at NUS	13% [2]	34.6%
Total research funding	S$102 mil	S$366 mil
Total no. of research projects funded	1,751	1759 [3]
Journal publications in SCI/SSCI	1,307 [4]	3,270[5]
Patents filed	13	96
Patents granted	4	30
Cumulative patents granted by USPTO	21 [6]	244[7]
Cumulative no. of spin-offs using NUS IP	6 [6]	44[7]

1 Percentage for FY2004 2 Percentage of total student intake for 1997/8 3 Figure for FY2005
4 CY1996 5 CY2008 6 CY1990-1997 7 CY1990-2008

Source: NUS Annual Research Report (various years) University of Singapore

Considerable progress in education and research output even better performance in foreign talent attraction, entrepreneurship promotion and technology commercialization as well as in knowledge creation through

research publications.

Impact of NUS' Shift Towards Entrepreneurial University Model: Patents

- NUS played a significant role in Singapore's increased patenting activity over the last ten years.
- Since the early 1990s, all IP created by NUS staff are assigned to NUS
- Total number of NUS patent applications and grants has grown steadily over 1997-2007
- Engineering faculty dominates patenting in NUS
- Biomedical patents comprises much lower proportion compared to many leading universities in with medical schools

Impact of NUS' Shift Towards Entrepreneurial University Model: Licensing

- Proportion of inventions that are licensed out remains low
- Nevertheless, there is a clear increase in the volume of licensing activities since 2000
- Recent fall in the number of licensing deals reflects policy change: Focus on a smaller number of licensing deals with higher revenue potential
- Upward trend in licensing revenue despite recent fall in the number of licensing deals
- "Balanced" approach to technology licensing: Priority on promoting technology diffusion for impact vs. maximizing licensing income

Impact of NUS' Shift Towards Entrepreneurial University Model: Industry Collaboration

- Substantial growth in no. of RCA over the last decade
- Recent fall in the share of RCAs with industry may be due to the very small numbers of RCAs in the initial period.
- In addition to the RCAs, significant consultancy work undertaken by NUS faculty (≈ 700 consultancies over 2003-04)

Impact of NUS' Shift Towards Entrepreneurial University Model: Academic Entrepreneurship

- About ¾ of NUS spin-offs formed after 2000: Visible result of policy change to encouraging technology commercialization through spin-off and start-up formation
- Increase in the number of start-ups by NUS professors, students and recent alumni since 2000.
- Engineering faculty produces the highest number of spin-offs - half of NUS spin-offs are involved in IT/electronics
    - Software, consultancy services and wireless systems,
    - Most spin-offs originate from a single faculty rather than from inter- departmental collaboration

Estimated costs and other resources needs

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

4.3 OXFORD UNIVERSITY INNOVATION LTD. TECHNOLOGY TRANSFER MODEL

Brief description of the measure

Oxford University Innovation Limited (OUIL) is a company owned by the University of Oxford. The company's mission is to be the leading international technology transfer organisation, to transfer technology and expertise from the University of Oxford, to deliver value to all the clients, and to maximise social and economic benefits in a commercial manner. Oxford University Innovation helps staff and students to apply their expertise and research for wider social and economic benefit. OUIL's role is to help University staff and students bring the benefits of their research and expertise to create impact in wider society. OUIL support Oxford's researchers, staff and students, offering commercial skills and a range of specialist resources in order to maximise research impact. Any profits from commercialisation are returned to the University for the benefit of future generations.

OUIL's specialties include Technology Transfer, University Consulting, Commercialisation, Consultancy, Angel investment, Innovation, Technology licensing, Spinout company formation, Research commercialisation, Start-ups.

Oxford University Innovation is split into **three divisions, dedicated to different areas of knowledge transfer:**

- **Oxford Innovation Technology Transfer (OITT):** OITT is responsible for managing the commercialisation of IP developed in Oxford – licensing, spin-outs and material sales, managing proof of concept and seed funds, and investments.
- **Oxford University Consulting (OUC):** OUC is responsible for providing access to academic consultancy and services from the University of Oxford. OUC arranges consultancy services providing third-party clients access to expertise from the University's academics to enhance innovative capability and to manage the contractual and administrative aspects of consultancy, minimising the administrative burden while protecting personal interests of the academic and those of the University. Areas of expertise include (but are not limited to) problem solving, data analysis, expert evaluation, due diligence, management and business development. OUC also helps Oxford University departments in hiring out specialist services and facilities to private companies by managing the contractual and financial aspects on behalf of the departments. OUC's activities meet the ISO 9001 quality assurance standard.
- **Oxford Innovation Enterprise (OIE):** OIE is responsible for delivering consultancy to companies, governments, and technology transfer organisations worldwide. OIE was established as a separate business division in 2004, OIE offers consulting expertise, training and advice in technology transfer based upon its success as the University of Oxford's technology transfer company. OIE works with other universities, research organisations and governments around the world to develop their technology transfer activities, as well as helping private businesses improve research & development processes and technology scouting. In 2009 OIE set up an office in Hong Kong to facilitate the growth of academic and governmental technology transfer activity in the Asia Pacific region.

Target audience

Students, Academics, Researchers, Government, Non-profit, Industry, University born Start-up companies

Requirements

N/A

Process by which the initiative operates

1) Initial design of the programme.

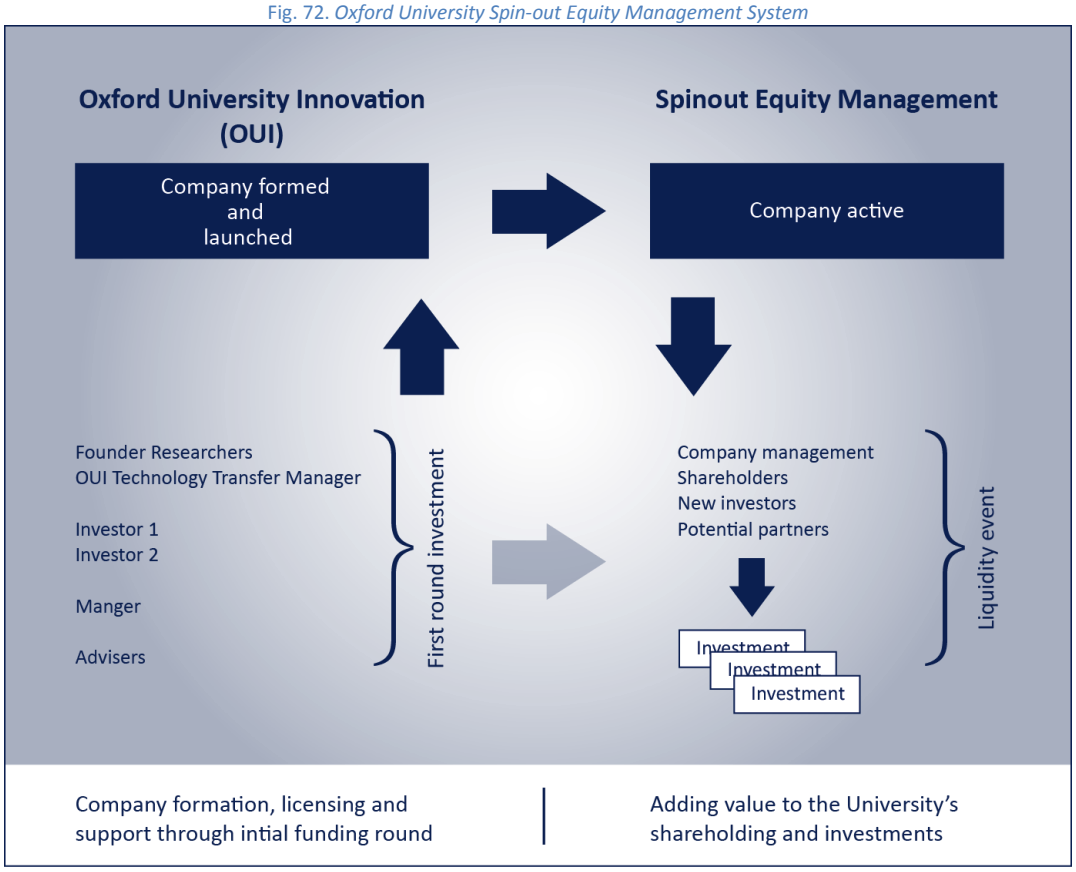
Oxford University Innovation **relevant programmes related to TT:**

- Oxford Innovation Society (OIS): founded in 1990, is a **forum for Open Innovation**, bringing together researchers and inventors, Oxford spin-outs, technology transfer professionals, local companies, venture capital groups and some of the world's most innovative multinationals. The society allows companies to have a "window" on Oxford science and fosters links between business and the academic community. Members receive an advance notification of all patent applications marketed by Isis, invitations to networking opportunities at formal OIS dinners, customised research presentations and bespoke seminars for technology road mapping and strategic planning.
- Oxford University Innovation **Angels Network** (OUIAN): introduces private investors and seed/venture capitalists interested in investing in spin-out companies from the University of Oxford to investment opportunities. OUIAN is a not-for-profit company limited by guarantee, established by Oxford University Innovation in 1999.
- University Challenge **Seed Fund** (UCSF): launched in 1999 with investment from the UK Treasury, Welcome Trust and Gatsby Foundation. The £4 million Oxford UCSF has invested in over 100 projects, ranging in size from £1,700 to £250,000. The overall objective of the UCSF scheme is to enable universities to access seed funds in order to assist the successful transformation of good research into good business.
- Oxford **Invention Fund** (OIF): The open fund allows anyone to donate money which goes towards helping create prototypes or proof-of-concept models from ideas and technologies developed at Oxford to improve the transfer into a commercial setting.
- Oxford University **Innovation Outcomes** (OUIO): Oxford University Innovation manages the licensing of copyrighted Patient Reported Outcomes (PROs) questionnaires via its Oxford University Innovation Outcomes brand. These questionnaires, developed within the University, are used for academic and commercial clinical studies into a variety of illnesses, including Parkinson's' Disease and Endometriosis. The negotiation of sales agreements for biological and physical science materials such as cell lines and antibodies are also handled by Oxford University Innovation.
- Oxford University Innovation **Start-up Incubator** (OUISI): Since 2010, designed to support very early-stage software ventures from students, staff and alumni of the University of Oxford; the Incubator offers physical space and IT facilities as well as commercial mentoring, funding support and business networking facilitation.
- Oxford **three University Science Parks:**
  - Begbroke Science Park: 6 Spin-outs on site; Owned & operated by Oxford University, 5 miles west from the city centre; University research labs; University Supercomputer operated by e-research centre; Business incubator & premises for new companies
  - The Oxford Science Parks
  - Milton Park, Oxfordshire
- Oxford **Spin-out Equity Management** (OSEM): Oxford University Innovation has strong links with all the parts of the University involved in technology commercialisation and enterprise. These include: Research Services; Begbroke Science Park; Oxford Science Enterprise Centre; and Entrepreneurship Said at the Saïd Business School. Oxford Spin-out Equity Management (OSEM) was created in 2008 working closely with Oxford University Innovation and the University of Oxford's Finance Division to manage the University's shareholdings in its spin-out companies and optimising returns on University investments. OSEM has three main roles:
  - Strategic: identifying opportunities to optimise the return on the University's investment and provide professional assistance to companies as they develop
  - Tactical: supporting companies by dealing with immediate or short-term issues such as funding or access to other support networks
  - Procedural: dealing with documentation relating to consents, fund-raising and exits

  In fulfilling this role, OSEM calls on its own expertise, its extensive networks of contacts in the financial, commercial and scientific worlds and its own investment fund which it manages on behalf of the University of Oxford. OSEM's portfolio comprises of 84 companies, following the sale of

NaturalMotion in February 2014 the portfolio is currently valued at around £70 million (August 2016).

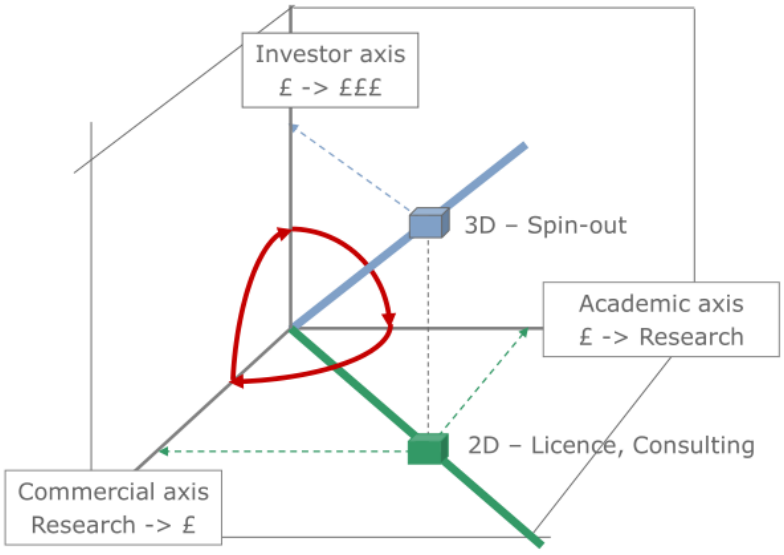
Fig. 72. *Oxford University Spin-out Equity Management System*



Source: Oxford University

2) Market/sale respectively motivation of the target group and intermediaries.

Fig. 73. *Oxford University Innovation is acting as multi-dimensional intermediaries*



Source: Oxford University

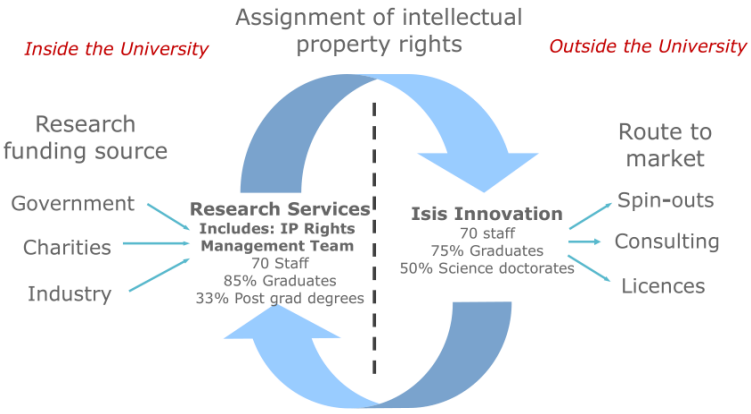
3) Actual delivery within the agency.

Intellectual Property Policy:

- University claims ownership of all employees‟ and students‟ IP rights resulting from University research activities
- The University assists those researchers who wish to commercialise their research by patenting, licences, spinout companies & consultancy
- Researchers share the benefits
    - Royalty shares from licences
    - Equity in spinout companies
    - Income from personal consultancy

Transfer of Intellectual property:

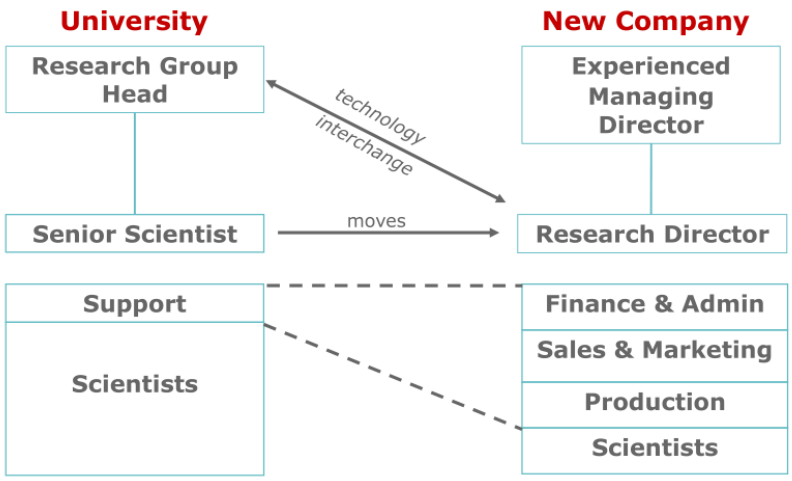
Fig. 74. *Oxford University Transfer of Intellectual property*



Source: Oxford University

Oxford University Innovation Spin-out strategy:

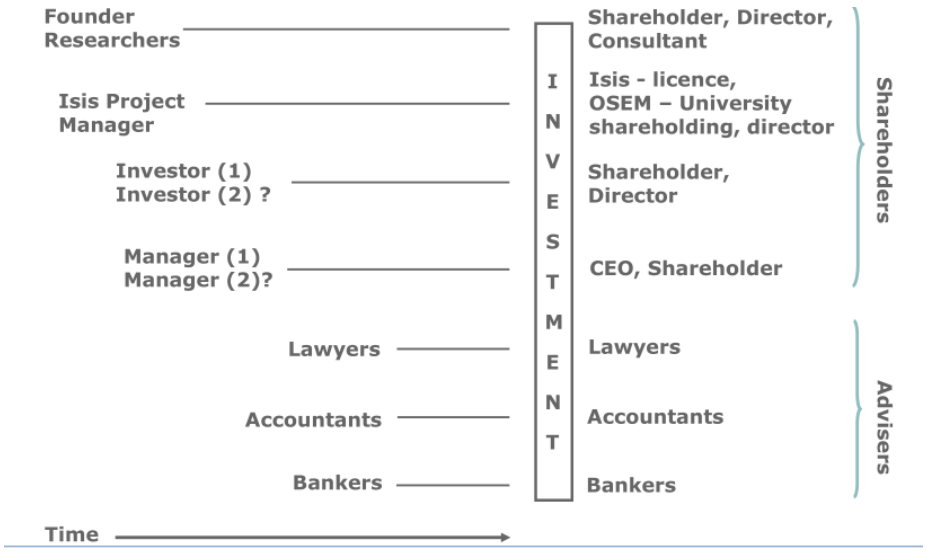
Fig. 75. *Oxford University Innovation Spin-out strategy*



Source: Oxford University

Spin-out Players:

Fig. 76. *Oxford University Innovation Spin-out Players*



Source: Oxford University

4) Monitoring, evaluation and impact analysis of the scheme

- £24.6m total revenues in 2015 (£14.5m in 2014)
- £13.6m returned to Oxford University and its researchers in 2015 (£6.7 in 2014)
- 5 spin-outs created by us in 2015 (8 in 2014)
- 40 start-ups admitted to the Start-up Incubator, 5 incorporated in 2015
- 529 deals in 2015 (75 technology licenses, 454 consulting deals; 503 total in 2014)
- 2686 days of innovation consultancy delivered by Isis Enterprise consultants, in 29 countries (1884 days in 2014)
- 2490 patents and patent applications on Oxford inventions managed by us (2333 in 2014)
- £25m translational research funding won by Oxford researchers with our direct support (£19m in 2014)

Estimated costs and other resources needs

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

4.4 CAMBRIDGE ENTERPRISE LIMITED (CEL) INTELLECTUAL PROPERTY COMMERCIALISATION

Brief description of the measure

Cambridge Enterprise Limited (CEL) is a wholly owned subsidiary of the University, responsible for the commercialisation of Cambridge intellectual property. Cambridge Enterprise delivers its mandate through three overlapping business units: technology transfer services, consultancy services and seed fund services. Activities include management and licensing of patents, proof of concept funding and support for University staff and research groups wishing to undertake consultancy work. Cambridge Enterprise provides access to angel and early stage capital through the Cambridge Enterprise Seed Funds and Cambridge Enterprise Venture Partners, and offers business planning, mentoring, and other related programmes though 3 main areas:

- **Technology Transfer** team works with researchers to manage and license their patentable inventions and other intellectual property. It works to support academics starting from the earliest stages of the commercialisation process, from supporting funding applications, to the market research and development of prototypes in order to find the best commercial partners.
- **Consultancy** is an effective way for the University to disseminate its knowledge and expertise to government, industry and the public sector. In consultancy, as opposed to collaborative research, University staff applies their personal expertise to help a client organisation solve problems that are specific to the client's business. The type of projects vary widely between expert witness appearances and tendered public contracts, while the broad scope of projects reflects the wide range of University research that is in demand by both industry and government.
- **Seed Funds:** Cambridge Enterprise invests intellectual property and cash to create successful new ventures based upon University research. PathFinder funding of up to £15,000 is available to carry out market and IP assessments; and seed funding of up to £250,000 is available to set up a new company, joint venture or partnership. The Seed Fund team maintains links to venture capitalists, angel and early stage investors through Cambridge Enterprise Venture Partners.

Target audience

Students, Academics, Researchers, Government, Non-profit, Industry, University born Start-up companies

Requirements

Primary focus on Cambridge University cosmos (alumni, researchers, staff, spin-offs and related network), although there is an outreach programme.

Process by which the initiative operates

1) Initial design of the programme.

A. For Academics, Researchers and Students:

1. Starting a company: Cambridge Enterprise supports those trying to start a company based directly on University research or people, investing up to £500,000 in each University spin-out from investment funds CEL manage on the University's behalf. Significant follow-on funding is available through Cambridge Enterprise's sister fund, Cambridge Innovation Capital (CIC). CIC has strong ties with the University of Cambridge and works closely with Cambridge Enterprise on its investments. CIC may also invest at the seed stage as a precursor to further investment. Cambridge Enterprise can work with the incumbents to make their business plan stronger, connect them with industry mentors and management, and CEL can fund consultants and proof of market studies. Since 1995, CEL has invested in 62 companies that together boast a three-year survival rate of 80%, compared with a national average of 30% for technology companies.

The investment CEL offers*:* CEL invests the University seed funds in new companies started by staff and students to enable the commercial development of University research. As such, they offer a range of

investment to help develop new ventures. Among them are:

- PathFinder investment, up to £20,000 to help carry out market and intellectual property assessments and business strategies.
- Fast 50, a Cambridge Enterprise initiative that offers up to £50,000 for work on time-sensitive projects and critical experiments that need investment delivered quickly.
- *Seed investment*, up to £500,000 in the initial round, to provide the first stages of company funding to advance technology development and management.

Once the investment is completed CEL continues to work with the incumbents to help develop and grow their business.

2. Winning a consultancy contract: It is through Cambridge Enterprise's Consultancy Services that University staff, researchers and postgraduate students are supported to be consultants, to provide their expertise and know-how, offer expert witness advice and serve on scientific advisory boards. The Consultancy Services team handles the negotiations, contracts, arrangements for use of University facilities, invoicing, debt collection, income distribution and all the other administrative tasks that can otherwise distract the incumbents from their work.

The services provided by the Consultancy Services team include the negotiation of contract terms and conditions as supported by the University Legal Services Office and the Insurance Section of the Finance Division. In addition, academics benefit from the University's professional indemnity and personal liability insurance policies. A Consultancy Services management fee is included in the price of the consultant contract and is paid by the client company.

3. Commercialising the research: CEL Technology Transfer team helps academics develop their ideas and inventions into opportunities that are attractive to business and investors. CEL's mission is to commercialise University knowledge and technology by working with academics, commercial partners, investors, the NHS and research funders to bring potentially big ideas to market, including by assisting with the formation of new companies and developing licensing opportunities. CEL works with University colleagues through the entire commercialisation process, and often with those whose ideas are still in the very earliest stages of development.

Cambridge Enterprise works to develop successful opportunities by helping academics apply for translational funding opportunities, undertaking market analysis, bringing together experts to scope and develop new technologies, finding development partners and investors, and negotiating and managing commercial deals through licensing IPR, including patents, know-how, data and copyright. Whatever route the idea takes, the first thing to do is contact CEL to talk through the options. Incumbent's idea can be at any stage of development and in any form, such as a research topic that is relevant to industry needs, software, a design (for a circuit or object), the creation of reagents or questionnaires, a new methodology, an algorithm or Patentable technologies.

4. Meeting enterprise champions - Linking Cambridge Enterprise to its academic partners:

Academics, researchers, facilitators and co-ordinators provide an invaluable link between Cambridge Enterprise and University departments and their networks. They are called Enterprise Champions, and they act as a first point of contact for department members who want advice on bringing their ideas and expertise to market. They know the resources available through Cambridge Enterprise and foster a good working relationship with colleagues to encourage commercialisation.

Enterprise Champions hail from a wide range of backgrounds – from those doing collaborative corporate research and starting companies, to fundraising and balancing the demands of academic research and business.

As well as academics, researchers and research facilitators, this group is comprised of Knowledge Transfer Facilitators (KTFs). KTFs support academics and researchers in knowledge transfer and collaborative activities and develop relationships between the University and external partners, and the University's multi-disciplinary Strategic Research Initiatives and Networks, which bring together internal cross-disciplinary research collaborations and provide a platform for large-scale funding applications, recruitment and international research partnerships. Together, the Enterprise Champions represent some 50 areas of the University.

5. Clubs, programmes and networking*:*

To develop ideas:

- Ideas Take Flight competition. CUE runs a business creation competition to support and accelerate entrepreneurship and innovation.
- Accelerate programme offers a structured approach of three-month programmes combining entrepreneurship training, regular coaching and mentoring, and access to shared workspace.
- Graduate Entrepreneur scheme for graduates of Cambridge University who have an outstanding business idea they want to put into practice in the UK.
- ideaSpace provides office space and resources for anyone looking to start a new, high impact company in Cambridge.

To join a society:

- Cambridge University Entrepreneurs (CUE) organises one of the most successful student-run business planning and creation competitions in Europe.
- The Cambridge University Technology and Enterprise Club (CUTEC) is the leading student-run organisation at the University of Cambridge with a focus on technology venture capital.
- Beyond Profit encourages the development of businesses that create positive social and sustainable solutions rather than simply maximising profit.
- i-Teams combines multi-disciplinary teams of students with industry mentors and real University inventions to assess the commercial viability of new technologies and product designs.
- Entrepreneurial Postdocs of Cambridge (EPoC) aims to support postdocs in their pursuit of entrepreneurial careers, share opportunities and foster a multi-disciplinary network of entrepreneurial postdocs within the University.

Learning more about entrepreneurship:

- *Enterprise Tuesday*, a programme of free events to introduce participants to the world of business, as well as to encourage and inspire individuals to pursue their entrepreneurial ambition.
- *Careers Service*, which provides resources for those wanting to set up 'conventional' businesses, such as restaurants, fitness centres and photographic studios. It also provides a *Start-up Careers Lecture* Series.
- *Cambridge University Enterprise Network (CUEN)*, which acts a portal to the various organisations involved in enterprise and innovation activities within the University.

B. For Industry, Government and Non-profit:

1. Consultant - Connecting academics and industry: Cambridge Enterprise offers an effective consultancy service which enables the University to share its knowledge with government, industry and the public sector, and make a direct impact on society. The goal is to make the process of consultancy easier for academics and for the organisations in need of their expertise. CEL's service covers the administrative issues associated with consultancy projects, including negotiation of contract terms and conditions, invoicing, debt collection, income distribution and the arrangements for use of University facilities. While CEL works primarily with researchers who have already been contacted by potential consultancy clients, they are happy to use their networks and experience to help organisations find a consultant.
The University of Cambridge has many specialist facilities embedded throughout its departments, from High Performance Computing to mass spectrometry labs. External clients can make use of these facilities through a consultancy contract with Cambridge Enterprise. This may involve contracting with a University expert. For example, an academic consultant could carry out analysis on a client's samples and provide the client with the raw data and a report on the results.

2. Opportunities to invest: Cambridge Enterprise invests the University's seed funds in new companies started by staff and students, building a bridge between research and commercial development. Early stage capital and support is pivotal to the success of new technology companies in what is often seen as a high-risk section of the investment spectrum. There are opportunities to invest.

3. Licensing Cambridge innovation*:* Cambridge Enterprise works in collaboration with researchers to market and license available technologies ranging from the biosciences to engineering. CEL welcomes contact from companies interested in licensing available technologies from the University of Cambridge, and work with companies on an individual basis to identify specific areas of interest.

4. Licensing for the research community*:* Cell lines, antibodies, proteins, DNA constructs, small molecules

and other research tools generated by scientists at the University of Cambridge play a key role in laboratory research. There is a wide range of research reagents available for commercial licensing through Cambridge Enterprise.

5. International Outreach Programme - Turning global knowledge into stronger economies: advice, training and support to governments and universities around the globe that want to grow by commercialising their research and knowledge base. Through its *International Outreach Programme (IOP)*, Cambridge Enterprise offers its international clients consultancy support and workshops that can involve mentoring in the client's home country. Academics seek out the programme to better understand how to bring their research to market.

6. Industry Engagement Forums encourages academics at all stages of their careers to think broadly about their work and better understand how it can be used to create impact in both commercial and humanitarian contexts, while non-profit organisations and industry gain access to world-leading research expertise. During the one-day brainstorming events, companies are invited to put forward themes related to their industry. Working together in small groups, participants identify areas of common interest that may lead to future research collaborations, studentships and secondments.

7. Innovation Fellowships: The Cambridge cluster, based around the University, the city's rich ecosystem of hi-tech and biotech companies, and entrepreneurial flair, is the most successful technology cluster in Europe. Through Cambridge Enterprise and the Centre for Science and Policy, the University is creating a network of international business leaders in order to build enduring connections between entrepreneurs, major corporate decision-makers and researchers, and to support knowledge exchange around innovation. Modelled on the University's highly successful Policy Fellowships Programme, the Cambridge Innovation Fellowships will enable CEOs and other senior executives of leading businesses to explore the processes that connect ideas to output. Fellows will meet and interact with practitioners and academics (and those who are both); they will take back to their companies' new insights, fresh perspectives, and enduring links with Europe's leading innovation ecosystem.

Benefits of the scheme: Innovation Fellowships offer a number of benefits to executives interested in engaging with the University and the cluster.

Benefits of the programme include:

- advice and guidance to enable you to 'navigate the network' and open the relevant doors around Cambridge and in the University
- on-going membership of a network of thought-leaders addressing common issues, and the chance to build your personal network
- direct connections to leading researchers in the areas of innovation, entrepreneurship, and business growth, and to those who have successfully put research into practice
- the ability to shape the knowledge-exchange with those you meet around your specific questions and concerns
- on-going support to convene workshops and other discussions within the network over a two-year period
- opportunities for your company to commission consulting or joint research in the University, or to gain profile through association with University events
- time and space to think in an intellectually stimulating environment – returning you to your day-job with new ways of tackling the key challenges you face.

2) Market/sale respectively motivation of the target group and intermediaries.

- **Technology Transfer:** support academics starting during all stages of the commercialisation process.
- **Consultancy:** University disseminates its knowledge and expertise to government, industry and the public sector.
- **Seed Funds:** create successful new ventures based upon University research.

3) Actual delivery within the agency.

- **Helping academics, researchers and student starting a company:**
  - CEL can be contacted for an early discussion about the idea and its potential. A member of the Seed Funds team will work with the incumbents to develop their idea and guide them through the investment process.
  - If applicable, the incumbent can apply for *PathFinder* investment to develop their plans.
  - For larger investment, the incumbents will need to present their business plan to the Seed Funds team, which will make an assessment about whether to progress their application to the Cambridge Enterprise Investment Committee.
  - If successful, the incumbents present their idea to CEL Investment Committee, which puts in place the necessary legal agreements to complete the investment.
- **Helping academics, researches and student winning a consultancy contract:** If the incumbents are contacted by a potential client it is important to identify the scope and nature of the services, what deliverables the client wants and any relevant milestones and timings. CEL advises on contractual matters, including costing and pricing the type of service required in the relevant subject area. After filling out a disclosure form, CEL generates a contract between CUTS and the client. After this, project work is set to begin and CUTS will invoice the client as detailed in the contract. CEL aim to distribute income from the client to the incumbent within 30 days of its receipt; management fees and direct costs, such as use of University facilities, will be deducted.
- **Helping academics, researches and student commercialising their research:** Once the incumbent have provided CEL with a completed disclosure form, they meet with the incumbents to discuss their ideas and any commercial applications. CEL reviews the competitive landscape – assessing the published papers and (if appropriate) patent applications that may be similar. CEL may contact some companies to establish whether incumbent's idea solves a relevant problem. Sometimes at this stage CEL may have a more detailed conversation with a company, which may require confidentiality agreements be put in place. These conversations may point to a need for more translational research before CEL engage with industry; they can help incumbent find funding for that purpose. Occasionally CEL may decide that Cambridge Enterprise is not the best route for commercialisation in which case they would discuss alternative options with incumbent.
  In cases where patent protection is appropriate, CEL works with incumbent and a patent agent to file a patent application – CEL will manage the patent prosecution but they will need incumbent's input at various stages.
  If no licensee has been identified, CEL markets incumbent's idea and try to find a good match. This could be through an existing company or they might help incumbents start one of their own.
  Cambridge Enterprise takes assignment of any registerable rights (patent, trademark, registered designs) and a licence to any non-registerable rights (know-how, copyright, unregistered designs, database rights) so that CEL can act on incumbents' behalf and on behalf of the University in commercialisation of an idea.
  CEL negotiates with the licensee to agree terms for the commercialisation of incumbents' idea in return for a revenue share or other appropriate consideration. Revenue received by Cambridge Enterprise is shared with incumbents, their departments and the University according to the University's IP policy (for registerable rights).
- **Meeting the Enterprise champions:** Champions meet three times a year to share departmental research priorities and updates and 'hot' technologies, critique Cambridge Enterprise's performance and network with like-minded colleagues from other parts of the University. They are kept abreast of the latest developments in IP and research policy, and are given the opportunity to share their opinions with University policymakers.
- **Opportunities for investors:** Through *Cambridge Enterprise Venture Partners (CEVP)*, investors have the opportunity to hear pitches from investment-ready Cambridge companies, followed by dinner at one of the Cambridge Colleges. CEVP is Cambridge Enterprise's investor forum to showcase companies to an audience of venture capitalists and business angels. CEL hosts three dinners a year, normally within one of the historic Cambridge Colleges. The evenings start with presentations from three Cambridge Enterprise associated companies. These are followed by dinner, where investors can engage in in-depth discussions with the presenting companies. The evening is rounded off with an after dinner speaker from the world of business, government or

academia. With currently over £3 billion of funds under management by members, CEVP is an excellent forum with a unique offering.

- **Innovation fellowships:** The starting point is a blank sheet of paper where Fellows write down the questions they face in their personal businesses about innovation. Cambridge Enterprise then connects each Fellow with investors and entrepreneurs and researchers whose theories can help answer those questions. Through an intense series of one-to-one meetings, organised over five days in Cambridge, the Fellows explore challenging and often unexpected perspectives, and discover the connections that will become the basis for on-going investigation over the two years of their Fellowships.
  Up to 12 new Innovation Fellows will be elected each year (four each term), each for a period of two years. Those who would like to apply to be an Innovation Fellow, they need to email CEL with a brief biography, a summary of the questions that they would want to address, and a note of support from their organisation. What each Fellow does over those two years is very much down to his or her needs and approach. Experience in the Policy Fellowships Programme suggests that some will want to return to Cambridge to convene expert workshops exploring key issues in depth; others will secure the greatest benefit from broadening their networks in the Cambridge cluster, or from bringing practitioners and researchers into their organisations to consult and advise. Many will also want to take up the opportunity to give lectures and lead seminars in Cambridge, closing the loop with the future generation of entrepreneurs.

4) Monitoring, evaluation and impact analysis of the scheme

- Since 1995, Cambridge Enterprise Ltd. has invested in 62 companies that together boast a three-year survival rate of 80%, compared with a national average of 30% for technology companies.
- Cambridge Enterprise Ltd. have completed more than 1,000 commercial agreements.
- Since seed funding began in 1995, CEL's portfolio companies have raised more than £1.29 billion in further investment and grant funding. They now employ more than 630 people and generate an annual turnover of £47 million.
- To date, Cambridge Enterprise has helped academic and government partners in Brazil, Colombia, Chile, Kazakhstan, Thailand, Saudi Arabia, Norway, China, Colombia, the Czech Republic and Mexico.
- Over the past three years, income from licensing has exceeded £23 million, 536 new technology disclosures were made and 315 patents were filed.
- Over the past four years, income from licensing, consultancy and equity transactions exceeded £37 million, of which £30 million was distributed to University departments and academics.
- The number of consultancy projects continues to grow rapidly, with a 92% increase in projects over the past four years. Client organisations include some of the largest and most respected companies in the UK and worldwide, including leading UK, US and European pharmaceutical companies, major petrochemical corporations and several Formula 1 racing teams.
- Currently, Cambridge Enterprise holds equity in more than 68 companies and manages evergreen seed funds on the University's behalf. Since 1995, the investee companies have raised more than £800 million in funding, representing a leverage of 75 times the University investment.
- Since seed funding began in 1995, CEL's portfolio companies have raised more than £1.29 billion in further investment and grant funding. They now employ more than 630 people and generate an annual turnover of £47 million.

Estimated costs and other resources needs

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

4.5 SCoRE Cymru scheme (Supporting Collaborative Research and innovation in Europe)

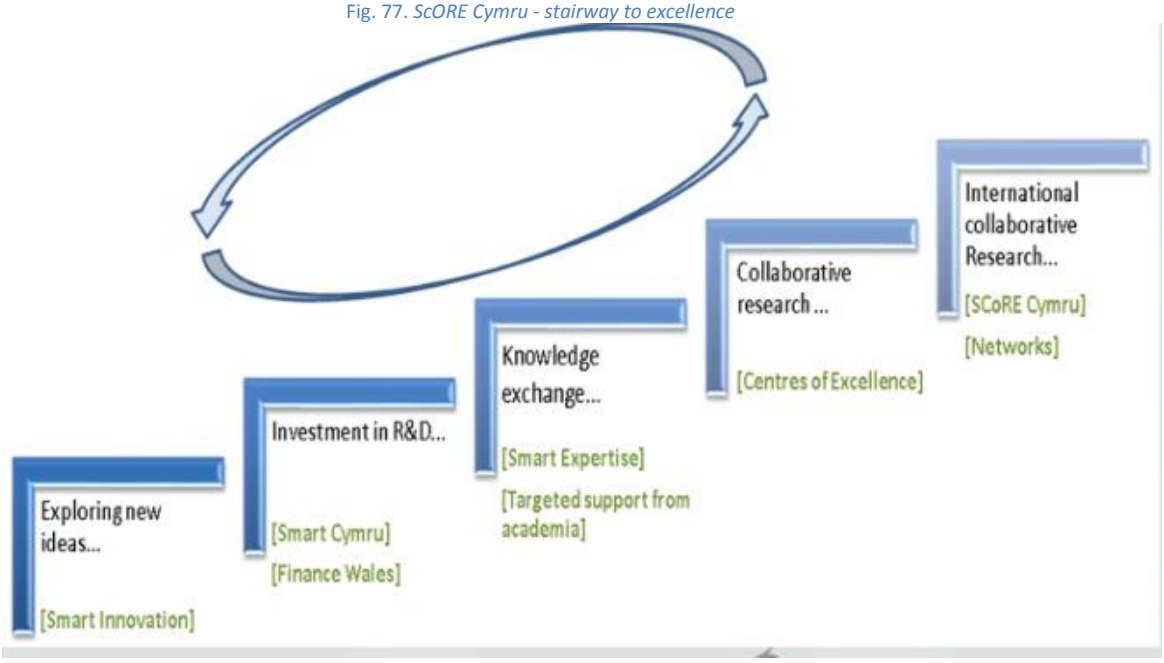
Brief description of the measure

Welsh government has established a new Horizon 2020 service or 'one-stop-shop' within the Welsh Government's Welsh European Funding Office (WEFO). The service draws on WEFO resources that are already playing a central role in supporting the Knowledge Economy through the management of the Structural Funds and its established EU networks and contacts. By bringing these EU funds together, as a 'one-stop-shop' service, the government can explore complementarities and synergies to make the best use of EU funds and generate further impact.

Wales has benefitted from over €107m of funding under the Seventh Framework Programme. Comprising 337 participants, this can be regarded as a respectable increase when compared to other major European regions. In order to further exceed expectations in Horizon 2020, the Welsh Government has developed several initiatives, including **SCoRE Cymru (Supporting Collaborative Research and innovation in Europe),** to help businesses and universities apply for future EU grants.

Any Welsh organisation involved, or planning to be involved, in cutting-edge research and innovation are able to apply. Organisations developing partnerships within the UK, the EU or even outside the EU have access to £1,000 (€1,383), different rates for different bodies from SCoRE Cymru to help cover travel costs. Up to £10,000 (€13,830) is also available for assistance in EU bid-writing costs.

Fig. 77. *ScORE Cymru - stairway to excellence*



Source: ScORE Cymru

Target audience

Wales-based organisation e.g. Universities, Public Research Organisation, other public sector organisations, Industries (SMEs and Large Enterprises) and individual who seek funding from European collaborative research e.g. Horizon 2020 Programme.

Requirements

To be a Wales-based Organisation or individual

Process by which the initiative operates

1) Initial design of the programme.

SCoRE Cymru (formally WECF) stands for Supporting Collaborative Research and innovation in Europe. It provides Grants to support Welsh - based organisations with the costs of accessing R&I programmes such as Horizon 2020. The scheme currently supports:

- The travel and accommodation costs involved in: identifying and building consortia and negotiation of contracts
- The cost of subcontracted expertise for: writing funding proposals, and negotiation and conclusion of consortium agreements and/or contracts

Grants Available for Travel:

- Up to £1,000 (€1,383) and/or 100% of the costs for SMEs
- Up to £1,000 and/or 75% of the costs for HE
- Up to £1,000 and/or 50% of the costs for other organisations travelling with a Welsh SME/HE partner

Grants Available for proposal development: Up to £10,000 (€13,830) and/or 100% of the costs
Improvements included so far in SCoRE scheme:

- Grant rate increases
- Administration simplified to reduce turnover time
- Now supports early consortium building
- Travel outside the EU and to UK destinations allowed under certain circumstances
- Assessment criteria focus on quality of proposal rather than eligibility rules

2) Market/sale respectively motivation of the target group and intermediaries.

- Maximising the opportunities for welsh-based organisations for collaborative research and technological development through programmes such as Horizon 2020
- Providing a platform for Wales to maximise its research and innovation expertise and drive forward Wales' knowledge economy, in turn securing global competitiveness and creating growth and jobs.

3) Actual delivery within the agency.

- Applicants need to complete an application form
- WEFO will contact the applicants shortly after receipt and encourage them to speak with them before applying.
- Wherever possible applications should be submitted at least 2 weeks before eligible costs are likely to be incurred.
- WEFO aims to process valid applications in less than 2 weeks but if applications are not received within a reasonable timescale or are significantly incomplete, then they may be rejected.
- The application is then assessed. In assessing the application, the Horizon 2020 Unit may seek advice on its merits from within the Welsh Government. The Unit may also seek external technical advice where required but will inform applicants if that is the case.
- Successful applications will receive an offer letter. Applications may be approved with qualifications.
- Application will be judged against the following criteria.

<u>All Applications:</u>

- How well the applicant has demonstrated that it is a Welsh-based organisation with the potential in the Welsh location to participate in a relevant proposal.
- That the anticipated eligible costs are clearly specified and are reasonable.
- That the requested grant rate is allowable and reasonable.
- The scale of the expected return on investment for Wales, e.g. if the European proposal is successful, what level of funding is likely to be awarded to the applicant and any other Welsh partners.

- The importance of the sector or area of research/innovation to Wales.
- That the applicant is financially viable.
- Compliance with State Aid law and procurement rules, where applicable.

For Travel:

- The strength of the justification for the journey, e.g. which call/theme is being targeted and why.
- The relevance of the experience and qualifications of those travelling.

a. The relevance of the planned event(s)/meeting(s) including the other attendees.

For Proposal Development:

- That a specific thematic area and an associated call deadline for submitting proposals have been identified.
- The strength of the evidence that the project proposal has been adequately scoped, including contact with National Contact Points, budget, partners' commitment and the timescale.
- That there is sufficient time before the associated call deadline for an eligible proposal to be developed.

WEFO as part of the Welsh Government will make the final decision on applications, claims, payments and all other matters relating to SCoRE Cymru.

4) Monitoring, evaluation and impact analysis of the scheme

Since the inception of the scheme there are said to have been over 164 enquiries and 68 successful applicants to travel in 18 countries worldwide to build collaborative partnerships or have accessed expert advice to develop their bids. Funding committed (as of November 2014) totals over €139,568, 72% of which has been awarded to SMEs. Potential projects supported include a novel system for the early detection of cancer, the 3D engineering of human ears from cartilage, a new therapy for hypothyroidism and a system for the rapid diagnosis of Alzheimer's disease.

The **European Commission's Horizon 2020 unit recommend this measure as an example of regional good practice to policy-makers from other regions.**

Estimated costs and other resources needs

'SCoRE Cymru' has a budget of £70,000 (€82,100) of funding to help Welsh organisations develop more competitive and collaborative bids with partners in Europe to access a range of EU research and innovation funding streams, including Horizon 2020. It is a more flexible fund, which was developed following engagement with key partners on lessons learned and best practice. SCoRE Cymru helps widen participation in Horizon 2020, especially by businesses.

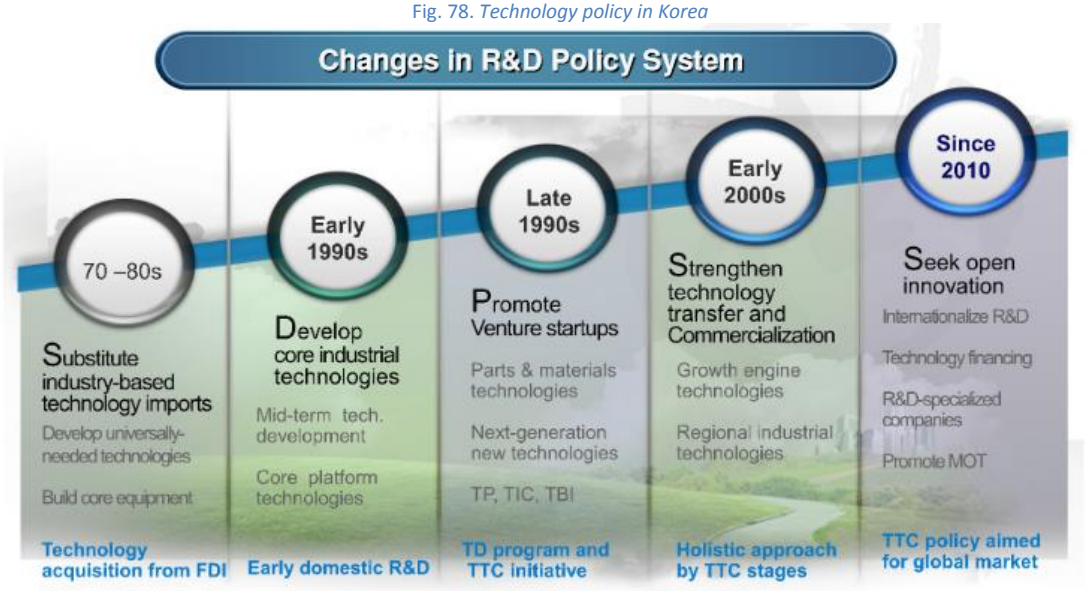
For more detailed information on the measure described see Annex I

4.6 TECHNOLOGY MATCHING SYSTEM (KTMS)

Brief description of the measure

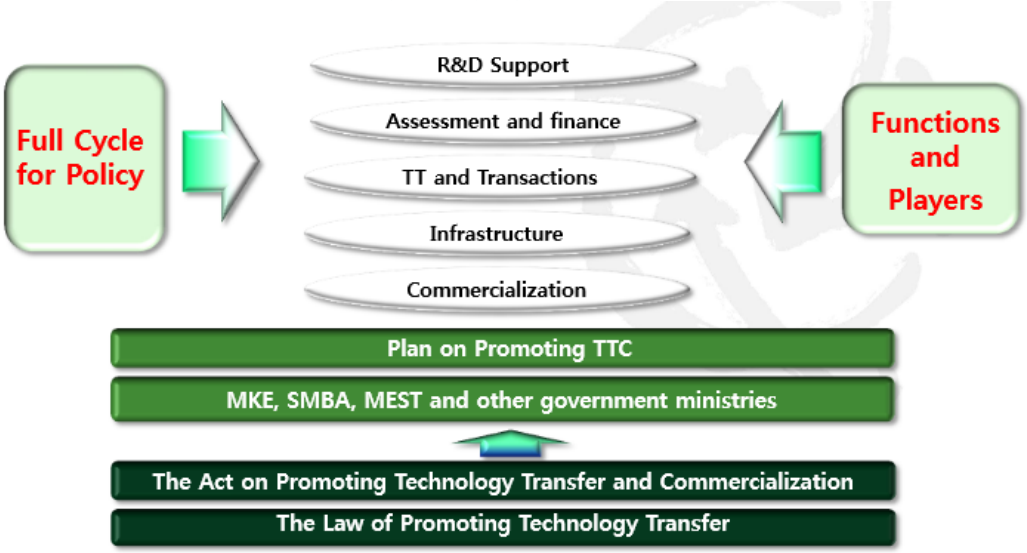
Korea ranked second among OECD member countries in terms of R&D spending to GDP with 4.1%, according to the OECD Science, Technology and Industry Scoreboard 2015. This is due to an effort of the Korean government expanding its R&D budget from 14.9 trillion KRW (approximately 12 billion EURO) in 2011 to 18.9 trillion KRW (approximately 15 billion EURO) in 2015. Among this budget, 65% is funded in public research institutes and universities. However, the developed technologies are not likely to transfer to companies for commercialization. In order to solve this problem Korea Technology Finance Corporation (KOTEC) has established an innovative technology transfer platforms for SMEs to promote open innovation and monetize of R&D results.

Fig. 78. *Technology policy in Korea*



Source: KOTEC

Fig. 79. *The policy flow chart*



Source: KOTEC

Target audience

Public research institutes; Universities; Industries

Requirements

N/A

Process by which the initiative operates

1) Initial design of the programme.

Credit guarantee system was first institutionalized in 1961 in Korea. Since then, the credit guarantee system has been playing its due part for overall Small and Medium Enterprises (SMEs) sector to lessen the problem of lack of financial resources due to banks' prevalent collateral-based lending practice.

In the 1980s, the necessity to promote SMEs with the orientation of technology or other source of innovation capabilities separately from general SMEs newly arose to nurture competitive advantage of the overall economy for the future growth, and the national consensus was reached.

As a result, KOTEC was founded in 1989 by the Korean Government as a non-profit credit guarantee institution under the special enactment, "Financial Assistance to New Technology Businesses Act" which went through a full-scale revision and was newly titled "Korea Technology Finance Corporation Act." in 2002.

KOTEC is now a specialized institution in providing full scale supports to SMEs and venture businesses with competitive technology, innovation, and other knowledge-based business contents at all growth stages. The mission of KOTEC is to take a lead in converting Korean economy to be creative and innovative.

2) Market/sale respectively motivation of the target group and intermediaries.

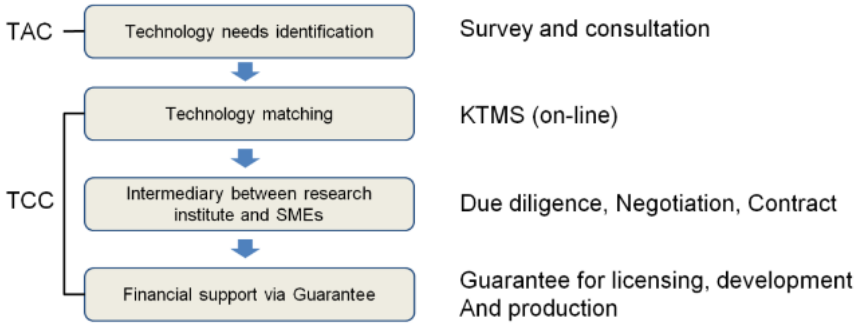
Useful tool for national & foreign organizations or companies to find advanced Korean technologies, as well as for technologies creators to disseminate their product.

3) Actual delivery within the agency.

In order to increase the technology transaction, KOTEC has developed an intermediary service to find the most appropriate technologies for requested parties. This is an online base service which is called KT MS (Kibo Technology Matching System). The process is developed in to 4 steps:

- First, the Technology Appraisal Centre (TAC), the branches of KOTEC, will have a survey and a consultation to the requested party in order to identify the technology needs. The TAC consists of 162 PhD degree specialists, 593 technology appraisal experts and 10 Certified Public Accountant (CPA), and the centre is spread all around the nation in 54 different locations.
- Second, the Technology Convergence Centre (TCC) specialized in intermediary services will communicate with the requested party both online and offline. The centre will use the KTMS online platform to search on the requested technologies.
- Third, utilizing the KTMS, the Technology Convergence Centre will find the most appropriate technologies for the requested party. Most of the offered technologies are developed by research institutes or SMEs. If the technology matches, the centre will support due diligence, negotiation and contract related works.
- Finally, KOTEC will financially support the requested party with the guarantee to loan for licensing, development and production. There are 239,057 offered profiles and 999 requested profiles available at the KTMS website (only available in Korean): tb.kibo.or.kr

Fig. 80. *Intermediary services of KOTEC*

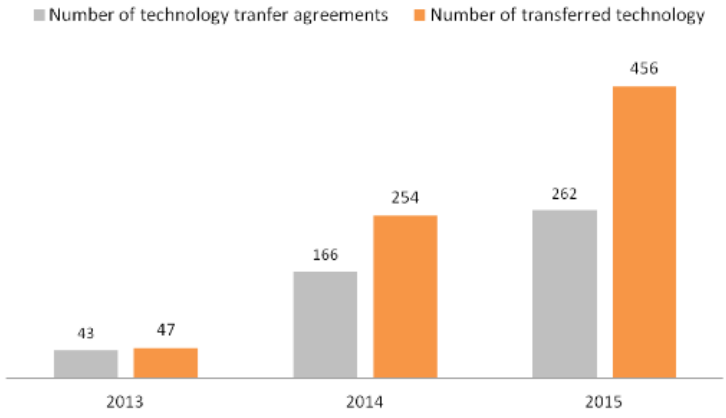


Source: KOTEC

4) Monitoring, evaluation and impact analysis of the scheme

In 2014 KOTEC achieved the most remarkable achievement since it first became involved in the business of technology transfers in 2001, with 166 cases of technology transactions for 254 technologies. The number of technology transfer agreements in 2015 grew by 57.8% over 2014. In the last two years, after the development and utilization of KTMS, 710 technologies were transferred and licensed to Korean SMEs.

Fig. 81. *KOTECs achievements progress 2013-2015*



Source: KOTEC

One of the success cases of this system is transferring the Electronics and Telecommunications Research Institute (ETRI)'s technology to a Korean SME called Macrograph. In November 2014, KOTEC worked as an intermediary and provided a Guarantee service to the SMEs in order to receive licensing agreement from ETRI. The technology was about formation and reconstruction of the multi - point of view computer graphics (CG). This technology was applied to two famous Korean movies. Due to this technology, the company reduced the CG production time up to 30%, created job up to 61 positions and increased the revenue up to 5 billion KRW (approximately €3.9 million).

KTMS is also a great tool for foreign organizations or companies to find advanced Korean technologies. This system enables requested party to find the most appropriate technologies. In addition, KOTEC will guarantee the technology and provide a financial support for Korean companies to collaborate with foreign organization or companies.

Estimated costs and other resources needs

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

4.7 MALAYSIA NATIONAL INNOVATION AGENCY: SIX APPROACHES TO INNOVATION

Brief description of the measure

Agensi Inovasi Malaysia (AIM) is a statutory body set up by the Government via AIM Act 2010, with the primary purpose of being the driving force behind Malaysia's push towards establishing an "innovation economy" and the country's aspirations of achieving a high-income nation status. AIM was created to jump start wealth creation through knowledge, technology and innovation to stimulate and develop the innovation eco-system in Malaysia. AIM lays down the foundation of innovation that inspire and produce a new generation of innovative entrepreneurs. AIM facilitate collaborations between government, academia and industry in advancing the consolidation and execution of new ideas in innovation.

Target audience

Students, teachers, schools, fresh graduates, academics, industry, government, SMEs and large enterprises

Requirements

N/A

Process by which the initiative operates

1) Initial design of the programme.

AIM has adopted six (06) approaches to innovation:

1. CULTIVATING A THINKING CULTURE
    a. Equipping Malaysia's next generation with the ability to think critically and creatively via programmes such as ***i-THINK***, ***IB*** and ***Genovasi***;
    b. These programmes are designed to enhance thinking skills for our primary and secondary school children and also design thinking for graduates;
    c. These programmes will also help foster a culture of innovative and critical thinking among youths and as such create a seamless creative pipeline for future innovations.
2. INNOVATION FOR AND BY SOCIETY
    a. Challenging youths on ***UReka.my*** to innovate, and guiding them through a process of ideation, prototyping, piloting and implementation;
    b. Crowdsourcing successful income generation models among micro-entrepreneurs and replicating to more people through a ***Gigih mentoring network***;
    c. Mobilising social finance to leverage social NGOs to collaborate with government and the private sector to transform social intervention and service delivery.
3. FACILITATE INDUSTRY-ACADEMIA COLLABORATION
    a. Catalysing greater collaboration activities between industry and academia to generate commercial-ready Ps via ***Steinbeis Malaysia***;
    b. These programmes will help the public to promote innovations, transfer knowledge and facilitate collaborations between Government, Rakyat, Academia and Industry to create a truly open innovation culture;
    c. These programmes also provide alternative innovative platforms for the industry (particularly SMEs) to engage the academia to solve real business needs.
4. TRANSFORMING STRATEGIC SECTORS
    a. Defining national strategies to transform strategic sectors of the future via programmes such as the ***National Biomass Strategy 2020*** and the ***National Graphene Action Plan 2020***;
    b. These programmes will deliver a national strategy to transform Malaysia into a global hub for biomass and a roadmap for strategic choices into competitive application areas with graphene as a key enabler.

5. INNOVATING ORGANISATIONS
    a. Providing support to mid-sized and large organisations on innovation via programmes such as the Mid-Tier Development Programme, ***National Corporate Innovation Index*** and the Intellectual Capital Future Check;
    b. Innovating organisations by providing support to mid-level and large organisations to make the jump to the next level and seek returns on innovation.
6. CATALYSE COMMERCIALISATION
    a. Making selective investments to catalyse new ventures (future innovation leaders);
    b. Creating platforms to monetise Malaysia's existing intellectual properties;
    c. Programmes such as ***Equity Investments*** and ***PlaTCOM Ventures*** will see AIM helping to create global success stories by working with companies that show potential to commercialise world-class innovations;
    d. The ***1Dana portal*** will be the central source of information for funding programs and public R&D facilities in the country. It will also be used for monitoring and evaluation of the effectiveness of the funding programmes.

2) Market/sale respectively motivation of the target group and intermediaries.

AIM stimulates innovation in Malaysia to help achieve Vision 2020 in the following ways:

- Direct/Indirect Investment - Produce direct (e.g. GNI) results and spur indirect (e.g. quality of life) outcomes;
- Quadruple Helix - Work with Government, Rakyat, Academia and Industry;
- Catalysing Role - Joint partnership to drive innovation and change;
- Multi-model Approach - Ranging from facilitating collaboration to transforming strategic sectors;
- Outcome Oriented - Held against measurable milestones and targets.

3) Actual delivery within the agency.

Fig. 82. *Description of iTHINK*

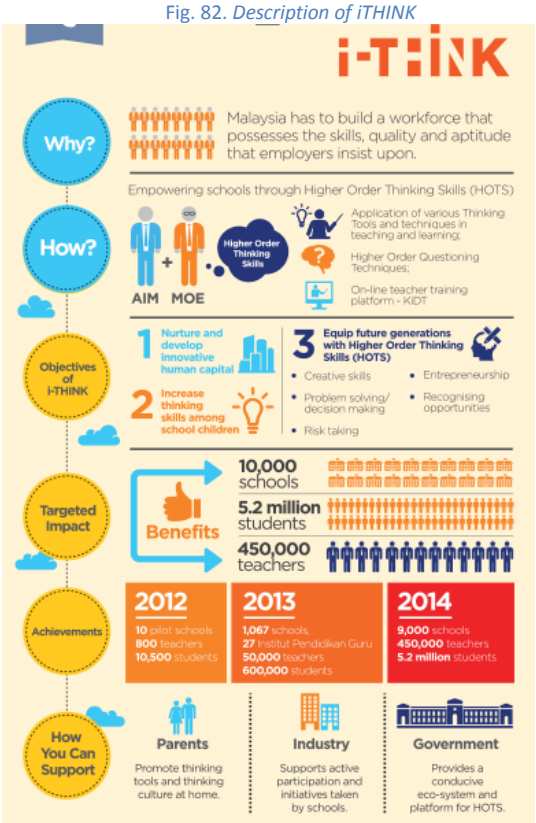


Fig. 83. *Description of IB*

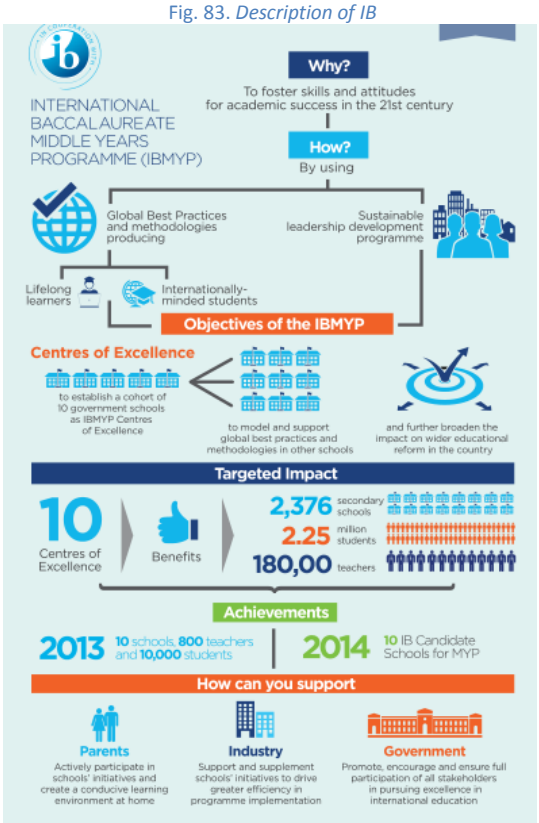


Fig. 84. *Description of Eureka.my*

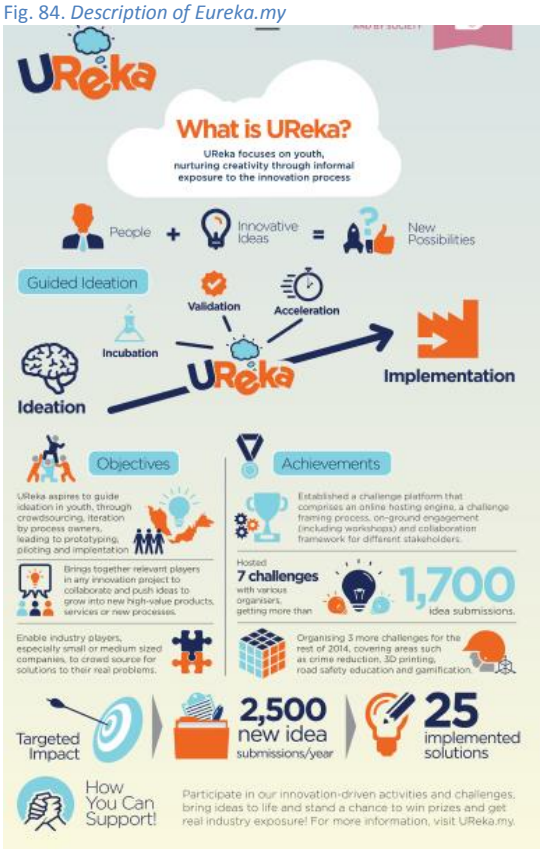


Fig. 85. *Description of GiGH*

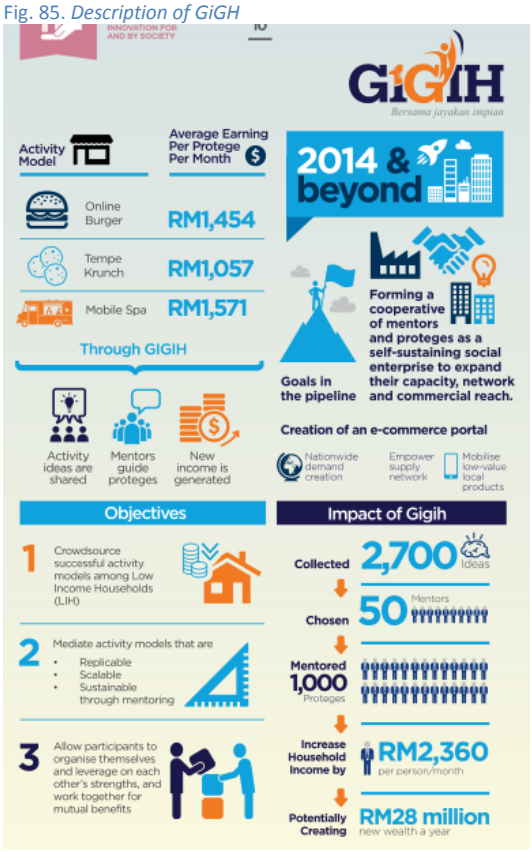


Fig. 86. *Description of Steinbeis*

Fig. 87. *Description of National Biomass Strategy 2020*

Fig. 88. *Description of National Graphene Action Plan 2020*

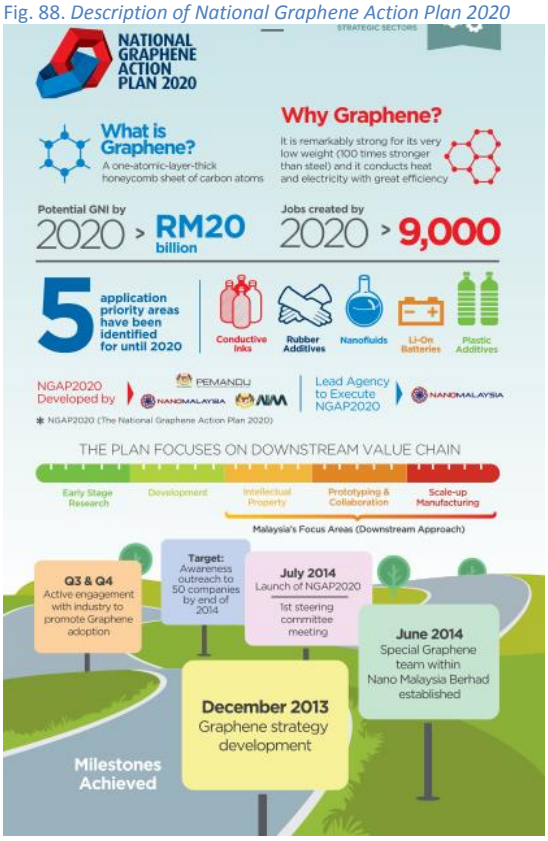


Fig. 89. *Description of National Corporate Innovation Index*

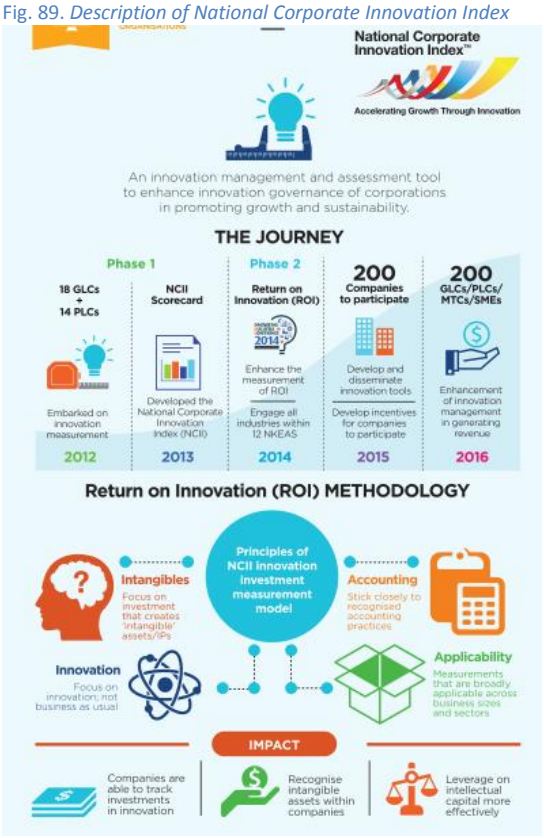


Fig. 90. *Description of ICFC*

Fig. 91. *Description of PlatCOM Ventures*

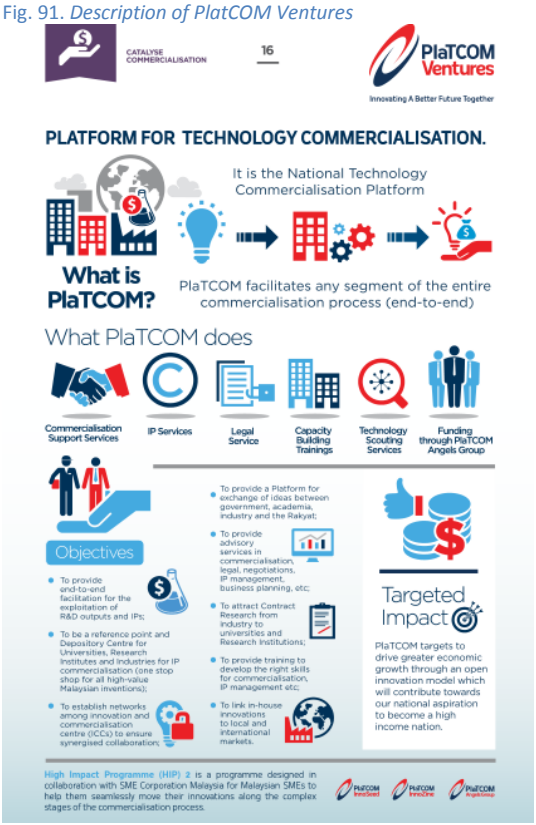


Fig. 92. *Description of 1DANA*

4) Monitoring, evaluation and impact analysis of the scheme

The impact of the projects taken by AIM are as follows:

- By 2014, 9,000 schools, 450,000 teachers and 5.2 million students came under ***iTHINK*** project in order to equip future generations with Higher Order Thinking Skills (HOTS)
- By 2013, 10 Schools, 800 teachers and 10,000 students came under ***International Baccalaureate Middle Years Programme (IBMYP)*** and in 2014 there are 10 IB candidate schools for MYP
- 717 graduates for ***Genovasi*** design thinking school.
- ***Ureka*** Programme established a challenged platform that comprises an online hosting engine, a challenge framing process, on-ground engagement and collaboration framework for different stakeholders. The programme so far hosted 7 challenges with various organisers getting more than 1,700 idea submission.
- ***Gigih*** so far collected 2,700 ideas, chose 50 mentors, and mentored 1,000 protégés, increased household income by RM2,360 per person/month, potentially increasing RM28 million new wealth a year
- ***Steinbeis Malaysia Foundation*** is modelled after Steinbeis Foundation of Germany. The target is to create 2,000 high-knowledge employees.
- ***National Biomass Strategy 2020*** programme launched in end of 2011. In March 2012 it launched *1MBAS* – one stop access for Malaysian biomass owners and downstream companies. In 2013 it created *Biomass JV Cluster Concept* and formed *Pellet Association of Malaysia (PAM)*. In 2014 it established *Brooke Renewables, Lahad Datu Biomass JV Cluster Berhad*.
- ***National Graphene Action Plan 2020*** identified 5 application priority area. Developed graphene strategy in 2013. Launched *NGAP 2020* and established special graphene team *Nano Malaysia Berhad*.
- ***National Corporate Innovation Index*** is an innovation management and assessment tool to enhance innovation governance of corporations in promoting growth and sustainability. In phase 1, 18 GLCs and 14 PLCs participated and NCII scorecard developed. In phase 2 all industries were engaged within 12 NKEAs. Companies are now able to track investments in innovation, recognise

intangible assets within companies, Leverage on intellectual capital more effectively.

- ***Intellectual Capital Future Check (ICFC)*** is a tool to evaluate intellectual capital for the purpose of organisational development. The programme increased financing opportunities for firms, especially SMEs. Potential innovative companies started focusing on intellectual capital instead of solely relying on tangible assets. It helped minimising financial institutions' risks as they could evaluate their customers more effectively using ICFC.
- ***Platcom Ventures*** is the national platform for technology commercialisation. It targets to drive greater economic growth through and ***Open Innovation (OI) model*** which will contribute towards Malaysia's national aspiration to become a high income nation.
- ***Equity Investments*** invested RM2.0 Million on ANOMAX, the world's first integrated plated circuit heat sink (IPCHS) to be used in street lamps, high bay lights, low bay lights and flood lights. It invested in iGene to commercialise digital autopsy technology with 3D visualisation system. It also helped *KLSMC* to commercialise regenerative knee cartilage using autologous step cell technology. It invested on *Qeos Technology* to commercialise fiber optics communications solutions based on the *Tilted Charge Dynamics* technology platform.
- ***1DANA*** was created under the purview of Jawatankuasa Pelaburan Dana Awam (JKPDA). JKPDA started the first R, D&C evaluation in 2013. To date JKPDA has evaluated more than RM2.5 Billion worth of R, D&C projects and programmes where RM 650 Million worth of R, D&C projects and programmes for 2014/2015 have been identified for streamlining.

Estimated costs and other resources needs

No information available regarding this aspect.

For more detailed information on the measure described see Annex I

5. GOOD PRACTICES ADOPTED BY THE PARTICIPATING ORGANISATIONS

Based on the new **innovation support to SMEs in TT measures compiled and analysed** up to this moment, **the Tetragon partners proposed several good practices** for the adoption in their regions. These, are also focused on three areas prioritized by TETRAGON:

- To foster an **entrepreneurial environment at universities and research centres** in order to increase the creation of spin-offs and to improve the exploitation of technology by existing companies.
- To foster **demand driven collaborative projects**, between public researchers and private SMEs
- Looking for **innovative ways of licensing**: including open source, open innovation and user innovation

Fig. 93. Classification of the innovation support measures per specialization area

No.	Region	Measure	Area
5.1.1	Galicia (Spain)	"Digital Innovation Hub" for the Galician Agri-Food Industry	Demand driven collaborative projects
5.1.2	Galicia (Spain)	IGNICIA Programme	Demand driven collaborative projects
5.2	Flanders (Belgium)	Imec 101 pre-incubation programme	Foster entrepreneurial environment and license deals at universities and research centres
5.3	Zlín (Czech Republic)	The Open Innovation System	Innovative ways of licensing

Source: Tetragon

5.1 GALICIA (SPAIN)

5.1.1 "DIGITAL INNOVATION HUB" FOR THE GALICIAN AGRI-FOOD INDUSTRY

Brief description of the measure

The advance of digital technologies such as Internet of Things (IoT) and Data Analytics (including Big Data), are acting as a lever for the transforming of the activity in the primary sector by making it smarter. This is generating changes across the whole value chain, such as: operation planning, optimization of resources, reduced environmental impacts, traceability, production efficiency, or coordination between actors within the supply chain.

Although all EU regions could benefit their rural economies with the adoption of smart technologies, this is particularly true in Galicia, where the weight of the agrifood sector in its GDP is significantly higher than the European average.

For the success in the adoption of these innovations, all the stakeholders involved in the sector have to work together in a coordinated manner to seize opportunities. The first step in this process is to establish what the EC calls a **Digital Innovation Hub at European level in the agrifood sector**.

Several entities are moving forward in order to achieve this goal: mainly Gradiant, as chairman of the Working Group on Smart Farming and Food Security in the European Alliance for Internet of Things Innovation (AIOTI), and the Santiago de Compostela University, with the collaboration of key entities such as

GAIN, in order to translate and transfer this technological rising trend to the reality of Galician primary sector.

Gain's role is to ensure that the decisions made in the design and implementation of the measure fit with regional policies and see if any revision of the Operational Programmes is necessary. Gain will also represent the Hub before the S3 Platform of the EC to guarantee the fit of the actions.

Target audience

Stakeholders involved in the sector: producers, food processors, machinery suppliers, engineering firms, knowledge and research centres and Public Administration.

Requirements

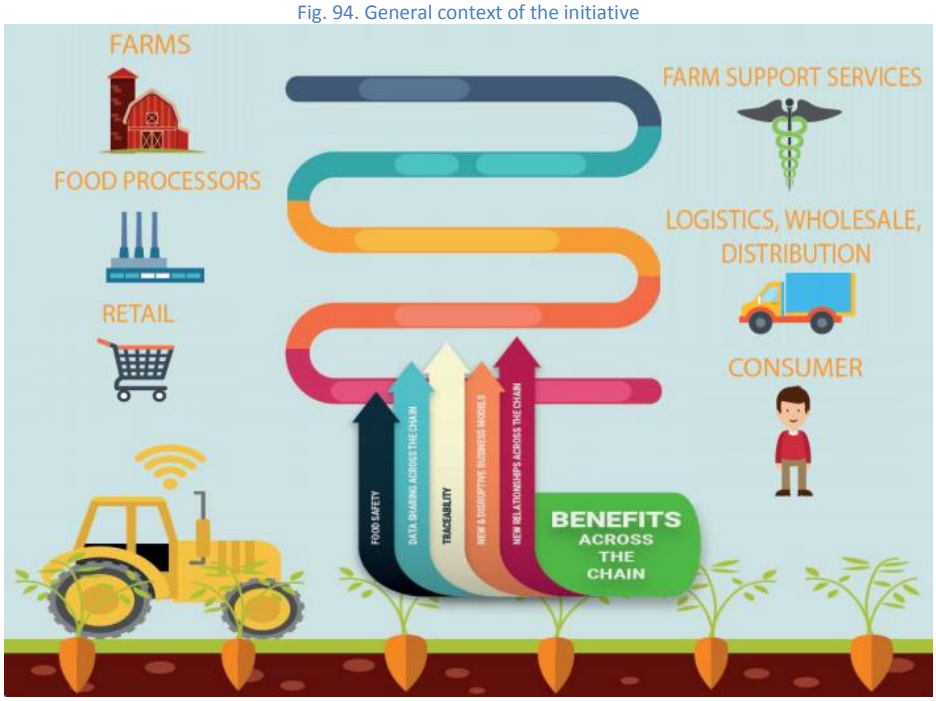
Establish the Digital Innovation Hub's governance and implementation model

Process by which the initiative operates

1) Initial design of the programme.

This joint initiative of the USC and Gradiant aims to establish open and agile collaboration dynamics, in order to achieve a greater competitiveness in the agrifood sector, to expand business opportunities, and furthermore to increase the export potential of technology providers; plus generating new possibilities for the capitalization of the existing R&D knowledge in Galicia.

Fig. 94. General context of the initiative



Source: EC

The process for the positioning of Galicia as Digital Innovation Hub in Smart Farming requires bringing together all the agents involved, in order to establish a starting point and the basis for the collaboration, as well as an analysis of cases of success in the adoption of digital innovation solutions by the agrifood sector. At this point GAIN and other regional public entities provided guidance on how this process of transformation is faced by the Administration, and what support mechanisms are being implemented.

Also, the process has involved the participation representatives of the European Parliament and the executive of Galicia, as well as representatives of producers of agricultural machinery and European agricultural cooperatives, with the organization of a high level panel focused on the adoption of digital

technologies in the European agricultural sector. This panel was followed by a workshop gathering representatives of the European Commission, about AIOTI's recommendations for large scale pilots. Such recommendations are the first results of the work of AIOTI, the Alliance called to lead innovations and deployment of the Internet of Things (IoT) technologies in the coming years.

2) Market/sale respectively motivation of the target group and intermediaries.

The Digital Innovation Hub for the Galician agrifood industry allows, on the demand side, the confluence between the productive and the transforming sectors, open to the incorporation of technologies and services, adapted to their reality and; on the offer side, allows the combination of both technology and services vendors, along with Centres of Knowledge and Innovation, to develop market-oriented solutions.

3) Actual delivery within the agency.

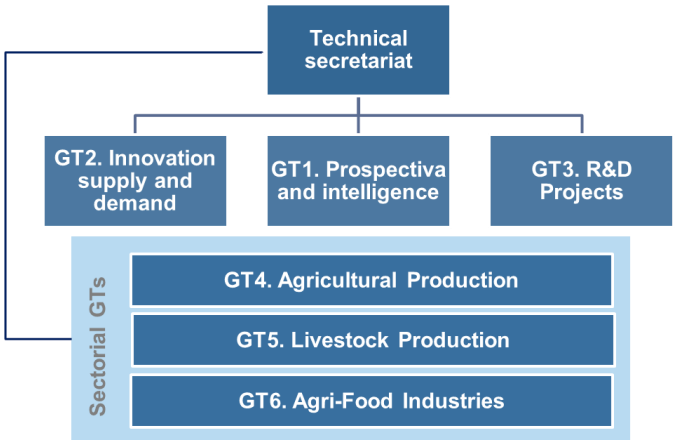
This Technology Transfer practice will allow the **use of ICT applications throughout all the supply chain of the agrifood sector**:

Fig. 95. Supply chain applications of the initiative

Source: Initiative proponents

The best way to understand the actions developed by this good practices is to first analyse its structure and governance:

Fig. 96. Governance of the initiative



Source: Initiative proponents

GT1. Prospective and intelligence: this task group plays the role of space for reflection and internal study to design strategic priorities and the main lines of action:

- Coordinating the activities and defining the action plans
- Requesting studies to identify the unique characteristics of the Agrifood sector in Galicia and the potential of ICT;
- Analysing Trends in the technology and agrifood sector;
- Working with the administration in the definition of policies and instruments to support the

implementation of ICT in the agrifood sector.

GT2. Innovation supply and demand: space of interaction between the technological demands of the food industry, and the supply of potential innovative solutions as well as the identification of opportunities:

- Creating a platform for cross between supply and demand for innovation;
- Matching between users and developers;
- Experimentation, demonstration and validation of potential innovative solutions;
- Identification of project ideas and solutions for R&D.

GT3. R&D Projects: R&D: facilitate, monitor and stimulate the emergence of new R&D projects:

- Search and advice on funding opportunities for the project ideas at regional, national and international level;
- Partner search and matching for the development of collaborative projects;
- Support and advice in the preparation of project proposals;
- Streamlining of key projects.

Also, a sectorial division for the **Agricultural and Livestock Production, and Agrifood Industries** (**GT 4, 5 and 6**) allows a more specific design of measures, structuring capabilities and needs around their value chains;

- Potential activities:
- Collect, synthesize and disseminate best practices;
- Identify sector problems and opportunities
-

4) Monitoring, evaluation and impact analysis of the scheme

The implementation of an innovation hub for the digital food industry summarizes the key roles that agricultural production, livestock and food processing play in the economy as a whole. Also, this initiative also contemplates two priorities already included in Smart Specialisation Strategy of Galicia (Galician RIS3).

Estimated costs and other resources needs

No information available regarding this aspect.

5.1.2 IGNICIA PROGRAMME

Brief description of the measure

During the analysis of the Technology Transfer Regional Success Measures (see 3.1.3 section of the present document), a good practice implemented by Fundación Barrié, the "Barrie Foundation Research Seed Fund" was described. Taking inspiration in that practice and other elements that the organization came across with during the elaboration of this Design Options paper, constituted the basis for the joint work, during the second half of 2016 and 2017of the Foundation with the Galician Innovation Agency (GAIN) to reproduce and improve the model developed.

The result of this collaboration is the **IGNICIA Programme**, launched by the Government of Galicia at the end of 2016 in order to support the transfer of research to the market, in the firm belief that there are a large number of projects led by Galician researchers with commercialization potential.

Fundación Barrié and GAIN have a confluence of visions that made possible the undertaking of this initiative:

- Facilitate the transfer of research results to the market.
- Accelerate and increase success in technology transfer processes
- Support the cultural change in science
- Encourage public-private partnership

Target audience

Galician researchers and Galician knowledge centres.

Requirements

Projects that address testing or subsequent actions to obtain the result of research that seek to be exploited:

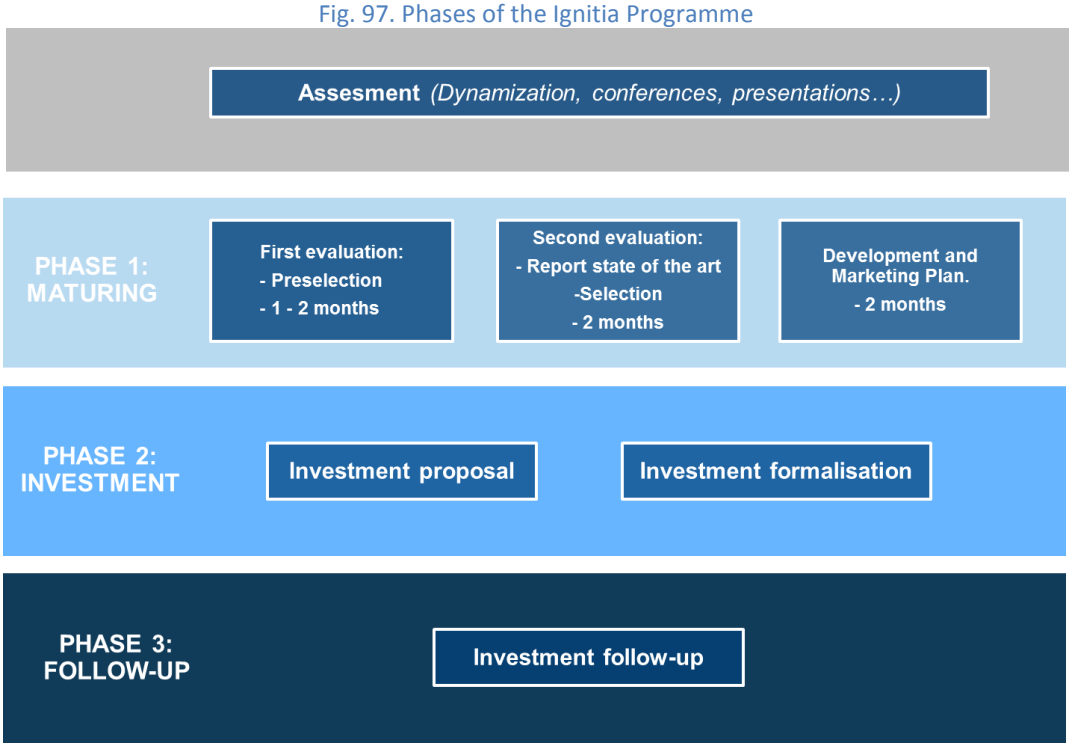
- Projects with results with potential transfer and generation of economic returns in the short/medium term.
- Ability to generate results with application in society.
- With teams committed to marketing and transfer.
- TRL 4 or higher
- To be developed by research organizations (public and private) in Galicia.

Process by which the initiative operates

1) Initial design of the programme.

Three phases: **maturing, investment and monitoring**

Fig. 97. Phases of the Ignitia Programme



Source: GAIN

The selected projects will receive:

Reports:

- Report on the state of the art supported by international experts (for 25 projects).
- Plan for development and marketing + legal audit report (DDL).

Support:

- Expert advice.
- Contact with potential partners.
- Identification and contact with customers.

Investment:

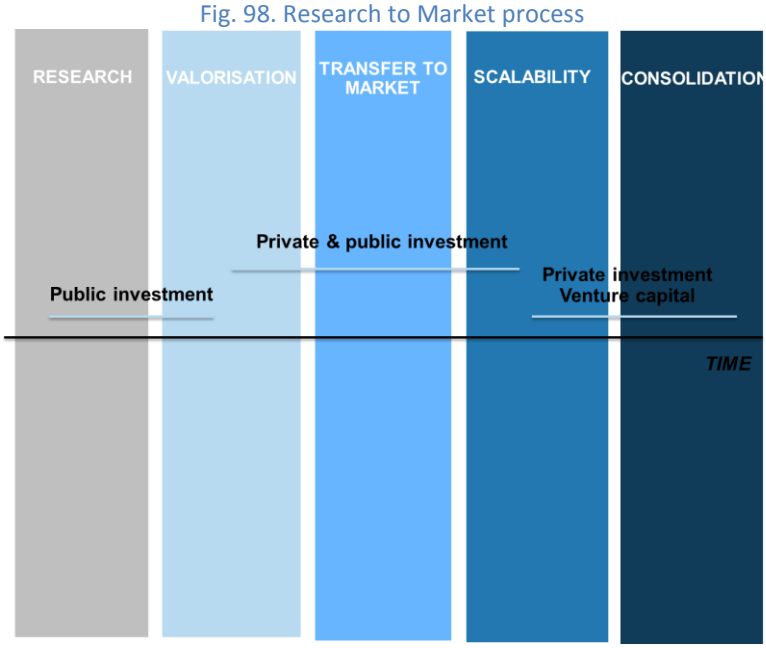
- Assumption of the first expenses.
- Contribution to the project costs.
- Possibility of entering the capital.

Follow-up and monitoring:

- Support throughout the marketing / commercialization process.

2) Market/sale respectively motivation of the target group and intermediaries.

Fig. 98. Research to Market process



Source: GAIN

3) Actual delivery within the agency.

In this first edition a total of 32 projects promoted by Galician knowledge centres were presented. The **selection process took place in two phases**, with the participation of technicians from GAIN and Barrie Foundation, accompanied by international experts from Oxford University Innovation, reference worldwide in the field of technology transfer.

In the first phase 25 proposals were selected which received a report on the quality of science in terms of protection, property and commercial viability and resulting information and recommendations on the state of technological maturity. The second phase, which included interviews with the research teams resulted in the final selection of the first seven projects of the Ignicia Programme investment phase.

Of the seven projects selected, three were presented by the University of Santiago (Matprint, related to 3D printing of bioceramic implants and chemical catalysts, and Oncometa Reprosteatosis, both to develop new drugs); three others from the University of Vigo (BIOFAST, for obtaining a biomaterial for bone regeneration from shark tooth; Ubismart linked with mobile applications, and XHS Platform, with nano- and provision of commercial services); and a seventh through Gradiant (Face Idnn, biometric verification for online).

The teams continue to receive, for about two months, expert advice for the preparation and improvement of a development plan and marketing strategy and legal protection, as a prelude to the completion of the investment. Investors which can exceed the overall figure of 2M€ (around 200.000€ per project), will finance the costs necessary to develop commercial applications of technologies and will be subjected to the fulfilment of milestones.

4) Monitoring, evaluation and impact analysis of the scheme

This initiative is expected to have a considerable socioeconomic impact:

- Alignment with RIS3 to Galicia.
- Impact on Galician productive sector and a high degree of mobilization of private investment.
- Potential for job creation in Galicia.
- Important size of the anticipated returns once the innovation is marketed

The Government of Galicia, which shares the risk of each initiative and at the same time ensures their participation in the possible benefits, complete this with other measures that seek to enhance the transfer of knowledge, making sure there are no overlaps.

Estimated costs and other resources needs

The programme has a budget of seven million euros until 2020.

REBECA GUERRA GARLITO PROJECT MANAGER, INNOVATION & TECHNOLOGY TRANSFER AT MRI-INTERNATIONAL AND KNOWLEDGE INNOVATION MARKET (KIM)

What do you think about this measure? What are the positive aspects? What are the negative aspects?

I think Ignitia programme is very interesting and most of Galician organization can use the public funding for technology transfer activity and to bring the technologies closer to the market.

What impact could they generate? If there is a good communication campaign, most Galician organization might applied to it. It will bring benefits to the region and to the companies. If there are more project running within the companies more jobs will be generated.

5.2 FLANDERS (BELGIUM)

5.2.1 IMEC 101 PRE-INCUBATION PROGRAMME

Brief description of the measure

The imec 101 programme is a pre-incubation initiative from imec. Target population are imec researchers, doing a PhD or post-doc with a technology that might have market potential. For a duration of 12 weeks, with (at least) 1 day a week spent on the project by the participating team, imec researchers get the chance to 'get out of the building' to assess the market potential of their technology. There is 1 dedicated hands-on lead to coach the team. The programme consists of 3 chapters with clear tasks and deliverables per chapter. During this period there is regular reporting on findings and progress and an evaluation per chapter. After each chapter the team reports and presents its findings to the steering committee. The steering committee brings together all the different stakeholders (imec mgmt., imec experts, researchers, promoters (professors) and TTO representatives). The funding consists of the support and coaching by the experts. There is also a limited budget (5k EUR) available per team for traveling and other relevant expenses during the process.

Target audience

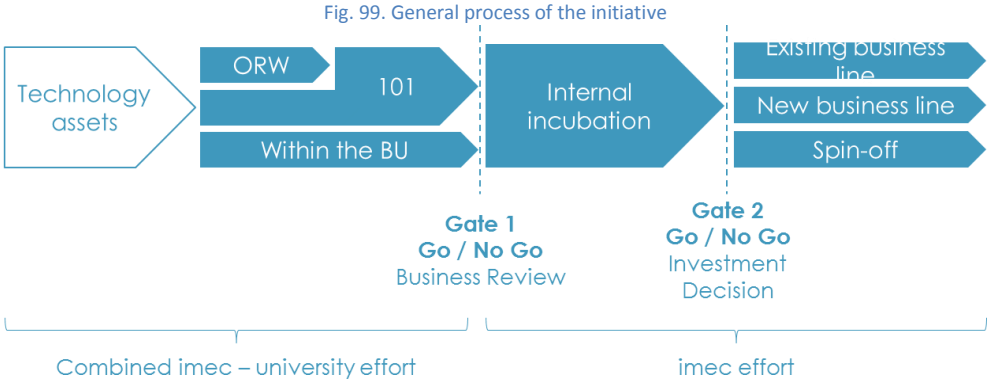
Imec PhD and post-doc researchers

Requirements

- Researchers are enthusiastic and eager to investigate the commercial potential of their work
- Promoter / professor supports the researchers in this ambition (e.g., can spent 1 day a week on the project)
- All stakeholders are involved, including the university TechTransfer Office
- imec (co-)owns the IP (so at least 50/50 share of costs and revenue)

Process by which the initiative operates

Fig. 99. General process of the initiative



Source: IMEC

1) Initial design of the programme.

The 101 programme is part of the larger product lifecycle management process within imec. It functions as a structured and guided pre-incubation trajectory that prepares the teams for a potential internal incubation process. All activities of the 101-programme are aimed at reaching gate 1 where a pitch is delivered to an executive jury of imec managers with a go/no go decision.

2) Market/sale respectively motivation of the target group and intermediaries.

The 101-programme would foster spin-offs with imec technology and stimulate the entrepreneurial skills of the researchers by having a rapid assessment of the market potential of the technologies. Besides spin-offs, a license deal or very clear technology transfer offer can also be the result of the process.

3) Actual delivery within the agency.

First, a little introduction on the agency structure for the clarification of who is responsible of the measure:
Imec is the world-leading R&D and innovation hub in nano-electronics (since 1984) and digital technologies from Flanders and is a trusted partner for companies, start-ups and academia. Since 2016, the new imec research institute is the result of the merger between the 'old' imec 'strategic research centre' and iMinds (Flanders' digital research & entrepreneurship hub). iMinds was a research institute founded by the Government of Flanders, Belgium, focusing on applications of ICT and broadband technology. It was composed of 21 top-of-class research groups, divided over five research departments, and involved the entire Flemish media and ICT business community, with more than 1.000 researchers from the five largest Flemish universities (Ghent, Leuven, Brussels, Hasselt and Antwerp) and a central staff of more than 100 people. Now, since the merger, the 'old' iMinds is one of the three business units of the new imec and is also referred to as 'imec.Ghent'.
The 101 programme is situated among 'imec.Ghent', but also involves people from all over imec, and it consists of three chapters:

- **Chapter I:** Value proposition + market study (week 1-4)
  Kick-off with all teams (learn from each other)
  Business plan for dummies
  First ideas on value promise and customer segments
  Assumptions
  Clear calendar
- **Chapter II:** Validation of findings chapter I (week 5-8): user and expert interviews
- **Chapter III:** Planning and financials + delivering final pitch (week 9-12)

4) Monitoring, evaluation and impact analysis of the scheme

The goal of the 101-programmeis to foster imec spin-offs and license deals. For the first execution of the 101-programme in the new imec organisation, 4 ex-iMinds teams participated in this programme, whereas 6 other teams also pitched at Gate 1 without following the 101-programme. The jury was unanimous in their comment that the 101-teams pitched significantly better than the others. Their value propositions were much more concrete and their validation examples more convincing

Estimated costs and other resources needs

The costs for the 101 were about 2K expenses for the teams to accommodate travel and other costs for the interviews and e.g. buying market reports.

Other costs per team: 1 dedicated imec-coach for 1 day/week during 3 months. 1 Living Lab expert as support for 0.5 days/week during three months.

The team itself is expected to dedicate 1day/week for three months.

Brokers' feedback on the proposed measure

Two of the Technology Brokers interviewed for the project gave their insights on the measure:

STANISLAS DE VOCHT. TECH TRANSFER AND TECHNOLOGY BROKERING RESPONSIBLE AT IMEC (EX-IMINDS):
What do you think about this measure? What are the positive aspects? What are the negative aspects?

Positive: I think the most positive aspects are the fact that the researchers are given some kind of structure to further develop and explore the potential of their research for the market. This structure is provided by

the clear deadlines and concrete deliverables that are expected. This forces them to balance between in-depth investigation and 'quick & dirty' validation. Also, I think the involvement of all stakeholders is positive. In the teams it is possible for example to resolve IP discussions, as there are experts available, there is also decision power from the research institute, which gives concrete opportunities to actually develop the market possibilities after the consecutive 'stage gates'.

Negative: There are still different tools and instruments to assist the researchers and the teams in the process. This requires openness between the different stakeholders in the teams and involved in the process. Also, the projects have different levels of maturity, how are they comparable? And how should the process differ, if it should differ at all? Also, the 'what's next?' is not entirely clear yet. This needs to be resolved as it is the most important incentive to participate. This kind of approach is also very dependent on the motivation of the researchers. If this is not the case, then the flipped tech transfer (Flipped TT) process is better suited. The process makes sure you have structure, but makes it less flexible.

What impact could it generate?

All participating researchers develop entrepreneurial skills in short period of time (12 weeks).The investment decision is backed up with data of the process. This allows to 'kill it faster' and invest more focused in promising technologies and research. It allows to get a feeling of the potential in a short, but focused time span. This would facilitate more spin-offs, spin-outs and flipped technology transfer, as the tech transfer budget and resources can be spent more efficiently.

For the stakeholders involved, we gathered a lot of positive reactions when pitching the 101-process to them. All the universities had a very positive reaction, as they like it that they are involved in the process. The professors are happy, as the process is not too long (12 weeks 1 day/week), so the researchers are not too distracted from publishing. The researchers are happy, as right now, they do not know how to start. The dilemma gets solved for them in a short period, the choice between becoming an entrepreneur or pursuing an academic career. The TTO offices are also happy, as a part of their work gets done during the process, but they are actively involved, as they can be part of the 101-teams. The research institutes are also happy, as they get faster indications on the probability of technologies and research for tech transfer.

PATRICK VANKWIKELBERGE. HEAD-BUSINESS DEVELOPMENT AT GHENT UNIVERSITY TECH TRANSFER OFFICE:

What do you think about this measure? What are the positive aspects? What are the negative aspects?

I think the 101 process is a very good start, but should be more strictly defined. At MIT, everyone knows the process, this is not the case yet at the 101. There are even posers with 'trust the process' at MIT. You should consider entrepreneurship as something you can learn, a process you need to go through and which requires you to get out of your comfort zone. With the 101-project that I followed, no one in the team is really willing to take the primary entrepreneurial role. You need leaders and enthusiasts to start a start-up. At MIT, there always is a leader that needs to find allies to create a strong, diverse and motivated team. With the 101, this team aspect should be elaborated more. The teams now are too much put together.

Second point is to explicit the process, document it clearly and evangelize it. Another point that is missing is the cohort effects of the teams involved in the process. This is the case with iStart, but by letting the teams know each other, they could share experiences and learn from each other, and motivate themselves. The multi-disciplinary aspect is positive for the 101-program, everyone has a certain role and expertise. However, the coaches are not always cast perfectly. They should be able to go deep into the technology, and this is not always the case yet. Some of the team members have this expertise and would be fit better maybe to be the main coach.

At the TT Office from Ghent University, we do not do something like this. The ten or so start-ups are not coached, but supported ad hoc and without structure. Monthly meetings are held, but this is not enough. This enables a lot of waste of energy and resources and demotivates the team. So the 101 tries to do something structured and therefore deserves credit, the TT Offices do not even try.

What impact could it generate?

The result could and should be more start-ups. The impact should also be that potential starters get motivation and coaching instead of funding, as funding gives them too much comfort and they need to get out of this comfort zoned. The funding stage gates should be mile-stone based, otherwise no funding, and milestones at least every six months, otherwise this is too long, with the continuous support of a dedicated coach. Essential is a milestone plan to guide you through the process and the right entrepreneurial attitude. At MIT, they use the slogan "You have to learn to be uncomfortable all the time." This sums it up nicely in my opinion.

PIETER-JAN GUNS. RESEARCH AND INNOVATION MANAGER FOR EGAMI AT UNIVERSITY OF ANTWERP:
What do you think about this measure? What are the positive aspects? What are the negative aspects? What impact could it generate?

In Antwerp, within the tech transfer activities, there is less time for this kind of projects and investigations. I personally think it is a good thing to let academic researchers reflect upon possible segments or target customers for their technologies, as in academic research, there is currently no time for that. The strongest part in the 101-process is the interviewing. This has to happen early stage. For academic researchers, some kind of a 'push' is needed in order for them to do this, as they are so busy with other work as well. Without this 'push', the majority will not engage in this market validation or potential customer exploration. The 101-process offers this kind of 'push', with concrete time pressure and deadlines. It is very intensive, and difficult to combine with the other work, but it can offer a lot of value. In the concrete case I was part of, the three milestones, one month each, are good, but the timing was not so good. Because of Christmas holidays and exams, the external pressure was high and this might have had some effects on the results. There was also a deadline for EU-projects, where I was part of. I handed in two projects in this time scope, so my personal involvement could have been higher.

The team itself that was part of the 101-process collaborated well and already had a history of working together. This made it easier to progress. However, in retrospect, there might have been some more involvement of PhD-students, as in the longer run, their kind of profile will be needed when the effective valorization is starting. The current team is too small to execute this.

I think in general for PhD students, this kind of process is very interesting. I would also take the coaching-based approach for them, perhaps with a little bit less instructions, but with a decent content base that they can use while progressing. There is demand for this amongst young researchers. In terms of experience, imec clearly leads in terms of the building of a business case. At Antwerp University, we are only 5 people, and you need some critical mass of people to run this kind of process.

5.3 ZLÍN REGION (CZECH REPUBLIC)

5.3.1 THE OPEN INNOVATION SYSTEM

Brief description of the measure

OTEVŘENÉ INOVACE
INOVACE 2

Inspired by Analysis of Technology Transfer Regional Success measures (section 3.1.3), and by the fact that in the region there are significant results of the research, although the transfer into a business reality is low and slow, since there is not really smooth communication between research centres and companies, through intermediaries or direct.

TIC ZLín wanted to support cooperation between research and business and also encourage technology transfer, acting as a facilitator and intermediary of TT, thus accelerating innovation. For this purpose the entity has adopted for the region the Open Innovation System.

This is applied mostly through a collaborative platform, where the entities looking for RTD or innovative solutions place innovation calls, and subjects offering solutions will meet in order to solve the given task.

The Open Innovation system will focused in the secondary economic sector (enterprises and manufacturing companies) as well as the tertiary sector (services and research).

The system will support TT to the region and probably result in an increase in regional TT transfer number.

Target audience

- Czech and Slovak (and prospectively Polish) research entities, with special attention to universities and research centres
- Companies of the ZLín region,
- Intermediaries and public bodies to make PR to the system

Requirements

Establishing a collaborative web based platform with individual support of TIC for all the participant and act as a virtual market of TT, transfer of RTD results and collaborative solution in order to make the most of the research and innovative potential of the ZLín region.

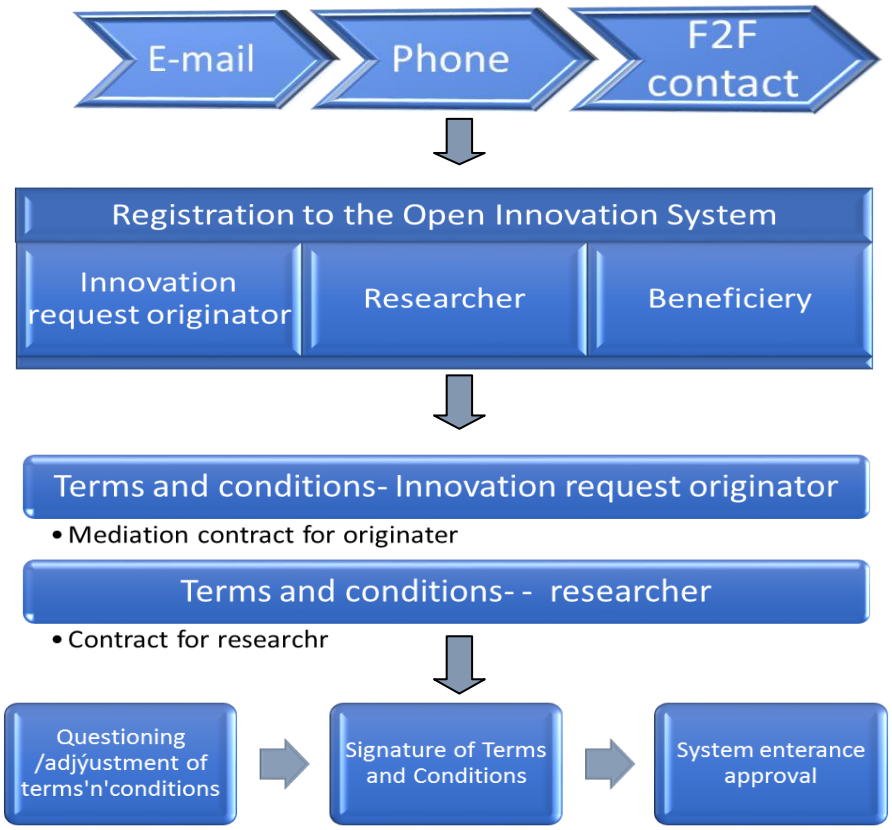
Process by which the initiative operates

1) Initial design of the program.

- Create a responsive and user friendly web www.otevreneinovace.cz
- Elaborate Open innovation manual
- Contact universities and research centres of the region and within to Czech republic to encourage them to join the system as “researcher”, e.g. solver of the placed innovation call
- Motivate companies searching for innovative solution acting as “innovation request originator ” to register their requirement for solution
- Contact TT or patents owners to encourage them to offer their property to the public and commercialize their Intellectual property

- TIC Zlín acting as Intermediary and facilitator of this process and the whole system

Fig. 100. Process for contacting prospect users



Source: TIC Zlín

Fig. 101. Entrance to the Open Innovation system by Innovation demanding subjects

Source: TIC Zlín

Fig. 102. Entrance to the Open Innovation system by researchers

Source: TIC Zlín

2) Market/sale respectively motivation of the target group and intermediaries.

- Time and money savings by outsourcing research and development services to get the most suitable solution to the given task
- Research centres are able to offer their capacities (HR and equipment) to the business sector
- Technologies and patents owners can commercialize them

3) Actual delivery within the agency.

TIC Zlín has launched the web site www.otevreneinovace.cz

All universities in the Czech republic were contacted, informed about the model and invited to the system

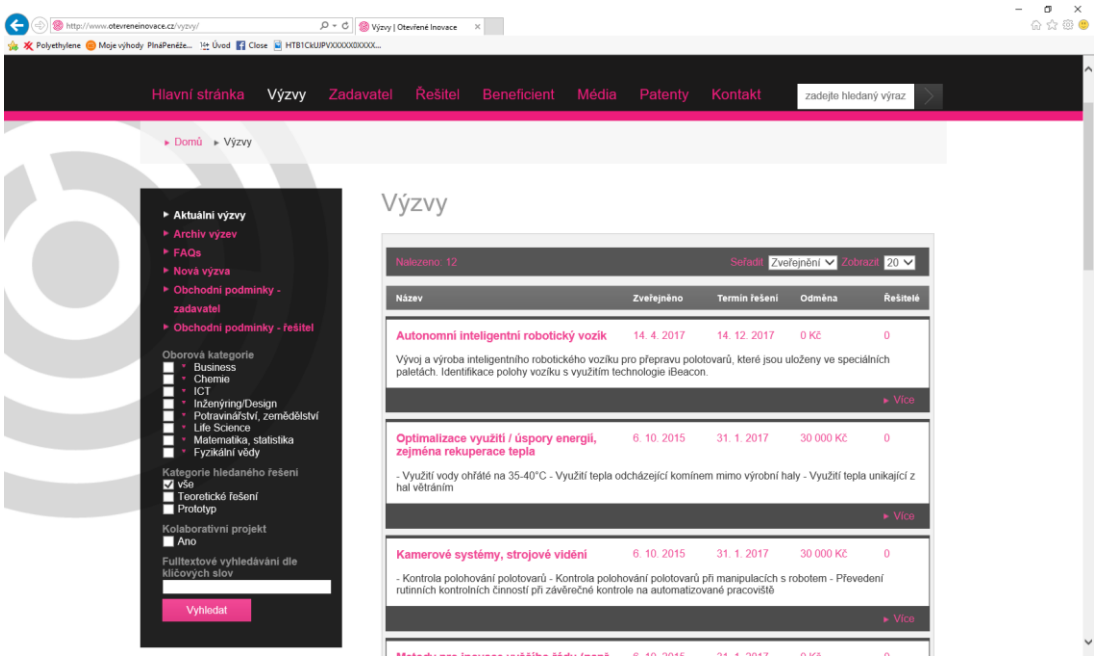
A pilot testing was done on closed platform with 11 companies, and also a pilot innovation call.

The closed platform was opened to the public and made available for all the research entities and companies searching the research or innovative solutions to their tasks and other companies were asked to join and place their calls (define an inquiry for research, development or innovative solution).

4) Monitoring, evaluation and impact analysis of the scheme

Currently there is free entrance for all participants and just provisions for the solved innovation call will be charged there are 26 Czech universities registered (out of 28) and 31 companies involved and ready to place their innovation calls when RTD or innovative solution are needed, also there are 12 innovation calls and 1 patent offered through the system at the moment.

Fig. 103. Calls posted on the platform



Source: TIC Zlín

Estimated costs and other resources needs

Paid partly from the TIC own resources, co-financed by the ZLín Regional Authority.

DANIELA SOBIESKA, EXECUTIVE DIRECTOR OF ZLÍN TECHNOLOGY INNOVATION CENTRE

What do you think about this measure? What are the positive aspects? What are the negative aspects?

We, as the company, we decided to implement it, because we count it as the prospective tools. The foreign experience shows, it's working in some countries. We did the pilot, which proved it can work in the region. On the other hand, there are experience of not working open innovation system in the world. At the moment it looks as a promising tool and we try to upgrade it on the commercial level. This is quite a risky stage, participant might not be ready to pay for the services, they considered helpful in the pilot stage.

What impact could it generate?

Definitely the regional development in the long term run.

PŘEMYSL STRÁŽNICKÝ, *TECHNOLOGY TRANSFER AND LICENSE OFFICER AT TOMAS BATA UNIVERSITY IN ZLIN, CZECH REPUBLIC*

What do you think about this measure? What are the positive aspects? What are the negative aspects?

Could be very helpful. We already joined the system and participate at the pilot stage. The companies will increase a cooperation with the universities, other research centres as well as among each other. Negative aspect – may be the companies as well as research part would be hesitant to of the business model of the tool.

What impact could it generate?

More cooperation, more technology transfer, research adjusted to the demand.

DAVID HAUSNER, PROJECT MANAGER AT THE PLASTICS CLUSTER (PLASTR)

What do you think about this measure? What are the positive aspects? What are the negative aspects? What impact could it generate?

The system could work if there are enough companies to participate or various tasks to be solved. It works as a virtual market. In the past we organized sectorial cooperation events and it was quite successful. So I think something similar is possible, if the Technology centre provides good service and assistance and gives added value to all the system.

6. GLOSSARY

This section contains an alphabetical list of terms used in the present document:

B23 NUTS 2 East Flanders
BE21 NUTS 2 Antwerp
BE22 NUTS 2 Limburg
BE24 NUTS 2 Flemish Brabant
BE25 NUTS 2 West Flanders
CZ07 NUTS 2 Střední Morava
CZK - Czech Koruna, currency of Czech Republic
DOP - Design Options Paper
EC - European Commission
EPO - European patent office
ES11 NUTS 2 Galicia
EU – European Union
FTE – Full Time Equivalent
GAIN – Galician Innovation Agency
GDP - Gross domestic product
GERD - Gross domestic expenditure on R&D
HRST - Human resources in science and technology
HTC - Employment in High-Tech Sectors
ICT – Information and Communication Technologies
IMEC - world-leading research and innovation hub in nanoelectronics and digital technologies.
IoT – Internet of Things
KPI – Key Performance Indicators
N/A – Not Applicable
NO01 – NUTs 2 Oslo og Akershus
NUTS Nomenclature of Territorial Units for Statistics
OECD - Organisation for Economic Co-operation and Development
OP – Operational Programme
PhD – Doctoral Degree
PROs - Public Research Organisations
R&D - Research and Development
R&D&I – Research Development and Innovation
RTD - Research and Technical Development
S&T - Science and Technology
S3 – Smart Specialisation Strategy
SME – Small and Medium Enterprises
STI – Science Technology and Innovation
SWOT - Strengths, Weaknesses, Opportunities, and Threats
TBU – Tomas Bata University
TETRAGON - TEchnology TRAnsfer for GrOwth with twinNing
TIC ZLín - ZLín region Technology Innovation Centre
TT - Technology Transfer
TTC - Technology Transfer Centre
TTO - Technology Transfer Office

7. RECOMMENDED READING

This section contains the main recommended readings on Tech Transfer to SMEs and its supporting measures:

- Dr Viraj Perera, ISIS Innovation, "Models of Technology Transfer and Innovation", 12th June 2013, A Coruña, Spain. Available online: https://www.youtube.com/watch?v=H8zSrsaoPHE.
- U.S. Geological Survey, USGS, "Technology Transfer Handbook for the U.S. Geological Survey", 2003. Available online: http://www.usgs.gov/tech-transfer/handbk.html
- Eric Ries, "The Lean Startup", Portfolio Penguin, 2011.
- Handbook on good practices for valorisation of R&D results, TRAIN2 project, SUDOE INTERREG IV, 2012.
- Dr. Callum Norrie, "TTO Circle Present and future challenges in technology transfer", 2011, Available online: https://ec.europa.eu/jrc/sites/default/files/jrc_20110428_ttocirle_present_and_future_challenges_in_technology_transfer.pdf
- European Commission "The Twinning Advanced Methodology", Available online: http://ec.europa.eu/easme/sites/easme-site/files/Twinning-Advanced-methodology.pdf
- Stephen M. Bauer & Jennifer L. Flag, "Technology Transfer and Technology Transfer Intermediaries", Suny Bufalo, 2010. Available online: http://files.eric.ed.gov/fulltext/EJ899223.pdf
- Samantha R. Bradley, Christopher S. Hayter & Albert N. Link, Greensboro, "Models and methods of University Technology Transfer", UNC, 2013, Available online: http://bae.uncg.edu/assets/research/econwp/2013/13-10.pdf
- Rachel Diamant & Meir Pugatch, "Measuring Technology Transfer in Public Private Partnerships – A Discussion Paper", Tel Aviv, MSD, 2007. Available online: http://www.stockholm-network.org/downloads/publications/ip/Measuring_TT_Performance.pdf
- Barry Bozeman, Heather Rimes & Jan Youtie, "The evolving state-of-the-art in technology transfer research: Revisiting the contingent effectiveness model"; Elsevier; 2014, Available online: http://www.sciencedirect.com/science/journal/00487333/44/1
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- H. Chesbrough, W. Vanhaverbeke and J. West, "Open Innovation: Researching a New Paradigm", Oxford University Press, 2006, Available online: http://www.amazon.com/Open-Innovation-Researching-New-Paradigm/dp/0199290725
- TTO Circle, "Connecting the Technology Transfer Offices of large European public research organisations", Available online: https://ec.europa.eu/jrc/en/tto-circle

8. BIBLIOGRAPHY

Section contains the main bibliography used for the composition of the present paper:

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- BIC 3T Technology Transfer Training http://bic3t.bicgalicia.es/
- Campus do Mar http://campusdomar.es/en/
- Clean Energy Manufacturing Initiative's Technologist-in-Residence Pilot https://www.energy.gov/eere/technology-to-market/downloads/technologist-residence-documents
- Clúster TIC Galicia http://www.clusterticgalicia.com
- Czech Invest Investment and Business Development Agency http://www.czechinvest.org/en
- Dementia Consortium http://www.dementiaconsortium.org/
- European Space Agency http://www.esa.int/ESA
- Eurostat is the statistical office of the European Union
- Eurostat Statistical Atlas (Regional Yearbook 2015, Publications Office of the European Union, 2015) http://ec.europa.eu/eurostat/documents/3217494/7018888/KS-HA-15-001-EN-N.pdf/6f0d4095-5e7a-4aab-af28-d255e2bcb395
- Flanders Information Agency Local Statistics http://aps.vlaanderen.be/lokaal/lokale_statistieken.htm
- Frascati Manual, 2002 edition, § 63
- From research to market: key issues of technology transfer from public research centres to businesses. White paper: http://4.interreg-sudoe.eu/contenido-dinamico/libreria-ficheros/3D0ED325-A000-2BDC-F737-7534920D685C.pdf
- Fundación Barrié http://www.fundacionbarrie.org/
- Galactea-Plus http://www.galacteaplus.es/
- Ghent University UGent TechTransfer http://www.ugent.be/techtransfer/en
- InfoRegio Regional Policy http://ec.europa.eu/regional_policy/en/
- Informe Cotec 2015. Fundación Cotec para la Innovación Tecnológica http://www.cotec.es/pdfs/informecotec2015web.pdf
- Innovation Policy Platform, Science and Technology Charting http://innovationpolicyplatform.org/STICharting/benchmark.htm?iso=ES
- Innovation Union Scoreboard 2015 http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/index_en.htm
- Innovation Vouchers Zlínský Kraj http://www.objevtesmer.cz/clanky/kategorie/2-inovacni-vouchery
- Instituto Galego de Promoción Económica (IGAPE) http://www.igape.es
- Kansas City Living Lab http://www.kclivinglab.com/
- Lambert Toolkit, Intellectual Property Office, UK Government https://www.gov.uk/guidance/lambert-toolkit
- Natural Sciences and Engineering Research Council of Canada http://www.nserc-crsng.gc.ca/
- OECD database. Main Science and Technology Indicators http://www.oecd.org/sti/msti.htm
- Plan Estratégico de Galicia 2015-2020. Tomo I do Plan Estratéxico: Diagnose. : Xunta de Galicia. Consellería de Facenda (Galicia Strategic Plan 2015-2020. Diagnostic) http://www.planestratexico.gal/es/inicio
- Real Academia Galega de Ciencias http://www.ragc.gal/es
- Regional Innovation Monitor Plus https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/galicia

- Shortcomings and needs of the Spanish System of Science and Technology. Recommendations to improve the transfer processes for knowledge and technology to companies. REPORT 2005. Spanish Foundation for Science and Technology FECYT. http://icono.fecyt.es/informesypublicaciones/Documents/carencias2.pdf
- Small Business Technology Transfer (STTR) Program Policy Directive https://www.sbir.gov/sites/default/files/sttr_pd_with_1-8-14_amendments_2-24-14.pdf
- Small Business Vouchers (SBV) Pilot. U.S. Department of Energy https://www.sbv.org
- Technologické inovační centrum s.r.o. TIC Zlín http://www.ticzlin.cz
- Technologie Allianz. Invention Store www.inventionstore.de
- Tomas Bata University in Zlín. University Institute http://www.utb.cz/
- Universidade de Santiago de Compostela http://www.usc.es/
- UNNINOVA Innovative Bussiness Innovator http://www.uninova.org

ANNEXES:

ANNEX I: DETAILED DESCRIPTION EXTERNAL IDENTIFICATION OF BEST PRACTICES

This Annex contains the complete information gathered when analysing the best practices explained in Secion 4 “GOOD PRACTICES AND TRANSFERENCE MEASURES”.

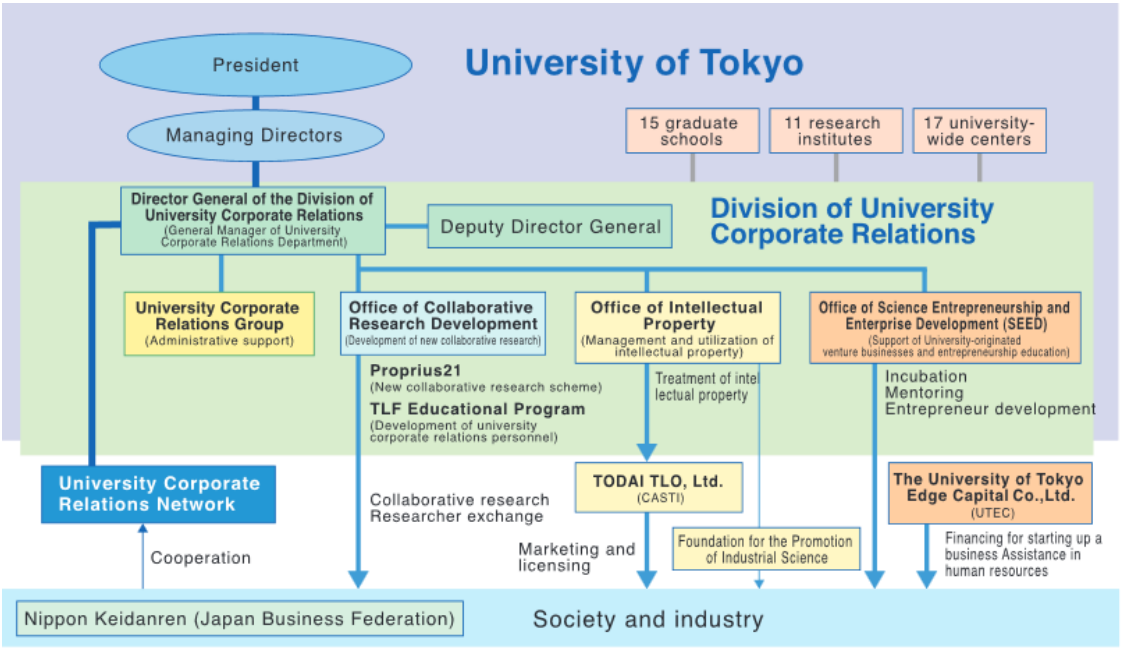
Featured best practices:

Serial No.	Country	Organisation
1	Japan	Technology Transfer Measures applied by the Division of University Corporate Relations (DUCR), University of Tokyo
2	Singapore	Entrepreneurial University Model: National University Of Singapore
3	UK	Oxford University Innovation Ltd. Technology Transfer Model
4	UK	Cambridge Enterprise Limited (CEL) Intellectual Property Commercialisation
5	UK	SCoRE Cymru Scheme (Supporting Collaborative Research and innovation in Europe) Scheme
6	Korea	Kibo Technology Matching System (KTMS)
7	Malaysia	Malaysia National Innovation Agency: Six Approaches to Innovation

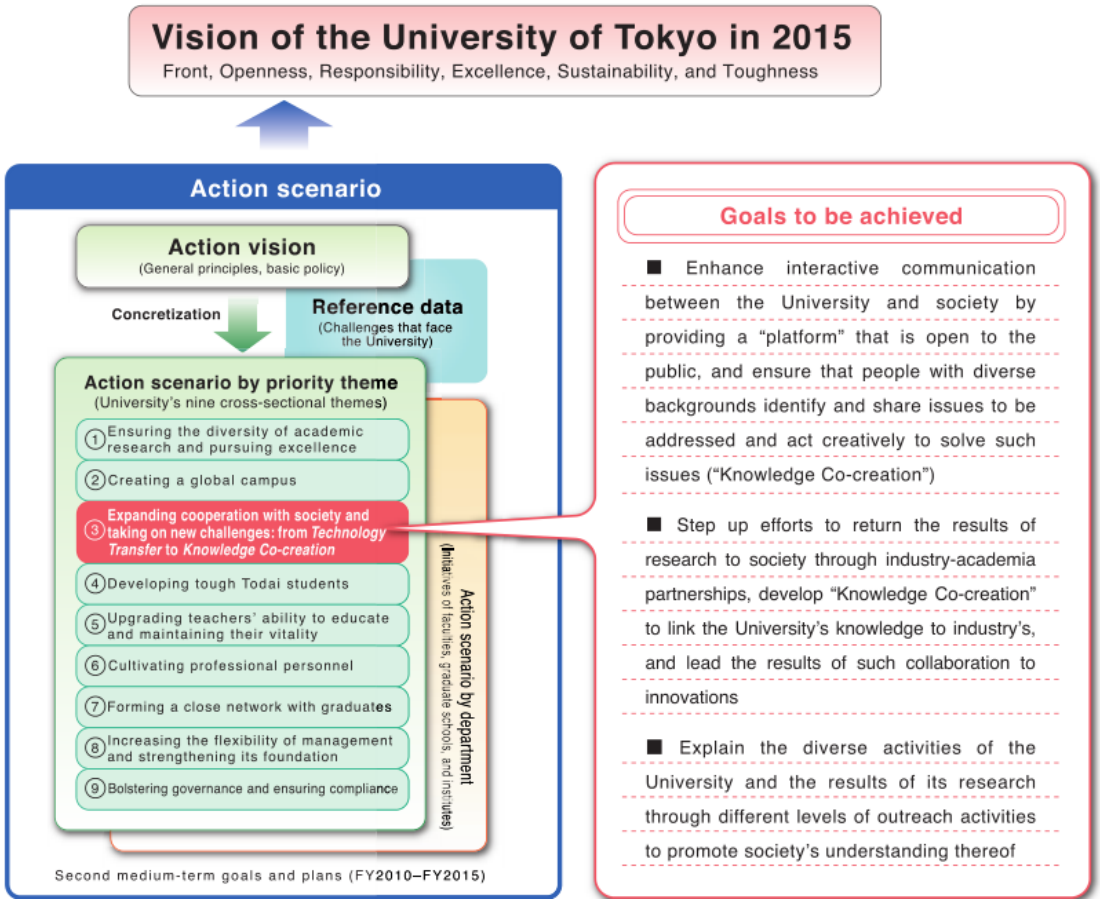
Detail description of best practices:

1. Division of University Corporate Relations (DUCR), The University of Tokyo
Description of the host organization of the best practice (country, age, type of organization,…)
Since its foundation in 1877, the University of Tokyo has contributed greatly to the development of Japanese society not only through academic accomplishments but also cooperation with industry. In order to meet the demands of society, the Division of University Corporate Relations (DUCR) was established. It was created as an organization aimed at effectively returning the results of research at the University to society. A part of the head-office organization under the President of the University of Tokyo, DUCR serves as a contact point for requests from industry as well as a university-wide support unit to facilitate cooperation between the University's researchers or offices and industrial circles. In the future, DUCR will continue to bolster its industry-academia partnership systems, improve the quality of its operations, and make them more efficient with the aim of ensuring that industry-academia partnerships bring concrete results. The objective of research at university lies in further learning about and expanding knowledge of the world and to convert research results produced at the University into something transferrable (intellectual property) and return it to society. To that end, the Division of University Corporate Relations (DUCR) plays a central role in the industry-academia partnership programs that the University promotes. As shown in the "University of Tokyo's Action Scenario FOREST 2015." the University of Tokyo believes that the age has arrived in which universities should not only return the results of their research but also promote "Knowledge Co-creation" between universities and society. In order to ensure that the University and society work together to identify and share issues to be addressed and create new knowledge and innovations. DUCR strives with all its resources to promote "Knowledge Co-creation." Among the research results that universities return to society, the development of products using technology created by universities and its industrialization are the most dynamic of diverse industry-academia partnerships involving universities and have the largest impact on society. A high level of technology-transfer and managerial strategies such as determining the marketability of technology, matching market needs with seeds of new technologies, and building new industrialization models with possible combinations of technologies in mind are indispensable for returning technology

created by universities to society. At the cutting edge of the University of Tokyo's industry-academia partnership programs, TODAI TLO, Ltd. (CASTI), the University of Tokyo Edge Capital Co., Ltd. (UTEC), and the Foundation for the Promotion of Industrial Science (FPIS) are producing steady results. As Japan's top runner in terms of industry-academia partnerships, DUCR will push forward with its technology-transfer strategy while maintaining close relationships with these related organizations. Furthermore, DUCR aims to make the University of Tokyo a university that is open to society through the University of Tokyo's University Corporate Relations Network, University Corporate Relations Proposal (UCR-Proposal) and other organizations.



Overview of the University of Tokyo's Industry-Academia Partnership System



Starting year of the programme/ initiative

April, 2004

Brief description of the programme/ initiative (content, funding, target population,…)

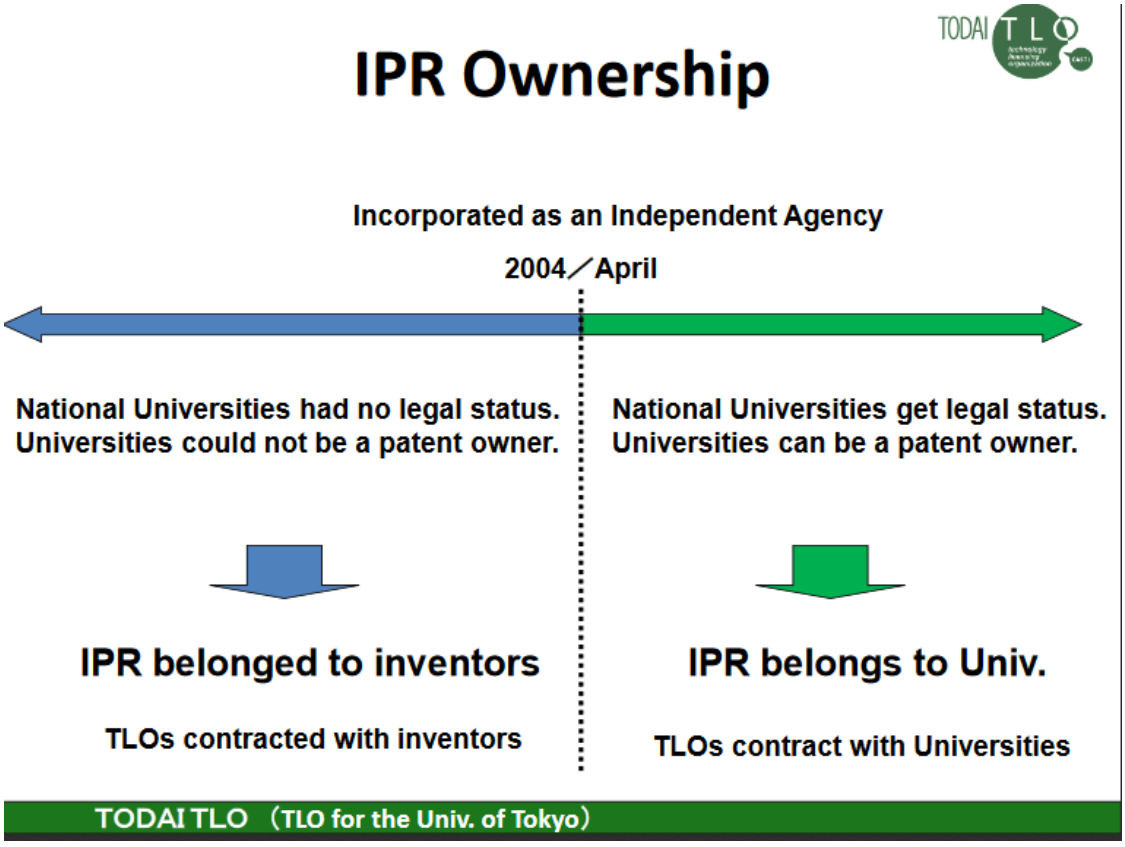
The University of Tokyo emphasizes "Expanding Cooperation with Society and Taking on New Challenges: From Technology Transfer to Knowledge Co-creation," one of the priority themes of the "University of Tokyo's Action Scenario FOREST 2015". Therefore, the University of Tokyo aims to step up its efforts to return the results of its research to society through industry-academia partnerships, develop Knowledge Co-creation to link the University's knowledge to industries, and lead the results of such collaboration to innovations. Its unique management structure is composed of the Division of University Corporate Relations (consisting of the three offices of Collaborative Research Development, Intellectual Property, and Science Entrepreneurship and Enterprise Development); Today TLO, Ltd.; and the University of Tokyo Edge Capital Co., Ltd. Using this structure, it has established a system that enables it to provide integrated support ranging from the creation of collaborative research to the identification, evaluation, management, and utilization of the University's intellectual property and the start-up of businesses and industrialization. Using these, it has carried out a wide range of support activities.

The University of Tokyo (UT) has over 4000 researchers in its faculty including professors, associate professors, assistant professors and Senior Researchers. Its research across various fields is characterized by a diversity fitting for a university. The University of Tokyo is a leader in producing world-class research results and has the advantage of being able to take a trans-disciplinary approach in dealing with a single research topic that spans several disciplines. The Division of University Corporate Relations (DUCR) manages major seven vertical segments according to the National Policy, and, with

these as a firm foundation, the University of Tokyo has taken a proactive role in establishing a closer relationship with society.

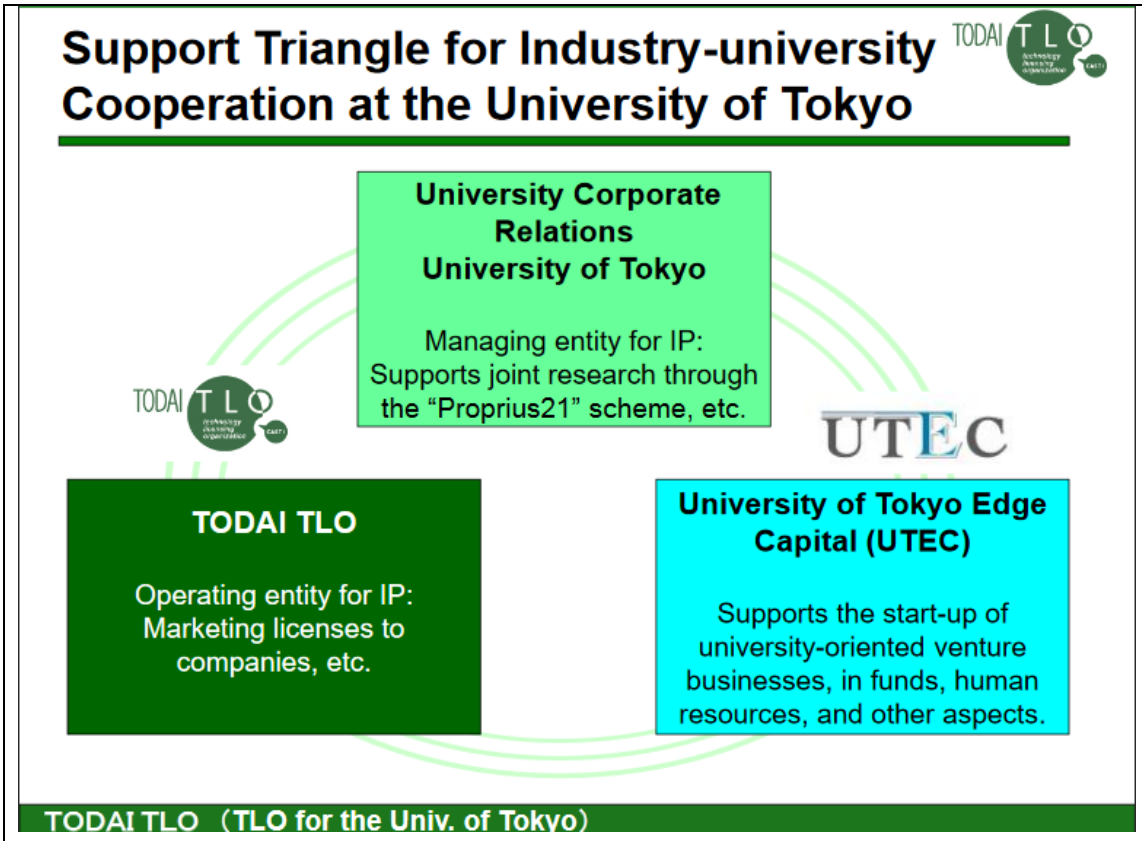
The ideology and philosophy of the University of Tokyo remain unchanged as it continues its pursuit for truth and search for academic depth. At the same time, however, we feel that transforming knowledge into a clearly defined format that can be more easily adapted by society is also an important role of universities.

Intellectual properties may have a meaning of themself but have no commercial value until practically applied. Their true value is thus only realized after they effectively contribute to society. It is only then that intellectual properties become a basis for a new scheme of intellectual production. The University of Tokyo proactively participates in creating new value structures and new values through collaborative research with private enterprises.



Description, evaluation and analysis of each proposed measure:

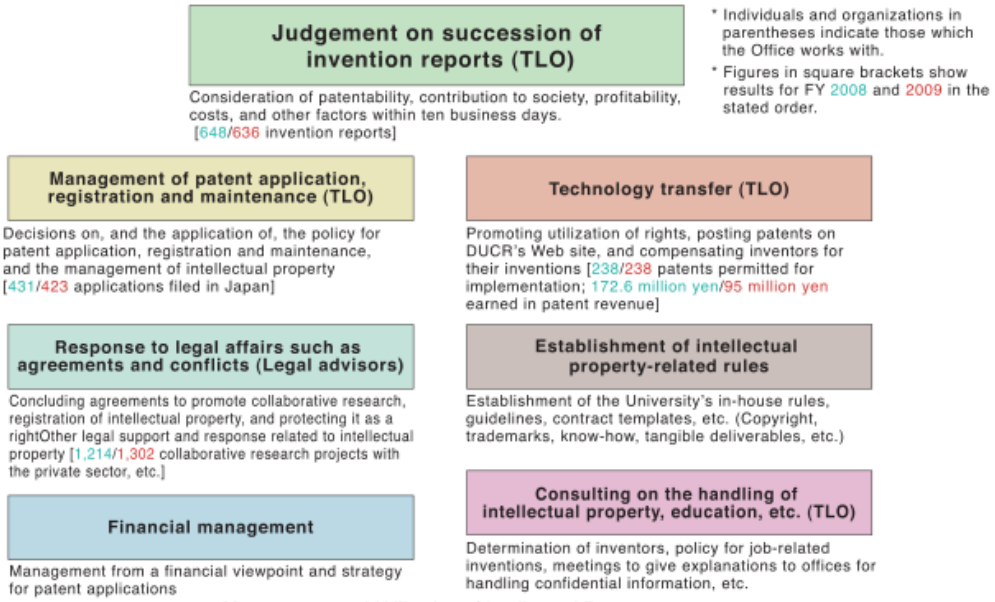
DUCR supports every department in the University of Tokyo in matters of collaborative research with private enterprises. It forms a tripartite group with TODAI TLO and the University of Tokyo Edge Capital Co., Ltd. (UTEC), and has established an "intellectual" spiral that provides full support from applying the seeds sown at the University of Tokyo and creating intellectual properties, to its practical applications. The tripartite has a strategic organizational structure that is designed to promote the conversion of the intellectual properties of the University of Tokyo into a format that benefits society and becomes clearly visible.



Office of Collaborative Research Development: Office of Collaborative Research Development aims to create collaborative research between industry and academia and return the results of such research to industry and society in concrete forms and reflecting them in basic research as well. Major activities of the Office include "Proprius21", a feasibility study programme aimed at creating collaborative research that leads to innovations through repeated discussions between industry and academia starting from the stage of inspiration; "Global Proprius21" Programs, which strive for international cooperation with overseas industry in the global environment; UCR (University Corporate Relations)-Proposals, which are specific research results by university researchers who wish to have industry-academia partnership; and various activities whose objective is to open the way for industry-academia collaborations. In addition, the Office has an educational programme called "Technology Liaison Fellows (TLF) Training System," whose primary objective is to invite autonomous bodies of local governments to send their personnel to the University of Tokyo so that they may learn about industry-academia partnerships for one year in the form of on-the-job training and effectively use the results of fellowship to revitalize the region from which they come.

Office of Intellectual Property: In order to return results obtained from research activities at the University of Tokyo to society and encourage society to make the most of them, the Office of Intellectual Property works closely with TODAI TLO, Ltd. (CASTI) and the Foundation for the Promotion of Industrial Science to engage in such operations as taking over intellectual property and protecting it as a right, utilizing it mainly through their licensing to industry and returning licensing revenue to the University, and establishing related rules to achieve these goals. Furthermore, from the viewpoint of promoting collaborative research as well as protecting and utilizing intellectual property, the Office ties up with law offices and other legal organizations in Japan and abroad to extend legal support such as reviewing and concluding contracts and providing consulting on the handling of intellectual property. Since the incorporation of national universities, the Office has put in place these management systems with the cooperation and understanding of parties inside and outside the University. In the future, it will make further efforts to gain the trust of researchers and research organizations in-house and of industry and support them in a way that meets their requests.

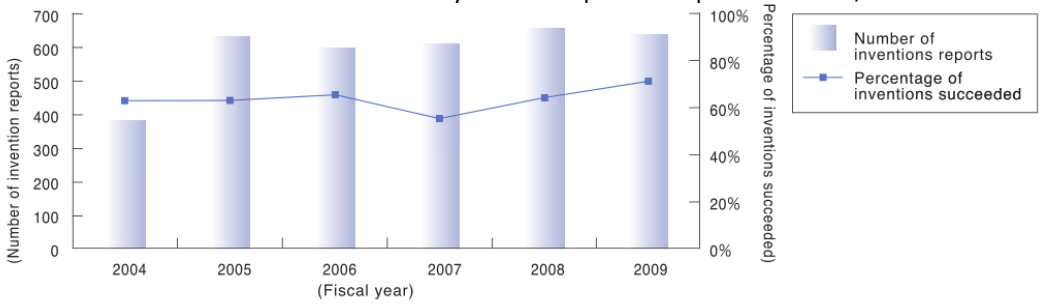
In close cooperation with the University Corporate Relations Group, TODAI TLO, and legal advisors as necessary, Office of Intellectual Property continued to be engaged in the operations shown in the figure below. In particular, as the number of notifications of inventions handled, and of contracts reviewed and concluded grows, the Office aims to have accurate and prompt processing.



Management and Utilization of Intellectual Property

The functions of the office of IP are as follows:

- Handling of Invention Reports and Utilization of Rights
- Contract-related services to collaborative research agreements and others
- Promotion of international industry-academia partnership
- Establishment and revision of industry-academia partnership-related rules, etc.



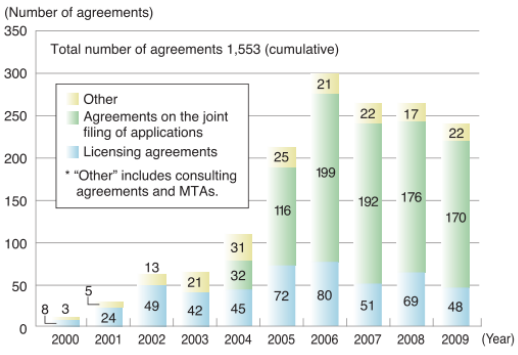
Changes in the Number of Invention Reports and the Number of Inventions Succeeded

Office of Science Entrepreneurship and Enterprise Development (SEED): The Office of Science Entrepreneurship and Enterprise Development (SEED) is responsible for supporting university and student entrepreneurship, and aims to develop innovative business based on the results of research and education at the University. Our strategic relationship with the University of Tokyo Edge Capital Co., Ltd. (UTEC), a venture capital management firm dedicated to the University of Tokyo, is a unique scheme that supports venture businesses that originate from the University. The Office is also engaged in the incubation of university start-ups at three facilities: the "Incubation Rooms" located at the UCR Plaza and the Komaba Campus Collaborative Research (CCR) Building, as well as the "University of Tokyo Entrepreneur Plaza." Furthermore, "Todai Mentors" provides mentoring through a network of external professionals to support university entrepreneurship. The Office has also concentrated its energies on organizing and operating the University of Tokyo Entrepreneur Dojo, an entrepreneurship education programme for students. As it enters its sixth year in 2010, the programme has begun to see some of its

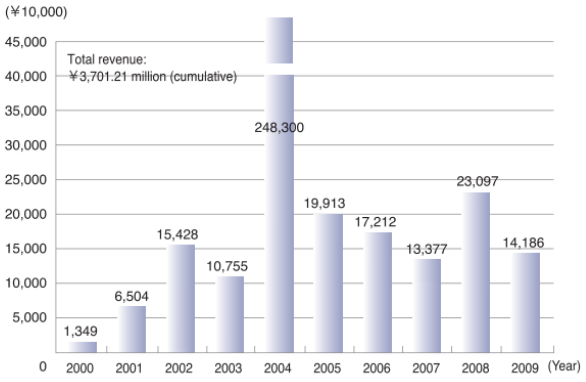
graduates start a new business. The Dojo has also embarked on internationalization of entrepreneurship education by, for example, initiating an exchange programme for award-winning student teams of the business plan contests between Peking University and the University of Tokyo in 2008.

Todai TLO, Ltd. (CASTI): TODAI TLO, Ltd. (CASTI) is a technology-transfer agency that handles all processes from application for intellectual property created by the University of Tokyo to its licensing. The goal of the firm is to contribute to society by returning knowledge generated at the University to society through technology transfer and commercializing the results of research, primarily basic research at the University. Currently, Todai TLO is a wholly owned subsidiary of the University of Tokyo, and aims to provide one-stop services as an agency for industry to communicate with the University with respect to intellectual property.

Todai TLO directs their efforts toward becoming a bridge between the university and the world of industry, working on marketing and licensing University of Tokyo technology, such as inventions, software, or specimens. Its current capital is: 20,000,000 yen (€176,377)



Changes in the Number of Agreements at TODAI TLO

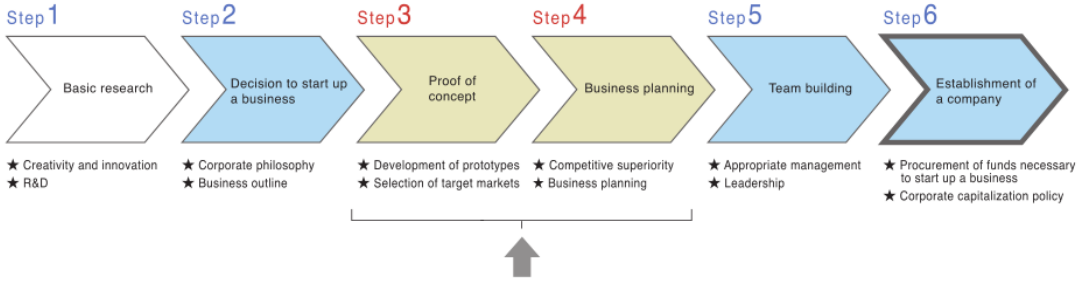


Changed in the Amount of Technology Transfer Revenue at TODAI TLO

The University of Tokyo Edge Capital Co., Ltd. (UTEC): The University of Tokyo Edge Capital Co., Ltd. (UTEC), the only venture capital (VC) certified by the University of Tokyo as an agency related to technology transfer, invests in venture firms that make the most of the results of research at the University and its human resources. Since 2004, UTEC has managed the "UTEC Limited Partnership 1," a venture capital fund. And in July 2009, it established a new VC fund called the "UTEC 2 Limited Partnership." In the future, UTEC will continue to make investments that actively support new firms which utilize the University of Tokyo's intellectual property and human resources so that they contribute to society on a continuous basis.

UTEC-EIR: UTEC is implementing a comprehensive entrepreneurship support programme called "UTEC Entrepreneurs in Residence (UTEC EIR)." This programme offers offices at the University of Tokyo Entrepreneur Plaza and other facilities free of charge to budding entrepreneurs, researchers working to start a business, and so forth. It also examines intellectual property to ensure its effective utilization, verifies the concepts of technology to prove its feasibility, pays expenses required for market research

and other undertakings to a certain extent, and helps draw up business plans with the support of UTEC's investment professionals. UTEC EIR collects ideas for entrepreneurship throughout the year.

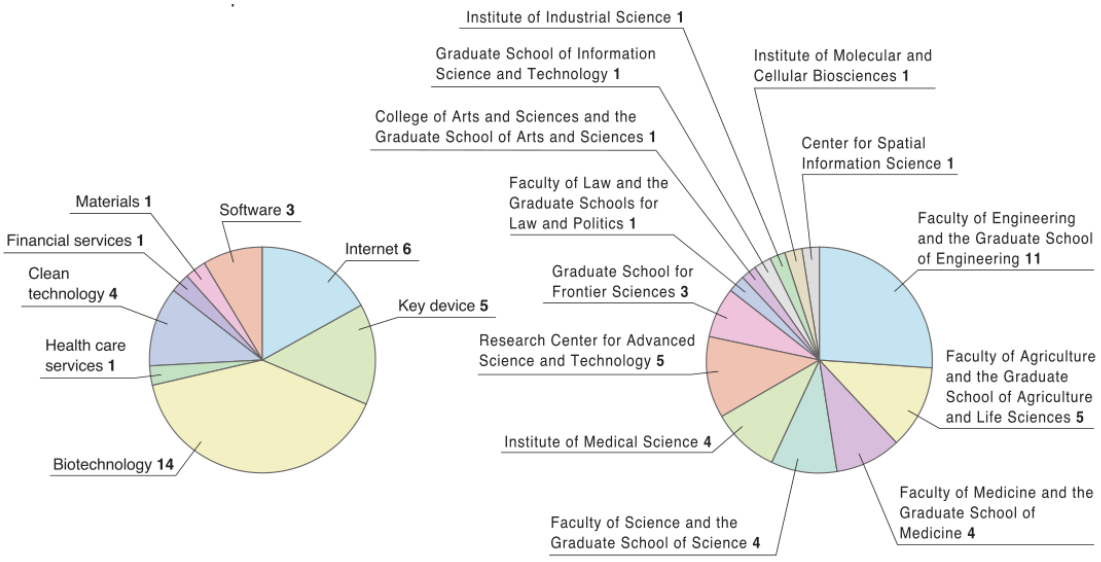


UTEC Entrepreneurs in Residence (UTEC EIR) Program

UTEC Search: UTEC is also carrying out "UTEC Search," a programme in which as part of UTEC's summer internship program, students, mainly graduate students at the University of Tokyo, work with UTEC's investment professionals to develop business plans based on seeds of business inside and outside the University. This program, too, continues to follow up on UTEC's projects and conducts additional research for them together with UTEC's investment professionals, providing UTEC with a source of excellent business deals.

Examination of inventions reported: A system has been put in place in which UTEC's investment professionals' work with University researchers, who have just reported their inventions to the University, to explore possibilities of industrialization prior to the filing of applications for patents. These initiatives lay the foundation for UTEC to continue excellent investment activities in the future, and UTEC is active in advancing these initiatives mainly through close cooperation with the University of Tokyo.

Investment Results:



Breakdown by Sector of 35 Companies in Which UTEC Invests and Related Faculties/
Graduate Schools and Research Institutes and Centers at the University of Tokyo (as of March 2010)

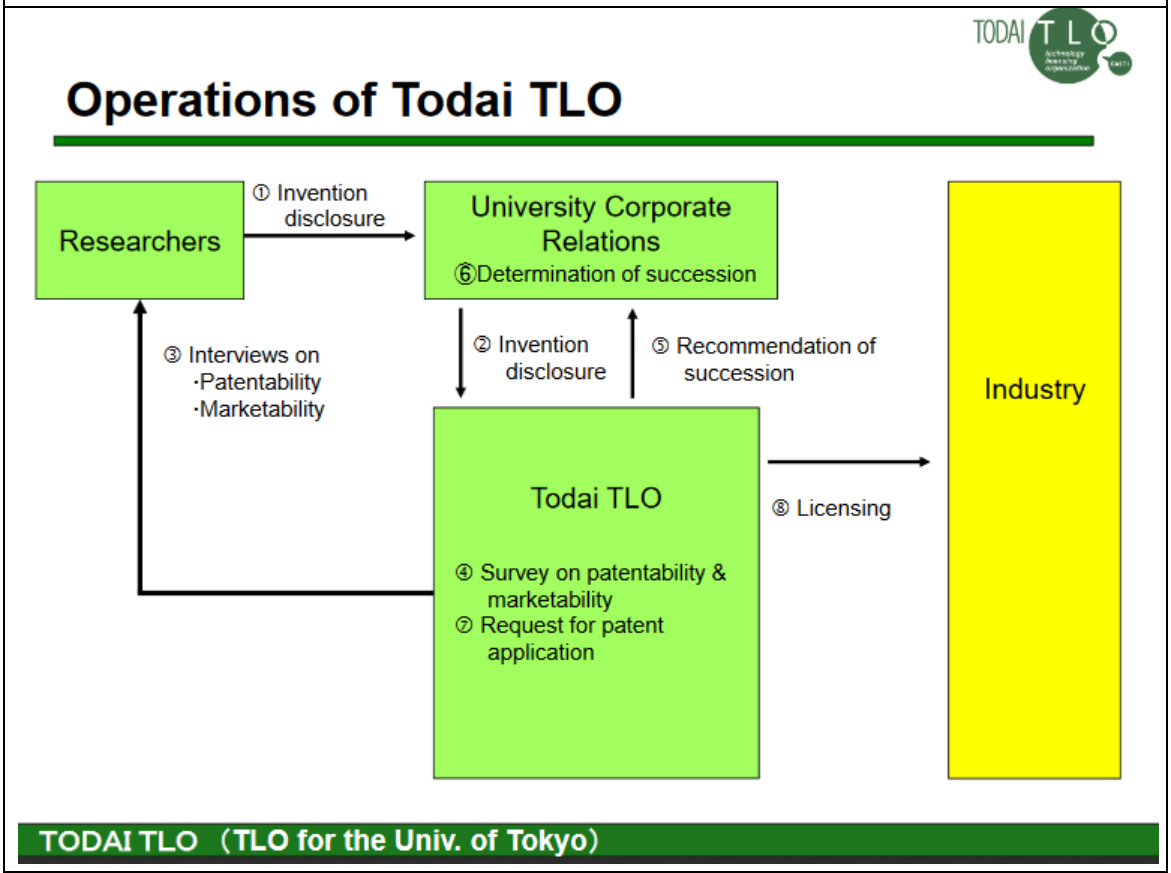
Target audience:

1. University researchers
2. Company Representatives

Requirements:

N/A

Process by which the initiative operates:



Impact of the best practice

Impact:

More than 600 patents a year are made for technologies developed at the University of Tokyo. We have nearly 4,000 researchers at the University of Tokyo.

Number of Invention disclosure in 2005 (U.S. & Japan)

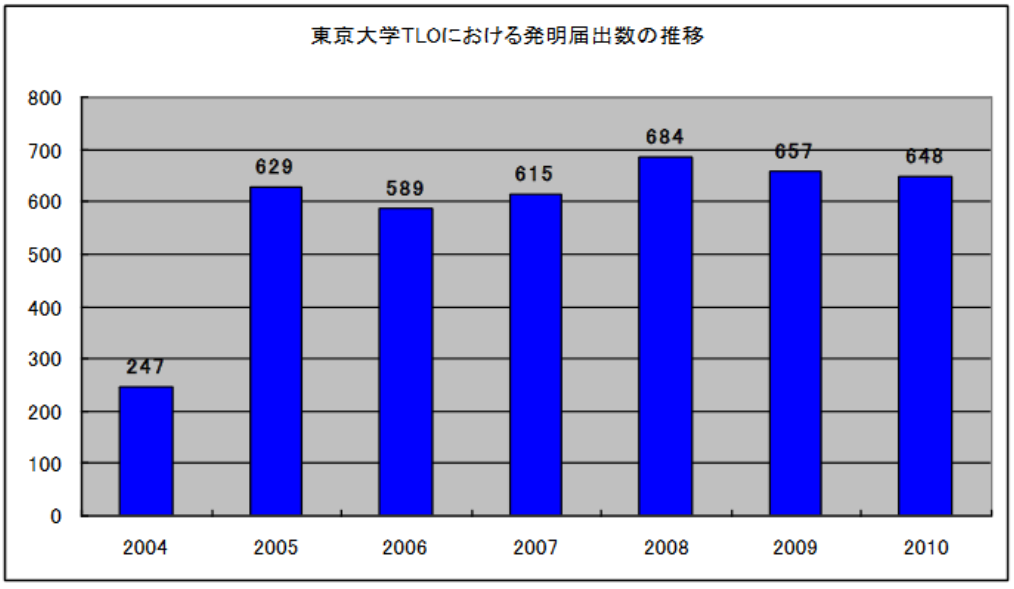
Name of university	Number of publication of inventions	Number of domestic applications	Application filing rate
University of California System	1,196	515	43.6%
University of Tokyo	**627**	**313**	**49.9%**
California Institute of Technology	549	416	75.8%
Tohoku University	527	380	72.1%
Osaka University	525	261	49.7%
MIT	515	287	55.7%
Tokyo Institute of Technology	464	317	68.3%
Kyoto University	457	324	70.9%
University of Wisconsin	405	163	40.3%
University of Pennsylvania	392	536	136.7%

*Source: AUTM U.S. Licensing Survey FY 2004 for the US data and the "Performance of university-industry collaborations FY 2005" of the Ministry of Education, Culture, Sports, Science and Technology for Japanese data.

TODAI TLO（TLO for the Univ. of Tokyo）

TODAI-TLO performance (Jan-Dec)

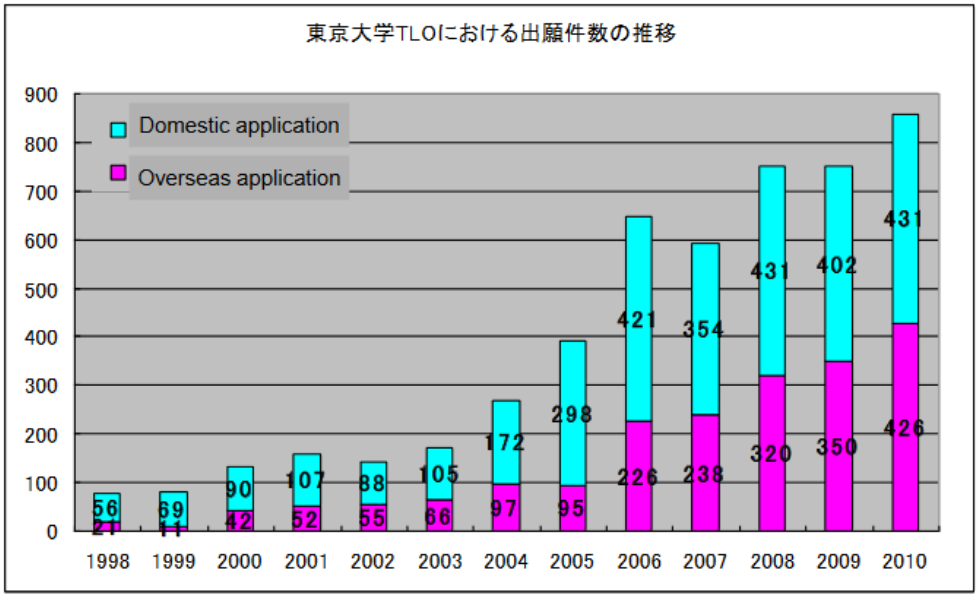
The number of invention disclosures that TODAI TLO accepted



TODAI TLO （TLO for the Univ. of Tokyo）

TODAI TLO

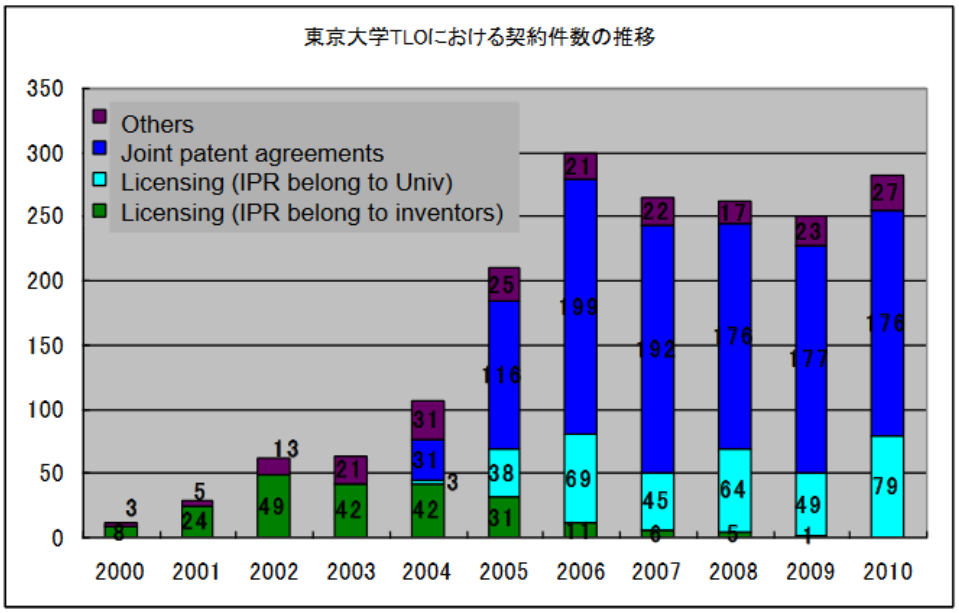
Number of patent applications



TODAI TLO （TLO for the Univ. of Tokyo）

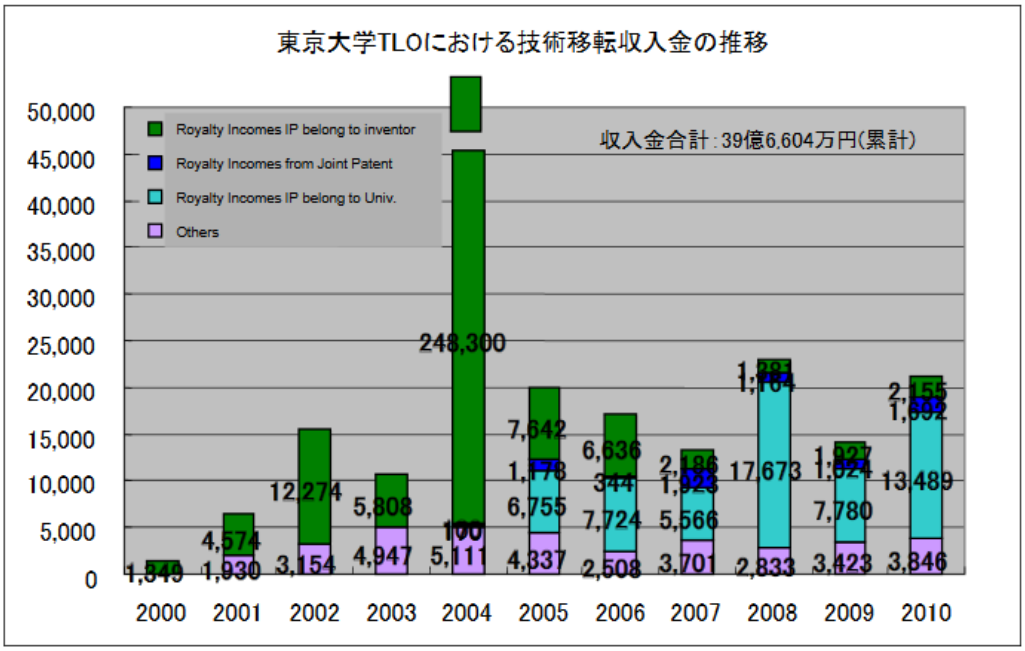
TODAI TLO

Number of Agreements



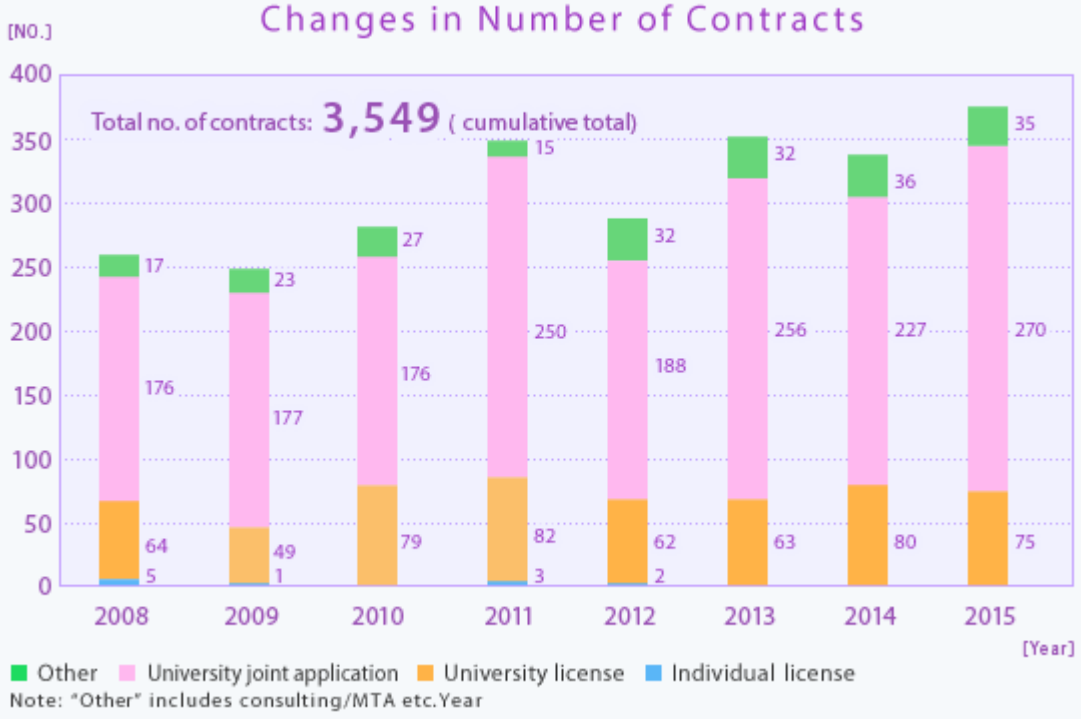
TODAI TLO （TLO for the Univ. of Tokyo）

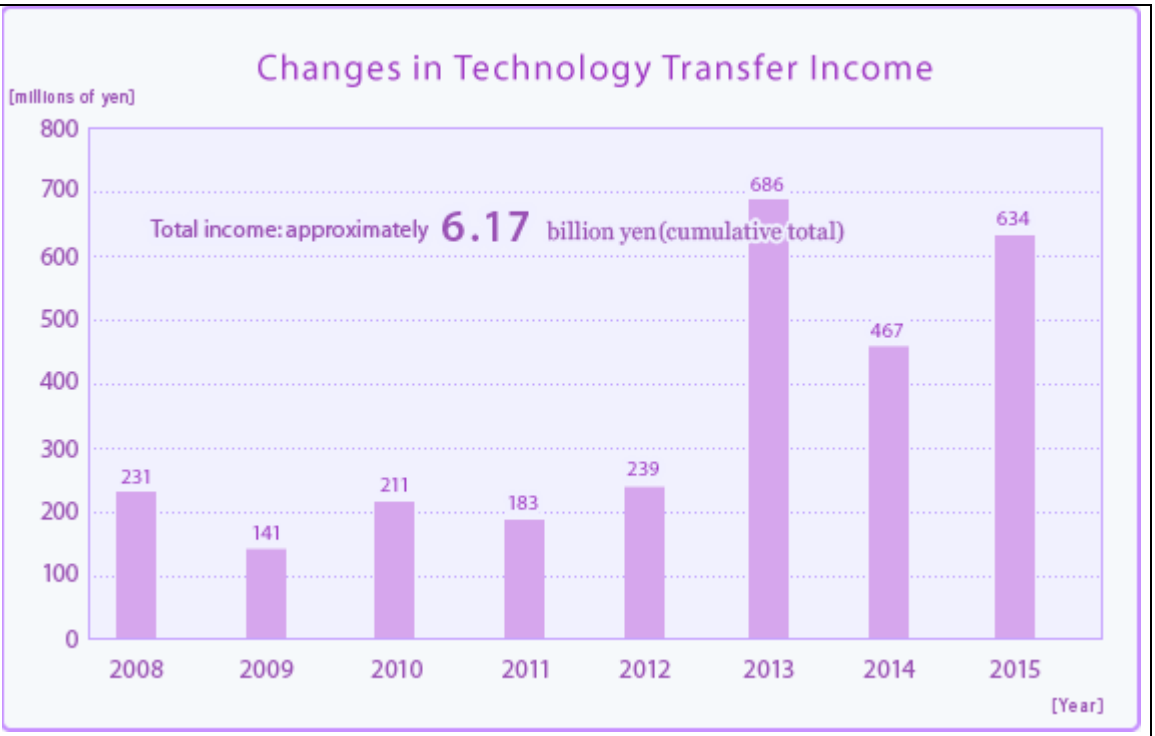
Royalty incomes



TODAI TLO （TLO for the Univ. of Tokyo）

Changes in Number of Contracts





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Publications and sources

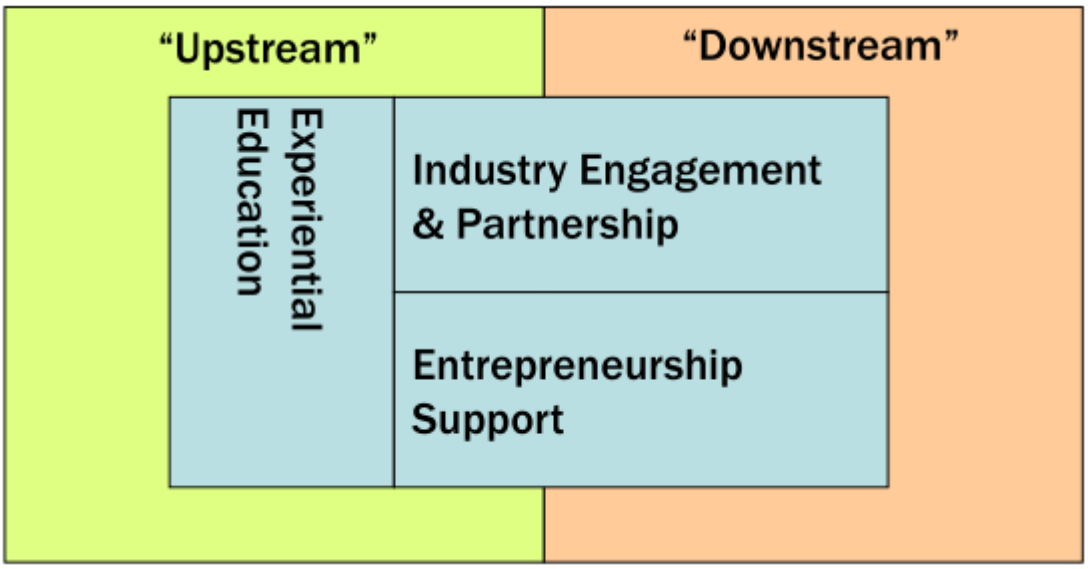
Division of University Corporate Relations, University of Tokyo: http://www.ducr.u-tokyo.ac.jp/

University Corporate Relations Network, University of Tokyo: http://www.ducr.u-tokyo.ac.jp/kyogikai/

TODAI TLO, Ltd. (CASTI) : http://www.casti.co.jp/
UCR Plaza, 3rd Floor: casti@casti.co.jp

The University of Tokyo Edge Capital Co., Ltd. (UTEC): http://www.ut-ec.co.jp/
UCR Plaza, 4th Floor: info@ut-ec.co.jp

Foundation for the Promotion of Industrial Science (FPIS): http://www.iis.u-tokyo.ac.jp/shourei/fpis-tlo/home.html

2. NUS Enterprise, National University of Singapore (NUS)
Description of the host organization of the best practice (country, age, type of organization,…)
National University of Singapore devised Strategic Changes to implement the new Entrepreneurial University Model: ▪ Incorporation of Enterprise as a "Third mission" in addition to the traditional missions of teaching and research ▪ Creation of a new Organizational Division – NUS Enterprise. Broad mission to inject more entrepreneurial dimension to NUS education and research ▪ Corporatization in 2006 to provide the university with greater autonomy and flexibility NUS Enterprise is embedding Entrepreneurial Learning as an integral part of NUS' Pursuit of Excellence in Education ("upstream" support) It is Translating NUS' Excellence in research into significant innovation and commercialisation impacts ("downstream" development)      NUS Entrepreneurship Centre is Asia's Think Tank for Enterprise and Innovation ▪ Provide thought leadership on innovation/entrepreneurship policies in Asian context ▪ Leverage on strategic links with leading innovation/entrepreneurship policy think-tanks - e.g. IARU, APRU, AUTM, SPRIE ▪ Complement & collaborate with innovation/entrepreneurship-related research programs like NUS Business & Engineering Schools, & LKY School of Public Policy ▪ Provide policy inputs to national innovation programmes and enterprise promotion agencies, e.g. NRF, A*STAR, SPRING, EDB, IDA, MDA, etc. ▪ Provide international benchmarking & policy analyses to NUS senior administrators on university-industry relations and academic entrepreneurship best practices ▪ Commercialize knowledge through consulting & IP transfer services to other countries – e.g. Brunei, and Middle East
Starting year of the programme / initiative
2008
Brief description of the programme / initiative (content, funding, target population,…)

Experiential Entrepreneurial Education: Aligning with the university's vision of being a leading global university centred in Asia, NUS Enterprise organises a variety of entrepreneurial education opportunities.

NUS Overseas Colleges (NOC) Programme: For those studying in NUS, the **NUS Overseas Colleges (NOC) Programme** is a unique and immersive means to gain entrepreneurial and international exposure. Participating students undertake full-time internships within start-up companies located around the world while concurrently attending entrepreneurship-related courses at prestigious partner universities.

NUS Enterprise: Major Initiatives

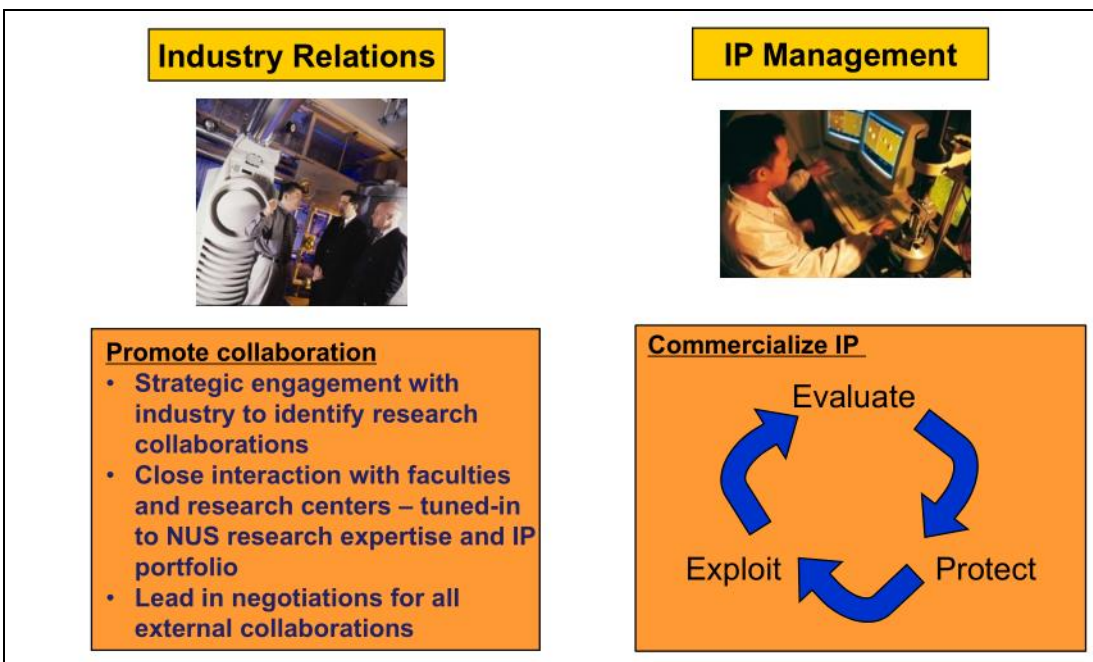
- *Reforming university policies on technology commercialization:* Reorganized the Industry and Technology Relations Office (INTRO) to make it more inventors friendly. Subsequently re-named and re-organized as the Industry Liaison Office (ILO) to emphasize its dual role of industry collaboration as well as IP management and commercialization
- *Expanding the Entrepreneurship promotion role with educational, research, outreach and venture support functions:* Introduced significant entrepreneurship education programs - *Technopreneurship Minor Programs, Overseas College Programme (NOC), Innovative Local Enterprise Achiever Development (iLEAD) and Extra Chapter Challenge programme* - to inculcate entrepreneurial and global mind-set among NUS students. Established NUS Enterprise Incubation (NEI) programme including incubator, seed funds, mentorship & investor-networking to nurture spin-offs by NUS professors, students and alumni

NUS' Shift towards an Entrepreneurial University Model: Organizational Structure of NUS Enterprise

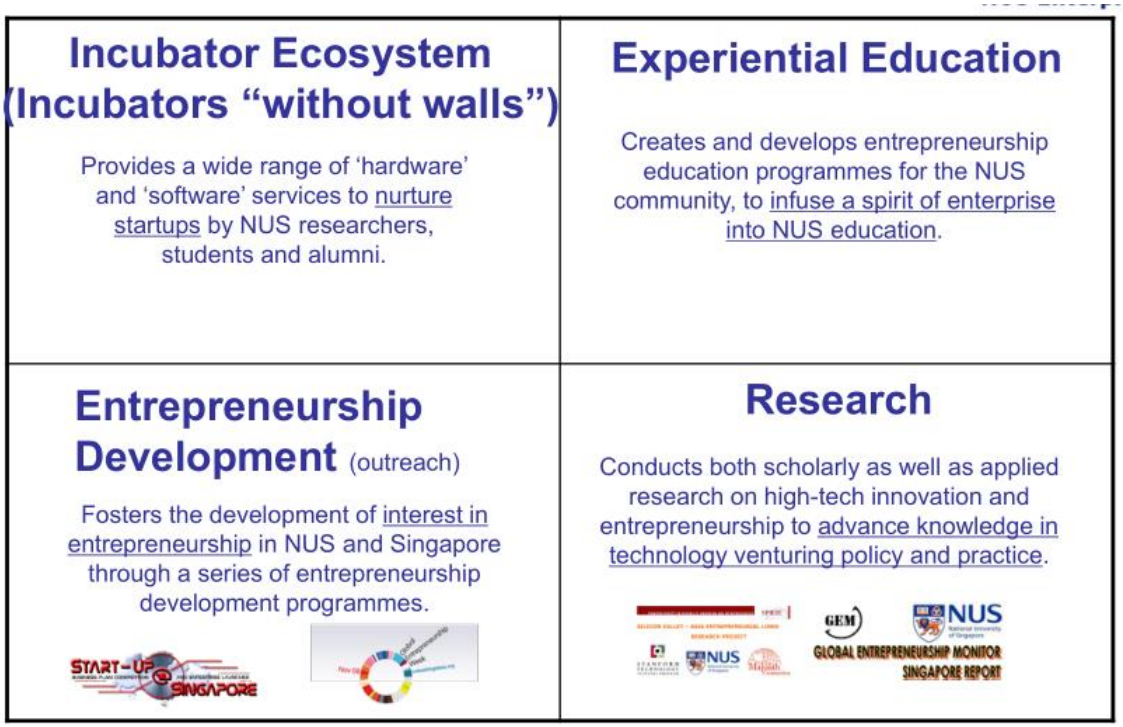
Units of NUS Enterprise in 2008	Core Functions
NUS Entrepreneurship Centre (NEC)	* Experiential Entrepreneurship Education * Outreach * Entrepreneurship Research * Entrepreneurship Support Services, including Seed Funding of NUS-related start-ups, Enterprise Incubation & Mentorship programs
Industry Liaison Office (ILO)	* Technology Licensing & IP Management * Industrial Liaison
NUS Overseas College (NOC)	* Overseas high tech start-up internship cum education program
NUS Extension (NEX)	* Continuing Education
NUS Publishing (NPU)	* University Press

NUS Enterprise to be the primary vehicle for coordinating and managing all major activities related to technology commercialization and entrepreneurship promotion within NUS.

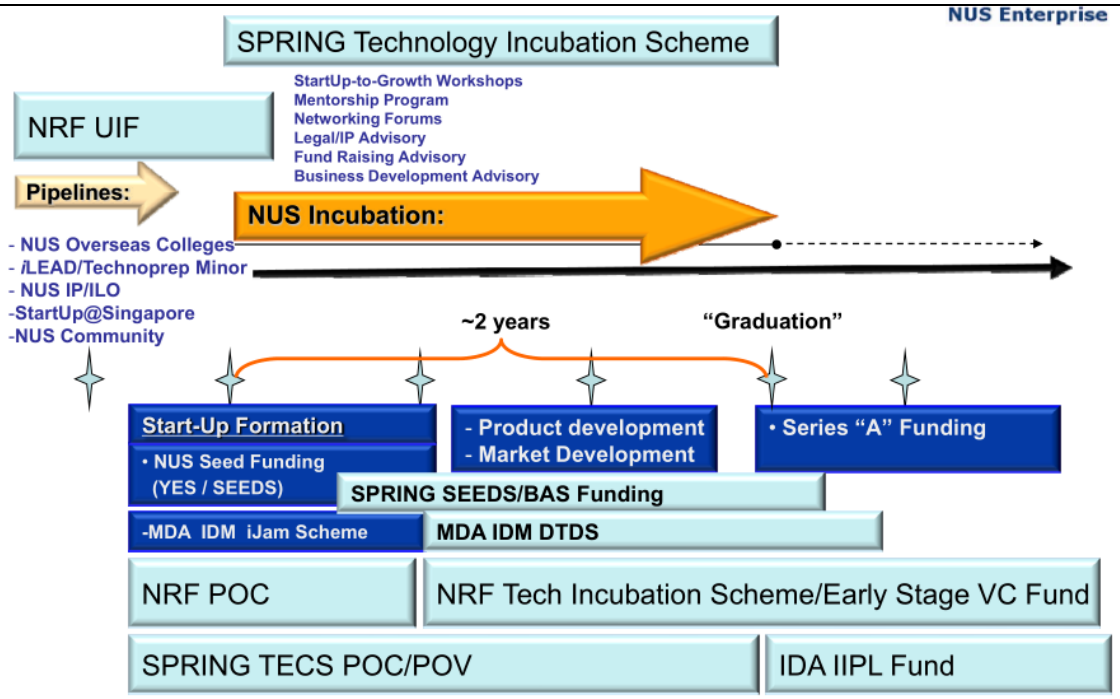
ILO:



NUS Entrepreneurship Centre (NEC)



NUS Entrepreneurship Value Chain:



NUS Enterprise Incubator:

- 4 bungalows + GARAG3
- Potential Capacity: 30 start-ups
- Current Incubatees: 26 companies
- GARAG3: IDM incubator

ETDF/SEEDS/MFS

- Funded 52 companies
- Mentored and assisted > 10 companies to next round financing
- Some examples: CADI, MOZAT, MXR, PEM, JitComm, Gajah etc.

Description, evaluation and analysis of each proposed measure:
Target audience:
1. University researchers 2. SME and large companies
Requirements:

Process by which the initiative operates:

Impact of the best practice

Comparisons of NUS vs. Selected Leading Universities – Patents granted by USPTO:

Name of Institution	Cumulative 1976 to 2005		2005	
	# of patents	Rank among world's universities	# of patents	# of licensing
University of California	5615	1	310	265
MIT	2825	2	133	93
University of Illinois	545	10	65	63
Stanford University	1541	4	100	109
University of Pennsylvania	718	14	37	37
University of Southern California	413	31	35	35
Georgia Tech	510	22	43	43
Oxford University	98	97	9	34
Cambridge University	35	127	4	41
Imperial College	97	98	7	n.a.
National Univ. of Singapore	182	67	26	40

Key Changes in NUS, Before and After Shift to Entrepreneurial University Model:

Indicator	AY1996/7	FY 2007/8
Teaching staff	1, 414	2,103
of which % foreign	39.0%	51.9%[1]
Research staff	843	1,710
of which % foreign	70.1%	78.6%[1]
Undergraduate students enrolled	17,960	23,330
Graduate students enrolled	4,478	7,020
Graduate students as % of total student enrolment	20.0%	23.1%
Percentage of foreign students studying at NUS	13% [2]	34.6%
Total research funding	S$102 mil	S$366 mil
Total no. of research projects funded	1,751	1759 [3]
Journal publications in SCI/SSCI	1,307 [4]	3,270[5]
Patents filed	13	96
Patents granted	4	30
Cumulative patents granted by USPTO	21 [6]	244[7]
Cumulative no. of spin-offs using NUS IP	6 [6]	44[7]

1 Percentage for FY2004 2 Percentage of total student intake for 1997/8 3 Figure for FY2005
4 CY1996 5 CY2008 6 CY1990-1997 7 CY1990-2008
Source: NUS Annual Research Report (various years), National University of Singapore; NUS Annual Report; Database of the USPTO; IPOS; ISI Web of Science; NUS Office of Research

Considerable progress in education and research output even better performance in foreign talent attraction, entrepreneurship promotion and technology commercialization.

NUS Overseas Colleges Alumni Network:

College	NCSV	NCBV	NCST	NCSH	India	NCBJ	Total	
Alumni	295	168	64	144	21	-	692	
Students still on the programme	36	30	21	33	2	10	132	**824**

Non-profit initiatives promoting entrepreneurship	12
Active startups by alumni	39
Entrepreneurial awards won by NOC students and alumni	51

Impact of NUS' Shift Towards Entrepreneurial University Model: Manpower Development and Attraction of Foreign Talent

NUS faculty members and research staff by nationality as at end June 1997 vs end June 2005

	As at end June 1997				As at end June 2005			
	Faculty members		Research staff		Faculty members		Research staff	
	No.	%	No.	%	No.	%	No.	%
Singapore	862	61.0	252	29.9	849	48.1	232	21.3
Malaysia	181	12.8	125	14.8	191	10.8	98	9.0
India	56	4.0	93	11.0	99	5.6	112	10.3
China	63	4.5	271	32.2	121	6.9	461	42.4
Other Asian countries	76	5.4	31	3.7	151	8.6	78	7.2
US/Canada	75	5.3	28	3.3	138	7.8	23	2.1
Other countries	101	7.1	43	5.1	216	12.2	83	7.6
Total	1,414	100	843	100	1,765	100	1,087	100

Source: NUS Annual Reports

Impact of NUS' Shift Towards Entrepreneurial University Model: Knowledge Creation through Research Publications

NUS Research Publications, 1997-2008

	Journal articles *covered by SSCI, AHI and SCI-Extended*
1997	1556
1998	1669
1999	1946
2000	2083
2001	2245
2002	2379
2003	2643
2004	2808
2005	3,123
2006	3,373
2007	3,209
2008	3,314

Source: NUS Annual Research Report; ISI Web of Science

- **Increase in output of publications in internationally-referred journals (113% between 1997-2008)**
- **Simultaneous improvement in quality of research output**
  - HEEACT ranking of 150th for citations/paper over last 11 years → 54th if analyzed over the last 2 years
  - Changing emphasis on quality over quantity of publications

Research Output Performance: SCI and SSCI-indexed Papers and Citations

Publications and Citations of NUS vs other Leading Asian Universities, Jan 1999-Feb 2009

	Country	No. of Papers	No. of Citations	Citations Per Paper
Universiti Malaya	Malaysia	3,439	14,316	4.16
Hong Kong Univ of Sci & Tech	Hong Kong	10,402	96,281	9.26
University of Hong Kong	Hong Kong	18,700	187,339	10.02
Seoul National University	Korea	33,779	271,702	8.04
KAIST	Korea	15,168	102,086	6.73
National Taiwan University	Taiwan	27,255	196,631	7.21
Peking University	China	22,857	148,132	6.48
Tsinghua University	China	23,182	121,584	5.24
University of Tokyo	Japan	67,864	882,361	13.00
Kyoto University	Japan	49,657	618,383	12.45
National Univ of Singapore	**Singapore**	**28,602**	**236,388**	**8.26**

Source: Wong and Ho (forthcoming), compiled from Thomson ISI's Essential Science Indicators/

Impact of NUS' Shift Towards Entrepreneurial University Model: Invention Disclosures

NUS Invention Disclosures , 1998-2006

	Total no. of disclosures	Average no. of disclosures
1998-99	141	70.5
2000-02	210	70.0
2003-06[1]	386	96.5

1 Financial year for 2004-2006
Source: ILO; NUS Annual Report 2005, National University of Singapore

Impact of NUS' Shift Towards Entrepreneurial University Model: Patents

- NUS has played a significant role in Singapore's increased patenting activity over the last ten years.
- Since the early 1990s, all IP created by NUS staff are assigned to NUS
- Total number of NUS patent applications and grants has grown steadily over 1997-2007
- Engineering faculty dominates patenting in NUS

- Biomedical patents comprises much lower proportion compared to many leading universities in with medical schools

Number of Patents Filed by and Granted to NUS, FY1997-2007

Financial Year	Patent Applications		Patents Granted	
	Total no.	Average no. per year	Total no.	Average no. per year
1997-99	230	76.7	39	13.0
2000-02	304	101.3	72	24.0
2003-07	661	132.2	149	29.8

Source: NUS Research Report (various years); ILO; NUS Annual Report
Note: Figures include patents filed in multiple countries

Top 20 Organizations with Singapore-invented US Patents, Cumulative to 2008

	Organization	Country	Patent count as at end 2008
1	Chartered Semiconductor Manufacturing	Singapore	856
2	Seagate Technology	USA	260
3	Hewlett-Packard Company	USA	248
4	**National University of Singapore**	**Singapore**	**244**
5	Micron Technology Inc	USA	203
6	Agency for Science, Technology, and Research	Singapore	130
7	Koninklijke Philips Electronics., N.V.[1]	Netherlands	119
8	Motorola Inc	USA	115
9	Creative Technology	Singapore	101
10	Matsushita Electric Industrial Co.	Japan	99
10	Texas Instruments	USA	99
12	Institute of Microelectronics	Singapore	93
13	ST Assembly Test Services	Singapore	91
14	STMicroelectronics	Italy/France	78
15	Infineon Technologies	Germany	66
16	Tri-tech Microelectronics[2]	USA	56
16	Advanced Micro Devices	USA	56
18	ASM International NV[3]	Netherlands	54
19	Bridge Semiconductor Corporation	Taiwan	52
20	Nanyang Technological University	Singapore	49

NUS is the fourth-largest US patent holder in Singapore.

1 includes US Philips Corp, Philips Singapore 2 filed for bankruptcy and entered liquidation in 1999. 3 includes ASM Technology Singapore, ASM America
Source: Compiled from NUS Database of US Patents

NUS' Share of Singapore Patents Granted by the USPTO: NUS vs Singapore

	NUS	Singapore	NUS share of Singapore patents (%)
1990-94	7	234	3.0
1995-99	33	725	4.6
2000-04	123	2,376	5.2
2005-08	81	2157	3.8
Total	244	5492	4.4

Note: includes all patents where at least one inventor is a Singapore resident
NUS patents include those which are jointly assigned to other parties

Overall, NUS' share of total US-patents granted to Singapore-based inventors has increased over 1990-2008

Composition of NUS Patents by Technology Category, 1990-2008

Technology category	No. of patents	%
Electrical & Electronic	77	31.6
Computers & Communications	58	23.8
Chemical	41	16.8
Drugs & Medical	40	16.4
Mechanical	17	7.0
Others	11	4.5
Total	244	100.0

Source: Calculated from USPTO database

Increase in collaborative innovation activities between NUS and external organizations in Singapore from 2000

Proportion of US Patents Invented by NUS in Collaboration with External Organizations, 1990-2008

Year of Grant	Proportion of patents jointly owned
1990-94	0.0
1995-99	18.2
2000-04	29.3
2005-08	30.9
Total	27.5

Source: Calculated from USPTO database

Impact of NUS' Shift Towards Entrepreneurial University Model: Licensing

- Proportion of inventions that are licensed out remains low
- Nevertheless, there is a clear increase in the volume of licensing activities since 2000
- Recent fall in the number of licensing deals reflects policy change
  - Focus on a smaller number of licensing deals with higher revenue potential
- Upward trend in licensing revenue despite recent fall in the number of licensing deals
- "Balanced" approach to technology licensing
  - Priority on promoting technology diffusion for impact vs. maximizing licensing income

NUS Licensing Agreements 1987-2008

	No.	%
1987-96	29	11.2
1997-99	31	12.0
2000-02	124	48.1
2003-08	74	28.7
Total	258	100.0

Source: NUS ILO

NUS Licensing Royalties, 1996-2008

	Total licensing royalties $'000	Average licensing royalties per year $'000
1996-99	335.0	83.8
2000-02	866.6	288.9
2003-08	3342.0	557.0

Source: NUS ILO

Impact of NUS' Shift Towards Entrepreneurial University Model: Industry Collaboration

- Substantial growth in no. of RCA over the last decade
- Recent fall in the share of RCAs with industry may be due to the very small numbers of RCAs in the initial period.
- In addition to the RCAs, significant consultancy work undertaken by NUS faculty (≈ 700 consultancies over 2003-04)

Research Collaboration Agreements (RCA) in NUS, 1995-97 vs 2005-07

	No. of RCA	No. of RCA with industry	% of RCA with industry
1995	36	17	47.2
1996	30	13	43.3
1997	43	17	39.5
2005	129	35	27.1
2006	146	46	31.5
2007	119	39	32.8

Source: NUS ILO

Impact of NUS' Shift Towards Entrepreneurial University Model: Academic Entrepreneurship

- About ¾ of NUS spin-offs formed after 2000: Visible result of policy change to encouraging technology commercialization through spin-off and start-up formation
- Increase in the number of start-ups by NUS professors, students and recent alumni since 2000.
- Engineering faculty produces the highest number of spin-offs - half of NUS spin-offs are involved in IT/electronics
    - Software, consultancy services and wireless systems,
    - Most spin-offs originate from a single faculty rather than from inter- departmental collaboration

Number of NUS Spin-offs, 1980-2006

	Total no. of spin-offs	Average no. of spin-offs
1980-99	11	0.55
2000-02	15	5
2003-06	18	4.5
Total	44	1.6

Note: Includes one company which has been liquidated
Source: NUS ILO and NUS Entrepreneurship Centre

NUS Spin-off Companies by Nature of Business

Nature of Business	No.	%
Information Technology	22	50.0
Biochemical	11	25.0
Electrical and Electronics	3	6.8
Mechanical and Machines	2	4.5
Scientific equipment	2	4.5
Other	4	9.1
Total	44	100.0

Source: NUS ILO

Contact person(s)

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Phone: +65 6516 7175

Publications and sources

http://enterprise.nus.edu.sg

3. Oxford University Innovation Ltd. (Former *Isis Innovation*), University of Oxford
Description of the host organization of the best practice (country, age, type of organization,…)
Oxford University Innovation Limited (OUIL) is a company wholly owned by the University of Oxford. The company's mission is to be the leading international technology transfer organisation, to transfer technology and expertise from the University of Oxford, to deliver value to all the clients, and to maximise social and economic benefits in a commercial manner. Oxford University Innovation helps staff and students to apply their expertise and research for wider social and economic benefit. OUIL's role is to help University staff and students bring the benefits of their research and expertise to create impact in wider society. OUIL support Oxford's researchers, staff and students, offering commercial skills and a range of specialist resources in order to maximise research impact. Any profits from commercialisation are returned to the University for the benefit of future generations. OUIL's specialties includes Technology Transfer, University Consulting, Commercialisation, Consultancy, Angel investment, Innovation, Technology licensing, Spinout company formation, Research commercialisation, Start-ups OUIL and its sub-divisions manage the University's intellectual property portfolio, working with University academics and researchers who wish to commercialise their work by identifying, protecting and marketing technologies through patenting and licensing, spin-out company formation, consulting and material sales. OUIL provides researchers with commercial advice, funds patent applications and legal costs, negotiates third-party licences and spin-out company agreements, and identifies and manages consultancy opportunities for University of Oxford academics. Isis works on projects from all of the University's research divisions: medical sciences, mathematical, physical & life sciences, humanities and social sciences. OUIL files, on average, one patent application each week, manages over 360 patent application families and has concluded over 450 licence agreements which has made Isis Innovation *"one of the country's most prolific technology transfer offices"*. According to 2012 figures from *WIPO*, Isis Innovation is the 4th largest filer of PCT patent applications in the UK and the highest European university applicant. Isis licenses technologies to companies who invest in developing and selling the products in a timely and ethical manner. Licensees are sought from all technology and business sectors on an international basis. OUIL works with University researchers to develop new business opportunities, identifying and sourcing investment, management and professional services. Since 1988 Isis has assisted in the formation of more than 70 University spin-out companies, generating over £2 billion in unquoted and quoted market valuations for the University of Oxford.
Starting year of the programme / initiative
The company was established in ***1987*** as **Oxford University Research and Development Ltd** and was renamed **Isis Innovation** a year later. The name was again changed in June 2016 as **Oxford University Innovation Ltd.**
Brief description of the programme / initiative (content, funding, target population,…)
Oxford University Innovation is split into **three** divisions, dedicated to different areas of knowledge transfer. **Oxford Innovation Technology Transfer (OITT):** OITT is responsible for managing the commercialisation of IP developed in Oxford – licensing, spin-outs and material sales, managing proof of concept and seed

funds, and investments.

Oxford University Consulting (OUC): OUC is responsible for providing access to academic consultancy and services from the University of Oxford. OUC arranges consultancy services providing third-party clients access to expertise from the University's academics to enhance innovative capability and to manage the contractual and administrative aspects of consultancy, minimising the administrative burden while protecting personal interests of the academic and those of the University. Areas of expertise include (but are not limited to) problem solving, data analysis, expert evaluation, due diligence, management and business development. OUC also helps Oxford University departments in hiring out specialist services and facilities to private companies by managing the contractual and financial aspects on behalf of the departments. OUC's activities meet the ISO 9001 quality assurance standard.

Oxford Innovation Enterprise (OIE): OIE is responsible for delivering consultancy to companies, governments, and technology transfer organisations worldwide. OIE was established as a separate business division in 2004, OIE offers consulting expertise, training and advice in technology transfer based upon its success as the University of Oxford's technology transfer company. OIE works with other universities, research organisations and governments around the world to develop their technology transfer activities, as well as helping private businesses improve research & development processes and technology scouting. In 2009 OIE set up an office in Hong Kong to facilitate the growth of academic and governmental technology transfer activity in the Asia Pacific region.

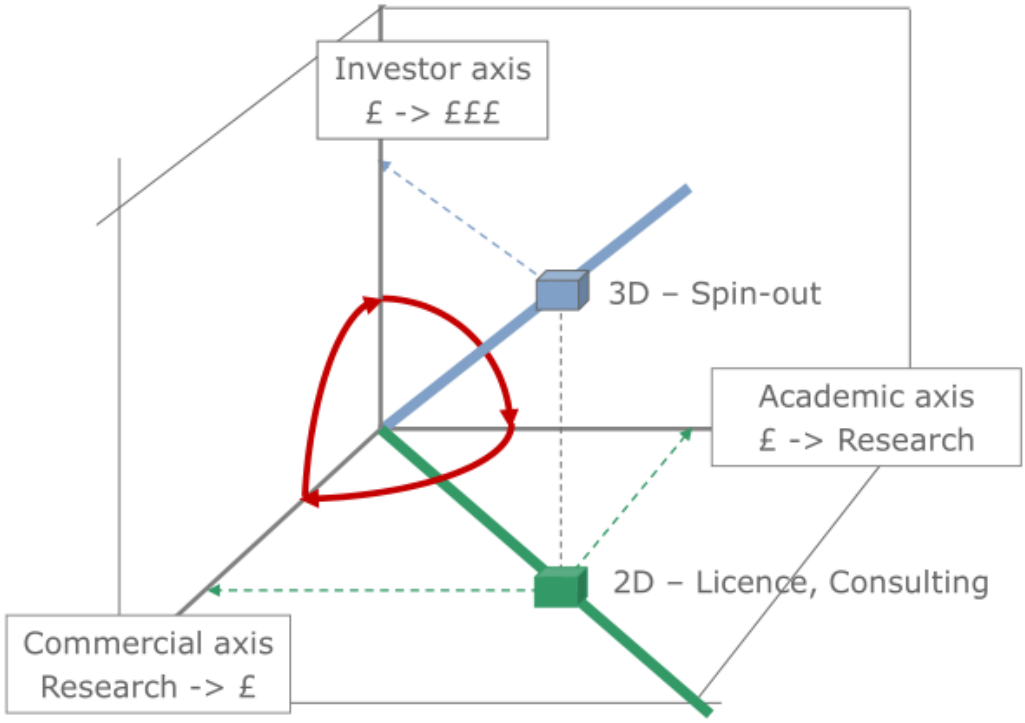


Figure: Oxford University Innovation is acting as multi-dimensional intermediaries

Description, evaluation and analysis of each proposed measure:

Oxford Innovation Society (OIS): The Oxford Innovation Society (OIS), founded in 1990, is a forum for Open Innovation, bringing together researchers and inventors, Oxford spin-outs, technology transfer professionals, local companies, venture capital groups and some of the world's most innovative

multinationals. The society allows companies to have a "window" on Oxford science and fosters links between business and the academic community. Members receive an advance notification of all patent applications marketed by Isis, invitations to networking opportunities at formal OIS dinners, customised research presentations and bespoke seminars for technology road mapping and strategic planning.

Oxford University Innovation Angels Network (OUIAN): The Oxford Innovation Angels Network (OIAN) introduces private investors and seed/venture capitalists interested in investing in spin-out companies from the University of Oxford to investment opportunities. OUIAN is a not-for-profit company limited by guarantee, established by Oxford University Innovation in 1999.

University Challenge Seed Fund (UCSF): Oxford University Innovation also administers the Oxford University Challenge Seed Fund (UCSF), which was launched in 1999 with investment from the UK Treasury, Welcome Trust and Gatsby Foundation. The £4 million Oxford UCSF has invested in over 100 projects, ranging in size from £1,700 to £250,000. The overall objective of the UCSF scheme is to enable universities to access seed funds in order to assist the successful transformation of good research into good business.

Oxford Invention Fund (OIF): In 2010, Oxford University Innovation – in conjunction with the University's 'Oxford Thinking' campaign – created the Oxford Invention Fund (OIF). The open fund allows anyone to donate money which goes towards helping create prototypes or proof-of-concept models from ideas and technologies developed at Oxford to improve the transfer into a commercial setting.

Oxford University Innovation Outcomes (OUIO): Oxford University Innovation manages the licensing of copyrighted Patient Reported Outcomes (PROs) questionnaires via its Oxford University Innovation Outcomes brand. These questionnaires, developed within the University, are used for academic and commercial clinical studies into a variety of illnesses, including Parkinson's Disease and Endometriosis. The negotiation of sales agreements for biological and physical science materials such as cell lines and antibodies are also handled by Oxford University Innovation.

Oxford University Innovation Start-up Incubator (OUISI): Since 2010, Oxford University Innovation has run the Oxford University Innovation Start-up Incubator (OUISI), designed to support very early-stage software ventures from students, staff and alumni of the University of Oxford; the Incubator offers physical space and IT facilities as well as commercial mentoring, funding support and business networking facilitation.

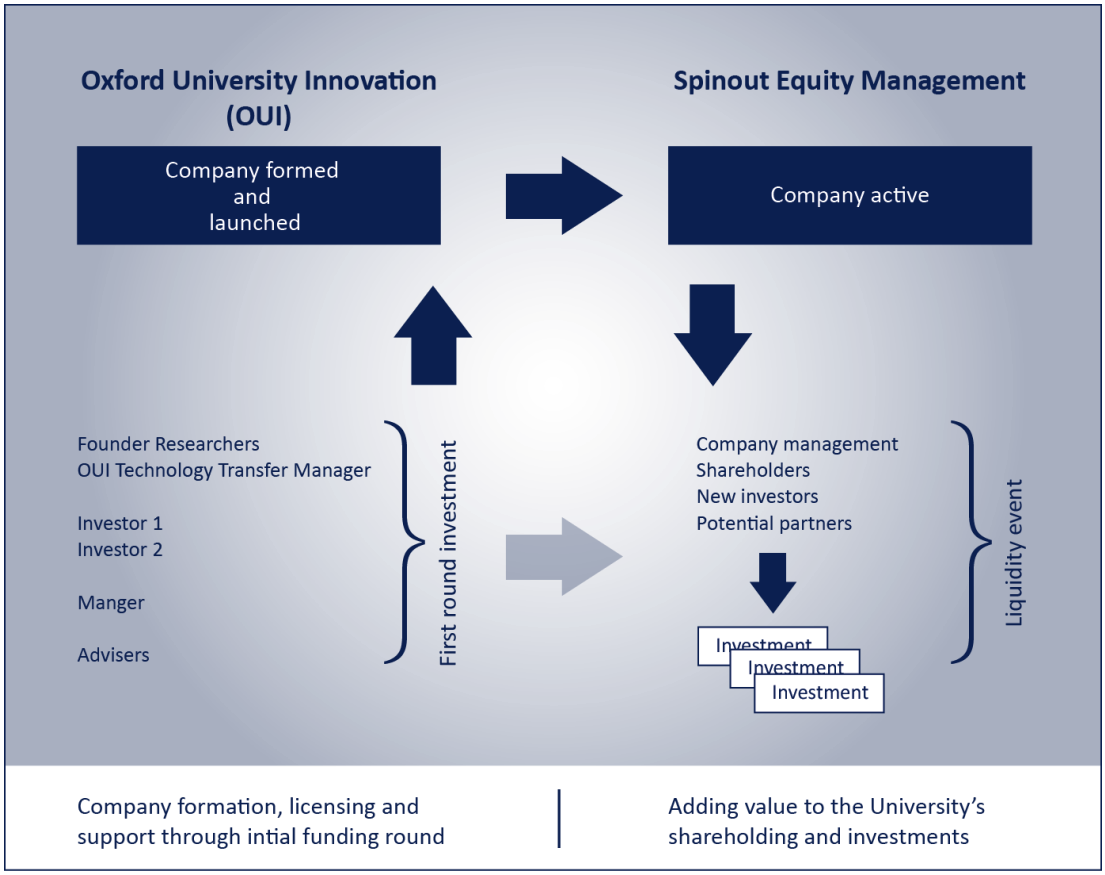
Oxford Spin-out Equity Management (OSEM): Oxford University Innovation has strong links with all the parts of the University involved in technology commercialisation and enterprise. These include: Research Services; Begbroke Science Park; Oxford Science Enterprise Centre; and Entrepreneurship Said at the Saïd Business School. Oxford Spin-out Equity Management (OSEM) was created in 2008 working closely with Oxford University Innovation and the University of Oxford's Finance Division to manage the University's shareholdings in its spin-out companies and optimising returns on University investments.

OSEM has three main roles:

1. Strategic: identifying opportunities to optimise the return on the University's investment and provide professional assistance to companies as they develop
2. Tactical: supporting companies by dealing with immediate or short-term issues such as funding or access to other support networks
3. Procedural: dealing with documentation relating to consents, fund-raising and exits

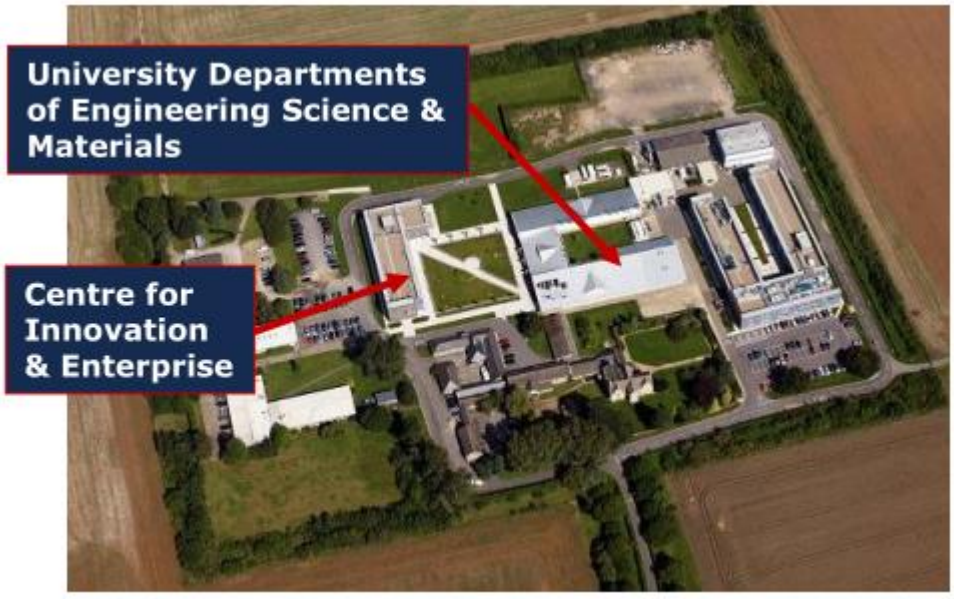
In fulfilling this role, OSEM calls on its own expertise, its extensive networks of contacts in the financial,

commercial and scientific worlds and its own investment fund which it manages on behalf of the University of Oxford. OSEM's portfolio comprises of 84 companies, following the sale of *NaturalMotion* in February 2014 the portfolio is currently valued at around £70 million (August 2016).



Oxford University Science Parks: There are three science parks. Those are as follows.

1. *Begbroke Science Park:*



- *Spin-outs on site*:

  - Prolysis/Biota Europe
  - Oxford Gene Technology
  - Oxonica
  - Oxford Advanced Surfaces
  - Oxford Biodynamics
  - Particle Therapeutics
- Owned & operated by Oxford University, 5 miles west from the city centre
- University research labs;
- University Supercomputer operated by e-research centre
- Business incubator & premises for new companies
- Central meeting room and café

2. *The Oxford Science Parks*:

3. *Milton Park, Oxfordshire*:

Target audience:

Students, Academics, Researchers, Government, Non-profit, Industry, University born Start-up companies

Requirements:

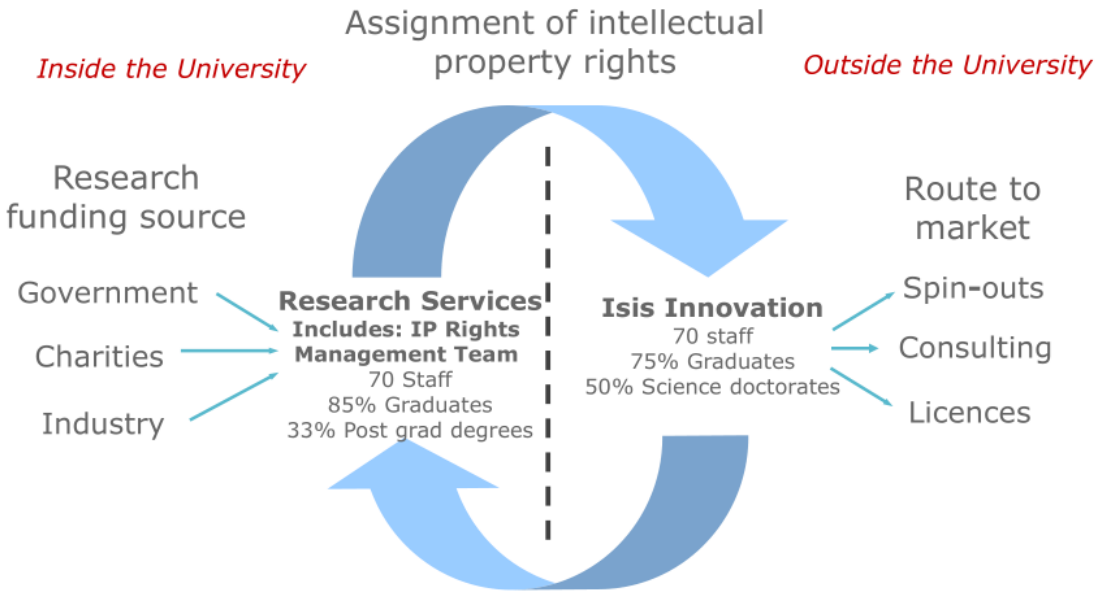
N/A

Process by which the initiative operates:

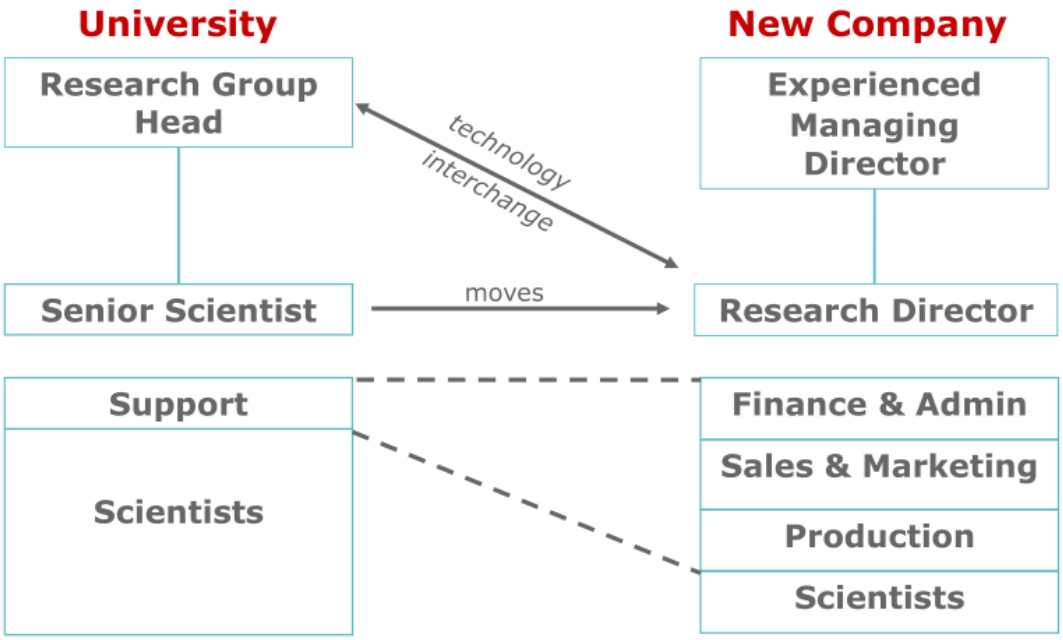
Intellectual Property Policy:

- University claims ownership of all employees‟ and students‟ IP rights resulting from University research activities
- The University assists those researchers who wish to commercialise their research
  - by patenting, licences, spinout companies & consultancy
- Researchers share the benefits
  - Royalty shares from licences
  - Equity in spinout companies
  - Income from personal consultancy

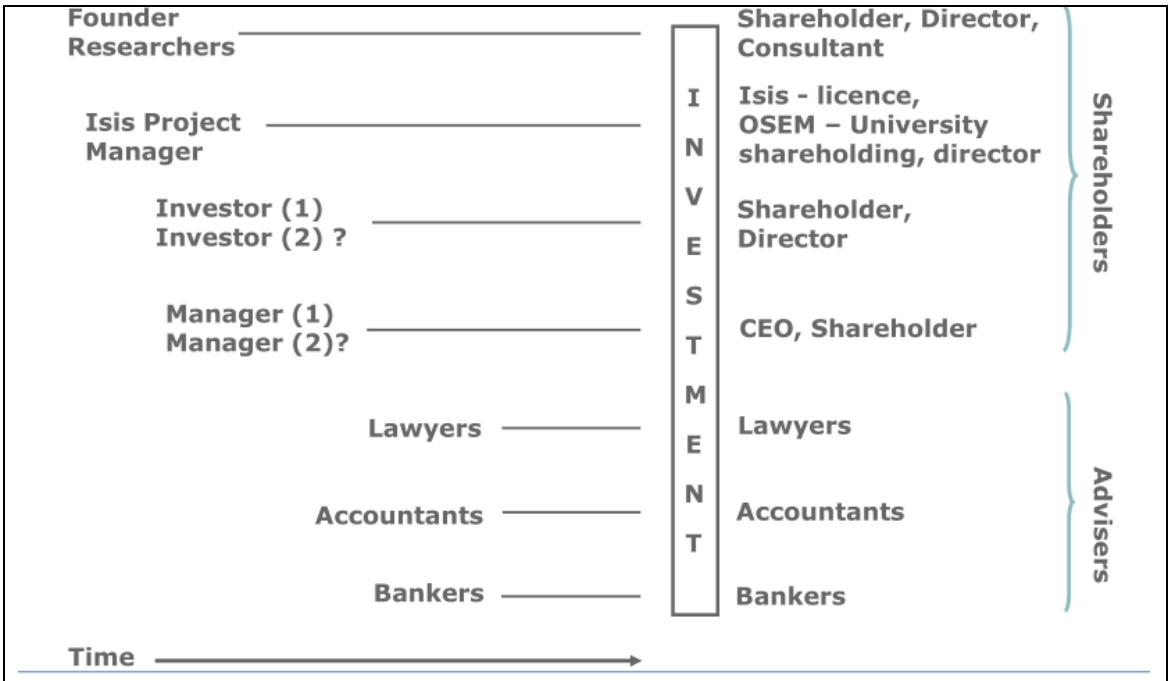
Transfer of Intellectual property:



Oxford University Innovation Spin-out strategy:



Spin-out Players:



Impact of the best practice

- **£24.6m total revenues** in 2015 *(£14.5m in 2014)*
- **£13.6m returned to Oxford University and its researchers** in 2015 *(£6.7 in 2014)*
- **5 spin-outs** created by us in 2015 *(8 in 2014)*
- **40 start-ups** admitted to the Start-up Incubator, **5 incorporated** in 2015
- **529 deals** in 2015 (75 technology licenses, 454 consulting deals; *503 total in 2014*)
- **2686 days of innovation consultancy** delivered by Isis Enterprise consultants, in **29 countries** *(1884 days in 2014)*
- **2490 patents and patent applications** on Oxford inventions managed by us *(2333 in 2014)*
- **£25m translational research funding** won by Oxford researchers with our direct support *(£19m in 2014)*

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Publications and sources

http://innovation.ox.ac.uk/

4. Cambridge Enterprise Ltd, University of Cambridge
Description of the host organization of the best practice (country, age, type of organization,…)
Cambridge Enterprise Limited (CEL) is a wholly owned subsidiary of the University, responsible for the commercialisation of Cambridge intellectual property. Cambridge Enterprise delivers its mandate

through three overlapping business units: technology transfer services, consultancy services and seed fund services. Activities include management and licensing of patents, proof of concept funding and support for University staff and research groups wishing to undertake consultancy work. Cambridge Enterprise provides access to angel and early stage capital through the Cambridge Enterprise Seed Funds and Cambridge Enterprise Venture Partners, and offers business planning, mentoring, and other related programmes. Over the past four years, income from licensing, consultancy and equity transactions exceeded £37 million, of which £30 million was distributed to University departments and academics.

Starting year of the programme / initiative

5 September, 1972

Brief description of the programme / initiative (content, funding, target population,…)

Technology Transfer: The Technology Transfer team works with researchers to manage and license their patentable inventions and other intellectual property. The team works to support academics starting from the earliest stages of the commercialisation process, from supporting funding applications, to supporting the market research and development of prototypes in order to find the best commercial partners. Over the past three years, income from licensing has exceeded £23 million, 536 new technology disclosures were made and 315 patents were filed.

Consultancy: Consultancy is an important and effective way for the University to disseminate its knowledge and expertise to government, industry and the public sector. In consultancy, as opposed to collaborative research, University staff apply their personal expertise to help a client organisation solve problems that are specific to the client's business. The type of projects vary widely between expert witness appearances and tendered public contracts, while the broad scope of projects reflects the wide range of University research that is in demand by both industry and government. The number of consultancy projects continues to grow rapidly, with a 92% increase in projects over the past four years. Client organisations include some of the largest and most respected companies in the UK and worldwide, including leading UK, US and European pharmaceutical companies, major petrochemical corporations and several Formula 1 racing teams.

Seed Funds: Cambridge Enterprise invests intellectual property and cash to create successful new ventures based upon University research. *PathFinder* funding of up to £15,000 is available to carry out market and IP assessments; and seed funding of up to £250,000 is available to set up a new company, joint venture or partnership. The Seed Fund team maintains links to venture capitalists, angel and early stage investors through Cambridge Enterprise Venture Partners. Currently, Cambridge Enterprise holds equity in more than 68 companies and manages evergreen seed funds on the University's behalf. Since 1995, the investee companies have raised more than £800 million in funding, representing a leverage of 75 times the University investment.

Description, evaluation and analysis of each proposed measure:

C. <u>For Academics, Researchers and Students:</u>

1. Starting a company: Cambridge Enterprise supports those trying to start a company based directly on University research or people, investing up to £500,000 in each University spin-out from investment funds CEL manage on the University's behalf.

Significant follow-on funding is available through Cambridge Enterprise's sister fund, Cambridge Innovation Capital (CIC). CIC has strong ties with the University of Cambridge and works closely with Cambridge Enterprise on its investments. CIC may also invest at the seed stage as a precursor to further investment.

Cambridge Enterprise can work with the incumbents to make their business plan stronger, we can

connect you with industry mentors and management, and CEL can fund consultants and proof of market studies. Since 1995, CEL has invested in 62 companies that together boast a three-year survival rate of 80%, compared with a national average of 30% for technology companies.

The investment CEL offers: CEL invests the University seed funds in new companies started by staff and students to enable the commercial development of University research. As such, they offer a range of investment to help develop new ventures. Among them are:

- *PathFinder* investment, up to £20,000 to help carry out market and intellectual property assessments and business strategies.
- *Fast 50*, a Cambridge Enterprise initiative that offers up to £50,000 for work on time-sensitive projects and critical experiments that need investment delivered quickly.
- *Seed investment*, up to £500,000 in the initial round, to provide the first stages of company funding to advance technology development and management.

Once the investment is completed CEL continues to work with the incumbents to help develop and grow their business.

2. Winning a consultancy contract: It is through Cambridge Enterprise's Consultancy Services that University staff, researchers and postgraduate students are supported to be consultants, to provide their expertise and know-how, offer expert witness advice and serve on scientific advisory boards. The Consultancy Services team handles the negotiations, contracts, arrangements for use of University facilities, invoicing, debt collection, income distribution and all the other administrative tasks that can otherwise distract the incumbents from their work.

The services provided by the Consultancy Services team include the negotiation of contract terms and conditions as supported by the University Legal Services Office and the Insurance Section of the Finance Division. In addition, academics benefit from the University's professional indemnity and personal liability insurance policies. A Consultancy Services management fee is included in the price of the consultant contract and is paid by the client company.

Examples of work undertaken by the consultants include:

- technical and creative solutions to specific business problems
- provision of expert reports on technical, economic and commercial issues
- expert witness advice
- serving on scientific advisory boards
- managed access to University technical facilities
- reviews of government strategy and policies
- art restoration and social housing assessments
- development of bespoke training programmes
- Provision of advice for and appearances in film and TV documentaries.

3. Commercialising the research: CEL helps academics develop their ideas and inventions into opportunities that are attractive to business and investors is at the heart of Cambridge Enterprise and its Technology Transfer teams. CEL's mission is to commercialise University knowledge and technology by working with academics, commercial partners, investors, the NHS and research funders to bring potentially big ideas to market, including by assisting with the formation of new companies and developing licensing opportunities. CEL works with University colleagues through the entire commercialisation process, and often with those whose ideas are still in the very earliest stages of development.

Cambridge Enterprise works to develop successful opportunities by helping academics apply for translational funding opportunities, undertaking market analysis, bringing together experts to scope and develop new technologies, finding development partners and investors, and negotiating and managing

commercial deals through licensing IPR, including patents, know-how, data and copyright. Whatever route the idea takes, the first thing to do is contact CEL to talk through the options. Incumbent's idea can be at any stage of development and in any form, such as:

- a research topic that is relevant to industry needs
- software
- a design (for a circuit or object)
- the creation of reagents or questionnaires
- a new methodology
- an algorithm
- Patentable technologies

After filling out a disclosure form,

- Cambridge Enterprise will handle the incumbent's idea with strict confidence
- CEL will discuss, even if the idea is not fully formed – they can help incumbent decide how to move forward.
- If the incumbents choose to develop the idea independently of Cambridge Enterprise, CEL will work with them to give them the necessary rights from the University.

4. Meeting enterprise champions - Linking Cambridge Enterprise to its academic partners:

Academics, researchers, facilitators and co-ordinators provide an invaluable link between Cambridge Enterprise and University departments and their networks. They are called Enterprise Champions, and they act as a first point of contact for department members who want advice on bringing their ideas and expertise to market. They know the resources available through Cambridge Enterprise and foster a good working relationship with colleagues to encourage commercialisation.

Enterprise Champions hail from a wide range of backgrounds – from those doing collaborative corporate research and starting companies, to fundraising and balancing the demands of academic research and business.

As well as academics, researchers and research facilitators, this group is comprised of Knowledge Transfer Facilitators (KTFs). KTFs support academics and researchers in knowledge transfer and collaborative activities and develop relationships between the University and external partners, and the University's multi-disciplinary Strategic Research Initiatives and Networks, which bring together internal cross-disciplinary research collaborations and provide a platform for large-scale funding applications, recruitment and international research partnerships. Together, the Enterprise Champions represent some 50 areas of the University.

5. Clubs, programmes and networking:

To develop ideas:

- Enter *Cambridge University Entrepreneurs' (CUE)* Ideas Take Flight competition. CUE runs one of the world's most successful business creation competitions to support and accelerate entrepreneurship and innovation.
- Apply to Accelerate, a programme run by the Judge Business School, which offers a structured approach of three-month programmes combining entrepreneurship training, regular coaching and mentoring, and access to shared workspace.
- Apply for the *Graduate Entrepreneur scheme* for graduates of Cambridge University who have an outstanding business idea they want to put into practice in the UK.
- Get in touch with *ideaSpace*, which provides office space and resources for anyone looking to start a new, high impact company in Cambridge.

To join a society:

- *Cambridge University Entrepreneurs (CUE)* organises one of the most successful student-run business planning and creation competitions in Europe.

- *The Cambridge University Technology and Enterprise Club (CUTEC)* is the leading student-run organisation at the University of Cambridge with a focus on technology venture capital.
- *Beyond Profit* encourages the development of businesses that create positive social and sustainable solutions rather than simply maximising profit.
- *i-Teams* combines multi-disciplinary teams of students with industry mentors and real University inventions to assess the commercial viability of new technologies and product designs.
- *Entrepreneurial Postdocs of Cambridge (EPoC)* aims to support postdocs in their pursuit of entrepreneurial careers, share opportunities and foster a multi-disciplinary network of entrepreneurial postdocs within the University.

Learning more about entrepreneurship:

- Go along to *Enterprise Tuesday*, a programme of free events run by the Judge Business School to introduce participants to the world of business, as well as to encourage and inspire individuals to pursue their entrepreneurial ambition.
- Talk to the *Careers Service*, which provides resources for those wanting to set up 'conventional' businesses, such as restaurants, fitness centres and photographic studios. It also provides a *Start-up Careers Lecture* Series.
- Visit the *Cambridge University Enterprise Network (CUEN)*, which acts a portal to the various organisations involved in enterprise and innovation activities within the University.

D. <u>For Industry, Government and Non-profit:</u>

1. Find a consultant - Connecting academics and industry:

Cambridge Enterprise offers an important and effective consultancy service which enables the University to share its knowledge with government, industry and the public sector, and make a direct impact on society. The goal is to make the process of consultancy easier for academics and for the organisations in need of their expertise. CEL's service covers the administrative issues associated with consultancy projects, including negotiation of contract terms and conditions, invoicing, debt collection, income distribution and the arrangements for use of University facilities. While CEL works primarily with researchers who have already been contacted by potential consultancy clients, they are happy to use their networks and experience to help organisations find a consultant.

The University of Cambridge has many specialist facilities embedded throughout its departments, from High Performance Computing to mass spectrometry labs. External clients can make use of these facilities through a consultancy contract with Cambridge Enterprise. This may involve contracting with a University expert. For example, an academic consultant could carry out analysis on a client's samples and provide the client with the raw data and a report on the results.

Projects CEL has undertaken so far:

- Technical and creative solutions to specific business problems
- Provision of expert reports on technical, economic and commercial issues
- Expert witness advice
- Serving on scientific advisory boards
- Managed access to University technical facilities
- Reviews of government strategy and policies
- Art restoration and social housing assessments
- Development of bespoke training programmes
- Provision of advice for and appearance in film and TV documentaries

2. Opportunities to invest:

Cambridge has a worldwide reputation as a place where new technologies emerge, companies are born and products that transform society are developed. Cambridge Enterprise invests the University's seed funds in new companies started by staff and students, building a bridge between research and commercial development. Early stage capital and support is pivotal to the success of new technology companies in what is often seen as a high-risk section of the investment spectrum. There are opportunities to invest. Since seed funding began in 1995, CEL's portfolio companies have raised more than £1.29 billion in further investment and grant funding. They now employ more than 630 people and generate an annual turnover of £47 million.

3. Licensing Cambridge innovation:

Cambridge Enterprise works in collaboration with University of Cambridge researchers to market and license available technologies ranging from the biosciences to engineering. CEL welcomes contact from companies interested in licensing available technologies from the University of Cambridge, and work with companies on an individual basis to identify specific areas of interest.

4. Licensing for the research community:

Cell lines, antibodies, proteins, DNA constructs, small molecules and other research tools generated by scientists at the University of Cambridge play a key role in laboratory research. There is a wide range of research reagents available for commercial licensing through Cambridge Enterprise.

5. International Outreach Programme - Turning global knowledge into stronger economies:

Regarded as one of the best knowledge transfer operations in the world, Cambridge Enterprise is frequently asked to provide advice, training and support to governments and universities around the globe that want to grow by commercialising their research and knowledge base. Through its *International Outreach Programme (IOP)*, Cambridge Enterprise offers its international clients consultancy support and workshops that can be as short as one day, or as long as several months and involve mentoring in the client's home country. Academics seek out the programme to better understand how to bring their research to market.

To date, Cambridge Enterprise has helped academic and government partners in Brazil, Colombia, Chile, Kazakhstan, Thailand, Saudi Arabia, Norway, China, Colombia, the Czech Republic and Mexico.

Brazil, which is developing a culture of entrepreneurship and innovation within its universities, has been one of the IOP's largest projects. It is one of several countries working with the IOP to help move its economy away from one dependent on natural resources. The work in Brazil was funded by the Foreign & Commonwealth Office of the UK, and included courses on technology evaluation, innovation policies and how to turn university research into new companies.

Cambridge Enterprise is now working closely with a group of Cambridge postgraduate students to raise the profile of the IOP across a number of Latin American countries. For more information about this programme, contact Shirley Jamieson.

6. Industry Engagement Forums:

Cambridge Enterprise Industry Engagement Forums encourage academics at all stages of their careers to think broadly about their work and better understand how it can be used to create impact in both commercial and humanitarian contexts, while non-profit organisations and industry gain access to world-leading research expertise. During the one-day brainstorming events, companies are invited to put forward themes related to their industry. Working together in small groups, participants identify areas of common interest that may lead to future research collaborations, studentships and secondments.

One Industry Engagement Forum, which brought together postdoctoral researchers, PhD students and academics from the Department of Physics, and scientists with British Petroleum (BP), resulted in three collaborative, funded projects.

Academics, researchers and PhD students, from the social sciences and humanities to those engaged in the fields of science, technology, engineering and maths (STEM), have attended Industry Engagement Forums with more than a dozen companies and organisations including Unilever, UNICEF, UNESCO, the International Red Cross, Pfizer, the Atomic Weapons Establishment (AWE) and World Bank.

7. Innovation Fellowships:

The Cambridge cluster, based around the University, the city's rich ecosystem of hi-tech and biotech companies, and entrepreneurial flair, is the most successful technology cluster in Europe. With more than 1,500 tech-based firms employing 57,000 people, and a combined annual turnover of more than £13 billion, the cluster is a rich source of innovation, growth and employment – and can offer many insights to entrepreneurs from the UK, Europe and worldwide. Through Cambridge Enterprise and the Centre for Science and Policy, the University is creating a network of international business leaders in order to build enduring connections between entrepreneurs, major corporate decision-makers and researchers, and to support knowledge exchange around innovation. Modelled on the University's highly successful Policy Fellowships Programme, the Cambridge Innovation Fellowships will enable CEOs and other senior executives of leading businesses to explore the processes that connect ideas to output. Fellows will meet and interact with practitioners and academics (and those who are both); they will take back to their companies new insights, fresh perspectives, and enduring links with Europe's leading innovation ecosystem.

Benefits of the scheme:

Innovation Fellowships offer a number of benefits to executives interested in engaging with the University and the cluster.

Benefits of the programme include:

- advice and guidance to enable you to 'navigate the network' and open the relevant doors around Cambridge and in the University
- on-going membership of a network of thought-leaders addressing common issues, and the chance to build your personal network
- direct connections to leading researchers in the areas of innovation, entrepreneurship, and business growth, and to those who have successfully put research into practice
- the ability to shape the knowledge-exchange with those you meet around your specific questions and concerns
- on-going support to convene workshops and other discussions within the network over a two-year period
- opportunities for your company to commission consulting or joint research in the University, or to gain profile through association with University events
- Time and space to think in an intellectually stimulating environment – returning you to your day-job with new ways of tackling the key challenges you face.

Cost of the scheme:

The one-off fee of £9,000 – plus expenses for local travel and accommodation – covers all the costs for the meetings in the University and the Cambridge cluster. It also gives access to networking events and seminars run by Cambridge Enterprise, the Centre for Science and Policy, and other relevant organisations over the two-year period.

Target audience:

Students, Academics, Researchers, Government, Non-profit, Industry, University born Start-up companies
Requirements:
N/A
Process by which the initiative operates:

1. Helping academics, researchers and student starting a company:

- CEL can be contacted for an early discussion about the idea and its potential. A member of the Seed Funds team will work with the incumbents to develop their idea and guide them through the investment process.
- If applicable, the incumbent can apply for *PathFinder* investment to develop their plans – CEL can make these smaller awards easily.
- For larger investment, the incumbents will need to present their business plan to the Seed Funds team, which will make an assessment about whether to progress their application to the Cambridge Enterprise Investment Committee.
- If successful, the incumbents will present their idea to CEL Investment Committee.

With Investment Committee approval we will put in place the necessary legal agreements to complete the investment.

2. Helping academics, researches and student winning a consultancy contract:

a) If the incumbents are contacted by a potential client it is important to identify the scope and nature of the services, what deliverables the client wants and any relevant milestones and timings.
b) Think through the time and resources required and try to identify any potential conflicts of interest.
c) Contact CEL as soon as possible and they will advise on contractual matters, including costing and pricing the type of service required in the relevant subject area.
d) Fill out disclosure form that describes the project and enables CEL to get started on the contractual side.
e) CEL will generate a contract between CUTS and the client based on the model agreement, then ask the incumbents to review the project-specific details.
f) A contract will be sent by the Consultancy Services team via CUTS to the client and amendments negotiated if necessary. CEL will keep the incumbent informed of developments.
g) Once the contract details are finalised, CEL will ask the incumbent to sign a short letter agreement, contracting the incumbent to CUTS to provide the services.
h) Project work is now set to begin and CUTS will invoice the client as detailed in the contract.
i) CEL aim to distribute income from the client to the incumbent within 30 days of its receipt; management fees and direct costs, such as use of University facilities, will be deducted.

3. Helping academics, researches and student Commercialising their research:

a) Once the incumbent have provided CEL with a completed disclosure form, they will meet with the incumbents to discuss their ideas and any commercial applications.
b) CEL will review the competitive landscape – assessing the published papers and (if appropriate) patent applications that may be similar.
c) CEL may contact some companies to establish whether incumbent's idea solves a relevant problem.
d) Sometimes at this stage CEL may have a more detailed conversation with a company, which may require confidentiality agreements be put in place.
e) These conversations may point to a need for more translational research before CEL engage with industry; they can help incumbent find funding for that purpose.

f) Occasionally CEL may decide that Cambridge Enterprise is not the best route for commercialisation in which case they would discuss alternative options with incumbent.
g) In cases where patent protection is appropriate, CEL will work with incumbent and a patent agent to file a patent application – CEL will manage the patent prosecution but they will need incumbent's input at various stages.
h) If no licensee has been identified, CEL will market incumbent's idea and try to find a good match. This could be through an existing company or they might help incumbents start one of their own.
i) Cambridge Enterprise will take assignment of any registerable rights (patent, trademark, registered designs) and a licence to any non-registerable rights (know-how, copyright, unregistered designs, database rights) so that CEL can act on incumbents' behalf and on behalf of the University in commercialisation of an idea.
j) CEL negotiates with the licensee to agree terms for the commercialisation of incumbents' idea in return for a revenue share or other appropriate consideration.
k) Revenue received by Cambridge Enterprise will be shared with incumbents, their departments and the University according to the University's IP policy (for registerable rights).

4. Meeting the Enterprise champions:

Champions meet three times a year to share departmental research priorities and updates and 'hot' technologies, critique Cambridge Enterprise's performance and network with like-minded colleagues from other parts of the University. They are kept abreast of the latest developments in IP and research policy, and are given the opportunity to share their opinions with University policymakers.

5. Opportunities for investors:

Through *Cambridge Enterprise Venture Partners (CEVP)*, investors have the opportunity to hear pitches from investment-ready Cambridge companies, followed by dinner at one of the Cambridge Colleges. CEVP is Cambridge Enterprise's investor forum to showcase companies to an audience of venture capitalists and business angels. CEL hosts three dinners a year, normally within one of the historic Cambridge Colleges. The evenings start with presentations from three Cambridge Enterprise associated companies. These are followed by dinner, where investors can engage in in-depth discussions with the presenting companies. The evening is rounded off with an after dinner speaker from the world of business, government or academia. With currently over £3 billion of funds under management by members, CEVP is an excellent forum with a unique offering.

6. Innovation fellowships:

How it works:

The starting point is a blank sheet of paper where Fellows write down the questions they face in their personal businesses about innovation. Cambridge Enterprise then connects each Fellow with investors and entrepreneurs and researchers whose theories can help answer those questions. Through an intense series of one-to-one meetings, organised over five days in Cambridge, the Fellows explore challenging and often unexpected perspectives, and discover the connections that will become the basis for on-going investigation over the two years of their Fellowships.

How to apply:

Up to 12 new Innovation Fellows will be elected each year (four each term), each for a period of two years. Those who would like to apply to be an Innovation Fellow, they need to email CEL with a brief biography, a summary of the questions that they would want to address, and a note of support from their organisation. What each Fellow does over those two years is very much down to his or her needs and approach. Experience in the Policy Fellowships Programme suggests that some will want to return to Cambridge to convene expert workshops exploring key issues in depth; others will secure the greatest

benefit from broadening their networks in the Cambridge cluster, or from bringing practitioners and researchers into their organisations to consult and advise. Many will also want to take up the opportunity to give lectures and lead seminars in Cambridge, closing the loop with the future generation of entrepreneurs.

Impact of the best practice

1. Since 1995, Cambridge Enterprise Ltd. has invested in 62 companies that together boast a three-year survival rate of 80%, compared with a national average of 30% for technology companies.
2. Cambridge Enterprise Ltd. have completed more than 1,000 commercial agreements.
3. Since seed funding began in 1995, CEL's portfolio companies have raised more than £1.29 billion in further investment and grant funding. They now employ more than 630 people and generate an annual turnover of £47 million.
4. To date, Cambridge Enterprise has helped academic and government partners in Brazil, Colombia, Chile, Kazakhstan, Thailand, Saudi Arabia, Norway, China, Colombia, the Czech Republic and Mexico.

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Publications and sources

1. http://www.enterprise.cam.ac.uk/

5. SCoRE Cymru (Supporting Collaborative Research and innovation in Europe) Scheme

Description of the host organization of the best practice (country, age, type of organization,…)

Research and innovation is vital to the global competitiveness of the Welsh economy and so it is very important to maximise the opportunities for collaborative research and technological development through EU funding programmes, such as the European Structural Funds and Horizon 2020. These schemes can help build strong foundations upon which Wales can drive forward its Knowledge Economy (KE) and secure growth and jobs.

Wales has a good track-record in using Structural Funds to help boost research and innovation. Since 2007, Walsh government has invested £220m (~€255m) of Structural Funds in R&D, supporting projects like Cardiff University's £34m Low Carbon Research Institute Energy Programme, which is collaborating with industry and key Welsh universities on industrial energy R&D projects, creating up to 275 jobs and assisting 550 enterprises.

Looking ahead to the funding round from 2014, Welsh government wanted the Structural Funds to be a stepping stone to accessing further EU research and innovation funding, including Horizon 2020, as well as focus on activities that are already strong or are showing promise in line with the Smart Specialisation concept promoted by the European Commission. Structural Funds focuses on measures to build capacity, which should lead to organisations accessing Horizon 2020. Above all, it is important to maximise the synergies between both funding schemes to achieve greater impact from these investments to drive forward research and innovation in Wales.

It is important that the government increase current research and innovation investment levels in relation to GDP so that Wales can create a globally competitive nation, which the ambitious 'Programme for Government' and innovation and science strategies are seeking to deliver. Providing better advice and support to help businesses and higher education institutions increase their participation in European framework programmes is one way to help Wales achieve this goal. With a likely budget of around £60bn for Horizon 2020, this funding can be leveraged for the benefit of the Welsh economy.

Welsh government has established a new Horizon 2020 service or 'one-stop-shop' within the Welsh Government's Welsh European Funding Office (WEFO). The service draws on WEFO resources that are already playing a central role in supporting the KE through the management of the Structural Funds and its established EU networks and contacts. By bringing these EU funds together, as a 'one-stop-shop' service, the government can explore complementarities and synergies to make the best use of EU funds and generate further impact.

Welsh government wants to see Wales as a European leader in maximising the opportunities for collaborative research and technological development through programmes such as Horizon 2020. The government is working closely with its stakeholders to help set challenging, yet achievable, targets for the research and innovation community in Wales.

EU funds have delivered significant benefits for Welsh businesses, people and communities during difficult economic times. It has been envisaged that the impact EU funds can bring, particularly to businesses helping them develop ground-breaking products, services and technologies for commercial success. The enthusiasm and support for Wales' approach in the way it manages and participates in EU-funded programmes is also encouraging. The Welsh government looks forward to forging stronger links with its European partners so that Wales drive forward research and development opportunities to build a KE at the cutting-edge of innovation.

Starting year of the programme / initiative

May 2013

Brief description of the programme / initiative (content, funding, target population,…)

Wales has benefitted from over €107m of funding under the Seventh Framework Programme. Comprising 337 participants, this can be regarded as a respectable increase when compared to other major European regions. In order to further exceed expectations in Horizon 2020, the Welsh Government has developed several initiatives, including SCoRE Cymru (Supporting Collaborative Research and innovation in Europe), to help businesses and universities apply for future EU grants.

SCoRE Cymru (formally WECF) stands for **S**upporting **Co**llaborative **R**esearch and innovation in **E**urope. It provides Grants to support Welsh - based organisations with the costs of accessing R&I programmes such as Horizon 2020. The scheme currently supports:

- The travel and accommodation costs involved in:
  - identifying and building consortia,
  - negotiation of contracts
- The cost of subcontracted expertise for:
  - writing funding proposals,
  - negotiation and conclusion of consortium agreements and/or contracts

Grants Available for:

Travel:

- Up to £1,000 (€1,383) and/or 100% of the costs for SMEs
- Up to £1,000 and/or 75% of the costs for HE
- Up to £1,000 and/or 50% of the costs for other organisations travelling with a Welsh SME/HE

partner

Proposal development:

- Up to £10,000 (€13,830) and/or 100% of the costs

Improvement so far in SCoRE scheme:

- Grant rate increases
- Administration simplified to reduce turnover time
- Now supports early consortium building
- Travel outside the EU and to UK destinations allowed under certain circumstances
- Assessment criteria focus on quality of proposal rather than eligibility rules

Description, evaluation and analysis of each proposed measure:

'**SCoRE Cymru**' has a budget of £70,000 (€82,100) of funding to help Welsh organisations develop more competitive and collaborative bids with partners in Europe to access a range of EU research and innovation funding streams, including Horizon 2020. It is a more flexible fund, which was developed following engagement with key partners on lessons learned and best practice. SCoRE Cymru helps widen participation in Horizon 2020, especially by businesses.

Any Welsh organisation involved, or planning to be involved, in cutting-edge research and innovation are able to apply. Organisations developing partnerships within the UK, the EU or even outside the EU have access to £1,000 (€1,383), different rates for different bodies from SCoRE Cymru to help cover travel costs. Up to £10,000 (€13,830) is also available for assistance in EU bid-writing costs.

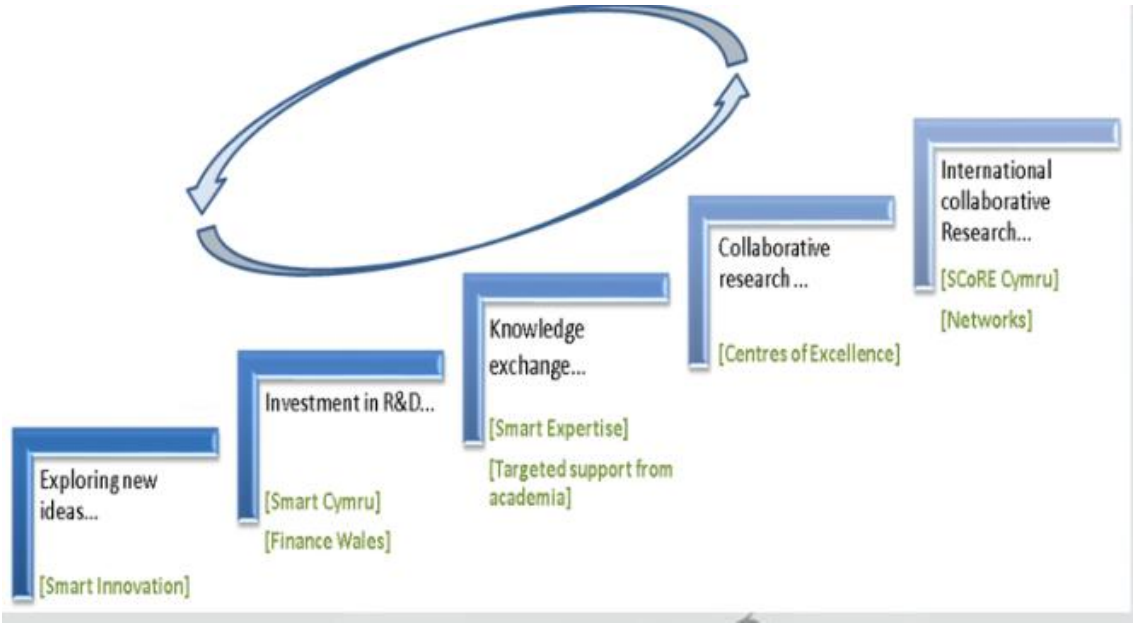

Figure: ScORE Cymru - stairway to excellence

Since the inception of the scheme there are said to have been over 164 enquiries and 68 successful applicants to travel in 18 countries worldwide to build collaborative partnerships or have accessed expert advice to develop their bids. Funding committed (as of November 2014) totals over €139,568, 72% of which has been awarded to SMEs. Potential projects supported include a novel system for the early detection of cancer, the 3D engineering of human ears from cartilage, a new therapy for hypothyroidism and a system for the rapid diagnosis of Alzheimer's disease.

European Commission's Horizon 2020 unit recommend this measure as an example of regional good practice to policy-makers from other regions.

Target audience:

Wales-based organisation e.g. Universities, Public Research Organisation, other public sector organisations, Industries (SMEs and Large Enterprises) and individual who seek funding from European collaborative research e.g. Horizon 2020 Programme.

Requirements:

To be a Wales-based Organisation or individual

Process by which the initiative operates:

1. Applicants need to complete an application form
2. WEFO will contact the applicants shortly after receipt and encourage them to speak with them before applying.
3. Wherever possible applications should be submitted at least 2 weeks before eligible costs are likely to be incurred.
4. WEFO aims to process valid applications in less than 2 weeks but if applications are not received within a reasonable timescale or are significantly incomplete, then they may be rejected.
5. The application is then assessed. In assessing the application, the Horizon 2020 Unit may seek advice on its merits from within the Welsh Government. The Unit may also seek external technical advice where required but will inform applicants if that is the case.
6. Successful applications will receive an offer letter. Applications may be approved with qualifications.
7. Application will be judged against the following criteria.

All Applications:

a. How well the applicant has demonstrated that it is a Welsh-based organisation with the potential in the Welsh location to participate in a relevant proposal.
b. That the anticipated eligible costs are clearly specified and are reasonable.
c. That the requested grant rate is allowable and reasonable.
d. The scale of the expected return on investment for Wales, e.g. if the European proposal is successful, what level of funding is likely to be awarded to the applicant and any other Welsh partners.
e. The importance of the sector or area of research/innovation to Wales.
f. That the applicant is financially viable.
g. Compliance with State Aid law and procurement rules, where applicable.

For Travel:

b. The strength of the justification for the journey, e.g. which call/theme is being targeted and why.
c. The relevance of the experience and qualifications of those travelling.
d. The relevance of the planned event(s)/meeting(s) including the other attendees.

For Proposal Development:

a. That a specific thematic area and an associated call deadline for submitting proposals have been identified.
b. The strength of the evidence that the project proposal has been adequately scoped, including contact with National Contact Points, budget, partners' commitment and the timescale.
c. That there is sufficient time before the associated call deadline for an eligible proposal to be developed.

8. WEFO as part of the Welsh Government will make the final decision on applications, claims,

payments and all other matters relating to SCoRE Cymru.

9. Claiming the grant:

For Travel, Payment will be made upon prompt submission of:

a. Proof of expenditure (original receipts, etc.) of all eligible costs including mileage declaration if applicable.
b. A completed travel report form (which will be provided with your offer letter) detailing the activity and outcomes.
c. A completed claim form.
d. An invoice on applicant organisation's headed paper, stating the amount of funding requested from the Welsh Government

For Proposal Development, Payment will be made upon prompt submission of:

a. Proof of expenditure (original paid invoices, receipts, etc.) of all eligible costs.
b. A completed claim form.
c. An invoice on applicant organisations headed paper, stating the amount of funding requested from the Welsh Government.

and one of the following as appropriate

d. A copy of the complete proposal as submitted to the European Commission (EC) along with a receipt from the EC proving filing of the proposal before the call deadline.
e. A copy of the signed consortium agreement or EC contract.
f. The Welsh Government will retain 10% of the claimed amount or £500 (whichever is greater) until it is in receipt of a copy of the relevant EC Evaluation Summary Report.

10. Claims for expenditure incurred in developing proposals that are not submitted to the EC or miss the relevant call deadline, or travel that does not achieve the expected purpose, will be considered but the Welsh Government reserves the right to withhold payment if the reasons given are not acceptable.

Impact of the best practice

1. maximising the opportunities for welsh-based organisations for collaborative research and technological development through programmes such as Horizon 2020
2. Providing a platform for Wales to maximise its research and innovation expertise and drive forward Wales' knowledge economy, in turn securing global competitiveness and creating growth and jobs

Contact person(s)

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Telephone: 0845 010 3355

Website: http://wefo.wales.gov.uk/programmes/other/fp7/lang=en

Publications and sources

1. http://gov.wales/funding/eu-funds/horizon2020/?lang=en
2. https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/support-measure/score-cymru
3. http://horizon2020projects.com/pr-interviews/wales-ambition-to-score-in-h2020/
4. http://gov.wales/docs/wefo/publications/150205scoreguidancedocen.pdf

6. KTMS (Kibo Technology Matching System), Korea Technology Finance Corporation (KOTEC)

Description of the host organization of the best practice (country, age, type of organization,…)

Korea ranked second among OECD member countries in terms of R&D spending to GDP with 4.1 percentages, according to the OECD Science, Technology and Industry Scoreboard 2015. This is due to an effort of the Korean government expanding its R&D budget from 14.9 trillion KRW (approximately 12 billion EURO) in 2011 to 18.9 trillion KRW (approximately 15 billion EURO) in 2015. Among this budget, 65% is funded in public research institutes and universities. However, the developed technologies are not likely to transfer to companies for commercialization. In order to solve this problem Korea Technology Finance Corporation (KOTEC) has established an innovative technology transfer platforms for SMEs to promote open innovation and monetize of R&D results.

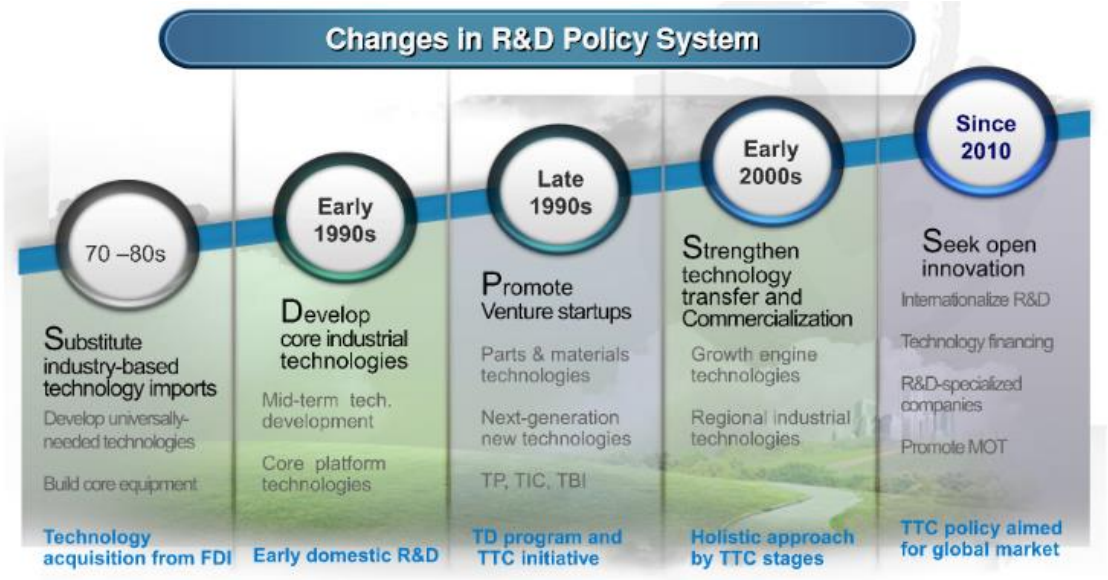


Figure: Technology policy in Korea

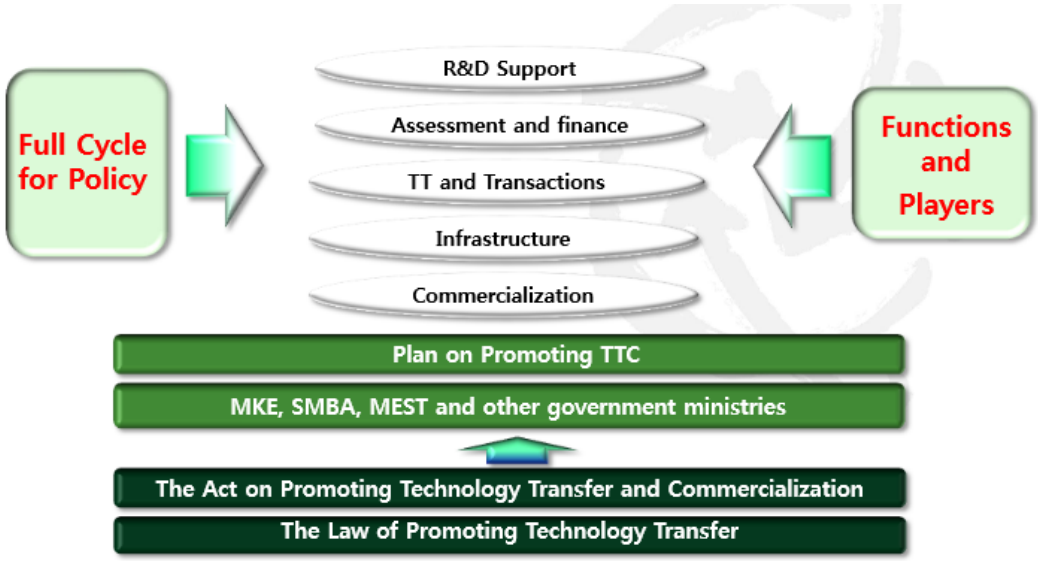


Figure: The policy flow chart

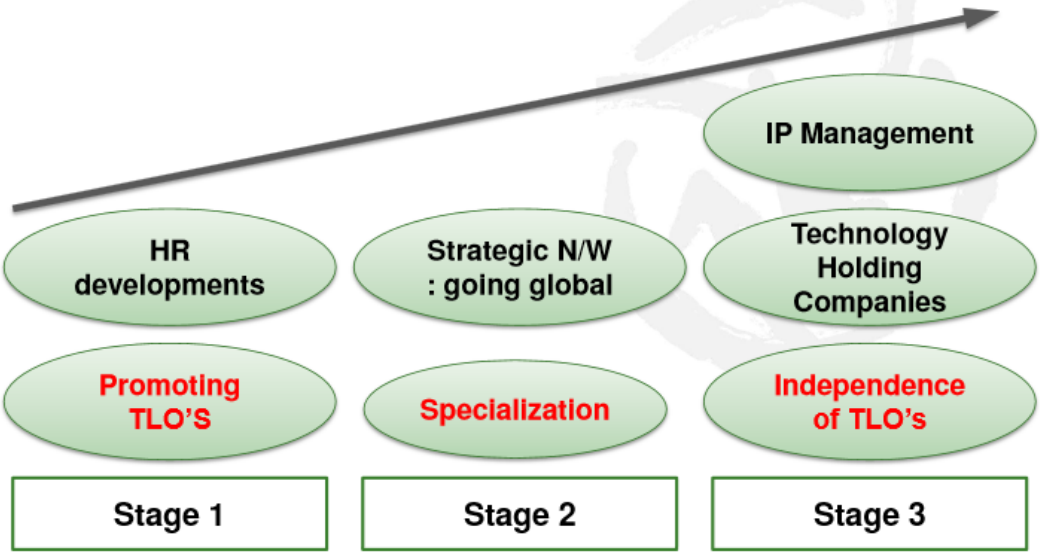


Figure: TLO's developments Korea misses most

Starting year of the programme / initiative

Established: 1989

Brief description of the programme / initiative (content, funding, target population,…)

In order to increase the technology transaction, KOTEC has developed an intermediary service to find the most appropriate technologies for requested parties. This is an online base service which is called KT MS (Kibo Technology Matching System). The process is developed in to 4 steps. First, the Technology Appraisal Centre (TAC), the branches of KOTEC, will have a survey and a consultation to the requested party in order to identify the technology needs. The TAC consists of 162 PhD degree specialists, 593 technology appraisal experts and 10 Certified Public Accountant (CPA), and the centre is spread all around the nation in 54 different locations. Second, the Technology Convergence Centre (TCC) specialized in intermediary services will communicate with the requested party both online and offline. The centre will use the KTMS online platform to search on the requested technologies. Third, utilizing the KTMS, the Technology Convergence Centre will find the most appropriate technologies for the requested party. Most of the offered technologies are developed by research institutes or SMEs. If the technology matches, the centre will support due diligence, negotiation and contract related works. Finally, KOTEC will financially support the requested party with the guarantee to loan for licensing, development and production. There are 239,057 offered profiles and 999 requested profiles available at the KTMS website (only available in Korean): tb.kibo.or.kr

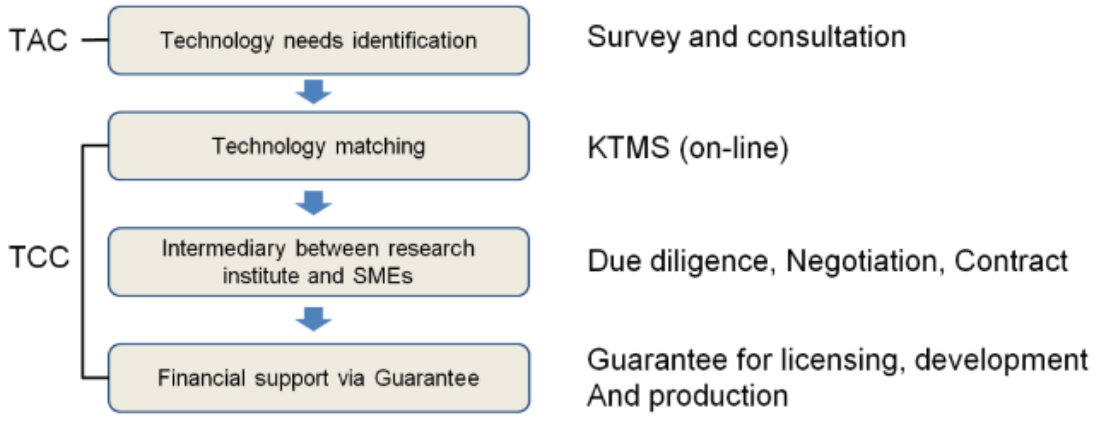
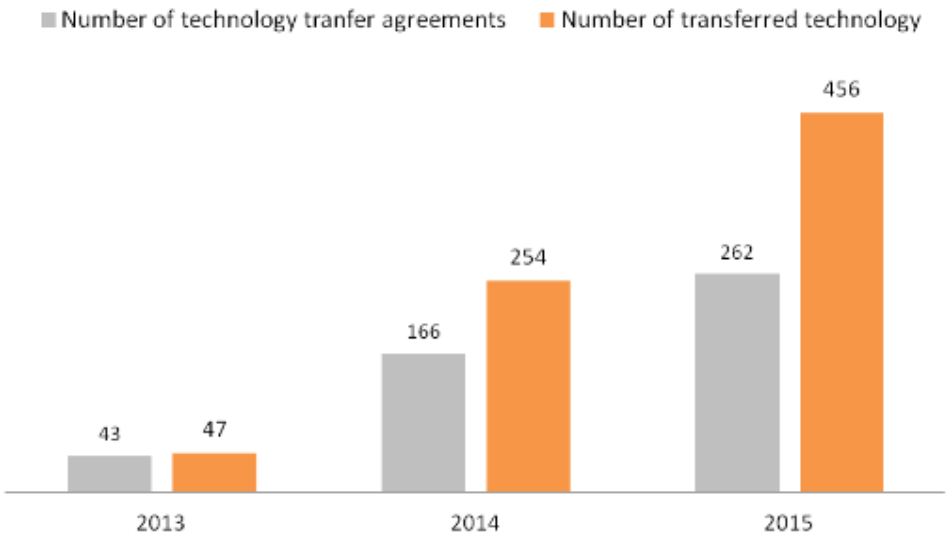


Figure: Intermediary services of KOTEC
Description, evaluation and analysis of each proposed measure:
KTMS is also a great tool for foreign organizations or companies to find advanced Korean technologies. This system enables requested party to find the most appropriate technologies. In addition, KOTEC will guarantee the technology and provide a financial support for Korean companies to collaborate with foreign organization or companies.
Target audience:
1. Public research institutes 2. Universities 3. Industries
Requirements:
Process by which the initiative operates:
Credit guarantee system was first institutionalized in 1961 in Korea. Since then, the credit guarantee system has been playing its due part for overall Small and Medium Enterprises (SMEs) sector to lessen the problem of lack of financial resources due to banks' prevalent collateral-based lending practice. In the 1980s, the necessity to promote SMEs with the orientation of technology or other source of innovation capabilities separately from general SMEs newly arose to nurture competitive advantage of the overall economy for the future growth, and the national consensus was reached. As a result, KOTEC was founded in 1989 by the Korean Government as a non-profit credit guarantee institution under the special enactment, "Financial Assistance to New Technology Businesses Act" which went through a full-scale revision and was newly titled "Korea Technology Finance Corporation Act." in 2002. KOTEC is now a specialized institution in providing full scale supports to SMEs and venture businesses with competitive technology, innovation, and other knowledge-based business contents at all growth stages. The mission of KOTEC is to take a lead in converting Korean economy to be creative and innovative.
Impact of the best practice
Result in 2014 - 20 15 In 2014, KOTEC had achieved the most remarkable achievement since it first became involved in the business of technology transfers in 2001, with 166 cases of technology transactions for 254 technologies. The number of technology transfer agreements in 2015 grew by 57.8% over 2014. In last two years, after the development and utilization of KTMS, 710 technologies was transferred and licensed to Korean SMEs.



One of the success cases of this system is transferring the Electronics and Telecommunications Research Institute (ETRI)'s technology to a Korean SME called Macrograph. In November 2014, KOTEC worked as an intermediary and provided a Guarantee service to the SMEs in order to receive licensing agreement from ETRI. The technology was about formation and reconstruction of the multi - point of view computer graphics (CG). This technology was applied to two famous Korean movies. Due to this technology, the company reduced the CG production time up to 30%, created job up to 61 positions and increased the revenue up to 5 billion KRW (approximately €3.9 million).

Figure: Success case of Technology Transaction

Contact person(s)

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Email: b038@kibo.or.kr

Publications and sources

1. Jeong Eun Ha, Officer for Innovation, Technology and Science, January 4,2016

2. www.tb.kibo.or.kr

3. http://www.kibo.or.kr/src/english

7. Agensi Inovasi Malaysia (AIM) [National Innovation Agency Malaysia]
Description of the host organization of the best practice (country, age, type of organization,…)

Agensi Inovasi Malaysia (AIM) is a statutory body set up by the Government via AIM Act 2010, with the primary purpose of being the driving force behind Malaysia's push towards establishing an "innovation economy" and the country's aspirations of achieving a high-income nation status. AIM was created to jump start wealth creation through knowledge, technology and innovation to stimulate and develop the innovation eco-system in Malaysia. AIM lays down the foundation of innovation that inspire and produce a new generation of innovative entrepreneurs. AIM facilitate collaborations between government, academia and industry in advancing the consolidation and execution of new ideas in innovation.

AIM has two clear goals:

- To bring about holistic societal well-being through cultivation of the innovation ecosystem
- To drive the national innovation agenda to generate the new-wave wealth

AIM's Vision is: *'Wealth creation through knowledge, technology and innovation'*

AIM's Mission is: *'To stimulate and develop the innovation ecosystem in Malaysia towards achieving vision 2020'*

AIM's objectives are:

- Generate additional revenue and contribute to Malaysia's GDP
- Provide additional jobs for the Malaysian workforce
- Inspire and produce a new generation of innovative entrepreneurs
- Facilitate the evolution of Malaysian companies into major global players

Figure: AIM promotes and manages the wealth of creativity and innovation in the country

AIM stimulates innovation in Malaysia to help achieve Vision 2020 in the following ways:

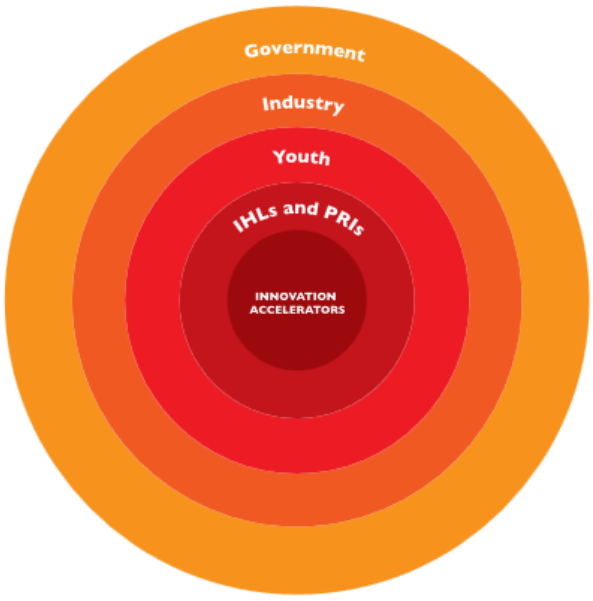
1. Direct/Indirect Investment - Produce direct (e.g. GNI) results and spur indirect (e.g. quality of life) outcomes;
2. Quadruple Helix - Work with Government, Rakyat, Academia and Industry;
3. Catalysing Role - Joint partnership to drive innovation and change;
4. Multi-model Approach - Ranging from facilitating collaboration to transforming strategic sectors;
5. Outcome Oriented - Held against measurable milestones and targets.

AIM's Purpose:

AIM has been created to improve and jump-start the national innovation eco-system and generate new-wave wealth through innovation. In striving to achieve its objectives, AIM will take a professional and strategic approach that is driven by governance and emphasises collaboration between the public, private and education sectors.

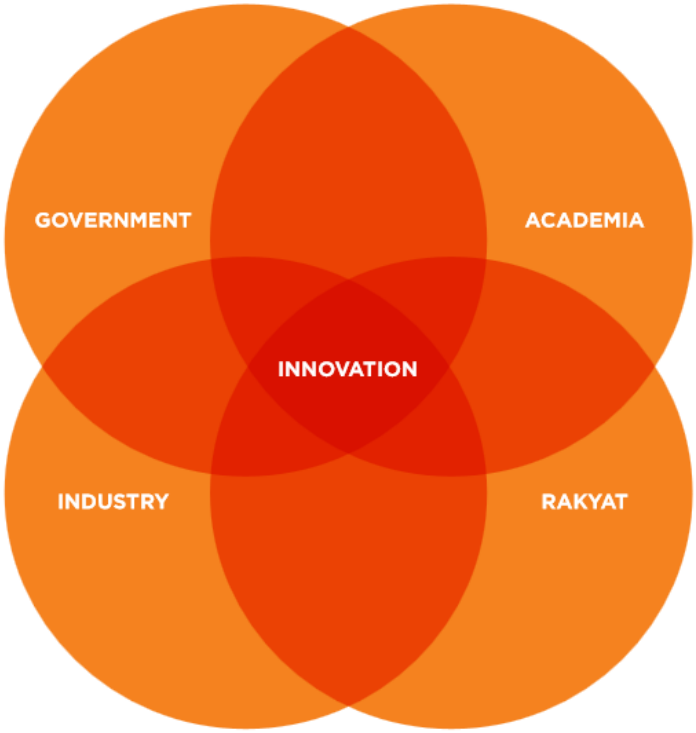
In relation to the eco-system, AIM address four key areas. These are:

- Institutes of Higher Learning (IHL) and Public Research Institutes (PRI)
- Youth (education)
- Industry, and
- Government



Each of these areas are unique and requires different strategies, techniques and projects to foster innovation.

To develop the innovation eco-system and ensure its sustainability, AIM has identified several tried and tested models and mechanisms that can be successfully adapted to the Malaysian context. They include the Quadruple Helix Model, Onion Model and Innovation Accelerators.



Starting year of the programme / initiative

2010

Brief description of the programme / initiative (content, funding, target population,…)

AIM has adopted six (06) approaches to innovation:

7. CULTIVATING A THINKING CULTURE

    a. Equipping Malaysia's next generation with the ability to think critically and creatively via programmes such as ***i-THINK***, ***IB*** and ***Genovasi***;
    b. These programmes are designed to enhance thinking skills for our primary and secondary school children and also design thinking for graduates;
    c. These programmes will also help foster a culture of innovative and critical thinking among youths and as such create a seamless creative pipeline for future innovations.

8. INNOVATION FOR AND BY SOCIETY
    a. Challenging youths on ***UReka.my*** to innovate, and guiding them through a process of ideation, prototyping, piloting and implementation;
    b. Crowdsourcing successful income generation models among micro-entrepreneurs and replicating to more people through a ***Gigih mentoring network***;
    c. Mobilising social finance to leverage social NGOs to collaborate with government and the private sector to transform social intervention and service delivery.

9. FACILITATE INDUSTRY-ACADEMIA COLLABORATION

a. Catalysing greater collaboration activities between industry and academia to generate commercial-ready Ps via ***Steinbeis Malaysia***;
b. These programmes will help the public to promote innovations, transfer knowledge and facilitate collaborations between Government, Rakyat, Academia and Industry to create a truly open innovation culture;
c. These programmes also provide alternative innovative platforms for the industry (particularly SMEs) to engage the academia to solve real business needs.

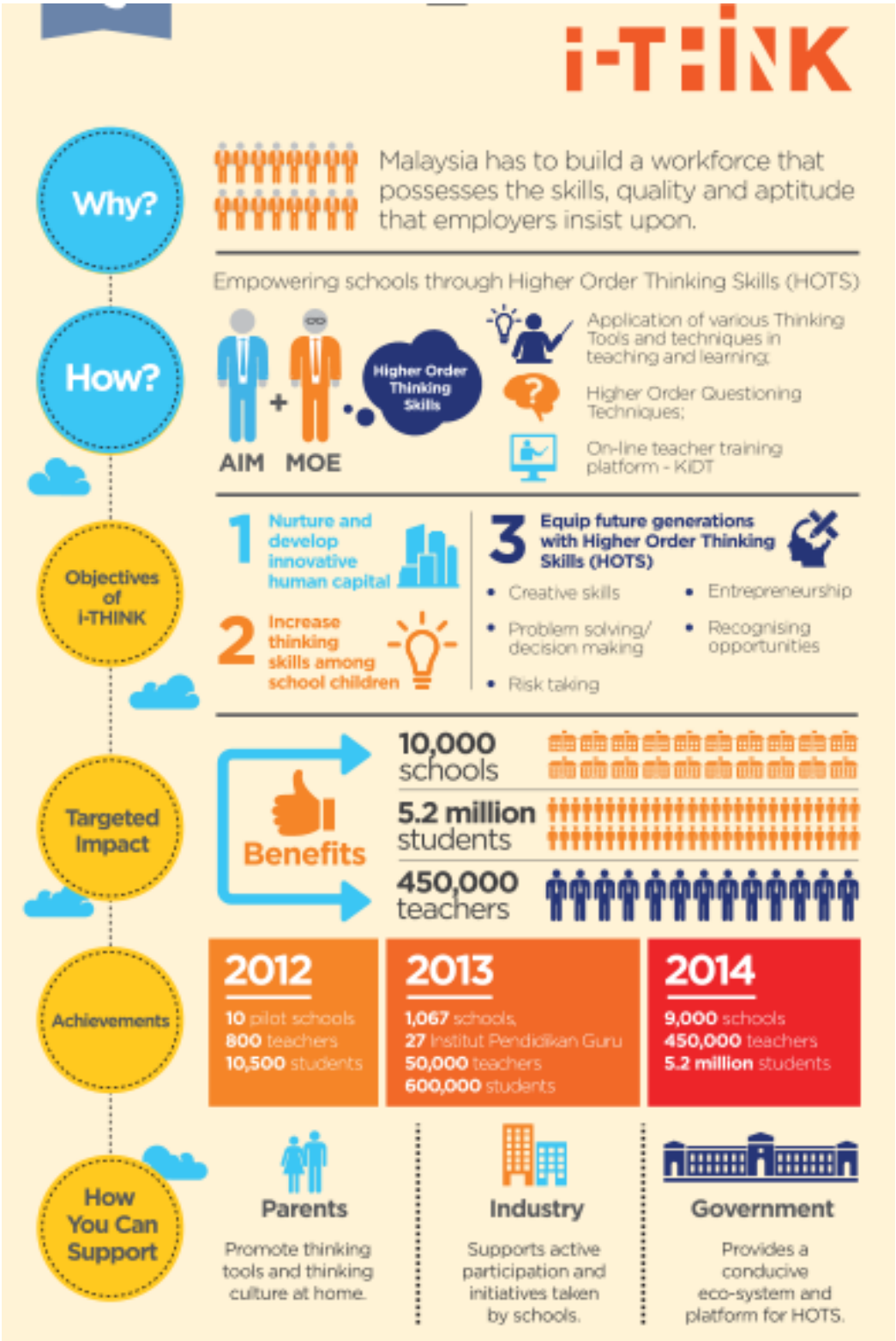
10. TRANSFORMING STRATEGIC SECTORS
    a. Defining national strategies to transform strategic sectors of the future via programmes such as the ***National Biomass Strategy 2020*** and the ***National Graphene Action Plan 2020***;
    b. These programmes will deliver a national strategy to transform Malaysia into a global hub for biomass and a roadmap for strategic choices into competitive application areas with graphene as a key enabler.

11. INNOVATING ORGANISATIONS
    a. Providing support to mid-sized and large organisations on innovation via programmes such as the Mid-Tier Development Programme, ***National Corporate Innovation Index*** and the Intellectual Capital Future Check;
    b. Innovating organisations by providing support to mid-level and large organisations to make the jump to the next level and seek returns on innovation.

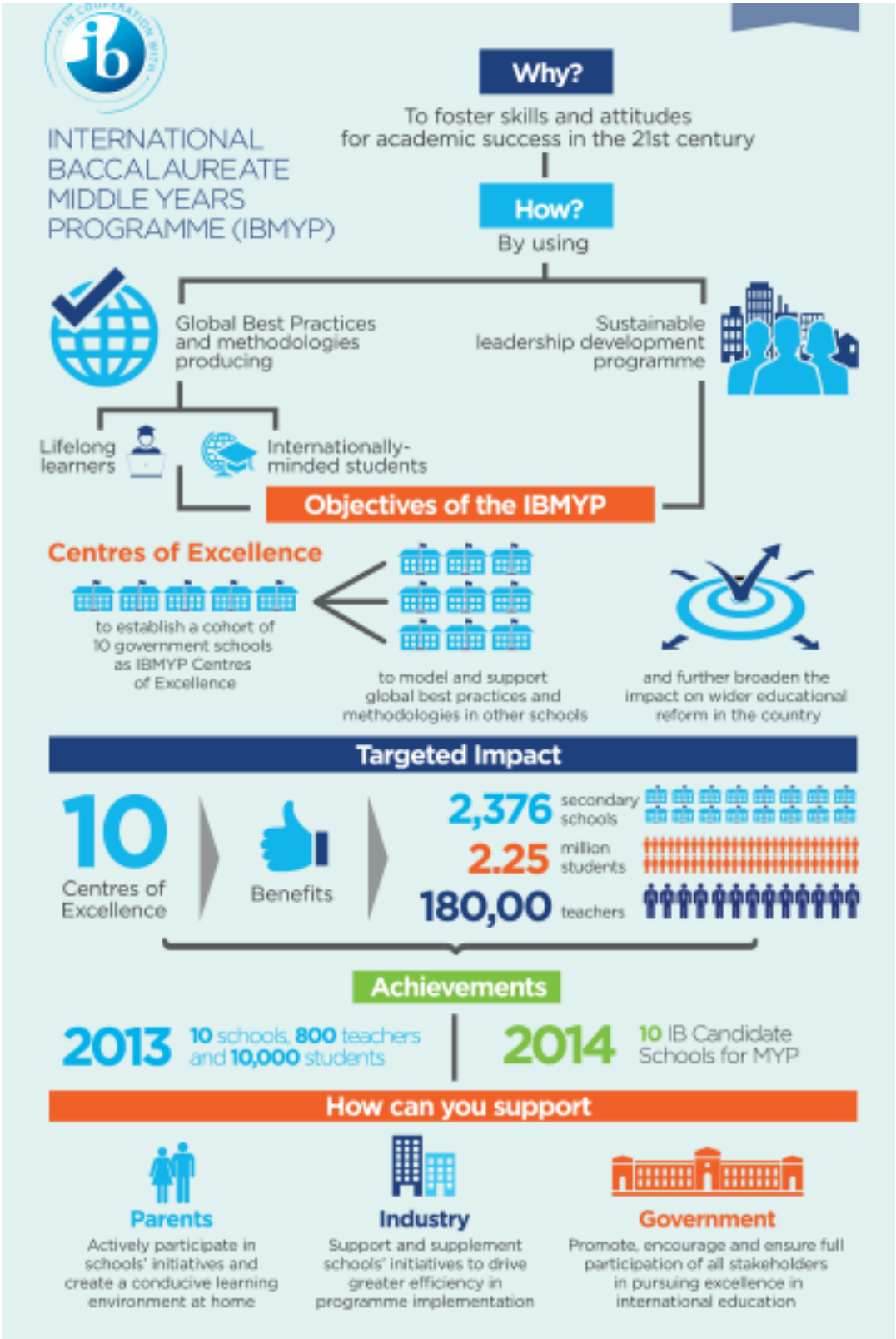
12. CATALYSE COMMERCIALISATION
    a. Making selective investments to catalyse new ventures and start-ups (future leaders in innovation);
    b. Creating platforms to monetise Malaysia's existing intellectual properties;
    c. Programmes such as ***Equity Investments*** and ***PIaTCOM Ventures*** will see AIM helping to create global success stories by working with companies that show potential to commercialise world-class innovations;
    d. The ***1Dana portal*** will be the central source of information for funding programs and public R&D facilities in the country. It will also be used for monitoring and evaluation of the effectiveness of the funding programmes.

Description, evaluation and analysis of each proposed measure:

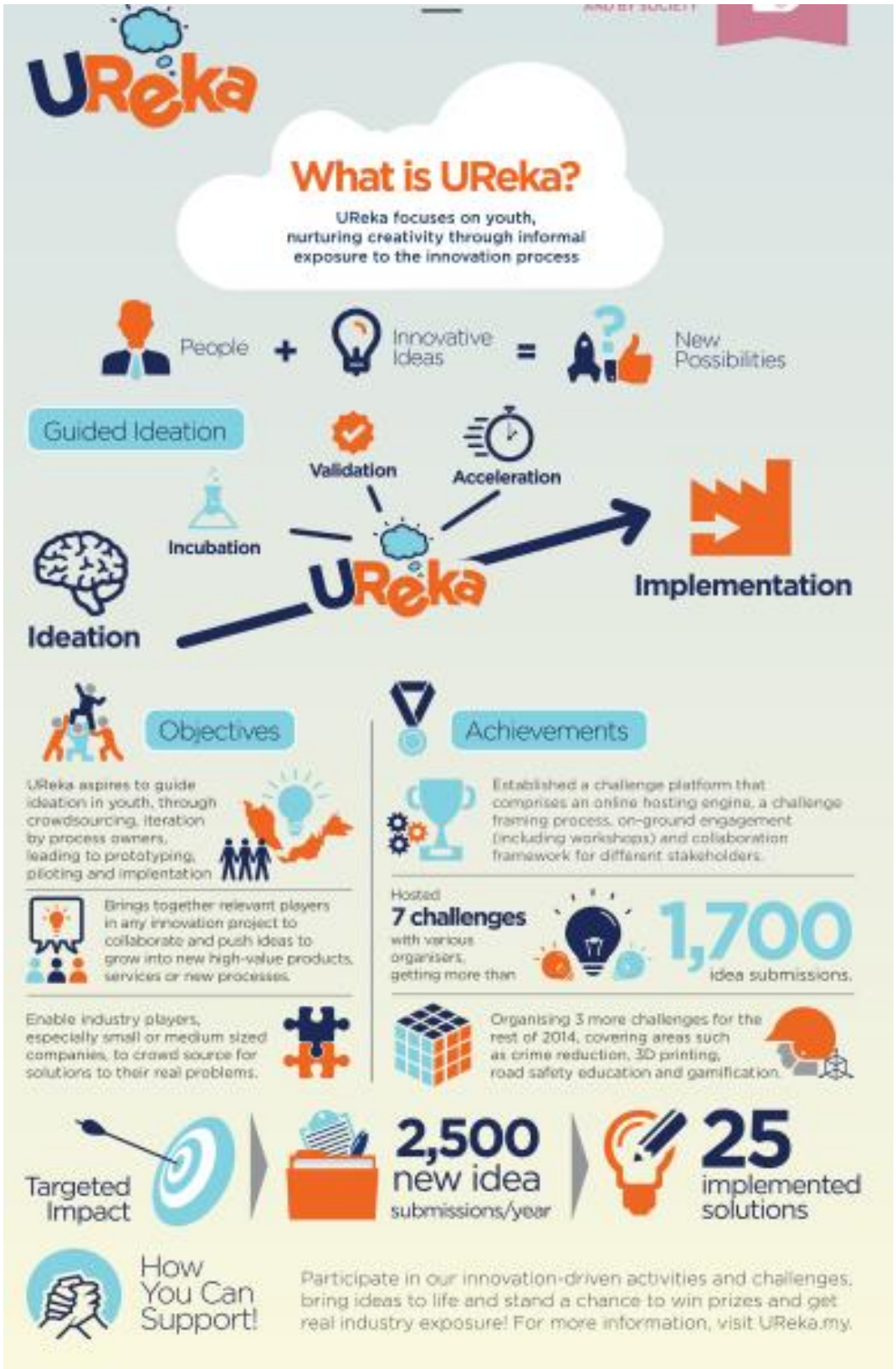
1. Description of *iTHINK*:



2. Description of *IB*:



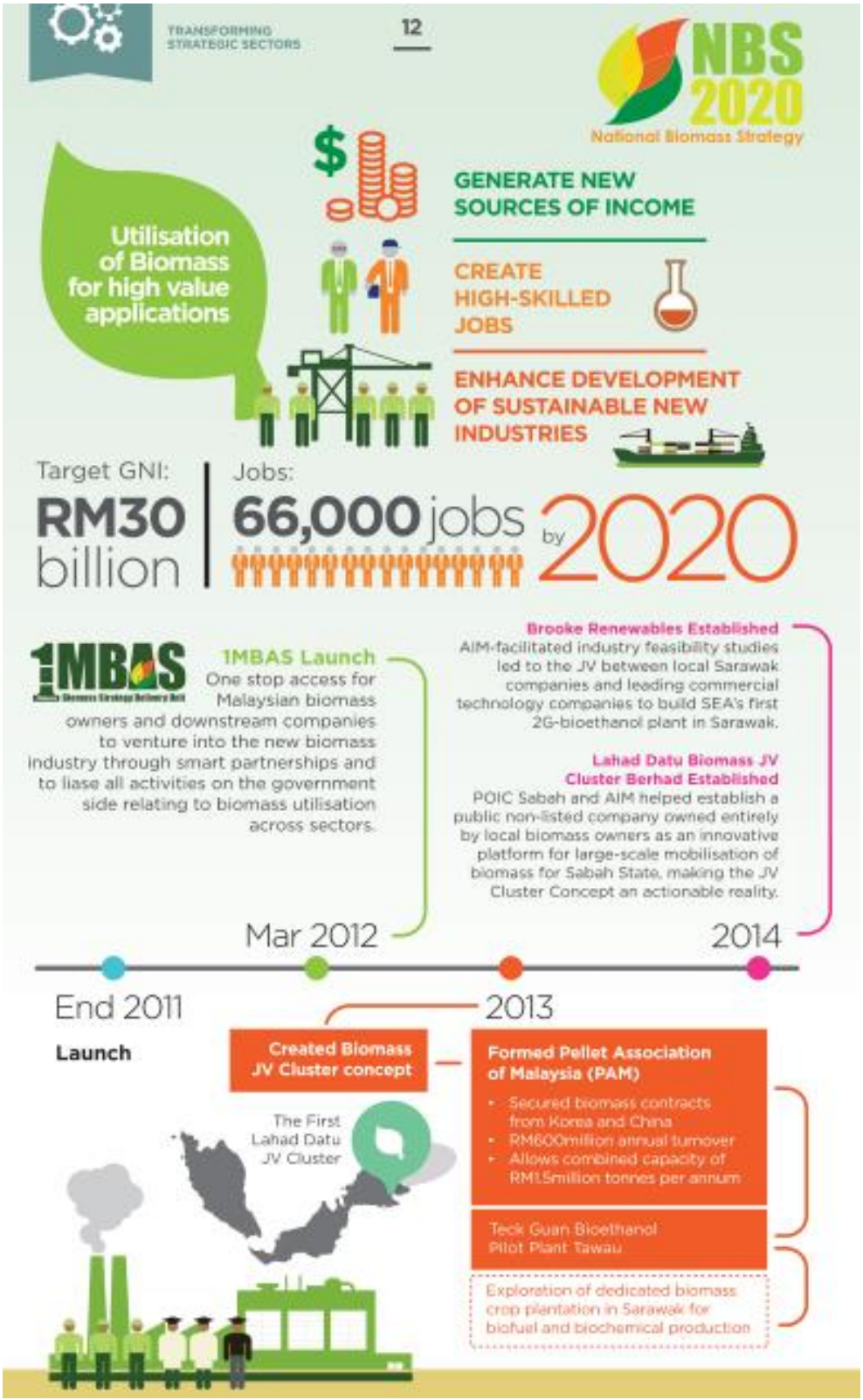
3. Description of *Genovasi*:



4. Description of *GiGH*:

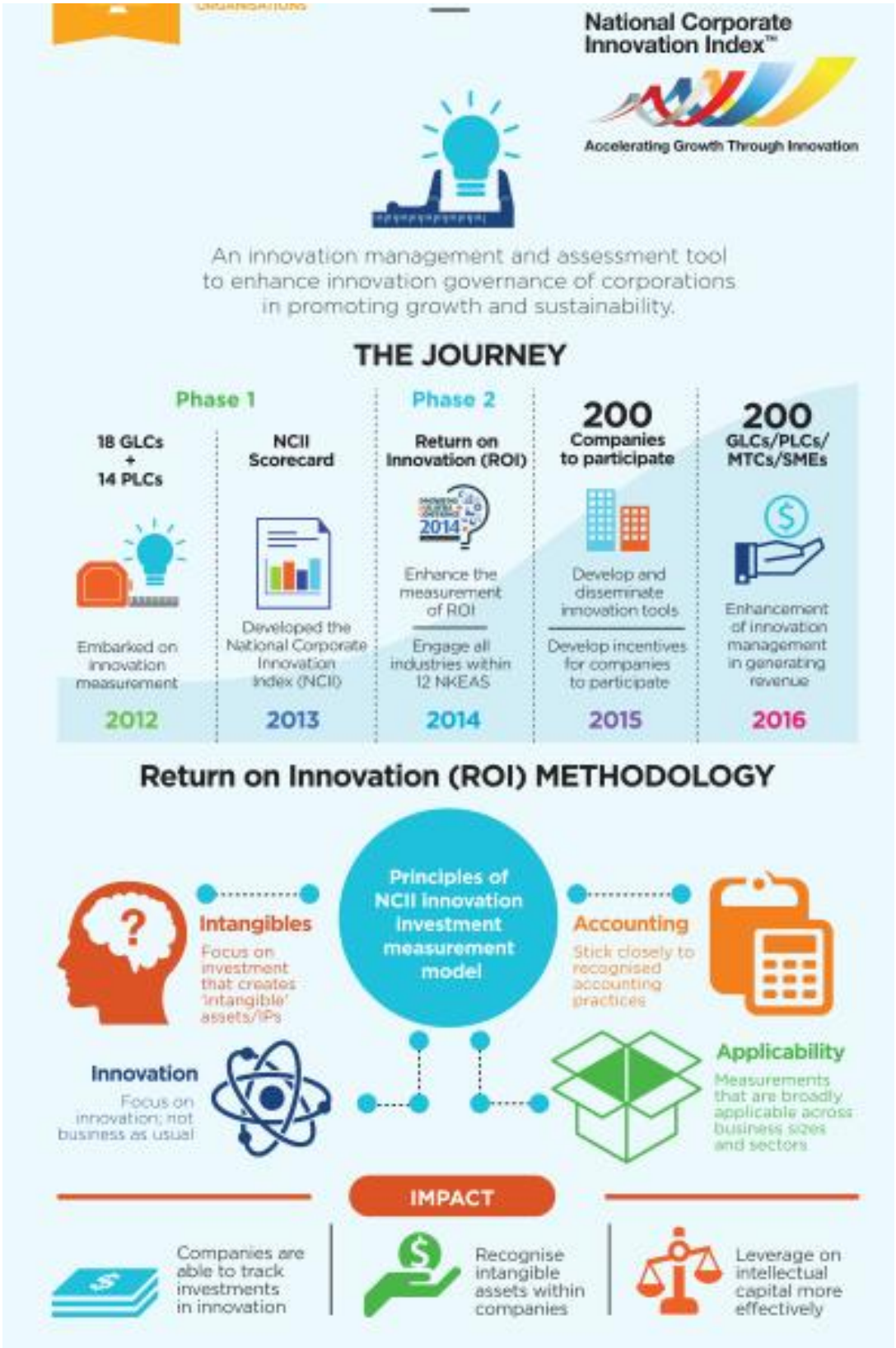
5. Description of *Steinbeis*:

6. Description of *NBS 2020 (National Biomass Strategy)*:



7. Description of *National Graphene Action Plan 2020*:

8. **Description of *National Corporate Innovation Index*:**



9. **Description of *ICFC*:**

ICFC

INTELLECTUAL CAPITAL FUTURE CHECK (ICFC)

A tool to evaluate intellectual capital for the purpose of organisational development

ICFC would allow firms to demonstrate their capability on future development and increase their transparency within the credit risk assessment

INTELLECTUAL CAPITAL

Human Capital (HC)
(E.g. Competences, Motivation, Leadership Ability)

Structural Capital (SC)
(E.g Internal Communication, Innovation, Culture)

Relational Capital (RC)
(E.g Customers, Suppliers, Co-operation Partners)

BENEFITS

- Diagnose companies
- Instrument for Decision Support
- Tool for Optimisation and Innovation
- Improve Internal Communication
- Support Monitoring and Risk Management
- Reporting Instrument

OUTCOME

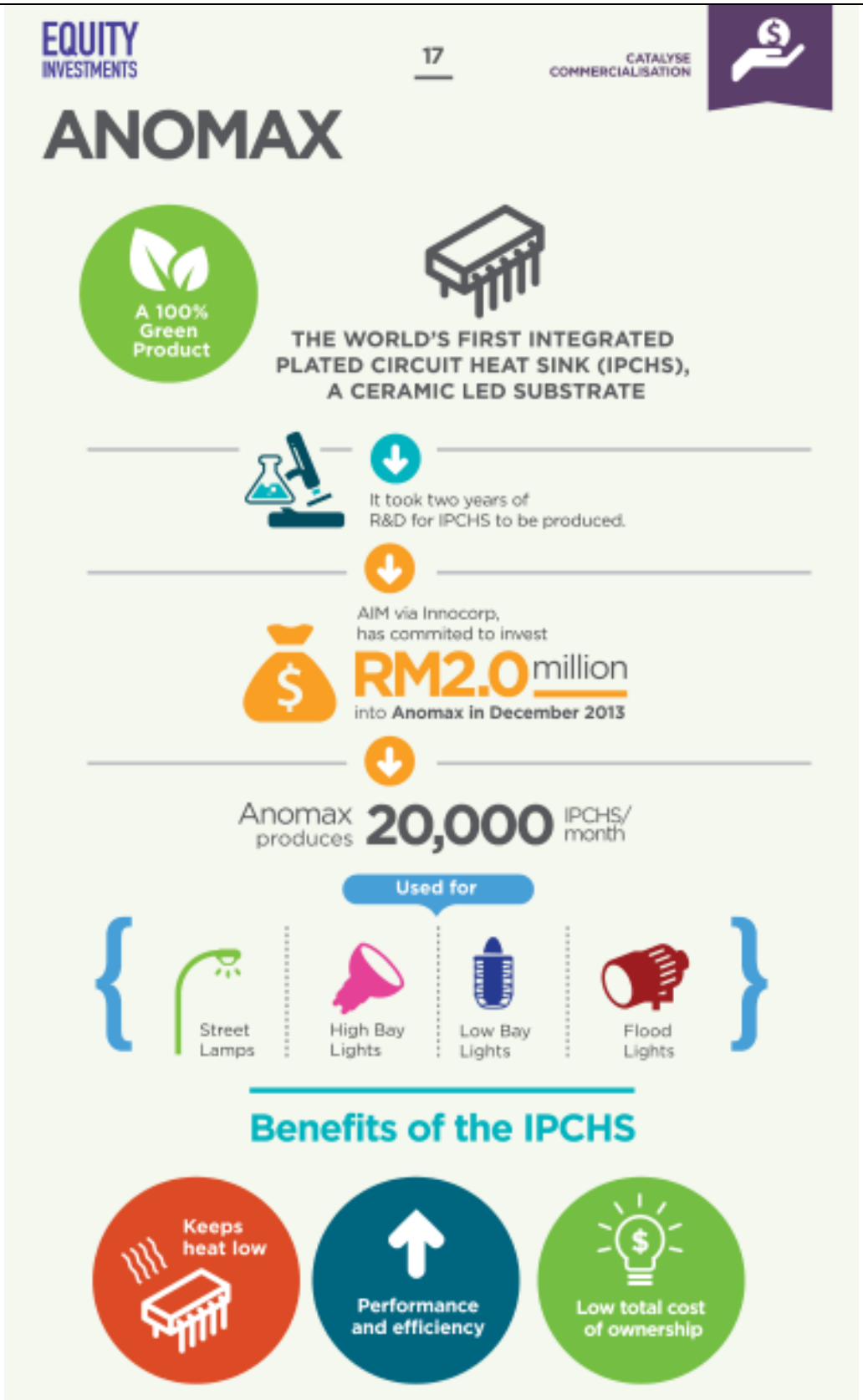
Increase financing opportunities for firms, especially SMEs.

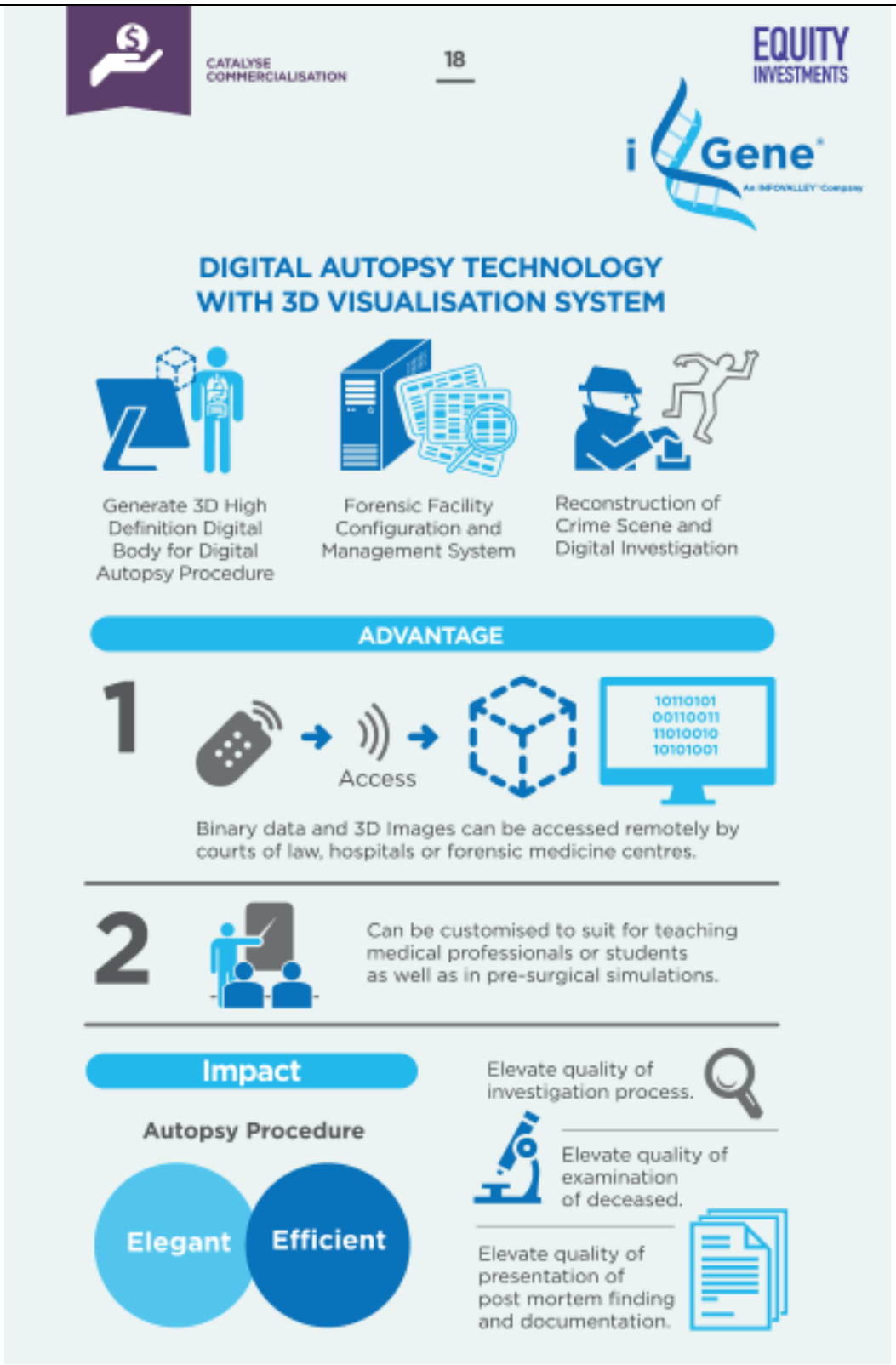
Potential innovative companies to start focusing on intellectual capital instead of solely relying on tangible assets.

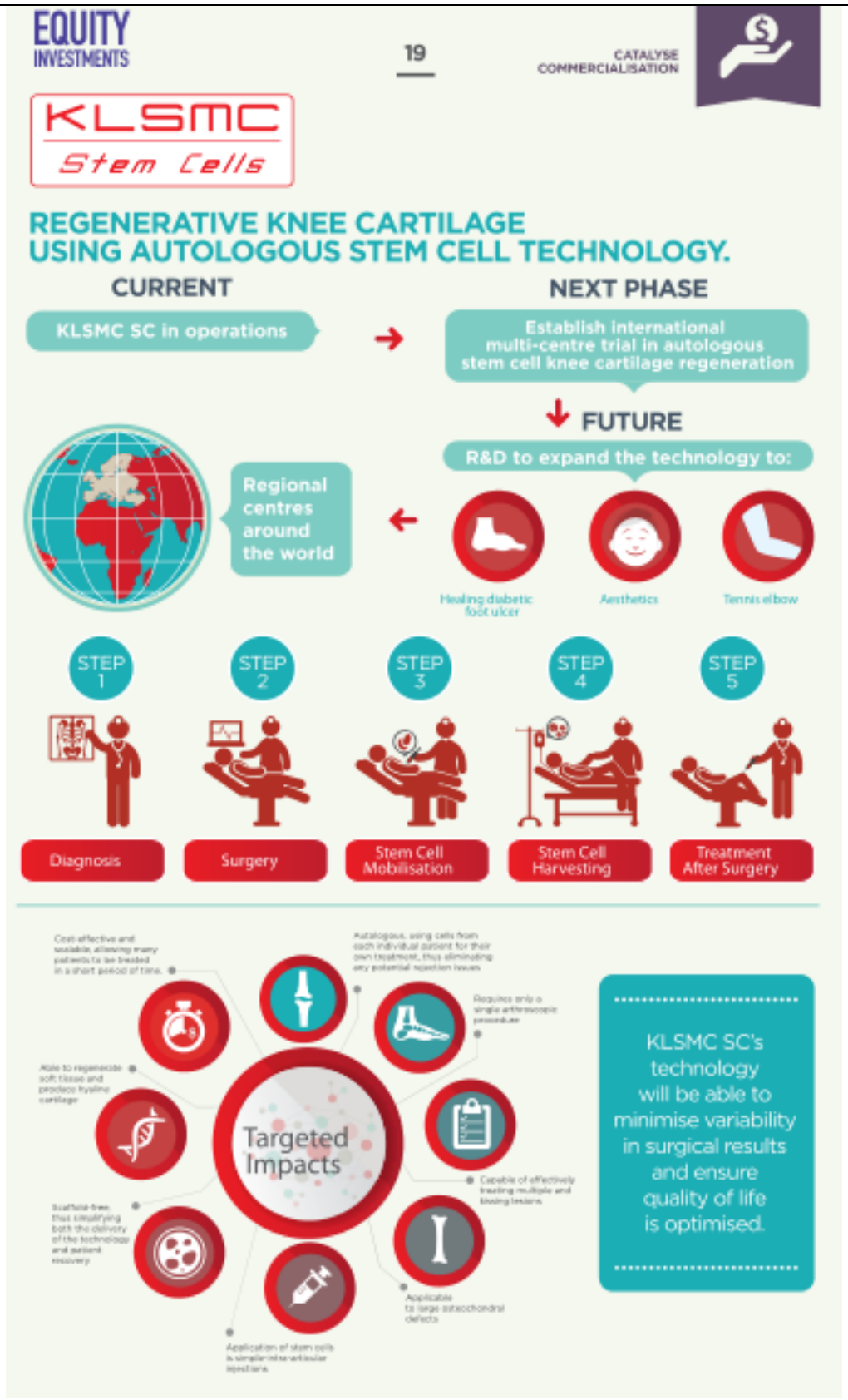
Minimise financial institutions' risk as they could evaluate their customers more effectively using ICFC.

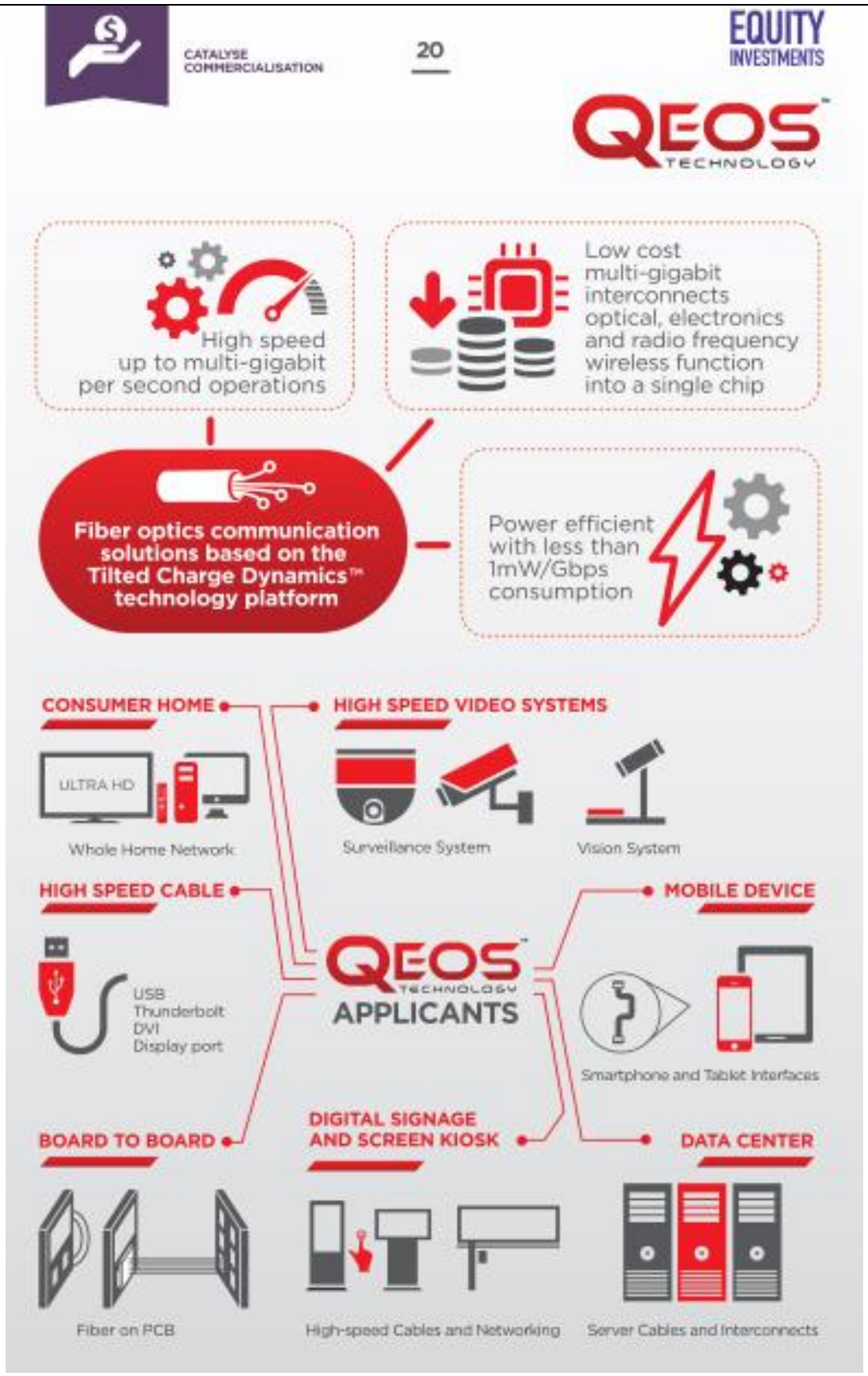
10. Description of *PlatCOM Ventures*:

11. Projects funded by *Equity Investments*:


EQUITY INVESTMENTS
17
CATALYSE COMMERCIALISATION
ANOMAX
A 100% Green Product
THE WORLD'S FIRST INTEGRATED PLATED CIRCUIT HEAT SINK (IPCHS), A CERAMIC LED SUBSTRATE
It took two years of R&D for IPCHS to be produced.
AIM via Innocorp, has commited to invest
RM2.0 million
into Anomax in December 2013
Anomax produces 20,000 IPCHS/ month
Used for
Street Lamps
High Bay Lights
Low Bay Lights
Flood Lights
Benefits of the IPCHS
Keeps heat low
Performance and efficiency
Low total cost of ownership


CATALYSE COMMERCIALISATION
18
EQUITY INVESTMENTS
iGene
DIGITAL AUTOPSY TECHNOLOGY WITH 3D VISUALISATION SYSTEM
Generate 3D High Definition Digital Body for Digital Autopsy Procedure
Forensic Facility Configuration and Management System
Reconstruction of Crime Scene and Digital Investigation
ADVANTAGE
1
Access
10110101
00110011
11010010
10101001
Binary data and 3D Images can be accessed remotely by courts of law, hospitals or forensic medicine centres.
2
Can be customised to suit for teaching medical professionals or students as well as in pre-surgical simulations.
Impact
Autopsy Procedure
Elegant
Efficient
Elevate quality of investigation process.
Elevate quality of examination of deceased.
Elevate quality of presentation of post mortem finding and documentation.


EQUITY INVESTMENTS
19
CATALYSE COMMERCIALISATION
KLSMC Stem Cells
REGENERATIVE KNEE CARTILAGE USING AUTOLOGOUS STEM CELL TECHNOLOGY.
CURRENT
KLSMC SC in operations
NEXT PHASE
Establish international multi-centre trial in autologous stem cell knee cartilage regeneration
FUTURE
R&D to expand the technology to:
Regional centres around the world
Healing diabetic foot ulcer
Aesthetics
Tennis elbow
STEP 1
STEP 2
STEP 3
STEP 4
STEP 5
Diagnosis
Surgery
Stem Cell Mobilisation
Stem Cell Harvesting
Treatment After Surgery
Targeted Impacts
KLSMC SC's technology will be able to minimise variability in surgical results and ensure quality of life is optimised.


CATALYSE COMMERCIALISATION
20
EQUITY INVESTMENTS
QEOS TECHNOLOGY
High speed up to multi-gigabit per second operations
Low cost multi-gigabit interconnects optical, electronics and radio frequency wireless function into a single chip
Fiber optics communication solutions based on the Tilted Charge Dynamics™ technology platform
Power efficient with less than 1mW/Gbps consumption
CONSUMER HOME
ULTRA HD
Whole Home Network
HIGH SPEED VIDEO SYSTEMS
Surveillance System
Vision System
HIGH SPEED CABLE
USB
Thunderbolt
DVI
Display port
QEOS TECHNOLOGY APPLICANTS
MOBILE DEVICE
Smartphone and Tablet Interfaces
BOARD TO BOARD
Fiber on PCB
DIGITAL SIGNAGE AND SCREEN KIOSK
High-speed Cables and Networking
DATA CENTER
Server Cables and Interconnects

12. Description of *1DANA*:

Target audience:
1. Students 2. Teachers 3. Schools 4. Fresh graduates 5. Academics 6. Industry 7. Government 8. SMEs 9. Mid-size companies 10. Large enterprises
Requirements:
N/A
Process by which the initiative operates:
N/A
Impact of the best practice
The impact of the projects taken by AIM are as follows: 1. By 2014, 9,000 schools, 450,000 teachers and 5.2 million students came under ***iTHINK*** project in order to equip future generations with Higher Order Thinking Skills (HOTS) 2. By 2013, 10 Schools, 800 teachers and 10,000 students came under ***International Baccalaureate Middle Years Programme (IBMYP)*** and in 2014 there are 10 IB candidate schools for MYP 3. 717 graduates for ***Genovasi*** design thinking school. 4. ***Ureka*** Programme established a challenged platform that comprises an online hosting engine, a challenge framing process, on-ground engagement and collaboration framework for different stakeholders. The programme so far hosted 7 challenges with various organisers getting more than 1,700 idea submission. 5. ***Gigih*** so far collected 2,700 ideas, chose 50 mentors, and mentored 1,000 protégés, increased household income by RM2,360 per person/month, potentially increasing RM28 million new wealth a year 6. ***Steinbeis Malaysia Foundation*** is modelled after Steinbeis Foundation of Germany. The target is to create 2,000 high-knowledge employees. 7. ***National Biomass Strategy 2020*** programme launched in end of 2011. In March 2012 it launched *1MBAS* – one stop access for Malaysian biomass owners and downstream companies. In 2013 it created *Biomass JV Cluster Concept* and formed *Pellet Association of Malaysia (PAM)*. In 2014 it established *Brooke Renewables, Lahad Datu Biomass JV Cluster Berhad*. 8. ***National Graphene Action Plan 2020*** identified 5 application priority areas. Developed graphene strategy in 2013. Launched *NGAP 2020* and established special graphene team *Nano Malaysia Berhad*. 9. ***National Corporate Innovation Index*** is an innovation management and assessment tool to enhance innovation governance of corporations in promoting growth and sustainability. In phase 1, 18 GLCs and 14 PLCs participated and NCII scorecard developed. In phase 2 all industries were engaged within 12 NKEAs. Companies are now able to track investments in innovation, recognise intangible assets within companies, Leverage on intellectual capital more effectively. 10. ***Intellectual Capital Future Check (ICFC)*** is a tool to evaluate intellectual capital for the purpose of organisational development. The programme increased financing opportunities for firms, especially SMEs. Potential innovative companies started focusing on intellectual capital instead of solely relying on tangible assets. It helped minimising financial institutions' risks as they could evaluate their customers more effectively using ICFC. 11. ***Platcom Ventures*** is the national platform for technology commercialisation. It targets to drive greater economic growth through and ***Open Innovation (OI) model*** which will contribute towards Malaysia's national aspiration to become a high income nation.

12. ***Equity Investments*** invested RM2.0 Million on ANOMAX, the world's first integrated plated circuit heat sink (IPCHS) to be used in street lamps, high bay lights, low bay lights and flood lights. It invested in iGene to commercialise digital autopsy technology with 3D visualisation system. It also helped *KLSMC* to commercialise regenerative knee cartilage using autologous step cell technology. It invested on *Qeos Technology* to commercialise fiber optics communications solutions based on the *Tilted Charge Dynamics* technology platform.
13. ***1DANA*** was created under the purview of Jawatankuasa Pelaburan Dana Awam (JKPDA). JKPDA started the first R, D&C evaluation in 2013. To date JKPDA has evaluated more than RM2.5 Billion worth of R, D&C projects and programmes where RM 650 Million worth of R, D&C projects and programmes for 2014/2015 have been identified for streamlining.

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