

# INVESTING IN INNOVATION BEYOND 2014



# KICs' EUROPEAN IMPACT

## CLIMATE-KIC:

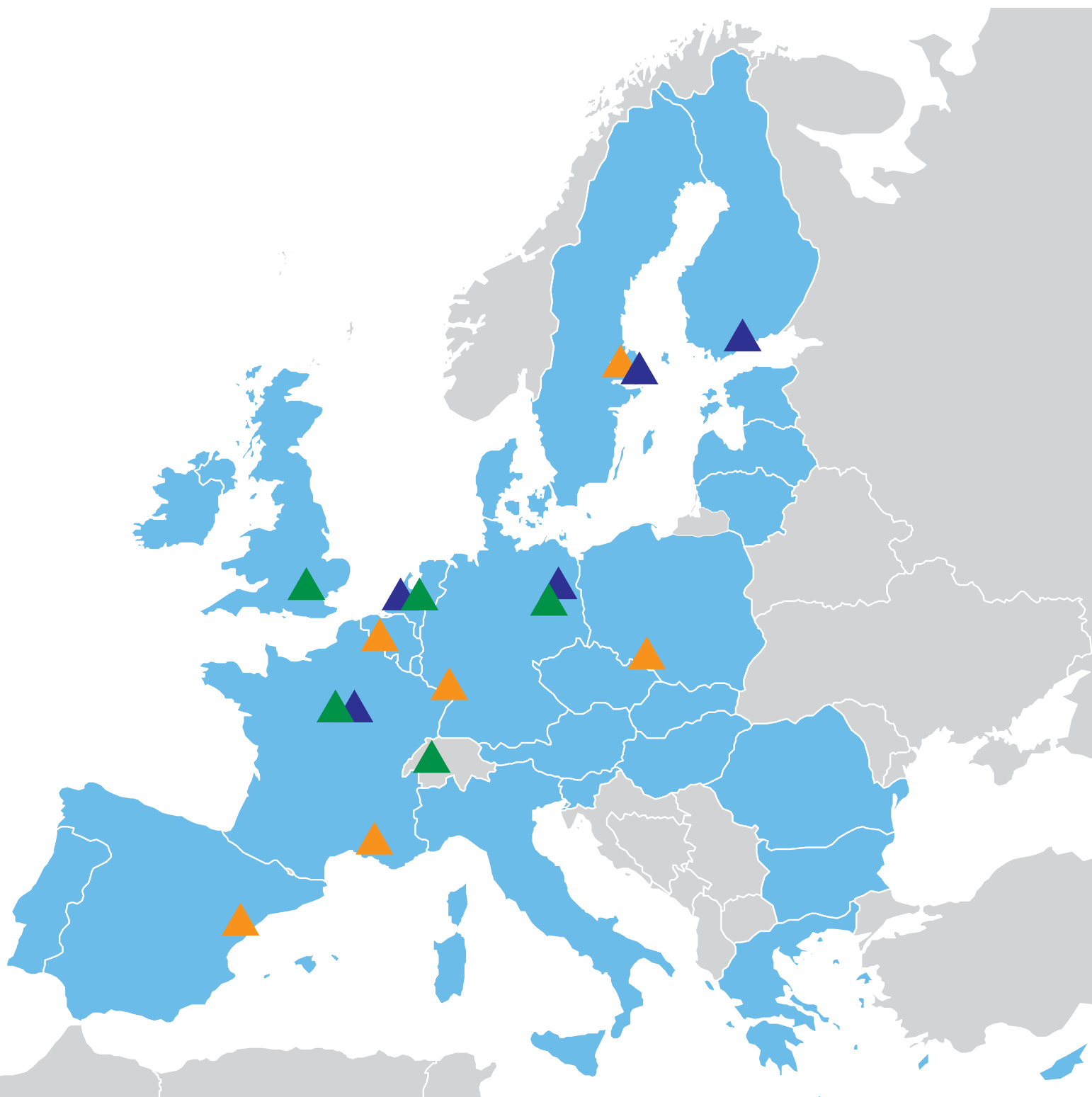
▲ Co-location centre

## EIT ICT LABS:

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## KIC INNOENERGY

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# FOREWORD: ENTREPRENEURS AS THE DRIVERS OF THE “KNOWLEDGE TRIANGLE”

**M**any Europeans believe that top class research and education per se lead to innovation. However, when taking a closer look at how research and education creates innovative chains of added value within the U.S. and more recently within the emerging markets, it is clear that the entrepreneur plays a crucial role within the “knowledge triangle” (business, education and research). He/she unlocks the knowledge and education found within R & D institutions to drive their potentials into new business creation.

Innovative entrepreneurship is a rare species in Europe: teachers, students and graduates of European higher education institutions seldom see the opportunity to translate their knowledge and education into innovative products and services. This negative trend is facilitated by

- a prevailing averse public mindset and culture towards entrepreneurship, ownership and risk taking,
- lack of visible and outstanding entrepreneurial “role models”, like Gates (Microsoft), Zuckerberg (Facebook) and Boyer (Genentech), serving as light towers in the USA’s innovative landscape,
- lack of a supportive attitude by academia towards colleagues and trainees, who, instead of pursuing a career in academia, are seeking an entrepreneurial chance in their life, and
- lack of incentive structures and risk capital; which is ironically counteracted by a surplus of red tape thwarting the set up of innovative businesses.

To overcome the above mentioned innovation gap, the EIT (European Institute of Innovation and Technology), an independent body of the European Union, was set up in 2008 to implement Knowledge- and Innovation Communities (KICs). KICs, as legal entities, integrate public and private research organizations, innovative industries, higher education institutions, investors and spin offs.

The first three KICs bring together five or six European hotspots of excellence with strong records in research, education and focus on specific societal challenges, e. g. renewable energy. The EIT acts as a high impact innovation fund, by providing seed money to “Innovation factories”, the KICs, led and run by a CEO and on the basis of their respective business plans. This ensures that the innovation power of the integrated hotspots is optimally utilised to create innovative business and services within the KICs’ thematic fields.

Students, trainees and professional experts working within a KIC are educated through degree programmes and courses on entrepreneurship that are awarded an EIT label. The EIT supports and fosters the KICs towards innovative entrepreneurship and at this stage, the first three KICs have been successfully implemented forming 16 hotspots spread across Europe. The EIT and the KICs are designed to continuously learn from each other and based on the learnings from the first round of KICs, the EIT is aiming for a second round of investment from 2014 onwards.

For more information, please visit [eit.europa.eu](http://eit.europa.eu)

**Alexander Von GABAIN,**  
Chairman of the EIT Governing Board,  
From September 2011

# PREAMBLE: REFLECTIONS FROM THE FOUNDING CHAIRMAN OF EIT GOVERNING BOARD ON THE SIA

**W**orld-wide the race is on to create eco-systems that nurture the next “superstar” company. In such environments, public and private enterprise overlap heavily. Europe has chosen to develop the EIT, the European Institute of Innovation and Technology, for this purpose. The EIT’s Knowledge and Innovation Communities (KICs) consist of clusters of eco-systems (co-location centres) where excellent education institutions, research centres and businesses can be found in close proximity. The KICs aim to foster innovation in terms of new products and services for existing companies as well as new business and company creations, and also to develop entrepreneurially driven people. To date, the EIT has established its KICs, and the first results of entrepreneurial education and new business creation have emerged. The EIT added value and the challenges and opportunities it faces will be described in detail later in the document.

Many have contributed tremendously to this: first and foremost, the EIT initiator José Manuel Barroso, European Commission President and first parent of the EIT, as well as the then Commissioner for Education, Training and Culture Ján Figel” and later Androulla Vassiliou as Commissioner for Education, Culture, Multilingualism, Sport, Media and Youth. Without the wisdom of the then Director General for Education and Culture (DG EAC) Odile Quintin, and the tenacity and brilliant efforts of the unit “EIT, Economic Partnerships” led by Lucia Recalde Langarica, the EIT would not have advanced at the pace that it has. Moreover, and equally important, the EIT Governing Board stepped up to take on an unprecedented executive role. In particular, their personal support, dedication and energy under the leadership of a chairman who has acted as a CEO in the interest of a swift EIT build up has created great momentum. Last but not least, the support of the Hungarian Government must be acknowledged in their fine contribution to the build-up of the EIT Headquarters in Budapest.

The EIT champions entrepreneurship as the single and overarching element to foster innovation defined holistically as all activities (business processes, research, edu-

cation, risk management, governance, etc.) in pursuit of the creation or expansion of economic activity. Thus, the three elements research, education, and business processes of the knowledge triangle have equal value in their contribution to innovation – a given that had so far not been recognised in Europe. And the EIT is moving forward! From a small grantee of a 25% contribution to the KICs aimed at catalysing innovation in the knowledge triangle, the EIT is now aiming to become an innovation impact investor focusing on 25% investments into promising eco-systems (KICs). It is therefore most appropriate that the EIT Governing Board has elected Prof. Dr. Alexander von Gabain, both an established entrepreneur and former university professor, as its new incoming chairman as of 15 September 2011.

Can we as Europe be happy with the EIT now? In the almost three years since its inception, Facebook and Twitter have appeared as new thriving global companies. Meanwhile Europe has still not made a dent when it comes to the renewal of the lists of top impactful companies in the world. However, a start is here and here to stay for “a long term horizon of 13 years” as stipulated at the outset of the EIT by the European Parliament and Council of Ministers. The EIT has shown that leadership in a CAN-DO mode and with relentless focus on innovation output (rather than effort) has put eco-systems (and KICs) in place which can potentially produce new “superstar” companies. That is why a new investment round is needed for 2014 and that is why new KICs must be put in place in order to create opportunities in more domains that are of the essence for Europe’s well-being. I highly recommend that you consider very seriously this Strategic Innovation Agenda “Investing in Innovation beyond 2014” which has been prepared under the leadership of the Vice-Chairman of the EIT Governing Board, Prof. Anders Flodström; and I call upon all decision-makers to support the EIT’s vision as outlined hereafter.

**Dr. Martin SCHUURMANS,**  
Founding Chairman of the EIT Governing Board,  
2008-September 2011

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# 1. INTRODUCTION



On 11 March 2008, the European Parliament and the Council of the European Union (EU) launched the European Institute of Innovation and Technology (EIT), a new initiative at EU level that is intended to complement existing EU and national policies in increasing European innovation and business. The initiative is based on the knowledge triangle by aiming to foster integration between research, higher education and innovation/business across the European Union. The EIT was created to become a catalyst for a quantum leap in sustainable economic growth and innovation capacity in the EU and Europe as a whole. Its mission is both to create new innovations and businesses, and equally important, to contribute to a skilled workforce with a new, more entrepreneurial mindset. Skills shortages on the European labour markets are in fact one of the main obstacles to economic growth in the EU and a severe bottleneck for new innovations and business creation. The EIT considers it essential that this development encompasses Europe as a whole.

Since its establishment, the EIT has published a first call for proposals, evaluated proposals submitted, and chosen the first three Knowledge and Innovation Communities (KICs), all of which started their activities at the beginning of 2010. Proposals have been translated into strategies and business plans. Contractual agreements between stakeholders and partners within the KICs, and between the KICs and the EIT, have been signed. The first KIC educational and entrepreneurial activities have been successfully accomplished. The EIT Headquarters (HQ) in Budapest have been established and grown into full operation (see Annex II for EIT Milestones). The EIT has now largely received financial autonomy, a prerequisite for playing the role of an icebreaker in reforming innovation infrastructures and education as well as in fostering new mindsets characterised by creativity and entrepreneurship.

The road to achieving all of the above has not always been smooth; many unforeseen obstacles have been dealt with. The result so far is that all activities as foreseen by the EIT Regulations have been accomplished within eighteen months of the EIT Governing Board's (GB) appointment. The EIT is on its way to becoming the vanguard of sustainable European growth and competitiveness as intended by its founding fathers.

The EIT is based on the idea of being an output driven and engaged stakeholder in the KICs, rather than a mere funding agency. The EIT has devised a novel solution to stakeholder integration in the shape of its new legal entities, the KICs, within which representatives from business, industry, universities and research institutes collaborate within a common legal framework on equal terms for the first time.

This makes the EIT different from all other current initiatives aiming to transform and translate European research and know-how into practical implementations and business: the EIT is a front-runner in the implementation of the knowledge triangle concept in a way that ensures the seamless integration of research, higher education, and innovation/business in all its activities by way of this new type of organisation and governance.

The KICs can be seen as the new European eco-system fostering innovation not through research in isolation, but through entrepreneurship holistically defined as all human activity in pursuit of the creation or expansion of innovations and economic activity. In fact, for the first time in Europe, research, education and business processes are being considered as equally important drivers of economic value creation, and results are being measured in terms of innovation and business output.



## 2. THE EIT – THE NEW INNOVATION INSTITUTE



**C**reativity and innovation on an individual basis occur all the time in everyday life when people adapt to their surroundings. Creativity and innovations that change society on a larger scale, in terms of new products or processes, can only occur in a system where different actors with diverse backgrounds and competencies are able to act together. The keyword for solving this in the EIT concept is stakeholder integration in the framework of new and challenging business models. The organisational innovation to achieve this is the KICs, that is, multi-stakeholder legally and financially integrated entities, governed by a director (CEO) appointed by a board of stakeholders from academia and business. The KICs are organised around Co-Location Centres (CLCs) – another EIT invention – which are geographical locations where most (or indeed the entire) innovation web is in close physical proximity, and where focused excellence can meet and interact. The emphasis is on people from diverse backgrounds (SMEs, larger industry, academia, nationality, gender, discipline and more) working together with face-to-face contacts, thus leading to great transversal mobility of knowledge. By acting through the CLCs, the EIT is able to also insert the local dimension in the innovation/ business loop.

In summary, the EIT model enables

- New ways of tackling future grand challenges through new methods and more substantial and systematic

collaboration between researchers, students, innovators, and entrepreneurs;

- New and challenging business models and related key performance indicators;
- Companies to become more engaged in educational activities both in terms of participating and in defining their own needs for a well educated, skilled work force;
- Geographical and organisational mobility of students and faculties, researchers and entrepreneurs, leading to new perspectives, experiences, and networks for the individual, and, in turn, promoting openness and creativity;
- A better selection of excellent researchers, students and entrepreneurs, due to selection from a larger pool which is, however, more closely aligned to the needs of local co-location contexts;
- Experimentation with new innovation models for businesses, public goods and education.

An overview of the EIT governance model is given in Annex III.

# 3. THE EIT — KEY ACHIEVEMENTS

## 3.1 ESTABLISHMENT OF THE EIT AND KICS

In September 2008, the eighteen newly appointed, independent members of the EIT GB met for the first time in Budapest, the location European Heads of State and Government had chosen as the EIT HQ's seat. European Commission President José Manuel Barroso and the then Commissioner for Education Ján Figel' introduced the EIT concept as well as the first three KIC areas to the GB. In fifteen months, three themes for the KICs were chosen based upon the identified societal challenges for Europe and following advice from the European Parliament. A call for proposals was written, a number of European conferences on both selected KIC themes and other vital EIT characteristics were held, and subsequently the first three KICs were selected.

The response of European academic and business knowledge communities was impressive. 18 of the 21 proposals were eligible and were reviewed. Both the call for proposals and proposals received were concise while opting against being overly precise, embracing the approach that learning by doing was more important than entering into lengthy discussions about the exact meaning of novel concepts.

The timely success of the procedure proved that with the right leadership, dedicated board members, a sense of urgency, and a "can-do" spirit, things really can be moved faster and more simply than anticipated.



## 3.2 THE RELATIONSHIP BETWEEN THE EIT AND KICS

In January 2010, three KICs in the form of independent legal entities were in place: Climate-KIC, EIT ICT Labs, and KIC InnoEnergy. To date, the three KICs bring together a total of 195 partners including 61 universities, 51 research institutes, 73 businesses, and 10 local/regional agencies in 12 countries and at 16 co-location centres [see Annex VI]. The KICs, now into their second year of existence, are significantly diverse and different from each other, and rightly so. Still, the strength of the EIT concept is that the different KICs have a common EIT identity and a common overall goal.

The KIC set-up phase has been a radically new experience and a learning-by-doing process for everyone involved (see Annex IV). Each KIC is a separate entity, choosing for itself the structure that best guarantees the achievement of its set objectives. The KICs submit annual business plans to the GB which are assessed and form the basis of a GB decision on the annual grants/ investments. The decision also takes into consideration KIC reports on achievements and performances. Thus, changes in KICs' performance will be reflected in the level of annual grants to each KIC. The experience gained so far has demonstrated that EIT GB and HQ must react promptly to the KICs' changing needs and be able to act fast enough to take the necessary planning and funding re-arrangement decisions. The EIT is in the process of elaborating on more precise KIC monitoring and reporting requirements to be adopted in the near future. EIT guidance on the KICs' legal status is also needed and should be in line with the EIT strategy to become an impact driven investor and the KICs to become sustainable ventures. This could be facilitated by inserting an internal agreement or a Memorandum of Understanding template directly in the call text. In addition, the EIT will adopt a more flexible contractual approach based on a balance between lump sums and flat rates more tailored to the KIC's needs in the forthcoming negotiations.

## 3.3 MAIN KIC ACHIEVEMENTS

The KICs have now consolidated their basic internal processes. Despite their relatively short history to date, some results are available regarding both business and innovation, and education and entrepreneurship models. KICs have the entrepreneurial freedom to develop concepts and to choose structures most suitable for their respective substantive focus areas. The following paragraphs reflect the individual KICs' views on their objectives and achievements. They were submitted by the three CEOs Prof. Dr. Mary A. Ritter (Climate-KIC), Prof. Dr. Willem Jonker (EIT ICT Labs), and Diego Pavia (KIC InnoEnergy) when requested to highlight the distinctive characteristics of each KIC. A more detailed description of the KICs' achievements is reported in Annex V. Information regarding individual KICs' governance models, thematic strategies and expected impact can be obtained from their business plans [see individual KIC websites for additional information].



Climate change presents Europe with a huge and diverse challenge, within an environment where the relevant business sector is young and equally diverse. Innovation is essential to provide solutions to climate change adaptation and mitigation. Innovation is also needed to provide novel structures, mechanisms and activities whereby these solutions can be generated and sustainability achieved. To address these issues, Climate-KIC has created a community of leading European universities in England, Switzerland, Germany, the Netherlands and France, regional innovation centres (RICs) in Poland, Hungary, Germany, Italy, Spain and the UK, world leading companies as Bayer, EDF, DSM and Vattenfall and cutting edge SMEs, together with other bodies such as city and regional governments. This Climate-KIC community, which comes together at five CLCs, embraces the complete value chain from discovery and innovation through to test bed, commercialisation and implementation – to act as a catalyst for innovation that will create a climate resilient and low-carbon economy.

Prof. Dr. Mary A. RITTER,  
CEO “Climate-KIC”

At their home institutions and companies, the students study environmental or climate sciences, engineering, supply chain logistics, sustainable development, business, and marketing – a portfolio of disciplines as diverse as the challenges of climate change. Climate-KIC scholars all share a flair for entrepreneurship and at the start their course come together in a unique Climate-KIC Contextual Learning Journey (CLJ) – learning from real innovation experience in a geographical, economic, social and political context. Hosted by the CLCs, the entrepreneurial focus of the 6-week CLJ in 2010 centred on elaborating ideas for innovations in the four programme areas of Climate-KIC. This first cohort of 50 young entrepreneurs is already on the path to innovation success. The “DeCo! – Decentralized Composting for Sustainable Farming and Development” group won the SEED Award for Entrepreneurship in Sustainable Development 2010 and has already gained external funding for their start-up company, while ElectricFeel – a new urban mobility concept – won the Swiss KPMG Inspiration Grant 2010 and work is progressing on seeking business partners.

### NEED FOR YOUNG ENTREPRENEURS

Unique to Climate-KIC is the RICs – a consortium of six major regions in the north, south east and west of Europe which share a strong commitment to tackling the problems of climate change. Each brings together a cluster of its key innovation actors – regional development agencies, research institutes, universities, large companies, SMEs and public agencies – and provides Climate-KIC with a network of test-beds for climate change mitigation and adaptation experiments.

### SHARING INNOVATION THROUGHOUT EUROPE

The climate change industrial sector is a young and diverse one, so SME partners are particularly important in Climate-KIC’s innovation programme. The SMEs not only provide early business niches; the Climate-KIC community also supports entrepreneurs from these SMEs by offering opportunities for their employees to gain experience of cutting edge work in large companies, regional bodies and in academic institutions – thus enabling the transfer of new climate change knowledge and skills to the SME on their return. 2010 saw 59 of these “Pioneers-into-Practice” undertake such placements.

### SMEs ARE KEY MEMBERS OF THE CLIMATE-KIC COMMUNITY





## EIT ICT Labs

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**Prof. Dr. Willem JONKER,**  
CEO "EIT ICT Labs"

EIT ICT Labs is a new KIC initiative intended to turn Europe into the global leader in ICT innovation. It aims to accomplish this mission by establishing a new type of partnership between leading companies, research centres, and universities in Europe. EIT ICT Labs will transform its CLCs in Berlin (DE), Eindhoven (NL), Helsinki (FI), Paris (FR), and Stockholm (SE) into world-class innovation hotspots. The setup and launch of the KIC organisation which can accomplish this mission and integrate various stakeholders in a balanced structure both nationally and Europe wide is a key achievement in its own right. This line of work was completed at the end of 2010 with the establishment of all required legal entities, their management and governance bodies.

EIT ICT Labs' work programme focuses on innovation and new business creation in key societal domains by combining EIT funded education, research, and business activities with existing activities in an integrated and mutually reinforcing fashion to create significant added value.

A key concept for this is the catalyst-carrier model. EIT ICT Labs will develop a set of value added activity types – the catalysts – and apply them on top of existing co-funded activities – the carriers – to create added value and achieve high leverage. The catalysts' performance is monitored, and the set is developed further on the basis of results achieved. The catalyst-carrier model was first adopted in the business plan 2011.

To achieve an efficient delivery structure, EIT ICT Labs work plan is composed of action lines. Thematic action lines focus on major societal challenges and aim for significant innovations and business opportunities. Competence action lines focus on developing capabilities and excellence in education, research, and business.

Each action line is composed of several linked value added activities, in turn composed of catalysts applied to carriers. Action lines have a designated lead responsible of both progress and reporting to the KIC board. At present, twelve action lines have been launched, five thematic, three research, two educational, and two business action lines, with at least three more planned for 2012.

Education catalysts focus on transforming existing education programmes towards world-class quality and impact, signified by EIT labelled modules. The main catalyst is the inclusion of a creativity, innovation, and entrepreneurship education module.

KIC InnoEnergy's objective is to be the leading engine for innovation and entrepreneurship in the field of sustainable energy.

Diego PAVIA,  
CEO "KIC InnoEnergy"

It aims to work towards sustainability by coming up with solutions to: reduce costs throughout the energy value chain (supply, transport, storage, distribution, and retail), increase energy security (autonomy vis-à-vis the resource holders, intrinsic operational security), reduce CO<sub>2</sub> and other green house gas emissions, and to focus on six thematic areas: (1) clean coal, (2) smart grids, (3) smart cities, (4) bio fuels, (5) renewables, and (6) convergence nuclear-renewable.

The foreseeable impact can be measured in concrete monetary terms: assuming that the cost of a given good produced or consumed in Europe is EUR 100, EUR 27 thereof is the cost of energy consumed during its production. On the basis of the current EU GDP, a 1% reduction in the cost of energy will represent around EUR 20 billion of savings, translating into additional competitiveness for European industry and a buffer for European welfare public services. Tangible external outputs from KIC InnoEnergy with market impact are so far:

- Implementation of the Entrepreneurship Programme "From Science to Business" with huge impact on the 27 PhD students;
- First Clean Tech Venture Capital Day in Stockholm (SE) in September 2010 with 250 participants (investors and start-ups);
- Second Grenoble Innovation Fair (GIF) in October 2010 with 17 energy entrepreneurs of that ecosystem;
- Innovation Speed Date in October 2010 with 27 energy entrepreneurs;
- New Open Economy Model (NOEM): First start-up "The Sustainable House";
- Launch of a Smart Grid PhD programme: ramped up to 40 PhD students;
- Launch of 6 MSc programmes (5 specific and 1 generic), first students to start in September 2011;
- Launch of 3 executive programmes, first students to start in September 2011;
- Launch of 32 innovation projects in aforementioned six thematic areas with first deliverables (demonstrators, patents, new products and services due in autumn 2011).

KIC InnoEnergy is the only existing "one stop shop" in Europe, which offers such an ambitious portfolio in one joint commercial and legal vehicle, operated as a business and delivered by the best actors of the knowledge triangle.



# 4. EIT— ADDED VALUE TO THE EUROPEAN INNOVATION UNION

## 4.1 GLOBAL AND LOCAL — ORGANISATIONAL SOLUTIONS WITH GEOGRAPHIC OUTREACH

**W**hile scientific knowledge is mobile, science driven business is often firmly rooted in a matrix of local culture and know-how. Smart regions do not limit themselves to create “isolated”, ivory tower like world-class universities and research centres. Not only are such ventures expensive, they are also subjected to risks such that key researchers and research groups move on to the next better offer. In addition, many regions do not have the resources to even begin the complex and lengthy process of building such comprehensive world-class centres. Instead, smart policy makers decide upon targeted actions which link cutting edge research with local skills and competencies.

The EIT is an elite institute; however, through its KICs and in combination with their dynamic and growing regional networks, different geographical areas of Europe will be able to put themselves on the map in new ways which were not feasible using traditional methods of organising research, higher education, and business. As an example of the development of these networks, Climate-KIC has introduced a new component in the KIC model: Regional Innovation Communities (RICs). The RICs will create regional test beds for new ideas, regionally disseminate new ideas, and involve regional SMEs in product development and the creation of new business. Hence, the EIT will also contribute substantially to capacity building and the exploitation of novel concepts in the field leading to smart specialisation in different regions. These and other models in combination with mobility for researchers, entrepreneurs, and students reiterate and confirm the need for European solutions in addition to mere national level solutions to bridge the innovation gap.

The EIT’s organisational flexibility allows for an outreach strategy aiming at both full European impact and excellence (see Annex VI). This anticipates synergy and cross-fertilisation between the Common Strategic Framework for Research and Innovation (CSFRI) and Structural (namely European Regional Development Fund (ERDF) and European Social Fund (ESF)) and Cohesion Funds. The EIT

will help achieve the Convergence and Regional Competitiveness objectives of bridging gaps of regional disparities. EIT will contribute to regional competitiveness by fostering entrepreneurship and innovation locally through the proven concepts of CLCs and RICs as well as by wide dissemination of KIC results.

## 4.2 THE EIT — FOSTERING RISK TAKING AND NEW BUSINESS CREATION

**I**nnovation and business creation means risk taking and learning from mistakes. These are essential characteristics of an entrepreneurial mindset. The EIT’s objective is to promote this type of mindset in Europe by means of initiatives such as *the EIT Entrepreneurship Award and the EIT Academy of Entrepreneurs*. The EIT Entrepreneurship Award is an initiative to promote a risk-taking culture in the KICs and beyond. At the outset, it shall do so by spotlighting and encouraging entrepreneurial ventures originated in the KICs. Moreover, it shall help nominated ventures to develop in a fast, successful, and sustainable way with the support of a mentorship scheme. Finally, it shall award annually one venture per KIC. The longer term vision for the award is to develop into *The European Award for Innovative Ventures* coming out of European universities and business incubators (not limited to but including KICs).

The EIT Academy of Entrepreneurs is a structured network of world-class entrepreneurs organised under the auspices of the EIT. The Academy will help nurture and develop the entrepreneurship capacity and capability of the EIT, the KICs, and Europe at large. It will help build the EIT brand for innovation and entrepreneurship in the global context. It is intended to emerge as the leading European entrepreneurship think-tank which will provide strategic guidance to policy makers, universities, and individuals. It will provide strategic advice to the EIT upon request and act as a sounding board to the KICs, particularly by providing the mentorship scheme associated with the annual EIT Entrepreneurship Award. Finally, it will promote and link the EIT to other globally leading communities and institutes in the field of entrepreneurship and the world of venture capital. Examples of planned EIT entrepreneurship activities in the short-term are: linking emerging ventures with potential investors during the Kraków Conference on Youth and Entrepreneurship in October 2011, an EIT award ceremony focusing on entrepreneurship in 2012, developing strategic partnerships with leading entrepreneurs and venture capitalists through the EIT Academy, and organising EIT entrepreneurial communities by inspiring the EIT students and alumni associations to be formed through a social networking site.

The EIT seeks to foster entrepreneurship by means of creating new mindsets and new investments. In 2010, the EIT Foundation (EITF) was established as an independent driver for promoting innovation and entrepreneurship as a key asset of the EU economy and society. The EIT Foundation aims at raising additional public and private funding in support of EIT/KIC activities (see below Chapter 5.1).



### 4.3 ENTREPRENEURIAL EDUCATION PROGRAMMES AND ACTIVITIES – EUROPE’S NEED FOR A SKILLED AND ENTREPRENEURIAL WORKFORCE

**E**ducation is at the heart of business concerns. In other parts of the world, one meets students with a sense of urgency to finish their education in order to make a difference in their societies and to create value for themselves and for others. In Europe, this spirit is seldom met and the educational programmes at European universities seldom help students to gain that spirit. European universities are focused on research as their main task. Higher education is viewed mostly as an individual project. High quality teaching for competencies rather than the mere acquisition of knowledge, and especially teaching from which students develop their competencies and attitudes in innovation and business, is scarce. Translating scientific discoveries into products is a unique talent and therefore demands new forms of teaching and learning.

The EIT is a new innovation infrastructure but it is *not* a new infrastructure for education. EIT master and PhD programmes are carried out at the KIC universities, by the relevant faculty. However, in addition to the learning outcomes expressed in the Qualification Framework for the European Higher Education Area (QF-EHEA; see Annex VII), EIT specific learning outcomes required for the EIT label are also imposed. In this way, the EIT will foster a new generation of young Europeans with an integrated view of research, education, innovation and business, combined with a spirit to transform ideas into business and to make a societal difference. In autumn 2011, the first 230 students will be studying in EIT labelled master and PhD programmes with a view to increase the number to about 950 students in 2012 and 1,300 in 2013 respectively.

The EIT is also engaged in delivering short courses, workshops, summer and winter schools and more, all designed together and in accordance with the needs expressed by KIC business partners. Continuing professional development (CPD) is an undervalued but essential component in the economy and a strategy for creating and maintaining a European workforce with the relevant skills and competencies. The EIT considers itself very well fitted to become an icebreaker and role model for this development.

### 4.4 THE EIT – A ROLE MODEL AS PART OF THE EU’S INNOVATION UNION STRATEGY

**T**he EIT was created not only to have a significant and beneficial impact on the European economy. It was also tasked to expand on the models that enable this impact to materialise and to enable their replication. The EIT should serve as a role model for the integration of all parts and all actors of the knowledge triangle.

The first and foremost example of this is the EIT/KIC experience currently being spread throughout Europe as an original contribution to the integration of the knowledge triangle. It is to be noted that the significant differences

between KICs in terms of legal entity, governance models, business and education focus, as well as in entrepreneurial approaches, is seen by the EIT GB as a very positive development illustrating the broad experimentation with innovation models which is currently highly needed in Europe. This also reflects the different innovation approaches needed in the substantively different innovation and business themes (currently energy, climate and future ICT), also in relation to the distinction between innovation for business and innovation for the public good. The second example is the investment strategy model (as opposed to mere funding). And the third will be the educational activities with their typical EIT profiles and teaching and learning methods based on active learning and new forms of assessment. The entrepreneurial and innovation-driven education models will be disseminated beyond the KICs as a contribution to advance the overall European performance in higher education.

The EU’s Innovation Union initiative is promoting new and more integrated forms of partnerships between EU Member States and its regions through enhanced co-ordination of basic measures supporting the research and innovation capability of Europe, namely the Framework Programmes for Research and Technological Development (FPs), the Competitiveness and Innovation Programme (CIP) and the Structural Funds. Furthermore, the Capacity Building and Smart Regions initiatives will contribute to the EU 2020 Agenda. The EIT as a catalyst and investor should be part of the Common Strategic Framework on Research and Innovation (CSFRI), however, not subject to the common set of rules. The EIT operates within the whole European innovation landscape, and must interact with all other EU and national/ regional initiatives and programmes via the CSFRI. In particular, through their “societal grand challenges” approach to innovation, the EIT and its KICs must be able to pool different initiatives funded under the new framework to allow for maximum synergies and impact on EU activities (see Annex VIb on KIC Funding Sources).

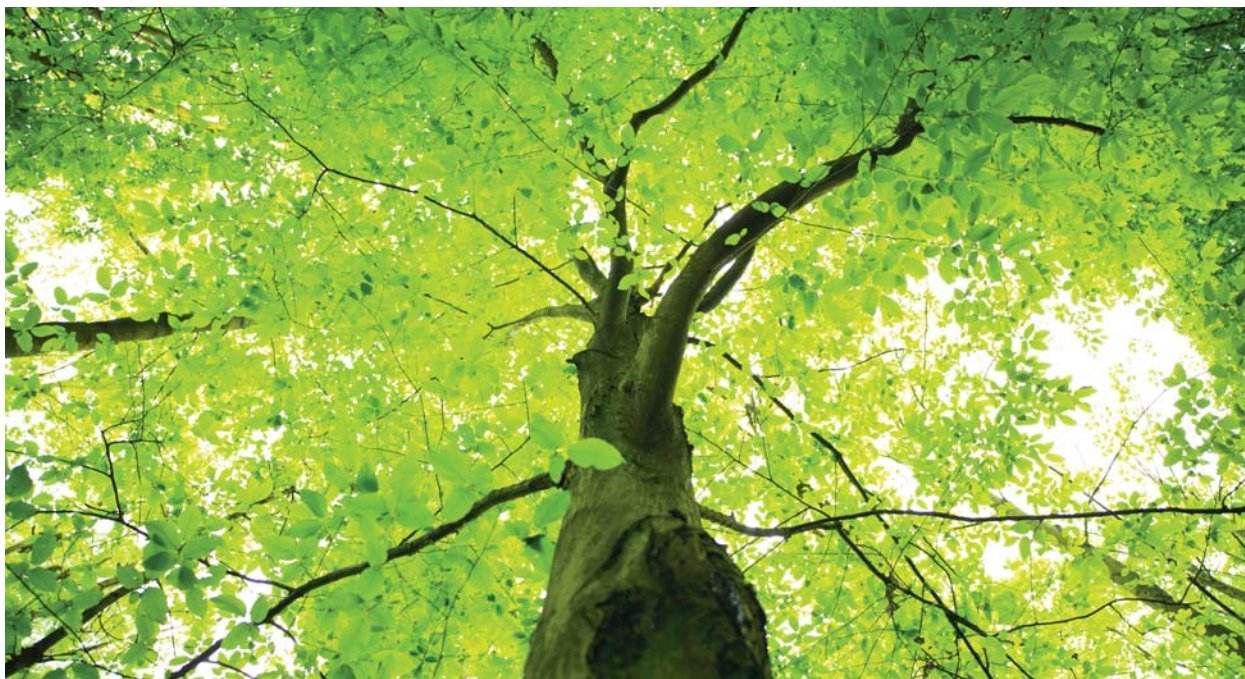
Simplification and flexibility in both operations and the disbursement of funds have been a defining characteristic of the initial success of the EIT. To realise its full potential as an icebreaker and role model for new governance and innovation funding schemes, the EIT and its KICs need flexible mechanisms to cope with rapidly changing circumstances affecting their market and societal impact. A “one-size-fits-all” approach to rules and obligations would seriously stifle the EIT and the KICs’ mission to explore new ways of seeking innovation and achieving impact.

“EIT, positioned under the Common Strategic Framework, will gain in visibility and profit from closer relations with like-minded stakeholders, initiatives and other EU funding sources – in line with the Innovation Union’s focus on bringing ideas to the market. At the same time, any rules applying to EIT in this context will need to remain tailor-made and flexible to fit with the EIT’s missions, in line with its current specific operating rules and financial derogations.”

European Commission President José Manuel BARROSO



# 5. THE EIT — STRATEGIES FOR SUSTAINABILITY AND IMPACT



**T**he EIT was created with one single vision: to be a key driver of sustainable European growth and competitiveness through the stimulation of world-leading innovations and business with a positive impact on the economy and society. This was envisaged to become reality by means of a new funding or smart investment approach as well as co-funding; and by shaping a new flexible and stakeholder integrated organisation that would effectively transform research and innovations by creative and entrepreneurial people to new businesses and to societal advances. The EIT has proven its capacity to form the essential new infrastructure for this. The key challenge now is to develop strategies to continue enhancing this new model for sustainability and impact. The EIT's impact will be measured by its success in implementing the following targets:

- To increase European competitiveness by generating more innovations and turning these into businesses,
- To become a role model for the creation of a European innovative and entrepreneurial workforce, and
- To make Europe a global leader in turning the Grand Challenges into Grand Opportunities.

## 5.1 DEVELOPING EIT GOVERNANCE AND INVESTMENT STRATEGIES

**T**he EIT takes on a new and non-traditional role in relation to the funding of its KIC activities as compared to other funding concepts. Traditionally, different funding bodies pool resources to enable a research project to be pursued successfully. Current discussions on a new EU research and innovation funding scheme envisage the streamlining of different instruments to obtain maximum efficiency and minimum overlap of funding mechanisms. This is crucial for the overall credibility of EU funding. However, EIT co-financing has a new, distinct mission. It is not just an additional funding instrument with the notion that it should contribute to certain research objectives. Instead, it is a purposeful investment in the KICs' innovation capacity. These investments should catalyse innovation, entrepreneurial and business creation activities based on and in synergy with the bulk of research and educational activities pursued with the help of the other funding schemes. EIT funding to the KICs should therefore not be judged solely on the percentage of monetary contribution to the KICs' activities. The EIT's strategy is to invest in such a way as to enable the KICs to catalyse innovations and to educate entrepreneurial individuals in an operative

way (see Annex X on the EIT Scoreboard). In particular, it aims to set up an infrastructure that generates educational programmes that teach entrepreneurship and business creation, and that transform research into innovation and business creation. The EIT will complement and become an attractive partner for research and education sponsored by other European, national and regional resources.

The EIT as an impact investor and engaged stakeholder leads directly to the notion that KICs should become profitable and sustainable ventures, as any successful start-up should. Presently, two KICs are non-profit associations and one (KIC InnoEnergy) has been set up as profit making company (although its profits are not distributed but rather re-invested in KIC activities). The EIT will now reflect on the concept of profitable and sustainable KICs and the consequences thereof on the KICs' operations. Strategies need to be formed about commercial profit on one hand and profit in terms of public good on the other. The EIT plans to establish a clearly defined investment exit strategy which would be communicated to the KICs.

To be an investor and not a grant giver leads to consequences for the EIT governance structure. The GB will make decisions on investment strategies, actual investments, and will assume the financial and business outcome responsibility for these. This calls for a more executive GB with risk taking experience. In the future, GB members must continue to be selected on the basis of their expertise and background of individual engagement. Any changes to the current blend of GB members should be in the direction of a stronger business profile. SMEs, especially in Central and Eastern European countries, will play a deciding role for European business progress. Such competence and experience should be represented in the GB. A GB for this type of venture needs to be focused and lean. Thus, the number of board members should not exceed ten.

The EIT Foundation (EITF) – while being legally independent – is intended to play a crucial role in safeguarding the EIT's financial sustainability and autonomy. The objective of the foundation is to attract donations from sponsors originating in the EU and beyond. In this respect, and leaving aside the funding brought in directly by the KIC partners into KIC operational activities, the EIT Foundation is intended to be the main vehicle through which all other – mainly private – sponsors can financially support the EIT and its KICs. To attract donations on a sufficiently large scale and in order to launch kick-off activities, the EITF is currently developing a fund-raising strategy, which identifies potential donors and ways to approach them. As an independent legal entity, the EITF will be at the service of the EIT/KICs with which it shares the common overall objective of contributing to Europe's innovation capacity (see above Chapter 4.3).

## 5.2 DEVELOPING THE EIT CORPORATE IDENTITY AND CULTURE

**T**he EIT identity so far has been exposed to a number of European actors, academicians, industrialists, and politicians, through the call for proposals, con-

ferences and workshops, and by way of discussions on new ideas and new thinking especially within the higher education and entrepreneurship remit. The ideas have been very well received. The sense of newness created has already built a strong EIT brand. However, the EIT is a complex initiative involving a number of people and organisations, jurisdictions, interests, and languages. To find a strategy for this to work in the long run is as complex as the initiative itself. This is the main reason why the EIT cannot only be a new investment mechanism but rather needs to be a European body with a strong institutional character although in a "distributed" (i.e. non-centralised) manner. The road to success is not to regulate but to create a corporate identity. Identity formation requires the building of a platform of values which gives guidance in choices, commitments and actions. People with shared values naturally work well together towards common goals. To date, the following core values have been identified:

- The EIT activities should be characterised by a "can-do" entrepreneurial spirit.
- The EIT should act as role model in realising the seamless integration of research, higher education, and innovation/business in all its activities.
- The EIT regards each of business, innovation, education, and research activities as equally valuable.
- The EIT values single-headed leadership representative of all elements of the knowledge triangle and with a personal engagement above committee leadership.
- The EIT sees entrepreneurship from a holistic perspective as the key driver of innovation.

Finding ways to make these values known and accepted will initially be the responsibility of the EIT HQ together with the KIC CEOs. The EIT corporate identity will grow and mature over time but must always remain the identity of someone who is prepared to challenge or to be challenged by established views, who can stand up for new ideas and for simplification of existing rules.

## 5.3 DEVELOPING THE ROLE OF EIT HEADQUARTERS IN RELATION TO THE EIT'S MISSION

**W**ith a view to ensure, implement, and develop the EIT strategy, there is a vital need for operational EIT Headquarters (HQ) that on the one hand acts as a professional strategic advisor to the GB and on the other hand implements the EIT strategy as developed by the GB. It must link to and encourage the KICs in their innovation task, disseminate KIC results, share knowledge and maintain links with other EU bodies as well as all EIT stakeholders in Europe and beyond. Without the EIT HQ, the KICs might evolve in different directions and thus the central idea of a strong and integrated EIT would be lost. The autonomous KICs on their part have also expressed a need to be an integral part of the family of EIT innovation

centres. Moreover, they do look for help, guidance and support by the EIT HQ on a number of issues. Focus of the EIT HQ will be primarily – but not exclusively – on entrepreneurial education and the EIT label, entrepreneurship and new models for business innovation, simplified and innovative grant/ investment management, and new investment development, and on promoting the EIT culture.

If the EIT and the KICs are to enhance Europe’s innovative power in a spectacular way, the EIT HQ cannot be set up as the office of an ordinary funding body. The EIT HQ will need exceptional expertise within crucial areas to appreciate the results of the investments and to coach the KICs to become even more successful in their innovation, entrepreneurial and education activities. Effective working models are already being built which allow the EIT HQ and KIC expertise to work closely together to enhance the development of both educational and entrepreneurial activities.

The EIT HQ currently manages the financial, contractual, and administrative processes of the KICs, including reviews and strategic discussions on business plans, scoreboard results, the EIT label and quality assurance for educational and entrepreneurial activities, as well as its own EIT HQ internal organisational issues, such as recruitment, professional development and assessment of human resources.

In future, the EIT HQ will have to play an even stronger role as the centre of expertise in all of its main tasks and areas of responsibility, and incorporate flexibility and simplification into its working methods to enhance KIC results. This will be even more true once there are increased numbers of KICs in existence, with up to 12 KICs by 2020 a realistic possibility. As in any knowledge intensive venture the EIT HQ needs to have a flat organisational structure where the expertise can be engaged and used across areas and across tasks easily. This will also create an innovative EIT identity and spirit with common responsibility for the success of the EIT including the KICs. This does not exclude a strong management capacity based on key account management thinking. However, it is obvious that the present traditional hierarchical structure will have to be adjusted for future effectiveness. At the end of the day, it should be possible for the EIT HQ to carry out the challenging “linking pin” role with a budget equivalent to approximately five per cent of the total ongoing yearly investments by the EIT in its KICs.

The EIT Director with the aid of her/his team should be recognised for the determined operational management of the portfolio of innovation communities. The Director should be a thought leader in new ways of innovation applied both within EIT HQ and towards the KICs. This is crucial for the development of the EIT’s role in a new European innovation infrastructure.

## 5.4 DEVELOPING SUSTAINABLE WAYS FOR WORKING IN THE KNOWLEDGE TRIANGLE

The knowledge triangle has so far mostly been presented as a theoretical concept and political desideratum over changes needed in Europe. One necessary condition for making this a reality is that people are working on equal terms under the same umbrella as in the KICs. However, the risk of falling into the trap of “style over substance” is still there. This theoretical model must be transformed into a model of action, an everyday working model for the people involved. One way is to create an enquiry-based process around the three nodes of the triangle. Three questions need to be in everyone’s mind at all levels in the system, and during all planning and performing activities: (1) What are the best ways of linking research to education?; (2) What are the best ways of teaching creativity, innovation, and entrepreneurship?; (3) And how can optimal conditions be created for innovators to feed their knowledge and experience back into research? By using these questions used as starting points and basic tools when planning and performing research, education, and innovation, the EIT:

- Will ensure that the knowledge triangle is always put into practice;
- Has created the foundation for follow-up systems in terms of quality assurance and scorecard systems;
- Has created the foundation for the necessary EIT quality culture of excellence.

Two examples of this concept having been implemented in practice are the EIT ICT Labs’ catalyst-carrier model, and the learning outcomes of EIT master and doctoral educational programmes both of which keep the integration of research, education, and innovation/business rigorously in mind.

## 5.5 DEVELOPING AND FOSTERING BUSINESS INTEREST

At the same time as the EIT started its activities in September 2009, European businesses went into an economic crisis. The start of the EIT might have been ill-timed, however, despite the crisis, KIC activities were launched as planned and are indeed well timed to create a more innovative and competitive Europe for the future. The EIT has seen impressive industrial participation, most recently in 2011. Essential for the KICs’ success was the fact that industry has conclusively contributed to the development of the KICs’ legal structures and embraced the CEO leadership. In September 2009, many stakeholders in Europe did not believe that this was possible.

However, a trace of “wait-and-see” attitude is still visible in the European industry and there is need for a critical shift in the industrial mindset concerning its participation in KIC research and innovation/ business activities. Indeed, to remedy this first and foremost, the EIT now needs con-



crete results in terms of innovations resulting in new businesses and entrepreneurially educated people. 2011 is the first year of substantive implementation of EIT policies and the upcoming results need to be widely disseminated to industry. This is anticipated to attract wider industry interest in investing and becoming more actively involved in KIC activities.

In parallel, the EIT will continue to strive for greater simplification of rules and procedures to allow Europe's businesses simpler and faster access to innovation in EIT and its KICs. Another element to attract the private sector to EIT and KICs will be to exploit new knowledge transfer models in collaboration with industry and business. The EIT will educate master and PhD students in educational programmes where creativity and entrepreneurial experience will be integrated through clear learning outcomes, innovative assessment, and learning by doing. Of course, all of this will be done in a collaborative mode with the European Commission and, in particular when it comes to education, with DG EAC.

## 5.6 DEVELOPING THE INTERNATIONAL DIMENSION

**T**he EIT – through its KICs' co-location centres – is Europe's answer to create European innovation hotspots. The yardstick to measure the EIT is not Europe but the world. No doubt, Europe has huge potential

to remain an economic super power given its scientific excellence and in parts world leading capabilities in climate, energy, biotechnology, and ICT research, however, with no operational implementation towards business results Europe will not achieve its goals.

The presentation of the EIT at Shanghai's Expo in 2010 and the ensuing benchmark trip visiting Chinese education and entrepreneurial activity has made it clear that the EIT is being followed abroad with eager interest and anticipation of future participation. Such promotion of EIT visibility must continue. Moreover, the EIT will explore modern channels of communication such as developing social media tools to raise awareness and enhance visibility globally. Future visits of KICs to economic powers outside Europe are expected to lead to further participation of overseas nations and parties in the EIT/KICs. This will always be in the context of further learning towards even more effective innovation and education.

An underlying factor in the advancement of all research, education, and innovation societies in the world is that they will not be competitive if they cannot attract a world-class faculty, a world-class student body, and world-class companies including both SMEs and multi-nationals. The EIT will carefully consider making the future call for proposals even more open to international participation. This is certainly the way to create a strategy for sustainable excellence in science and in business.



# 6. NEW KIC AREAS AND THE WAY FORWARD

**R**ay Bradbury, author of books such as *Fahrenheit 451* and *Martian Chronicles*, was interviewed a few years back by Wired magazine. He was asked to foretell the future of mankind in the same accurate way he had done in 1950 in *Fahrenheit 451* when he predicted the media society we are presently living in. His answer was “*Future is not a path to be found. Future is a path to create. I did not write to predict a future. I wrote to prevent a future!*”

The choice of new KICs builds a path to create a future for Europe. Choice is upon us and depends on themes for KICs that are worthwhile pursuing as seen from a perspective of Europe’s needs and evolving strong capabilities.

## 6.1 EIT GUIDING PRINCIPLES FOR NEW KIC THEMES

**T**he specific new KIC themes mentioned below are first and foremost to be seen as a springboard for discussion – a discussion which no doubt will only be finalised once both the European Parliament and Council have made a final decision on the EIT’s future. The set of themes proposed below is therefore by no means comprehensive. It is considered indicative as regards the path Europe might want to create for the future. Without any doubt though, a successful KIC theme must be able to attract significant EU funding and must reflect an additional and compelling contribution to innovation as envisaged by EIT.

Several remarks can be made on the compelling contribution of the EIT. Firstly, a generic one: As a matter of course, socio-economic analysis cannot predict whether the KIC themes chosen will actually result in KICs that impact on new business creation in Europe and that provide solutions to the Grand Challenges or Grand Opportunities (!) we face. This is also illustrated by the online consultation on KIC themes that EIT requested the Institute for Prospective Technological Studies (IPTS) to undertake. The consultation illustrates how scientists, industrialists, and public administrators view the need of new KIC themes. The proposed themes are in line with those discussed in many other international contexts. Indeed, all the Grand Opportunities are created by us and are for us to solve: climate change; demographical changes due to ageing and too few new Europeans; scarcity of natural resources due to a lack

of raw materials, adequate food and fresh water; logistics changes due to urbanisation and an uneven global distribution of production; health changes due to food shortages but also overconsumption of certain foods; immunology related diseases; and personal integrity and security, to mention but a few!

Secondly and more specifically: what makes a theme *KIC-able*? And particularly, what makes it suitable to a KIC approach? Obviously, the KICs should impact on society in two ways: they should generate innovations that contribute to economic growth in their thematic area in a significant way. And they should generate innovations that contribute to the solutions of the Grand Opportunities, a public good. These objectives are never orthogonal. However, neither are they always in full synergy with each other or pursued in a fully equal and balanced manner. In the selection of new KIC themes both aspects will have to be considered and weighted. More importantly, the KICs’ specific innovation power to a theme as driven by entrepreneurship in the knowledge triangle, the integration of stakeholders in KICs, and the joining of local and global capabilities in KIC co-location centres, must lead to added value beyond normal programmatic funding of a theme. More precisely, the EIT should have an additional impact in terms of expected economic, employment, social, and cultural effects produced by the candidate KIC throughout its operative life.

Thirdly and most importantly: the EIT as an engaged stakeholder and smart investor in the KICs will invest in those KICs which, based on their proposal, the EIT judges to have the best chance of contributing to European innovation. Going forward with these new KICs (and the existing ones), the EIT will measure their socio-economic impact by means of a scoreboard and key performance indicators as defined in the KICs’ business plans. In short, the EIT in its role as a smart investor will carefully monitor its portfolio of KICs and will, from time to time, boost its investment in well-performing KICs while limiting the investments in KICs not living up to the expected outcomes. As regards the Innovation Union, the EIT as an EU body will lead the way to change focus away from investments based on controlled input and towards investments based on measured output.

In summary: The guiding principle for selecting KICs is their ability to create lead markets beyond normal programmatic funding by integrating stakeholders from the knowl-



edge triangle of both global and regional significance, while driving innovation through entrepreneurship education and business creation in a multi-disciplinary way.

Initial ideas put forward by the EIT GB and to be considered currently as a springboard for themes eventually adopted by the European Parliament and Council include the existing three KIC thematic areas as well as six potential new areas.

## 6.2 NEW KIC THEMES

The first call for proposals generated a wealth of different proposals. The scope of any future KIC theme shall be sufficiently wide to leave room for creativity in the proposals to be submitted. Any future EIT call must allow for a proposal to be chosen that is considered to make a contribution in line with the EIT characteristics which – as outlined above – do have a different logic than most other existing research and innovation funding initiatives. Such an approach calls for both balance and openness.

Suggestions for future themes as springboard for the envisaged new KICs include:

1. Human Life and Health
2. Human Learning and Learning Environments
3. Food 4Future
4. Manufacturing by and for Creative Human Beings
5. Security and Safety
6. Mobility and Smart Cities

It is to be noted here (for further details see Annex VIII) that all these themes

- will have significant social and economic impact,
- will attract crucial complementary funding from existing and/or new EU programmes,
- will benefit from EIT seeding since they contain sub-fields (e.g. *Ageing and Healthy Childhood* in the Human Life and Health theme) that will benefit compellingly from the EIT approach, making use of the full knowledge triangle in an innovation web rather than a linear innovation chain,
- have important scientific and technical competencies underneath the themes that require further strengthening in Europe such as Life Science, Biotechnology, Medicine, Cognitive Science, Information and Communication, Climate and Energy Science.

The choice for as broad a theme as Human Life and Health is deliberate as it encompasses all that is relevant for the various phases of life (and health) that will be vital for a European citizen in the 21st century. Other themes could be sub-themes to some extent but are considered so important that the EIT feels they should be a theme in their own right.

The EIT is very much aware that the final choice of themes for new KICs will go through a political process including the European Parliament and Council, as well as through a wide public debate. Other themes will also be suggested by stakeholders. All this is precisely the way it should be. However, the EIT is convinced that the Grand Opportunities mentioned in this document will remain determinative for the final choices. Moreover, the EIT believes that the final choice of the themes based on a call for proposals and subsequent thorough selection process will lead to formidable new KICs in 2014; KICs that any investor would like to have in his/her investment portfolio!

## 6.3 THE BUDGET FOR NEW KICS

The EIT was set up with a view to long-term European Union investment in operational innovation activities. Long-term is defined as the 15 years that the EIT Regulation stipulates. Over time, the EIT would like to bring successful KICs to profit and self-sustainability. However, by 2014 this will not yet have happened. The EIT and the (current) KICs will still be in the venture capital or investment phase.

The challenges and agenda outlined above lead the EIT to propose that beyond continued funding for the existing three KICs, there should be three further waves of new KICs: three new KICs in 2014, three in 2017, and up to three in 2019, all for an average twelve-year period. The reason for following this approach is that it strikes the right balance between:

- The need to carefully and in a learning-by-doing mode invest into new KICs addressing European challenges and opportunities,
- The estimated availability of excellent co-location centres in Europe,
- The need to spread the KIC approach more widely throughout Europe with a particular focus on Member States in Central and Eastern Europe,
- The inevitable loss of some co-location centres over time, and
- The need to carefully manage the impact investments.

Moreover, there is a need to step up the innovation efforts of the existing KICs and hence also of the new KICs. There are various reasons for this:

- The EIT's previous budget of EUR 309 million falls short of the benchmark amount needed in the EU to have a real innovation impact. Indeed that figure was somewhat arbitrarily arrived at rather than being the result of a clear calculation of adequate innovation investment in Europe. To illustrate, the figure of EUR 309 million pales in comparison to the ERC budget of approximately EUR 10 billion for the past four years!

- The EIT must increase the level of KIC funding per year to make the KICs more attractive to future powerful KIC partners. Currently, the investment funding is considered to be marginal if not sub-marginal for this purpose. Conversely, KIC parties do perceive the EIT's 25% funding of KICs as an appropriate strategic investment model and the EIT does not intend to alter this.
- **Most importantly: the existing KICs believe that they will have shown such convincing results and have drawn up such strong partnerships by 2014, that an increase of funding by a factor of about two is necessary and warranted in order to scale up to world-class innovation.**

The EIT has therefore chosen to step up the 25% investment funding by a factor of about two per KIC per year leading to a cumulative budget of about EUR 4 billion for the period 2014-2020 (for up to 12 KICs in 2020) (see Annex IX for further detail). The budget reflects a decrease of funding after about 10 years assuming that KICs are then approaching self-sustainability or disappear.

The EIT estimates that these funds are critically important to strengthen existing KICs (including their partners) and to enable future KICs to become highly integrated collaborative partnerships, legally and financially structured, producing new and world-class innovations within their priority themes through activities and investments with European added value.

KIC activities to be funded by the EIT include education, research, innovation and entrepreneurial programmes as well as activities contributing to the integration of the knowledge triangle within the KIC, in particular supporting and delivering the appropriate leadership, governance, co-location centres, mobility, intellectual property rights, coordination, administration and engagement by the KIC with other actors in Europe and beyond. Moreover, EIT funds will empower the KICs to address key societal challenges, to foster world-class excellence, to set a clear business-friendly framework, to enhance the free flow of knowledge through co-locations and other innovation hotspots, to promote new ways of educating people, and to create a new generation of entrepreneurs.

Thus, based on the envisaged three waves of new KICs and an average KIC life of 12 years the analysis leads to a financial need of below EUR 800 million in 2020. Risk taking should be carried out based on reasonably safe strategies but not on excessive control. The EIT goals for 2020 are:

- 10 to 12 KICs have been established,
- individual mature KICs have an annual budget of around EUR 350 million each,
- the first three KICs are, or are close to becoming, (self-)sustainable,
- the EIT's cumulative investment of EUR 4 billion in KICs has created world-leading European innovation hotspots and a risk-taking entrepreneurial culture

producing new businesses and better educated people for Europe.

The EIT HQ budget will stay lean and below an amount equivalent to around 2-3% of the total investment in the KICs over the period 2014-2020.

## 6.4 THE WAY FORWARD – 2014 AND BEYOND

**A**s outlined above, the EIT intends to extend the overall number of KICs gradually, building upon and transferring the knowledge gained in the set up phase of the initial KICs. For the immediate future the following priority tasks have been identified.

1. Securing the selection of the new KICs with a view to launching the next wave of KICs in 2014 is the first task of the EIT after 2013.
2. Encouraging seamless flows of information within and among both existing and future KICs, thereby ensuring that specific KIC strategies are anchored in a common identity and long-term vision. By identifying and subsequently disseminating KIC good governance and funding models, the EIT will ensure that knowledge from the KICs is captured, valorised, and capitalised on across the European Union and beyond. The EIT Headquarters will optimise its key operational functions to steer the KICs to maximal performance and to make key findings and results available to a wide audience.
3. Managing of the impact investment portfolio of the KICs by the EIT Governing Board in such a way that optimal business results will emerge. It goes without saying that this leadership style calls for new governance structures, relations within the GB, and between the GB and the KICs (see also Chapter 5.1 "Developing EIT Governance and Investment Strategies"). Ample examples on how to do this can be retrieved from the venture capital world.
4. Profiling the EIT as a promoter of education of high academic standing, nurturing innovation and entrepreneurial talent, and making Europe – via the KICs – an attractive destination for open-minded, high potential individuals who carry the ideas and implement the initiatives that will shape our future.

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# KEY MESSAGES OF THE EIT'S STRATEGIC INNOVATION AGENDA

## STRATEGIC INNOVATION AGENDA: THE EIT'S VISION FOR THE FUTURE

The European Institute of Innovation and Technology (EIT) was set up in March 2008 by the European Parliament and Council with a view to increasing Europe's innovation impact and to becoming a key driver of sustainable European growth and competitiveness.

The EIT is a European Union Institute that encourages, seeds and enables existing European education, research and business hotspots to form entrepreneurial and excellence driven innovation clusters – its Knowledge and Innovation Communities (KICs). The EIT brings together the three sides of the knowledge triangle consisting of higher education, research and business (including SMEs) from the EU and beyond.

KICs are driven by entrepreneurship to provide higher innovation impact in the form of new products and services for existing industry, new businesses and SMEs, and more entrepreneurially minded and (more highly) educated individuals. The EIT Headquarters are in Budapest. The EIT's Regulation gives the EIT significant autonomy so as to cope with the particular demands of fast-paced innovation; among them flexibility and simplicity through derogations from the EU Financial Rules.

## THE EIT'S KNOWLEDGE AND INNOVATION COMMUNITIES (KICS)

KICs are the EIT's operational base. The first three KICs were designated in December 2009: Climate-KIC (climate change), EIT ICT Labs (future information and communication society) and KIC InnoEnergy (sustainable energy). The funding or seeding of the KICs by the EIT accounts for only 25% of the total KIC budget. The remaining 75% reflects the commitment of KIC partners and comes from the partners' own resources and regional, national or European funding attracted by the partners.

KICs address long-term EU societal challenges offering new opportunities for innovation in Europe. The KICs drive real impact through the training of entrepreneurs in higher education, through new business creation leading to new products and services for the existing EU industry and through the creation of new businesses (including SMEs) in Europe. KICs are shaped by strong entrepreneurial cultures and are driven by common visions and goals expressed in a business plan. The KICs' innovative "webs of excellence" consist of five or six innovation hotspots where all the elements of the Knowledge Triangle are 'co-located', i.e. where they are in close physical proximity. Additional Regional Innovation Centres (RICs) help ensure geographical coverage throughout Europe.

The KICs have each set-up a legal entity representing the core of the KIC partners which are run by a CEO. Importantly, KIC partners are not held accountable on the basis of their efforts to contribute to the programme of a KIC as is the case for most grant programmes in Europe. Instead, the KICs must accept the leadership of the CEO (and a supervisory board) and commit to producing innovation results and impact, rather than efforts, as described in each KIC's business plan. It is also worth mentioning that KICs follow a completely new approach as regards contractual agreements: one contract is signed between the EIT and the KIC legal entity, while all KIC partners sign internal agreements with the KIC legal entity.

The EIT and the KICs are designed to continuously learn from one another. They establish and facilitate a culture that helps unlock Europe's underused potential to leverage people, technology and business innovation for greater EU innovation impact. Entrepreneurship is the central driving force of innovation in the EIT and its KICs. Over time, KICs must become self-sustainable world-class innovation centres to survive.

## EIT ACHIEVEMENTS

None of what the EIT has realised thus far has ever been achieved before. With a trial and error approach and an insistence on simplicity, the EIT selected the first three KICs and supported them in building their respective governance structure all in less than two years following the Call for Proposals. Following the first EIT Governing Board meeting with European Commission President Barroso in September 2008, the EIT launched its first call for KICs in April 2009.

The first three KICs were designated in December 2009 and one year later, the contractual agreements between the EIT and each KIC legal entity were signed. 2010 was spent developing KIC legal and financial entities, getting contracts signed, and putting the KIC entities under the leadership of a CEO. Meanwhile, the EIT has started driving entrepreneurship education and business creation together with the KICs; this includes initiatives such as KIC summer schools, mentoring schemes, business accelerators and an EIT Entrepreneurship Award. In addition, the EIT Foundation has been established to raise additional funding to support the EIT in its mission.

## EIT STRATEGY

The EIT and its KICs are currently following three specific strategic strands:

1. Building up of the EIT and the KICs by further developing the EIT Headquarters in Budapest and each KIC co-location centre as a hotspot driving innovation effectiveness and focusing specifically on results and impact;
2. Further developing entrepreneurship education within KIC higher education institutions branded by an EIT label; and
3. Directing continued focus on new business creation within the three KICs based on entrepreneurship leading to new products and services for existing industry, new businesses and SMEs, as well as more entrepreneurially minded and trained people.

## THE EIT'S CONTINUOUS LEARNING FOCUS

Shifting from a system based on control of expenditure towards a trust-based system, focusing on outcomes (impact) and rewarding performance is perceived as “the” next major challenge for the EIT. This will again be tackled in a ‘learning by doing’ approach and by capitalising on the EIT’s existing derogations from the EU Financial Regulation towards optimum flexibility for the institute to foster innovation. In the years to come, the EIT will aim and focus on becoming an **entrepreneurial driven innovation impact investment institute**.

## SECOND INVESTMENT ROUND FOR 2014

Further reinforcement of Europe’s innovation landscape beyond the current important policy strengthening of the 2020 Innovation Union target is both timely and urgent. Moreover, according to its regulation, the EIT was set-up to last for the long periods of time that innovation typically takes.

Thus, the EIT wants to go for a second ‘KIC investment round’ in 2014 so that more potentially world-class and over time self sustainable European innovation hotspots can emerge. Moreover, the EIT will add value to the European innovation landscape by providing a ‘role model service’ to others by providing, *inter alia*, inspiration and good practice to the larger initiatives of post-2013 EU funding, namely the Common Strategic Framework, the Education and Training Programmes as well as Structural and Cohesion Funds.

## HOW DOES THE EIT WANT TO ACHIEVE THIS?

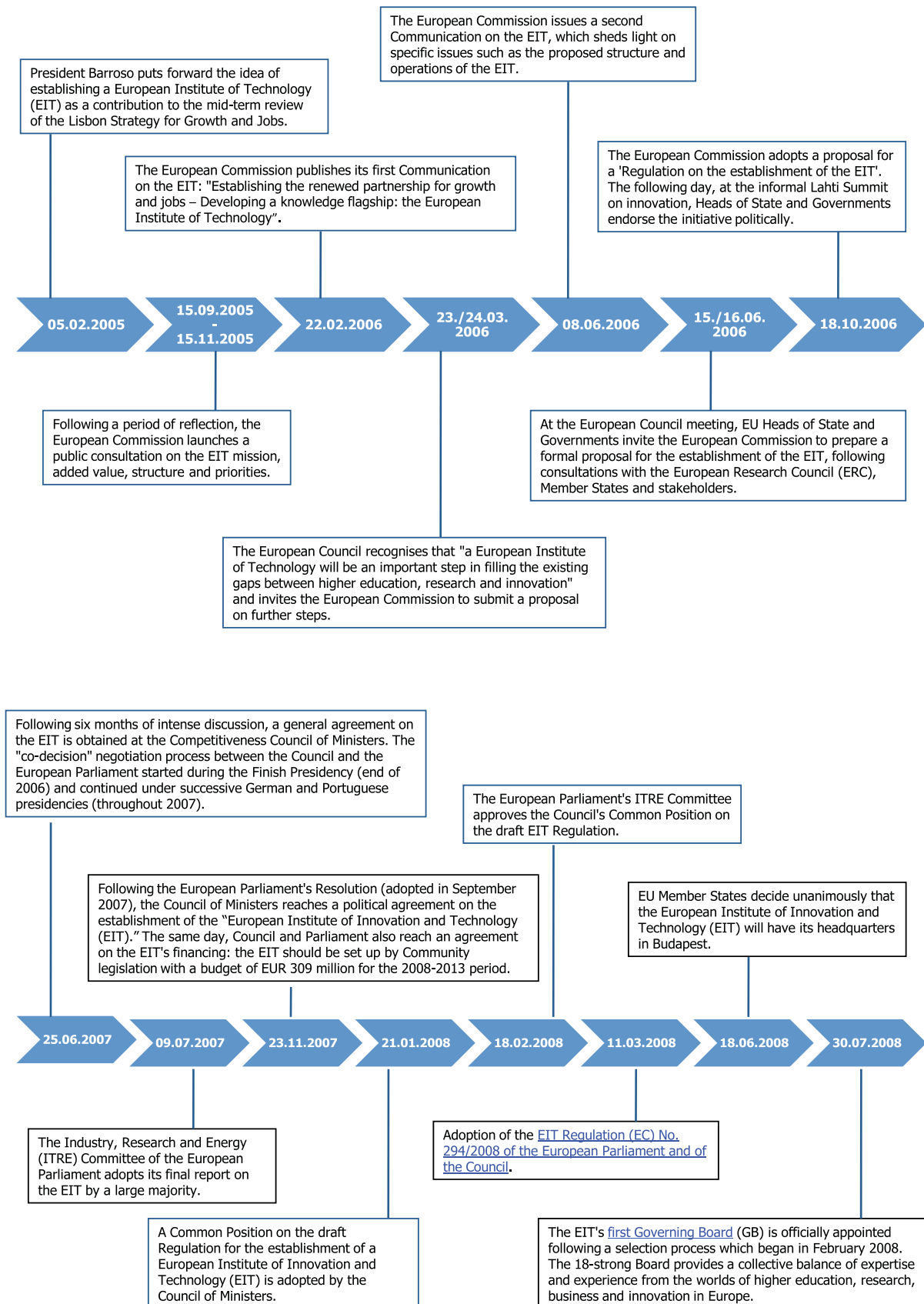
The EIT is putting forward additional new themes all with high societal relevance and all chosen to reflect new business creation opportunities and requiring the full inclusion of the knowledge triangle in its innovation approach. A next round of investment in new themes together with the existing three themes is to start in 2014.

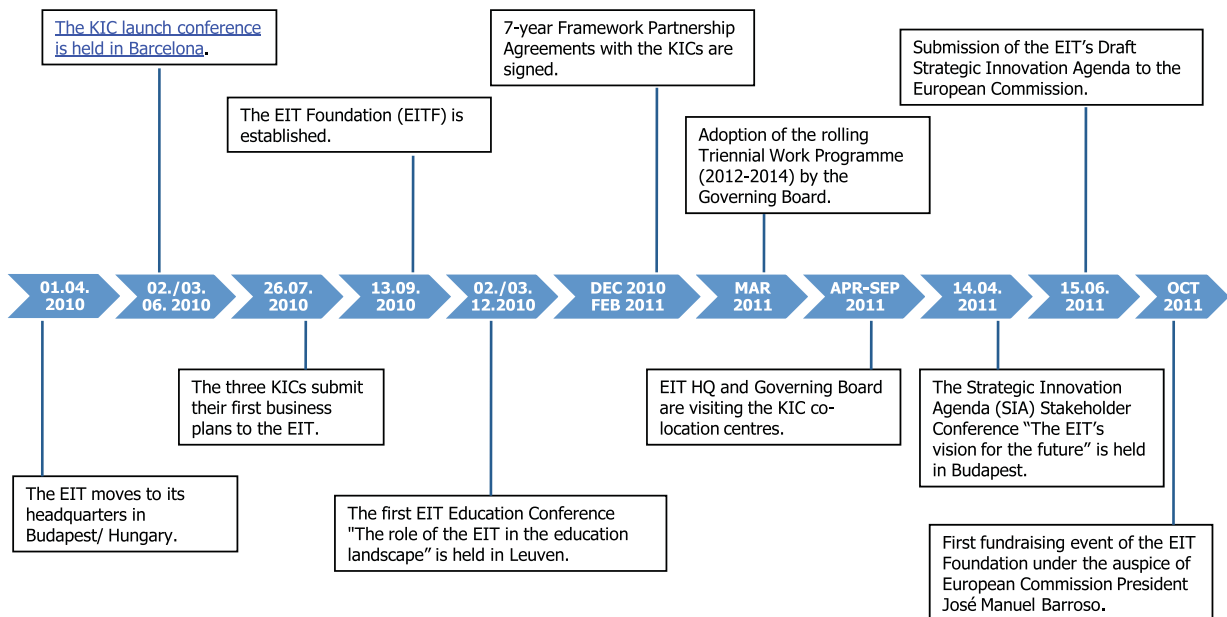
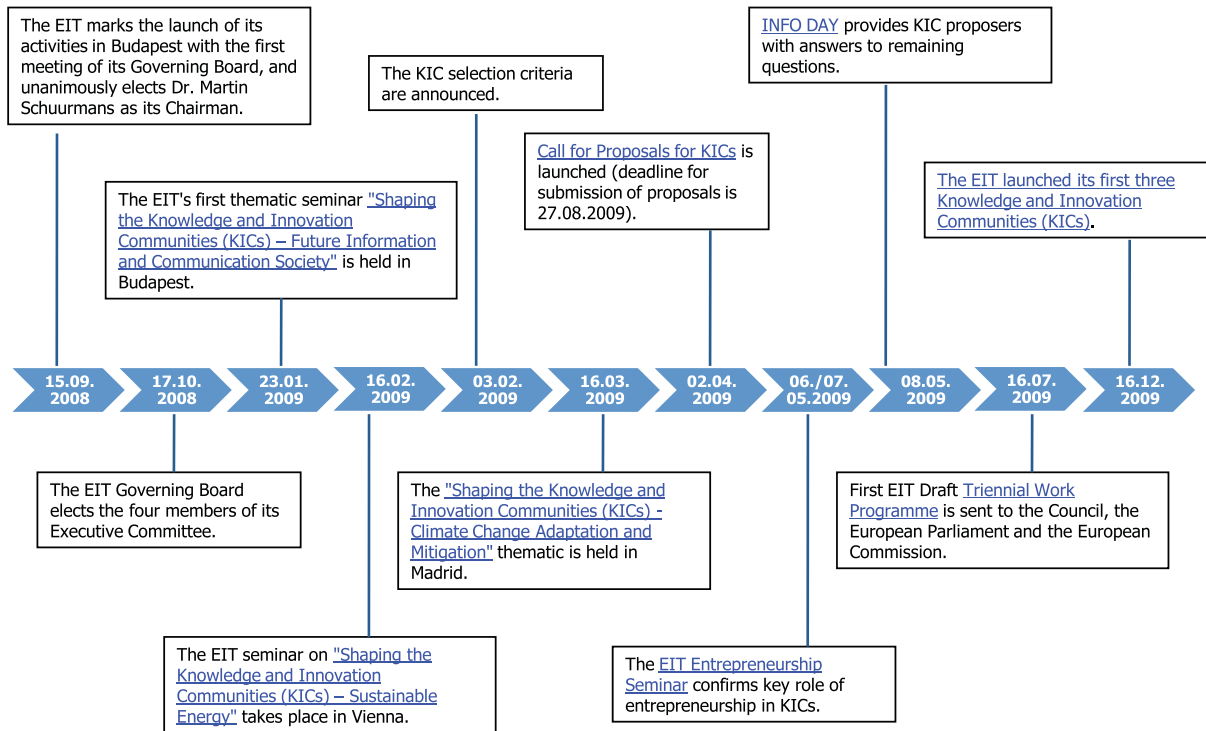
The EIT is ready to take its own place within the European Commission’s EU 2020 Strategy and Innovation Union and is confident it will significantly contribute to Europe’s innovation impact. Key requirements now and in the future remain flexibility and simplicity in the EIT’s operation, great attention to all elements of the knowledge innovation chain: education, research/technology and small and large businesses, and a continued and further re-enforced focus on entrepreneurship driving innovation impact.

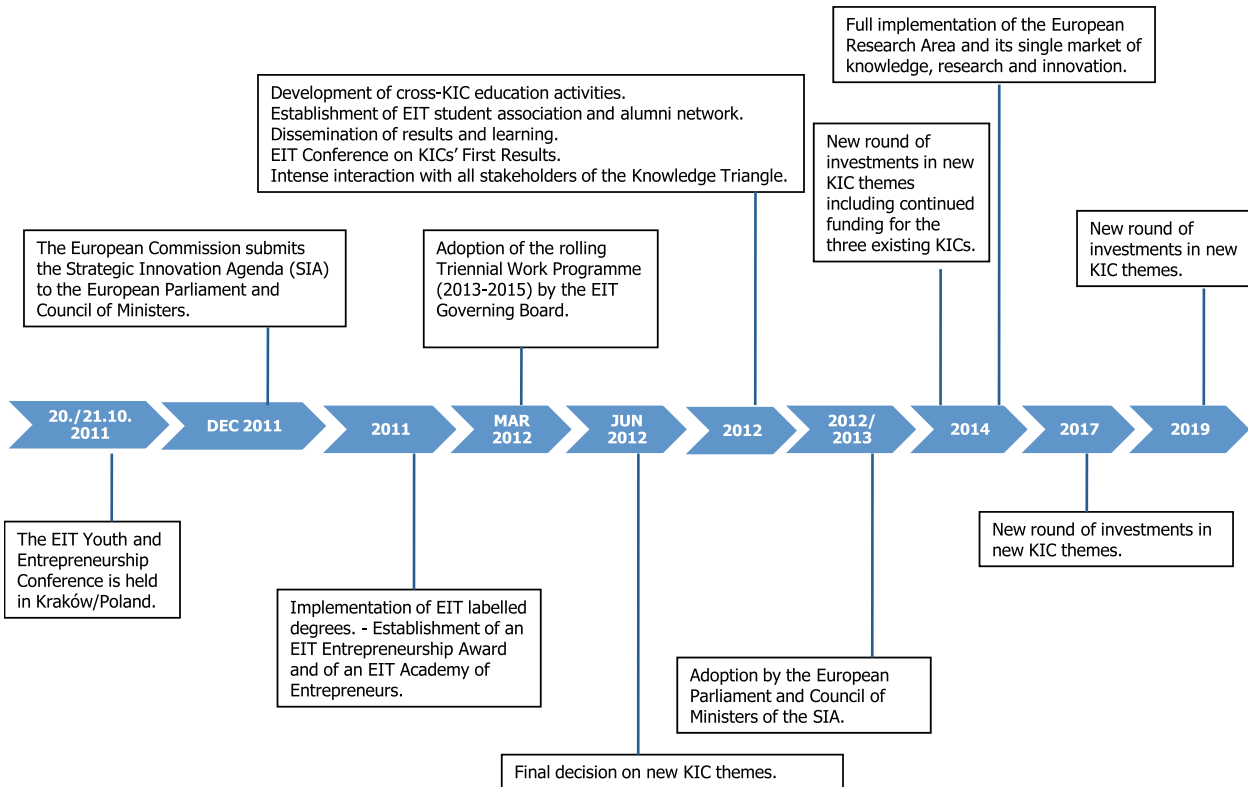
The EIT should be part of the Common Strategic Framework for Research and Innovation (CSFRI) while maintaining a strong link with the European Higher Education Area (EHEA). However, at the same time, any rules applying to EIT will have to remain tailor-made and fully flexible to fit the EIT’s mission!



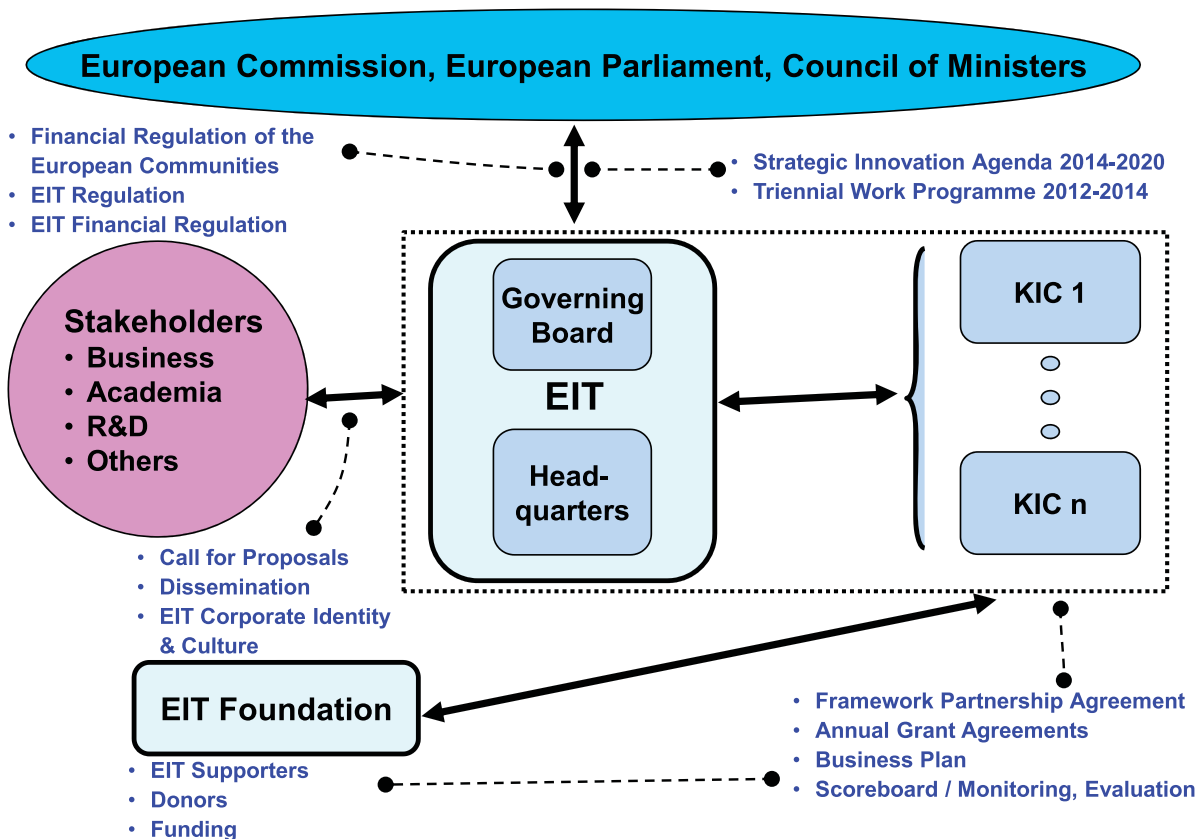
## ANNEX II







## ANNEX III



# LESSONS LEARNED FROM THE START-UP PHASE OF THE EIT AND ITS KICS

The following describes and elaborates on key lessons learned by those involved in setting up the EIT and its KICs, i.e. the European Commission, in particular DG EAC, the EIT Governing Board (GB) and the EIT Headquarters (HQ).

## 1. KNOWLEDGE AND INNOVATION COMMUNITIES: ONE CONCEPT – THREE DIFFERENT ANIMALS

From the outset, the Knowledge and Innovation Communities (KICs) concept was intentionally not clearly defined. Both the selection procedure and subsequent negotiation process with the KICs were used as instruments to refine the concept and to identify the KIC essentials on a “learning-by-doing” basis. In fact, the KIC concept is still in the making.

It has become obvious that there is no “one-size-fits-all” KIC model, and this should remain unchanged since it is indeed a “trademark” of innovation. However, substantial differences across the KICs in their implementation of KIC key defining features (such as co-location centres, leadership, and the role of the CEO) will have to be addressed as they pose challenges in terms of organisation, monitoring, reporting, and investing for sustainability.

For the time being, KICs differ in their visions on essential strategic issues such as the positioning of the EIT within the EU landscape, the EIT as a grant giver vs. the EIT as an impact investor, and financial sustainability. This must change. In addition, the KICs have thus far focused primarily on their own identity as KICs and have engaged in a common EIT identity to a lesser extent. However, within areas such as entrepreneurial education, the KICs have recognised and indeed emphasised the benefits stemming from the EIT’s common approach.

## 2. SETTING UP KNOWLEDGE AND INNOVATION COMMUNITIES: SELECTION CRITERIA AND PROCESS

The Call for Proposals to establish Knowledge and Innovation Communities (KICs) was designed not to be fully prescriptive. To mention a few examples: the required KIC management structures or the role of co-location centres and the interaction between KICs and co-location centres was not clearly defined. Moreover, the criteria for the requested KIC business plans and funding were not precise enough to give comprehensive guidance; indeed, they were too many and too complex. However, the GB felt that this concise approach was important to grant applicants the scope to manoeuvre necessary to come up with truly innovative ideas.

Due to time constraints, the organisation of the selection process closely mirrored the selection process of projects under the 7th Framework Programme for Research and Technological Development (FP7). This approach had limitations, in particular with regard to the assessment of the KIC proposals in relation to the strength of their commitments. Additionally, the selection procedure (two phases plus final panel) was not optimal. Evaluators had different levels of knowledge and expectations. In any future call, the overall organisation of the evaluation process should be carefully re-considered in light of experiences gained. An improved peer review aiming for a shorter process without compromising on the overall quality of the selection procedure should be the ultimate goal. Reviewers must receive thorough training and information on the differences between KIC evaluations and more traditional evaluations.

## 3. SETTING UP KNOWLEDGE AND INNOVATION COMMUNITY (KIC) PARTNERSHIPS

The KIC structure as a single legal entity led by a CEO is one of the main achievements of the EIT in the initial phase. Contracts have been concluded between the EIT and single KIC legal entities. This marks a clear departure from the multi-beneficiaries’ approach. However, the complexity of setting up KICs was underestimated. There was an uneven level of awareness, information, and understanding of the implications of establishing a KIC among KIC partners.

The legal structure chosen by each KIC reflects the initial commitment of the various partners upfront. More importantly, the choice of a specific legal structure is likely to influence the performance and long-term commitment of partners. Against this background, DG EAC launched a study in 2010 with a view to gaining better insight and understanding of the potential implications of the legal status chosen by the three KICs. However, it will take time until final conclusions as regards which legal structure works best for innovations by KICs can be drawn. The EIT Governing Board consequently considers it important to maintain significant freedom of choice when it comes to KIC legal structures in the upcoming Call for Proposals.

In some cases KIC partners had difficulties honouring the commitments made in the proposals and in the Framework Partnership Agreements (FPAs). One reason for this might have been a lack of understanding of the KIC concept. In some cases, KICs were being understood as a funding stream awarding money to partners from a particular field. In the future, the EIT must improve the assessment and evaluation of the seriousness of the commitments as described in the proposal.

#### **4. KIC FRAMEWORK PARTNERSHIP AGREEMENTS**

The Framework Partnership Agreement (FPA) defines relations that go beyond the organisation of pure financial flows between the EIT and KICs. However, the negotiations have shown that the FPA as defined in the EIT financial rules is not fit for framing the long-term relations between the EIT and KICs. Lawyer-to-lawyer discussions brought about additional delays and were perceived by some parties as overly formalistic and not in line with a trust-based approach. Some delays might be avoidable by providing guidance to and a framework for those discussions early on. Appending a template of the FPA to the call text might be helpful to make the overall setting-up process more straightforward and negotiations less cumbersome. Moreover, simpler instruments such as a Memorandum of Understanding plus annual grants could be envisaged by means of amending the EIT financial rules.

Whilst the FPA provides for the systematic use of lump-sums either alone or in combination with flat-rates and real cost calculations, this possibility has not been used to its full potential to date and will have to be further developed in close collaboration between the EIT HQ and the KICs.

Sub-contracting was one of the most sensitive topics during the discussions with the KICs. Additional flexibility could be helpful in relation to specific target groups (such as SMEs) or specific activities. A review of the EIT founding regulation should be considered in light of these considerations.

According to the FPA, the KICs' budget is structured around activities rather than expenditure, leading to a focus on performance and results. The agreements include some important open-ended issues as regards the measurement of KICs against their own ambitions and/or against one another. These open issues need to be further clarified and developed – in order to do so the EIT will encourage experimentation and trial solutions in a true spirit of learning.

#### **5. EIT'S INITIAL ROLE TOWARDS THE KICS: AN ADMINISTRATOR OF KIC GRANTS**

To date, the focus of the EIT has been on managerial issues rather than the establishment of strategic approaches. As a result, interactions between the EIT and the KICs have been directed primarily towards the management of agreements (contractual, legal, and financial). Against this backdrop, KICs have been eager to accept guidance from the EIT. As both the EIT and KICs are maturing, the balance between top-down steer and bottom-up autonomy needs to be re-considered.

For the time being, the strategic reflection on KIC-related issues is led by the KICs. In the future, the EIT will make strategic choices as to the guidance and support devoted to KICs while building up its own identity. Supporting the development of its own identity in the long-term, the EIT needs a vision on what to accomplish with the KICs and how it should be done. This will entail developing a strategic framework, and providing respective guidance and adequate support in the implementation of KIC activities. If the EIT is to position itself as an engaged stakeholder in the KICs, the question whether grant giving is the best instrument to interact with KICs will have to be addressed. KICs are intended to be dynamic entities, whilst a grant environment is generally more static.

#### **6. ROLES OF THE DIFFERENT PLAYERS INVOLVED: TOWARDS REFINED RESPONSIBILITIES**

##### **Role of Industry/ Business**

From the beginning, it was assumed that industry involvement in the KICs would be limited during the initial phase. It was expected that the industry would adopt a wait-and-see attitude given (i) the economic and financial crisis and (ii) an overriding wish to be subsidised without any further "interference" rather than receiving limited funding and being directed throughout the process. In the coming years, all parties concerned will have to produce significant results from the innovation pro-



gramme in order to attract industry interest in participating in any future KIC. Thus, KICs results should be disseminated as rapidly and widely as possible and with clear annotations as to what has worked to achieve these results and what has not. Well established European multiplier organisations (such as e.g. BUSINESSEUROPE, The European Roundtable of Industrialists/ERT, Lisbon Council etc.) are considered crucial and helpful in that respect. Moreover, systematic support from an EIT Academy of Entrepreneurs and the EIT Entrepreneurship Award are expected not only to enhance the front line role of entrepreneurship but also to improve the EIT's attractiveness for industry.

## Role of Academia

Academia has been generally enthusiastic about the EIT approach. The branding of EIT education will soon streamline what academia can do for entrepreneurial education. In that respect, the EIT must help universities build an effective role in innovation, which results in new businesses, products, and services. As this is far from trivial, it is worth building on the hard lessons learned by European industry. The EIT HQ will play a crucial role in driving this process and in building robust bridges based on high quality standards. However, this will take time and will require top and floating staff at the EIT HQ.

A clearer, more concise definition of the EIT Governing Board and Headquarters, the European Commission and KICs' respective roles and relations is envisaged. In the future, individual roles and respective responsibilities will be more clearly spelled out and communicated to the KICs.

## The Future EIT Governing Board

For the period leading up to the new financial perspective of 2014 and beyond, the EIT GB will gradually move into a different role. It will remain a strategic role with the strategy elements driven by EIT HQ and KICs, as well as the European Commission. However, eventually, the EIT must clearly position itself as strategic impact investor in KICs rather than a grant giver, and as an organisation that will focus first and foremost on the role of entrepreneurship in achieving business results. This will have to be reflected in the choice of any new GB chairperson. The chairperson should be a builder and strategy developer, and a consolidator with excellent understanding and experience of the world of entrepreneurship and business. These factors are indeed already reflected in the choice of the next designated chairman, who takes up his position in September 2011. It is highly advisable to continue to have a vice-chairperson as the tasks at hand are too numerous to be dealt with by one leader only. The overall size of the GB comprising 22 members should be reconsidered and the regulation changed accordingly.

Keeping the momentum in entrepreneurship is a cornerstone of the future of the EIT. Moving from a grant giver to a strategic impact investor is key. Strong, well-rooted and coherent leadership rather than committee leadership or leadership in isolation is the way to go. Consensus thinking was and is at odds with innovation. In the future, the EIT should continue along this path even at times when the political focus in Europe may point the other way.

## The EIT HQ as Engaged Stakeholder in KICs: Driving for Effectiveness and Efficiency of Innovation

The vision currently being shaped is that the EIT should move towards assuming its investor role as an engaged stakeholder in autonomous KICs. For quite some time since its establishment, the EIT GB has been developing strategies to support KICs, e.g. in entrepreneurship and education. In 2010, the KICs went through a very intense phase of setting themselves up as autonomous entities and starting first activities under the leadership of a CEO. It is only very recently that the KICs were able to open up to a more strategic dialogue with the EIT that goes beyond funding. The EIT HQ is becoming well positioned – together with DG EAC – to moderate between strategic visions of the GB and reality as experienced by the KICs, connecting top-down and bottom-up approaches. Hence, engagement is a two-way process and the EIT must build a trusted relationship with the KICs by engaging itself in KIC activities and by engaging KICs in shaping future strategy and concepts. This will contribute to the EIT being recognised as an institute that adds value to the KICs.

Optimising the conditions for the KICs' success in innovation and acquiring an appropriate dual role requires certain framework conditions under which the EIT HQ can be developed further. However, the past years have proven that gathering all required core competencies at the EIT HQ is not always feasible. Even though the EIT is building up expertise in all required areas with a strong sense of urgency, the EIT HQ will always rely on support and expertise from the European Commission services mainly due to both the sheer size of expertise and expert knowledge available at the Commission and the limitations on full time staff recruitable to Budapest. The EIT HQ will therefore always want to keep a strategic link with individual competencies in the European Commission, and to exploit those as best possible. In order to avoid any unnecessary frictions between the two organisations some vital strategic choices will have to be made to turn potential detrimental tensions into positive energy. It is important that core positions be staffed by experts to ensure that the EIT HQ becomes a driver of effectiveness and efficiency, and that other working arrangements such as job shadowing, expat arrangements from Brussels

to Budapest, and secondments from both the public and private sector are put into place with a view to attracting world-class contributions and skills.

## The EIT and the European Commission

To date, the EIT is under the parental guidance of DG EAC, which has been a very satisfactory arrangement for the EIT. Over time, the European Commission might decide to move the EIT to a new parent DG. Regardless of the organisational context, the EIT must remain unique, independent and largely autonomous, and not be subjected to any limitations resulting from a potential political desire to align structures with existing larger programmes. The current autonomy has been instrumental to achieving what the EIT stands for today. Losing this autonomy would mean losing the opportunity to bring innovation to a different level in Europe by means of the EIT approach. Losing this autonomy might also lead to the loss of the key identity which the EIT HQ has, namely as a driver of effectiveness and efficiency of innovation in the KICs.

In addition to the aforementioned (organisational) aspect, the (substance related) issue of co-funding has proven important both in relations with the KICs and the European Commission. The EIT has not sufficiently clarified its requirements on the types of co-funding activities that can be listed in the KIC business plans. KICs have asked for clarification but have not received any formal EIT position to date. A lack of clarity could lead to inflated budgets with co-funding activities that lack sufficient synergies with KIC added value activities. This might in turn lead to an uneven playing field between KICs. To ensure such synergies, one KIC has selected co-funding activities, so-called 'carrier activities', which are linked to so-called 'catalyst activities', of which only the latter are being funded by EIT. This catalyst-carrier model could serve as a core component, also on the EIT level, when establishing a strategic view on co-funding, in particular towards other funding programmes related to the KIC themes. This requires building a strategic relationship with the relevant parts of the European Commission which are responsible for funding programmes and initiatives relevant to the KICs' field of activities (e.g. DG CLIMA for Climate-KIC, DG INFSO for EIT ICT Labs, DG ENER for KIC InnoEnergy etc.).

## The EIT Foundation

The path to the EIT Foundation (EITF) has been bumpy. In the past, there has been enthusiasm but also scepticism by GB members regarding the concept of a foundation. Today, the EITF is in existence and will become a pro-active fundraiser and giver under the leadership of its Chairman. The Foundation can make a huge difference to the EIT, in particular regarding its quest to move away from being a grant giver to become a strategic impact investor in KICs.

## EIT Communication

While communication was dealt with in a very positive and satisfactory manner by the European Commission services, the EIT will have to embrace various new media including social networking platforms in order to move forwards and unleash its full communication potential. The EIT must also, going forwards, form strategic alliances with other European initiatives related to innovation.

# KIC MAIN ACHIEVEMENTS

## CONTRIBUTIONS FROM THE THREE KIC CEOS

### MARCH 2011

#### CLIMATE-KIC

Prof. Dr. Mary RITTER

Climate change presents Europe with a huge and diverse challenge, within an environment where the relevant commercial sector is young and equally diverse. Innovation is essential to provide solutions to climate change adaptation and mitigation. Innovation is also needed to provide novel structures, mechanisms and activities whereby these solutions can be generated and sustainability achieved. To address these issues, Climate-KIC has created a community of leading European universities in Switzerland, Germany, the Netherlands and France, regional partners in Poland, Hungary, Germany, Italy, Spain and the UK, world leading industrial partners such as Bayer, EDF, DSM and Vattenfall and cutting edge SMEs, together with other bodies including city and regional governments. This Climate-KIC Community, which comes together at five Co-location Centres (CLCs), is designed to embrace the complete value chain from discovery and innovation through to test bed, commercialisation and implementation – to act as a catalyst for innovation that will create a climate resilient and low-carbon economy.

*We need young entrepreneurs:* At their home institutions and companies, our masters and doctoral students study environmental or climate sciences, engineering, supply chain logistics, sustainable development, business, marketing or investment – a portfolio of disciplines as diverse as the challenges of climate change. Our scholars all share a flair for entrepreneurship and at the start their course come together in a unique Climate-KIC Contextual Learning Journey (CLJ) – learning from real innovation experience in a geographical, economic, social and political context. Hosted by our Co-Location Centres, the entrepreneurial focus of the 6-week CLJ in 2010 centred on elaborating ideas for innovations in the four programmatic areas of Climate-KIC: (i) water, food, and integrated land use; (ii) urban systems and mobility; (iii) low-carbon energy systems and sustainable production; and (iv) climate change assessment and monitoring. Many of this first cohort of 50 young entrepreneurs are already on the path to innovation success. The “DeCo! – Decentralised Composting for Sustainable Farming and Development” group won a 2010 the SEED Award for Entrepreneurship in Sustainable Development (EUR 100,000) and has already gained external funding for their start-up company, while ElectricFeel – a new urban mobility concept involving shared electric vehicles for one-way trip rentals” won the 2010 Swiss KPMG Inspiration Grant (EUR 100,000) and work is progressing on seeking partners for its realisation. Future years will accommodate many more scholars, generating a community of climate change entrepreneurs for Europe.

*We share Climate-KIC innovation throughout Europe:* Unique to Climate-KIC is the RIC (Regional Innovation and Implementation Communities) – a consortium of six major regions in the north, south east and west of Europe which share a strong commitment to tackling the problems of climate change. Each brings together a cluster of its key innovation actors – regional development agencies, research institutes, universities, large companies, SMEs and public agencies – and provides Climate-KIC with a network of test-beds for climate change mitigation and adaptation experiments such as socio-technical innovation, new low-carbon businesses and the development of new markets. Thus, while our five CLCs provide the ecosystem for Climate-KIC Community’s education, innovation and entrepreneurship activities, the key issue of outreach and dissemination throughout Europe is ensured by the RICs – to ensure that new developments and green jobs are to be embedded to the benefit of all European Society.

*SMEs are key members of the Climate-KIC Community:* the climate change industrial sector is a young and diverse one, so SME partners are particularly important in Climate-KIC’s innovation programme. Some SMEs are clustered around CLCs, with many more spread throughout Europe in the RIC consortium. These SMEs not only provide Climate-KICs early business niches; the Climate-KIC community also supports entrepreneurs from these SMEs by offering opportunities for their employees to gain experience of cutting edge work in large companies, regional bodies and research and higher education institutions –thus enabling the transfer of new climate change knowledge and skills to the SME on their return. 2010 saw 59 of these ‘Pioneers-into-Practice’ undertake such placements. The diverse inventions of our partner SMEs includes carbon negative cement (Novacem) based on magnesium oxide, and the Radical SRZero electric supercar, powered by advanced EVO Electric technology (EVO Electric Technology), the first electric car to successfully complete the first the 26,000km journey along the Pan-American Highway from Alaska to Tierra del Fuego.

*A Climate-KIC Community for added value:* the annual Climate-KIC Community Festival – the first to be held in Hungary in late summer 2011 – will bring together our partners, entrepreneurs, pioneers and students to provide a marketplace for ideas and products and ensure cross-fertilisation in innovation and entrepreneurship to address the challenges of climate change.

## EIT ICT LABS

Prof. Dr. Willem JONKER

### Organisational setup

EIT ICT Labs, the EIT KIC on the future information society, is a new initiative intended to turn Europe into the global leader in ICT innovation. It aims to fulfil this mission by establishing a new type of partnership between leading companies, research centres, and universities in Europe, focusing on transforming its co-location centres in Berlin (DE), Eindhoven (NL), Helsinki (FIN), Paris (FR), and Stockholm (SE) to world-class innovation hotspots. The set-up and launch of the KIC organisation that can fulfil this mission and integrate various stakeholders in a balanced structure both nationally and Europe-wide is a key achievement in its own right. This line of work was completed at the end of 2010 with the establishment of all required (legal) entities and their management and governance bodies.

### Catalyst-carrier model

The EIT ICT Labs work programme focuses on innovation and new business creation in key societal domains by combining EIT funded education, research, and business activities with existing activities in an integrated and mutually reinforcing fashion to create significant added value. A key concept for this is the catalyst-carrier model. EIT ICT Labs will develop a set of valued added activity types, the catalysts, and apply them on top of existing co-funded activities, the carriers, to create added value and achieve high leverage. The performance of the catalysts is monitored, and the set is developed further on the basis of the results. The catalyst-carrier model was first adopted in the Business Plan 2011 as submitted to EIT in October 2010.

### Action lines

To achieve an efficient delivery structure, the EIT ICT Labs work plan is composed of action lines. Thematic action lines are focus on major societal challenges and aim at significant innovations and business opportunities. Competence action lines focus on developing capabilities and excellence in education, research, and business. Each action line is composed of several linked value added activities, in turn composed of catalysts applied to carriers. Action lines have a designated lead responsible of the progress and reporting to the Management Committee of the KIC. At present, twelve action lines have been launched (five thematic, three research, two educational, and two business action lines), with at least three more planned for 2012.

### Education

Education catalysts focus on transforming existing education programmes towards world-class quality and impact, signified by EIT accredited diploma complements. The main catalyst is the inclusion of an innovation and entrepreneurship education module in existing programmes. Other catalysts, such as summer/winter schools, student and teacher mobility, and industrial projects and internships, complement this. Overall, the eligible programmes are organised as the EIT ICT Labs Master School that provides joint branding and facilitates student recruiting. At present, the EIT ICT Labs Master School is planned to consist of seven M.Sc. programmes, due to be launched in 2012. The development of all catalysts, notably the joint Innovation and Entrepreneurship minor topic module (30 ECTS), has also been launched. Pilot runs of individual catalysts were launched in 2010 and will continue in 2011.

### Research

Research catalysts focus on improving the impact of already existing European and national research activities by facilitating innovation-oriented experimental and explorative research, sharing of ideas and results, preparing joint initiatives, and facilitating research networking and mobility. Prime catalysts currently under preparation include shared test platforms and shared "living lab" platforms for user experience studies.

### Business

Business catalysts focus on providing end-to-end tools for turning research results to successful innovation in an accessible, flexible, and agile manner. This set of catalysts will foster innovation on both the entrepreneurial and the industrial path. A key goal is to create an open market for problems and solutions by matching research results with potential entrepreneurs or industry partners. The development of the initial set of ten business catalysts was launched in late 2010 and January 2011; the first results are expected later in 2011. Notably, the set includes the Innovation Radar and Best-Practice Benchmarking catalysts intended to advice the entire KIC and especially the thematic action lines.

## KIC INNOENERGY

Diego PAVIA

KIC InnoEnergy strategy is to be the leading engine for innovation and entrepreneurship in the field of sustainable energy. The sustainability aspect is been addressed by (1) reducing cost in the energy value chain (supply, transport, storage, distribution and retail), (2) increasing energy security (autonomy vis-à-vis the resource holders, intrinsic operational security), and (3) reducing CO<sub>2</sub> and other green house gas emissions. KIC InnoEnergy focuses on six thematic areas: Clean Coal, Smart Grids, Smart Cities, BioFuels, Renewables, and Convergence Nuclear-Renewable.

*Foreseeable impact:* If we take as EUR 100 the cost of any good produced/ consumed in Europe, EUR 27 thereof is energy cost. Hence, 1% of reduction in the cost of energy will represent EUR 20 billion of savings, thus, of additional competitiveness for European industry and a buffer for European welfare public services.

### Tangible External Outputs with Market Impact

In the area of *Entrepreneurship & Business Creation* the following examples highlight achievements so far: Implementation of the entrepreneurship programme “From Science to Business” greatly impacting on 27 PhD students as well as organisation of and participation in the following key events: First Clean Tech Venture Capital Day in Stockholm on 29-30 September 2010 with 250 participants comprising of investors and selected start-ups, the Second Grenoble Innovation Fair (GIF) on 5-6 October 2010 with 17 energy entrepreneurs of that ecosystem participating, the Innovation Speed Date on 29 October 2010 with 27 entrepreneurs participating. As New Open Economy Model (NOEM) the first start-up “The Sustainable House” launched.

*Education:* The following examples highlight achievements so far in the area of education: launch of Smart Grid PhD ramped up to 40 students, launch of six MSc (five specific and one generic) and of three Executive Programmes all to start tuition in September 2011.

*Technological innovation:* A total of 32 innovation projects in the six KIC InnoEnergy thematic areas were launched with first deliverables (demonstrators, patents in filling process, and new products and services) expected in Q3/2011.

### Tangible Internal Outputs

*Legal Structure Up and Running:* KIC InnoEnergy is today a commercial company with 29 founding shareholders incorporated as Societas Europaea (SE) (“European Company”). KIC InnoEnergy is profit oriented, however, with a “not-for-dividend” financial strategy since profits will be reinvested in activities. KIC InnoEnergy activities in education, technology and innovation & entrepreneurship are designed, developed, and implemented by a very reasonable balance of top rank industries, research centres, universities and business schools, the actors of the knowledge triangle, with the following split

	Shareholders Formal Partners	Associated & Network Partners	Total Partners
Industries	9	35	44
Research Centers	7	8	15
Universities *	11	17	28
Business Schools	2	0	2
<b>Total partners</b>	<b>29</b>	<b>60</b>	<b>89</b>

Those partners are regionally mapped in six collocation centres (CLCs) across Europe, and are either Formal, Associated or Network, depending on their contribution to the industrial plan, and resulting in different participation in the equity in the different legal structures (i.e. KIC or CLCs).

*Operational Structure Up and Running:* the executive team to implement the industrial plan is up and running both at KIC level and at the six co-location levels. Executives have been appointed at key functions. The Handbook of Procedures (operational and financial), that structure the flows of information, reporting, controlling and moneys among all stakeholders (EIT, KIC, CLCs, partners, outside world) have been completed. For the collaborative work, the first layer (out of a total of three) of the ICT services is operational. Layers 2 and 3, with more sophisticated services (ERP, Controlling tool, Knowledge Management) will be ready in Q2/2011. Financially, the balance sheet is stronger, with EUR 290,000 of equity from shareholders and EUR 4.2 million of treasury coming from own resources outside EIT funding.







## For Business Creation activities:

The process to support business creation from technology, which is depicted as KIC InnoEnergy Highway™, has been defined and it is being tested with two entrepreneurs. Twelve others are currently waiting for final check up.

KIC services to entrepreneur		KIC ENERGY HIGHWAY™														
		Gate1			Gate2			Gate3		Gate4			Gate5		Gate6	
		Innovation novelty assessment	Market competitive assessment (IP, commercial)	Team assessment	Technology enhancement	Market assessment (quantitative, qualitative)	Team training & complement, Business Coach	PoC	Business Case	Pilot	Business Plan	Agreement with Investor for industrialization	Industrialization	Start-Up. Legal constitution	KIC logo	First customer
D1.1	D1.2	D1.3	D2.1	D2.2	D2.3	D3.1	D3.2	D4.1	D4.2	D4.3	D5.1	D5.2	D5.3	D6.1	D6.2	
WHO from KIC	RC/Uni	*			*		*		*		*					
	BusSchool		*			*		*		*						
	Industry	*	*		*	*	*	*	*	*	*				*	
	Incubator		*	*		*	*	*	*	*	*		*			
	KIC €				*	*	*	*	*	*	*	*	*		*	*
	Inv/VC €										*	*	*		*	*
Others										*	*	*				
Lead Time (weeks)																
Load (m.days)																
Cost (K€)																

## Why is KIC InnoEnergy different from any other existing EU platform, consortiums etc.? Why reaching those goals has a much higher probability with KIC InnoEnergy?

- Because KIC InnoEnergy is a company with all its implications: built upon an industrial plan, results and output oriented, commitment from shareholders for a first period of seven years with a view to become financially sustainable in the medium term.
- Because the industrial plan addresses integrally the three dimensions of the so called “knowledge triangle” (education, technology, business creation) since only combined and managed as one it can deliver the incremental and disruptive innovation we pursue.
- Because the executors of the industrial plan are first rank representatives of industry, research centres, universities and business schools, i.e. the actors of the knowledge triangle => the best do deliver the best results!
- Because KIC InnoEnergy’s portfolio of activities is very focused aiming at for market and business impact:
  - Ad Hoc Master of Sciences, PhD Schools or Long Life Learning (for professional in their mid careers) tailored to the market needs. With a blend of generic energy topics, specialisation in at least one of the six focal topics of KIC InnoEnergy described above, hands on for four months in industry, tuition in entrepreneurship and new management skills, finalising with a guided business case on a real industrial need from its design to launching its execution.
  - Dedicated Research, Development & Innovation teams brought together from key technicians of KIC InnoEnergy’s top rank shareholders better fit to solve the singular energy requirements with disruptive market and business impact.
  - Business Creation Services with which KIC InnoEnergy transforms an idea into a business, or help to create the workflow of “innovation to business” in existing industries.

With clear measurable planned outputs delivered by those activities in the first three years of the industrial plan, such as:

- 1,200 students, PhD and mid-career professionals trained in KIC InnoEnergy Education programmes,
- 55 new products or services for the sustainable energy value chain,
- 37 patents registered (of which ten transferred to SMEs), and
- 20 spin-offs/ start-ups.

KIC InnoEnergy’s unique selling proposition is that it is the only existing “one stop shop” where such an ambitious portfolio can be found, delivered by the best actors of the knowledge triangle, in a commercial joint vehicle, and run as a business.

# KICs' EUROPEAN IMPACT

**CLIMATE-KIC:**

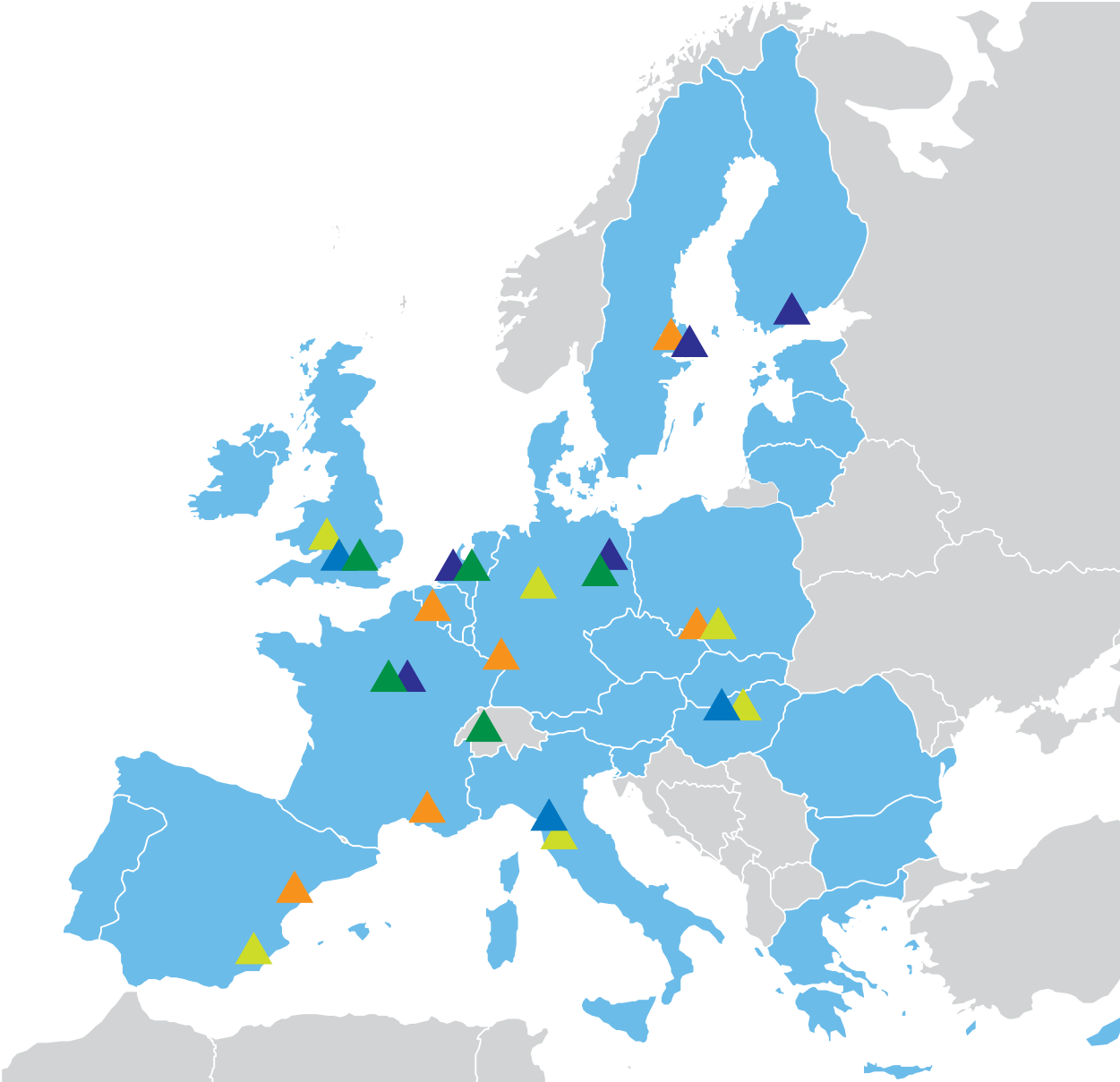
- ▲ Co-location centre
- ▲ RIC (Regional Implementation and Innovation Centre)

**EIT ICT LABS:**

- ▲ Co-location centre
- ▲ Associated Partner

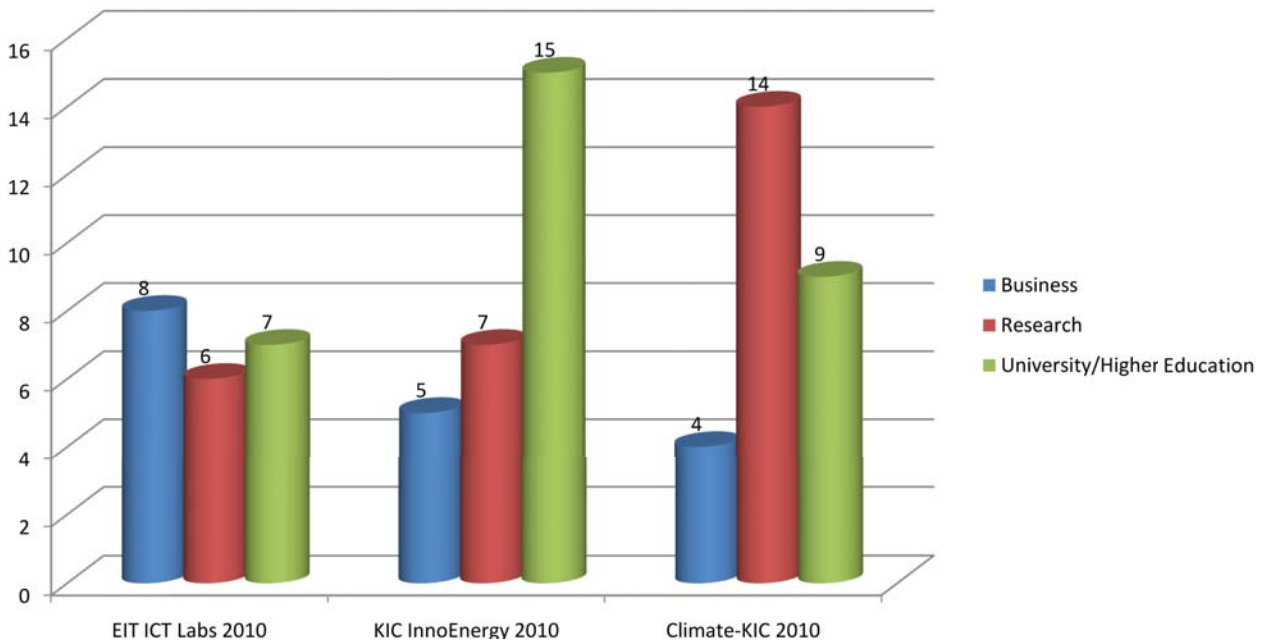
**KIC INNOENERGY**

- ▲ Co-location centre

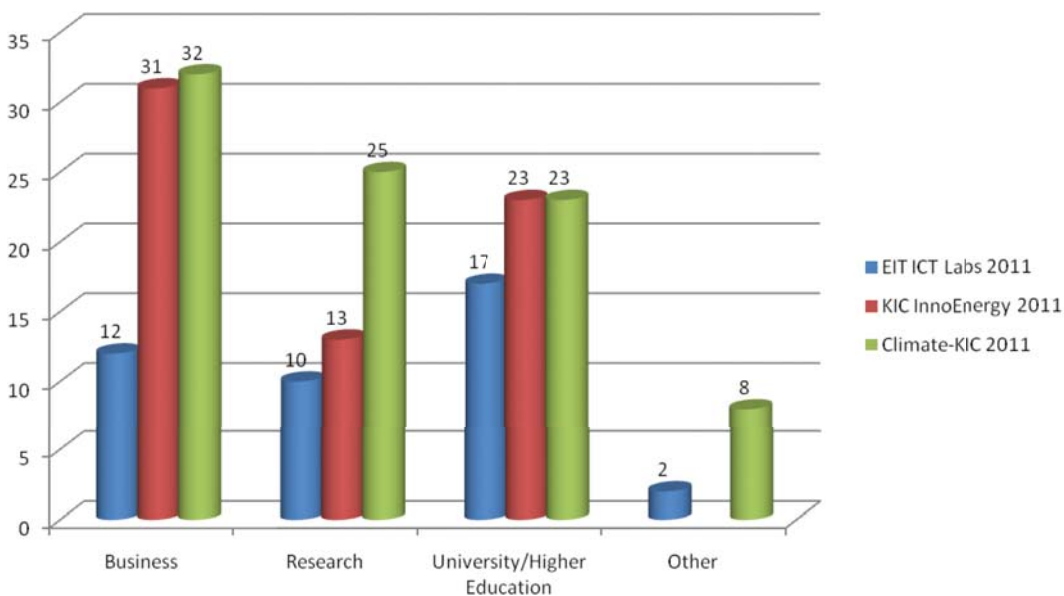


# KIC PARTNERS

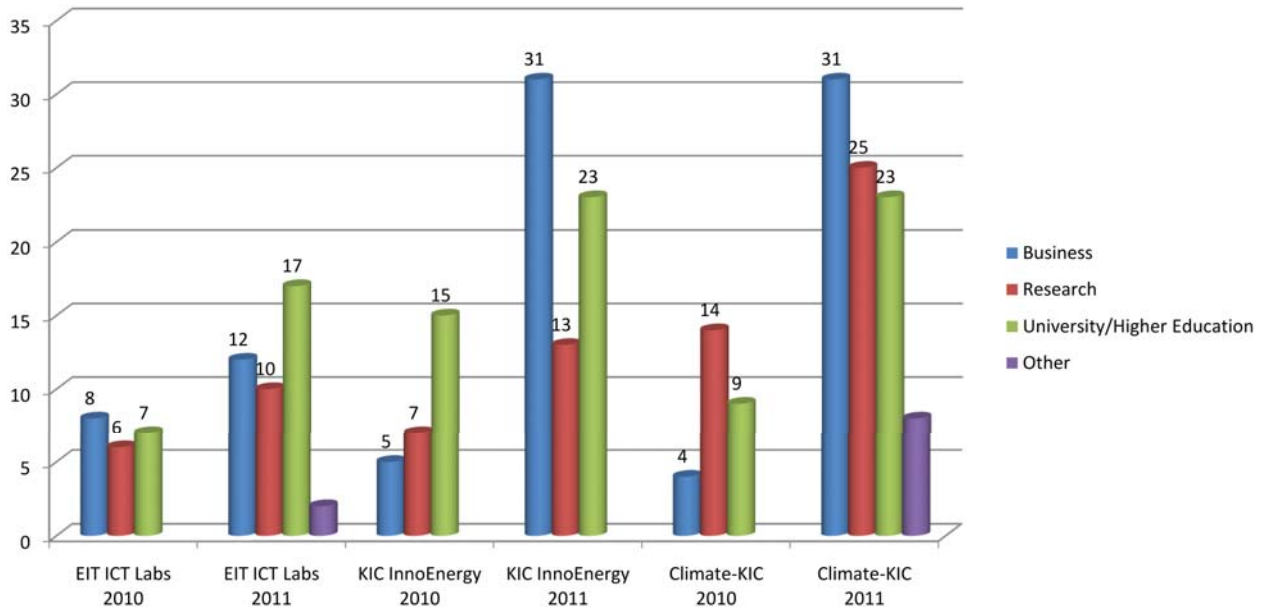
	EIT ICT Labs 2010	KIC InnoEnergy 2010	Climate-KIC 2010
Business	8	5	4
Research	6	7	14
University/Higher Education	7	15	9



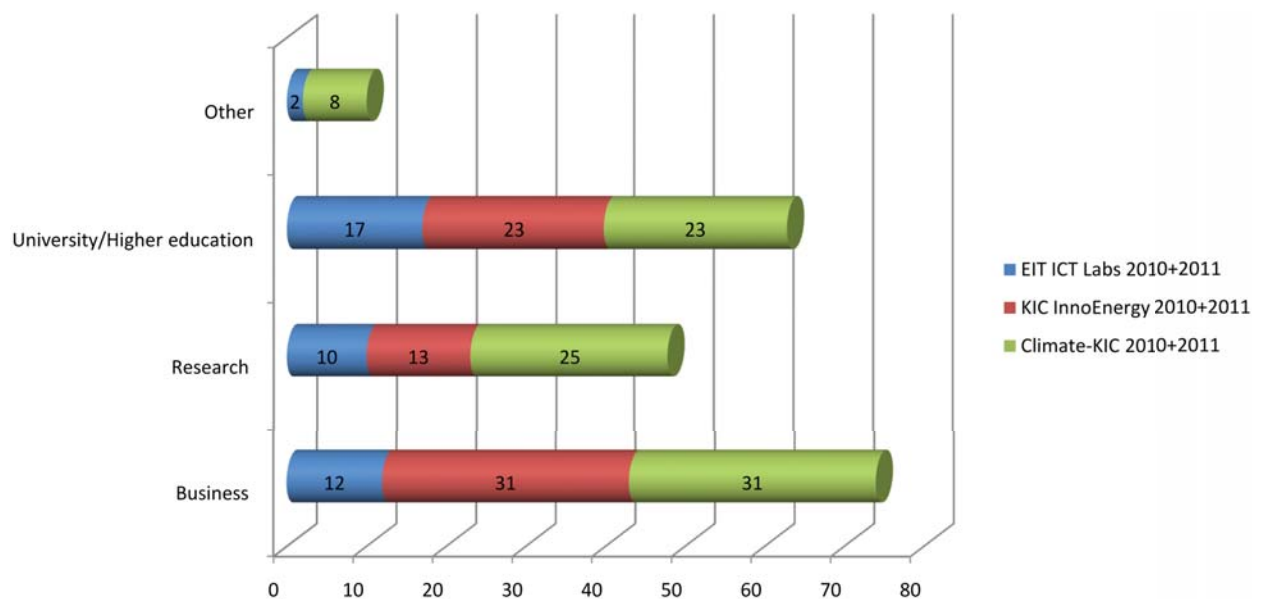
	EIT ICT Labs 2011	KIC InnoEnergy 2011	Climate-KIC 2011
Business	12	31	32
Research	10	13	25
University/Higher Education	17	23	23
Other	2		8



	EIT ICT Labs 2010	EIT ICT Labs 2011	KIC InnoEnergy 2010	KIC InnoEnergy 2011	Climate-KIC 2010	Climate-KIC 2011
Business	8	12	5	31	4	31
Research	6	10	7	13	14	25
University/ Higher Education	7	17	15	23	9	23
Other		2				8
<b>Total</b>	<b>21</b>	<b>41</b>	<b>27</b>	<b>67</b>	<b>27</b>	<b>87</b>



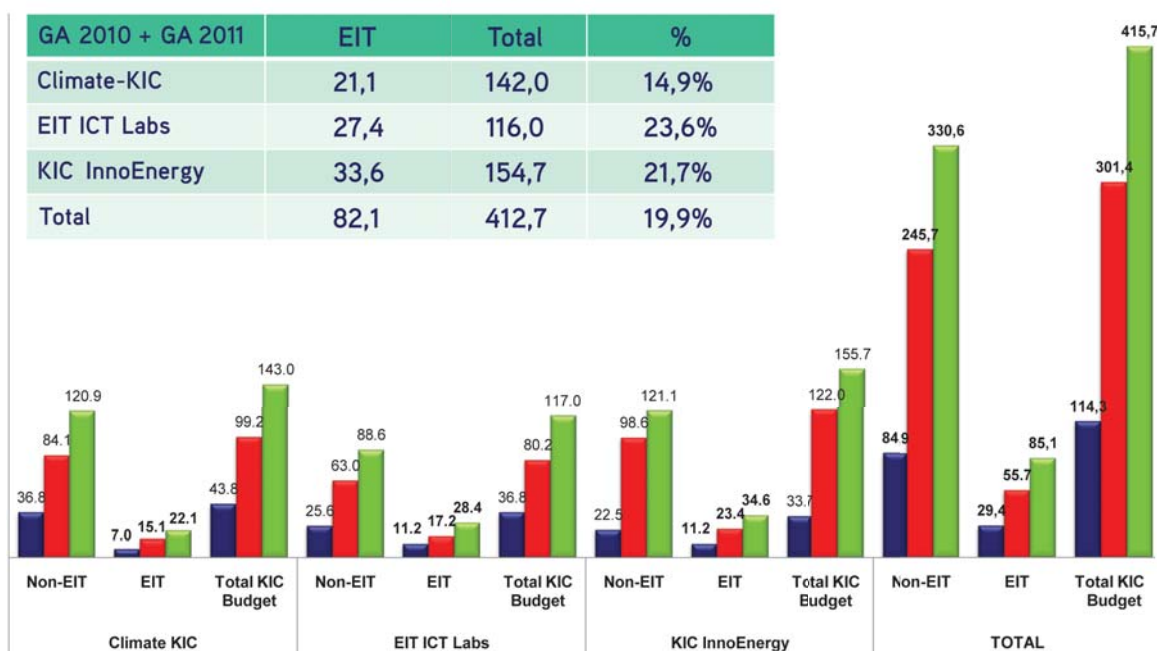
	EIT ICT Labs 2010 + 2011	KIC InnoEnergy 2010 + 2011	Climate-KIC 2010 + 2011
Business	8	5	4
Research	6	7	14
University/Higher Education	7	15	9
Other	2		8
<b>Total</b>	<b>41</b>	<b>67</b>	<b>87</b>



# KIC FUNDING SOURCES

(BASED ON 2011 GRANT AGREEMENTS)

Figures in Million Euros



## ANNEX VII

# SECURING THE EIT LABEL – EIT LEARNING OUTCOMES AND A QUALITY ASSURANCE & LEARNING ENHANCEMENT MODEL

The EIT Regulation provides the basis for the education and training activities of the EIT at master and doctoral level. These activities should promote the development of innovation-related skills, the improvement of managerial and entrepreneurial skills, and the mobility of researchers and students. Such excellence driven and innovation related education and training activities are further expanded upon in the Framework Partnership Agreement (FPA) between the EIT and KICs, which includes specific quality criteria for the implementation of EIT labelled degrees.

The hallmark of EIT educational activities is not only to educate students to acquire knowledge, but also to teach them how to apply that knowledge to solve real life problems, all framed in an entrepreneurial mindset.

### BACKGROUND TO THE ISSUE OF NATIONAL QUALITY ASSURANCE (QA) SYSTEMS IN RELATION TO THE EIT EDUCATIONAL PROGRAMMES

EIT educational programmes comply with the demands of the Framework for Qualifications of the European Higher Educa-



tion Area (QF-EHEA) and are subjected to the national quality assurance (QA) systems they belong to. The different national QA systems comprise audits and/or programme evaluations but do not secure the quality of the EIT educational programmes in terms of the specific objectives, knowledge forms and learning outcomes that characterise the EIT label. For example, national QA systems do not evaluate excellence. Hence, in order to guarantee that the EIT labelled programmes really do show targeted excellence by fostering students to be more creative, innovative, and enterprising, these programmes should be subjected to an EIT label securing process. In turn, it should be stressed that the EIT label in no way replaces or interferes with Qualifications of the European Higher Education Area (EHEA) and the national quality assurance systems.

## THE EIT LEARNING ENHANCEMENT MODEL: WORK IN PROGRESS

One of the most important success factors when developing quality systems (external or internal), is that those concerned take an active part in the design of the system. This ensures two things: continuous reality checks and a sense of ownership making the system both sustainable and relevant for stakeholders. The EIT is currently developing a Learning Enhancement model (EIT LE Model) together with the Knowledge and Innovation Communities (KICs) and the European Commission's Directorate General for Education and Culture (DG EAC).

To this end, the EIT has established a working group for educational matters. The working group consists of the three educational directors from the KICs, one representative from the EIT Headquarter (HQ) in Budapest, one representative from DG EAC, and one contracted expert on issues concerning quality assurance and teaching and learning for creativity, innovation and entrepreneurship. The blend and structure of the group ensures an optimal balance between top-down and bottom-up approaches and provides a platform for the development of cross-KIC activities. The group meets regularly to discuss all issues related to the implementation of EIT educational activities. The group's mission is to create and present a legitimate, transparent and predictable model for an EIT label.

To date, the group has agreed upon the EIT specific knowledge forms and is presently discussing the EIT specific learning outcomes for master and doctoral programmes. These learning outcomes together with the quality criteria already agreed upon and set out in the EIT Regulation and FPA, should form the basis for the EIT LE model to guarantee the EIT Label. The model should be based on the following elements: firstly, a process to decide which programmes are entitled to carry the EIT label, and secondly, a process for handling the review of ongoing EIT labelled programmes. KICs should be responsible for the first part, being autonomous and accountable to the EIT for the EIT labelled programmes. The EIT HQ should be responsible for the review process, for which peer-review models could be used to assess the programmes on a regular basis.

The model should focus solely on the EIT particularities, including creativity, entrepreneurial, managerial and leadership competences, whilst avoiding overlaps with national QA systems. It should also be fully aligned with the principles of the Bologna Process, taking a number of existing European documents and statements into account (e.g. European Standard and Guidelines (ESG); ENQA Position Paper on QA in the EHEA of April 2009; the Salzburg recommendations; the EUA policy statement on QA of September 2010; Education International/ESU publications on student centred learning; LERU Doctoral Degrees beyond 2010, and others).

Moreover, focus would be on supporting and developing high (excellent) quality teaching and learning methods, and on providing EIT teachers with the tools for planning and delivering their teaching.

The model should be built on:

- The learning outcome paradigm evidenced in terms of *coverage*, *accessibility*, and *fit-for-purpose* of learning outcomes combined with active, collaborative, and innovative learning methods;
- Student-centred teaching and learning; and
- A structured set of quality indicators, each with separate assessment areas for transparency and predictability.

Follow-up results would be presented in written reports and could be presented as Quality Profiles for each programme.

## QUALITY TEACHING AND LEARNING FOR THE KNOWLEDGE TRIANGLE

The provision of EIT education at all levels (master, doctoral, continuing professional development and lifelong learning) is characterised by its integration of the knowledge triangle.

The learning outcomes currently envisaged as prerequisites for the award of an EIT label at the second (master) and third (doctoral) cycle by the EIT are as follows:

### Creativity Skills and Competences

**Master =>** The ability to think beyond boundaries and systematically explore and generate new ideas.

**Doctoral =>** The ability to think beyond boundaries and systematically explore and generate new ideas and to inspire and support others in this process and contribute to the further development of those ideas.

### Innovation Skills and Competences

**Master =>** The ability to use knowledge, ideas or technologies to create new or significantly improved products, services, processes, policies, or new business models.

**Doctoral =>** The ability to use their research combined with the knowledge, ideas or technologies of others to create, test and implement, new or significantly improved products, services, processes, policies, or new business models.

### Entrepreneurship Skills and Competences

**Master and Doctoral =>** The ability to transform ideas into feasible business solutions.

### Research Skills and Competences

**Master =>** Knowledge and understanding of cutting-edge research methods, processes and techniques; their application, within their field of study field; the investigation of new venture creation and growth, and the capability to work in cross-disciplinary teams in the thematic field of their KIC.

**Doctoral =>** Original research contributions and the ability to apply, extend and develop research methods, processes and techniques using cross-disciplinary approaches towards new venture creation and growth in the thematic field of their KIC.

### Intellectual Transforming Skills and Competences

**Master =>** The ability to transform practical experiences into research problems and challenges.

**Doctoral =>** The ability to autonomously and systematically transform practical experiences into research problems and challenges, and to lead and support others in this process.

### Leadership Skills and Competences

**Master =>** Leadership and decision-making, based on a holistic understanding of the contributions of higher education, research, and business to value creation, in teams and contexts of limited size.

**Doctoral =>** Leadership and decision-making based on a holistic understanding of the contributions of higher education, research, and business to value creation.

### Making Value Judgements

**Master =>** An appreciation of ethical, scientific, and sustainability challenges as they pertain to their field of work.

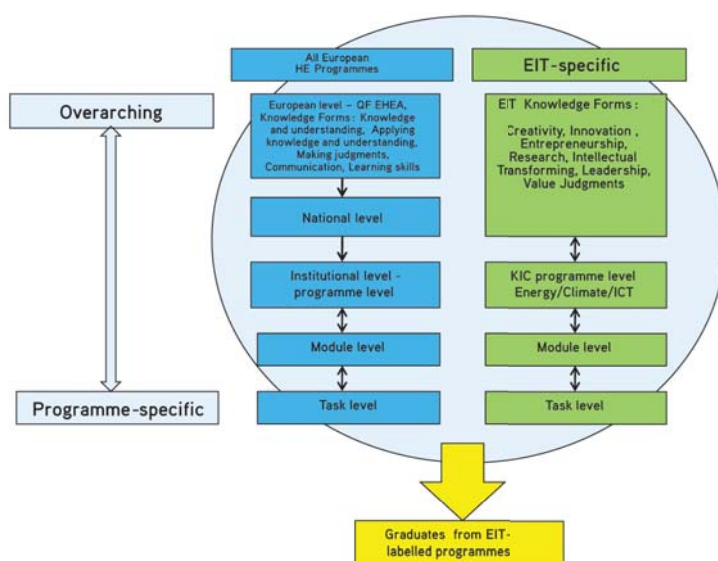
**Doctoral =>** The application of critical analysis and evaluation of ethical, scientific, and sustainability challenges in relation to their field of work.

These learning outcomes should be regarded as work in progress which may be refined by the EIT and KICs when necessary.

These learning outcomes are complements to the learning outcomes of QF-EHEA (see below) and should, in the same way as these, be transformed into more specific outcomes on programme and module levels respectively, and be connected to relevant forms of assessment, teaching and learning activities.

The EIT learning outcomes are not separate components that can be “ticked off” one by one when planning and performing teaching, but must be integrated in a well-balanced manner to create programmes that foster an innovative and entrepreneurial mindset based on the knowledge triangle.

### Different Levels of Learning Outcomes:



### The QF-EHEA uses five different forms of knowledge “Qualifications that signify completion of the second (master) cycle are awarded to students who”:

#### Knowledge and Understanding

Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Bachelor’s level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

#### Applying Knowledge and Understanding

Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multi-disciplinary) contexts related to their field of study.

#### Making Judgements

Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.

#### Communication

Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.

#### Learning Skills

Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomou

# SUBSTANTIATIONS OF POTENTIAL FUTURE KIC THEMES

The Grand Challenges of the society we live in and the enjoyment we see as necessary to get the most out of our lives have fostered a new type of innovators. These innovators are need driven and not driven by new technology. These innovators and entrepreneurs are clever users of comprehensive technology and intelligent clients for new science and technology. Business innovations are becoming numerous, driven by open and user innovation processes. Often advances in science and technology, demand or curiosity driven, enable business innovations. It is imperative for EIT and the KICs to educate this new innovators and entrepreneurs, and to give them the necessary technology tools to be effective while, at the same time, allowing them to experience a truly learning-by-doing environment.

The first three KICs have begun their activities. It is obvious that the areas, climate change – mitigation and adaptation, sustainable energy, and future information society are thematic and also Grand Challenges. KIC activities based on the Knowledge Triangle integration of research, education and innovation / business and on stakeholder integration will enable the KICs, in a novel way, to attack these challenges. In doing so, KICs will catalyse innovation and business creation. EIT and its KICs will become a European tool to create both public good and economic growth.

New KICs within new areas can be instrumental for generating technology, social and business innovations, which will lead to sustainable infrastructure, innovations and products. The first KICs advanced the concept of an innovation driven knowledge society. The concept will evolve through the learnings from running the first KICs. The first KICs themes recognised the need of dramatic societal, scientific and technology changes in order to create sustainable development. A collaborative European effort should be the way forward for the European knowledge society, for Europe as an economic competitive region, and as a global leader in tackling the new societal Grand Challenges.

New KICs must be able to contribute to advancement of the new themes in a broad sense and yield competitive advantages for Europe. If the KIC characteristics will not contribute a clear added value the themes should not be chosen. A simple conclusion is that disciplinary or even multidisciplinary themes are not the preferred ones. These should be addressed by increased research funding available at national and European level. It is imperative that for the advancement of science the European Research Council (ERC) and national research councils share an important common responsibility. In an analogue way, themes are not suited for KICs were the success is dependent on access to massive financial resources through pilot test technology, or commercial viability as test novel pharmaceuticals, or new nuclear energy production methods. Themes that overlap with existing themes should be reviewed critically, however, should not be excluded per se. It is obvious that (e.g.) the ICT and sustainable energy areas have lot of room for proposals not inferring with each other but rather bringing fruitful synergies to emerge.

EIT and KICs should only be used when both new knowledge and the application of new knowledge by skilled and creative people with the objective to create new innovations and new business are in focus. Furthermore, EIT and KICs should only be used when the knowledge triangle through entrepreneurial facilitated education and innovation is effective.

New themes that deal with Grand Challenges are global. Lack of natural resources, urbanisation, scarceness of energy, a free, inclusive and secure Internet, reindustrialisation through innovative production, food and healthcare for an increasing and ageing population, learning enhancement based on learning science are topics common to humanity. EIT will collaborate seeking to create the new knowledge and the people that can apply that knowledge to be able to manage the challenges. At the same time, we will compete globally to transform the interaction between research, higher education and innovation to create new businesses in a dynamic future society.

The first three KIC themes addressed Grand Challenges, before the notion had even been formed. They were based on ideas about future anticipated societal problems and trends. They were also recognised as global contests and thus important for European competitiveness. The conventional view that innovation and new business create economic growth and prosperity solely through product development bringing new and attractive products to the market is contested. The reason is that we observe societal changes that can be solved only if innovative infrastructures are created. These new infrastructures are so important to individual citizens that they through public media, NGOs and politics demand a saying on how the different alternatives for new infrastructures affect their personal quality of life. The discussions will result in a future policy and strategy revealing a must to combine scientific, technology, social and business innovations to build the public good needed.

It is then obvious from an economic growth and prosperity perspective that future innovations for new products and services will be intimately coupled to these infrastructures as: non-fossil energy and transport systems, as carbon-free production for climate mitigation, as a secure and free Internet for democracy, as a health and societal care system allowing for all generations to contribute in synergy to the benefit of coming generations, and as free and accessible education for all. □

The students, by means of their project business plans, participating in the Climate-KIC 2010 Summer School clearly showed the numerous opportunities given if business innovations and contemporary technology are combined.

The European knowledge society will need to become more multi-purpose. There should be incentives for excellence to advance scientific knowledge in itself – in Europe represented by the competitive project funding from the ERC. There should be incentives for excellence in efforts leading to societal impact through new business. EIT will here be a main actor serving as a role model for Europe. To create this multi-purpose knowledge society, it will be necessary to advance disciplinary, cross-disciplinary and thematic knowledge environments.

EIT's role as innovation and impact on societal change champion can only be accomplished by choosing thematic areas for new KICs. The new KIC themes in a similar way should be chosen to have a strong societal impact. As a consequence, the new themes will be related to needed changes critical to economic growth and society development.

Nine new KIC themes are foreseen ensuring a reasonable coverage of the themes EIT presently considers vital for the efforts outlined in the EU's Innovation Union initiative. A total of eventually twelve KICs will result in 40 to 50 co-location centres (CLCs) distributed over Europe – sufficiently enough to ensure that the EIT will be a European tool as a role model and an icebreaker – and sufficiently few to ensure that the EIT excellence will be secured!

The nine new KICs should address Grand Challenges originating from the world we have created and aiming at the world we want in the future. The areas of the Grand Challenges are too wide to serve as a basis for a call for proposal. They must be further specified in the actual proposals for new KICs. In a very pragmatic way, one could say that the themes announced in the call for proposal should result in more than three but less than nine competing proposals!

Three new KIC themes will be proposed with a view to start operations in 2014. All new KICs will be in operation by 2020. Initial theme ideas for the envisaged new KICs do include:

## 1. HUMAN LIFE AND HEALTH

Contemporary medical systems and processes increasingly focus on the concept of health as a state of physical, mental, and social well-being at all stages of human life. Health care services are also quickly changing to embrace the principles of universality and plurality of supply at no cost. Disease prevention and prediction, health care home assistance, therapy tracking, integrated management of patient data, and virtual consultations are non-exhaustive examples of such new care models. These services can increasingly be supplied without significantly affecting the day to day life of its recipients (the 'de-hospitalisation' trend). Consequently, medical technology and pharmacology research as well as sanitary processes are in need of radical change.

The suggested Human Life and Health KIC would address the significant challenges arising in this context, in particular those requiring a high degree of integration between research, industry, and medical service providers and would foster innovative business models.

The following two sub-topics serve as illustrative examples of possible KIC models within the Human Life and Health domain (although of course others of equal importance are also possible).

**Ageing population:** Europe, the New World, is getting old: currently about one in eight Europeans is over 65; by 2060 this will rise to one in three. This is a permanent demographic shift resulting from a long-term trend to global zero population growth. The resulting cultural and societal changes will not only affect medical and health care processes; new models for urban and domestic design will need to appear and a new legislative environment will need to foster the rise of innovative, elderly-friendly products and services.

**Healthy childhood:** According to the World Health Organisation (WHO), lifelong health and wellbeing is determined during the early stages of life. Failure to prevent, diagnose or manage conditions in childhood can have socio-economic implications in the home, workplace, and health sectors. Childhood diabetes, dyslexia, and undiagnosed vision impairments can each contribute to delayed development and lower academic achievement, which, in turn, are associated with dementia in later life. On a global level, infection remains the most important cause of death in children under the age of five. A significant challenge in the fight against infection continues to be the development of vaccines that are stable and can be administered in remote communities.



In addition to important sub-domains such as the above, it is clear that various scientific competencies could contribute significantly to a Human Life and Health KIC. One such competence worthy of particular mention is biotechnology. The full exploitation of biotechnology advances in the health sector (through e.g. pharmacogenomics and identification of biomarkers) requires major changes in health care processes (e.g. drug administration, diagnosis programmes, preventive analysis and elaboration). As a result, integration with existing health care processes becomes an issue. A biotechnological approach is consistent with the predictive, preventive, personalised and participatory character of the new health care paradigms. The cost of these new approaches is, however, increasing and inducing greater market fragmentation. There is great need for an assessment of the effectiveness of biotech-based health care (e.g. therapeutic advantages) and the resulting cost-impact throughout the entire process of health care delivery.

It is thus clear that the new health care models provide new challenges but at the same time a huge potential market for Europe: new products, systems, and services will be needed to implement the emerging models at all levels. It is also clear that Europe has the academic power and the industrial strength to be a health care leader, not only for Europe but for the world. For example, Europe can dominate the “Grey Markets” of the 21st century and Europe could be a leader in the healthy childhood sector by capitalising on its leading position in medical imaging and mobile assisted health care processes.

There is a real opportunity and a gap to be filled by entrepreneurial activity in all health sectors by developing new business, stimulating entrepreneurial SMEs, and changing the focus of large, existing companies. Business creation is likely as spin-out companies emerge from academic and research centres. Despite this, the European economy has thus far failed to create lead markets around the new health-related challenges. The size of the European biotech cluster is still modest, and heavily limited by several factors including knowledge transfer inefficiencies, the difficult passage from product to service test and often opaque sector policies. Another limit to health care system innovation in Europe is the fragmentation of initiatives for new health processes. In this regard the active role of public administration is essential and public-private co-operation is a must. In this evolutionary framework, only the most cost-effective new models which best guarantee the necessary quality and standards of medical services will survive. One of the major issues for national health systems and a great opportunity for innovative solutions, from technology to processes, lies in addressing the sustainability of sanitary expense (now close to 10% of EU GDP).

## THE EIT ADDED VALUE

The theme *Human Life and Health* can benefit specifically from the EIT/KIC approach because a successful programme in this theme (leading to new products, services, and businesses) needs to meet the following requirements:

- A **systemic vision**, implemented to connect the different levels of responsibility: from medical entities, to pharmaceutical entities and public administration down to the individual recipients of better life and health care provision;
- **Entrepreneurship** able to integrate a variety of scientific competencies and technologies with the logistics of personalised health care. This in turn needs to be linked with existing businesses and/or used to build new and yet to be discovered or defined value chains, lead markets, and businesses;
- The integration of all these elements in **Higher Education** through properly designed and administered courses in entrepreneurship in Human Life and Health care, and the integration of business and academia in a learning-by-doing approach;
- The **consolidation** of innovative public-private partnerships at a local level; a stronger co-operation between large and smaller, more specialised, firms for greater knowledge circulation, and a wider exploitation of research achievements in the global market.

A deeper look at the two sub-theme examples discussed above will further amplify the EIT/KIC added value. Many products that could improve the lives of the elderly are not reaching the market. They remain stuck in academic pilot projects – there is an “entrepreneurship gap”. Entrepreneurship and entrepreneurial education in this area will make a difference by enabling the translation of academic research into concrete products and services. In the healthy childhood sector this need is particularly relevant for health psychologists, who are traditionally considered at the social end of medicine and far removed from business, but whose insight can make the difference between acceptance and rejection of a new device by child or parent users.

When it comes to scientific competencies and the example of biotechnology, Europe is in fact a strong market player in diagnosis and vaccines, but weak in the application of biotech advances. Today, the biotech industry (both SMEs and large, established companies) employs more than 100,000 people in Europe alone. Considering Europe’s great tradition in pharmaceutical and chemical engineering, the size of the European biotech cluster is, however, still modest when compared to the USA cluster, which has developed only over the last 30 years. Europe is particularly suffering from the “Science-for-

Science” syndrome, i.e. interest-driven scientific research which is not stipulated by any market need]: although around half of all Nobel prizes for biotechnology are awarded to Europeans, there is very little new business generation compared to the USA. An EIT/KIC operational approach would reinforce the “Science-for-Business” approach and would lead to better results than strictly programmatic research and innovation approaches.

All new health models require an interdisciplinary research approach. Innovative sanitary processes, devices, therapies and strategies that target only one aspect in isolation (say, personal mobility or early impairments) will not be as useful as they might be within an integrated framework. The EIT/KIC model can bring experts from many disciplines together to focus on maximising the health and well-being gains at minimum expense.

## 2. HUMAN LEARNING AND LEARNING ENVIRONMENTS

Learning and adapting to his/her environment has always been necessary for the individual to survive, and the learning curve of an adaptive individual does not level out throughout his or her life. Nowadays, the same holds true for a region or a nation seen as a whole. The learning patterns and processes for an adaptive and hence successful society must therefore always be in transition, at the individual as well as collective level. It is consequently necessary to focus on the ability of society to adjust to the needs of all learners in order to give all individuals the opportunity to reach their full potential on the basis of their capacity, for the benefit of society. New generations of young Europeans will collectively determine the future European learning landscape. Their knowledge, skills, and spirit will, more than anything else, determine Europe’s competitiveness. It is thus worrying to observe that in global learning tests such as Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS), young Europeans perform significantly less well than young South-East Asians.

Citizens can no longer rely simply on their basic education to deal with an increasingly complex and connected world. Hence, inclusive educational solutions which address all sections of society and which help transform them must be created. Importantly, these solutions should complement the framework of traditional schooling and include both formal and informal learning paths for individuals of all ages. Education is the cornerstone of peoples’ success in terms of career and quality of life. Moreover, it forms the basis of economic, scientific, and cultural prosperity of regions and nations. Europe’s global competitiveness depends more than ever on an educated, skilled, and motivated workforce.

Imagine a high school student in the year 2016. She has grown up in a world where learning is as accessible through technologies at home as it is in the classroom, and digital content is as real to her as paper, laboratory equipment or textbooks. At school, she and her classmates engage in creative problem-solving activities by manipulating simulations in a virtual laboratory or by downloading and analyzing visualisations of real time data from remote sensors. Outside the classroom she has seamless access to school materials and homework assignments using inexpensive mobile technologies. She continues to collaborate with her classmates in virtual environments that allow not only social interaction with each other but also rich connections with a wealth of supplementary content. Her teacher can track her performance and progress across a lifelong digital portfolio, making notes of areas that need additional attention through personalised assignments, and alerting parents to specific concerns. What makes this possible is cyber learning; the use of networked computing and communications technologies to support and enhance learning. Cyber learning has the potential to transform education by enabling customised interaction with diverse learning materials on any topic – from anthropology to biochemistry to civil engineering to zoology.

Advances in learning sciences, including cognitive science, neuroscience, education, and social sciences, give us greater understanding of the three connected types of human learning – factual knowledge (*‘that’* or facts), procedural knowledge (*‘how’* or *skills*), and motivational engagement (*‘why’* or *urgency*), corresponding to each of the three main areas of the human brain. Today’s learning environments should reflect what we have learned about how people learn. They should take advantage of research into brain activity and apply the appropriate behavioural science and technology to optimise individual learning, but also teaching methods. Technology will help train educators: it will enable the development of collaborative teaching strategies combined with professional learning in order to increase educators’ competencies and expertise over the course of their careers. The teaching and learning industry should look to other kinds of enterprises, such as business and entertainment that have used technology to improve outcomes while increasing productivity, as examples.

Learning and learning science today is scientifically in a similar position to materials science at the beginning of the 20<sup>th</sup> century. There are a vast number of empirical studies that have been systemised and interpreted by social and behavioural sciences. Material science was “freed” and transformed once a new basic understanding of how atoms form materials was acquired. Learning and learning science will similarly be transformed by a new basic biological understanding of how the human brain functions.

The enhancement of learning on an individual level forms the basis for the progress of knowledge and competencies on a systemic level. The Grand Challenge/Opportunity of *Human Learning and Learning Environments* is to establish an integrated

system for managing all education at all levels, taking into account all the factors outlined above. Such learning infrastructure is likely to be based on cyber learning and should, for example, include the following features:

1. An integrated system that provides real-time access to learning experiences tuned to the level of difficulty and assistance which optimises learning for all learners, and that incorporates self-improving features, which enable it to become increasingly effective;
2. An integrated system for designing and implementing valid, reliable, and cost-effective assessments of complex aspects of 21<sup>st</sup> century expertise and competencies across academic disciplines;
3. An integrated approach for capturing, aggregating, mining, and sharing content, student learning, and financial data cost effectively for multiple purposes across many learning platforms and data systems in near real time;
4. An integrated system for efficient and effective online learning which produces content expertise and competencies equal or better to those produced by the best conventional instruction in half the time at half cost.

Europe has few private actors in the education sector. Universities are most often federal or state owned. Primary and secondary schools are most often community owned. Private and profit making alternatives are mostly seen as elite or segregated alternatives. A socio-economic analysis of the future learning sector is difficult. As stated above, it is possible to state definitively that the quality of the European knowledge society will determine the prosperity of Europe. This will create a market for novel education based on novel educational science incorporating novel concepts and methods of organising learning. How much of this will be accomplished as a public good and how much will be accomplished by profit making private initiatives remains to be seen. Or, in other terms, it will depend on the political balance between viewing the knowledge society as a public responsibility or as an individual responsibility.

One should, however, be aware that the competitive university sector and the even more competitive labour market will create a market for individual means of increasing personal learning curves, thereby achieving a competitive advantage. This market will be similar in character to the present youth oriented computer gaming market but will be seen very positively by parents and other investors in young people.

## The EIT Added Value

Human learning and learning environments represent mankind's most important infrastructure in terms of public spending, topped only by the health infrastructure. An infrastructure, if handled correctly, gives nations and regions a great competitive advantage in their economic growth and in the quality of life for their citizens. Still, very few European initiatives tackle this grand opportunity. Those that do, as for example "Youth on the Move", are important but have a rather specific objective and do not have the EIT stakeholder integrated and knowledge triangle based perspective which seeks transformation of the sector by way of innovation and new entrepreneurship. A research, education, and innovation approach is necessary to change the way learning is being developed as a public good but equally important, to create a market for learning available on an individual and personalised level. The EIT/KIC approach is naturally suited to facilitate the implementation of the new learning processes by means of:

- A **systemic vision** connecting the different levels of responsibility from private entities to public administration;
- **Entrepreneurship** able to integrate technologies and distributed intelligence techniques with the learning domain according to the value chains;
- Consolidation of **innovative funding solutions** like pre-commercial procurement;
- Entrepreneurship and **entrepreneurship education** will make a difference by supporting the translation of academic research into products and services for learning.

## 3. FOOD4FUTURE

The food value chain is more complex than ever. Many challenges face all actors involved, be it in agriculture, food production, policy making and regulatory bodies, or research and development. As we see it, the knowledge triangle in the area of food encompasses three broad areas: food science and technology, the impact of food on human health, and the social aspects of food consumption. Increasing the efficiency and sustainability of food production systems (in terms of agricultural production, processing, retail and food preparation), as well as assuring the safety of food products remain of great importance. In addition, diverse lifestyles and consumer demands with respect to organoleptic properties, shelf life, diversity, and

convenience of food have made innovation in food technologies and food concepts the key to success in the food sector.

In this context it is fair to state that, until recently, innovation in the agro-food sector has been strongly driven by technological progress in the chain from 'farm to fork' and mainly aimed at increasing production efficiency, productivity, and the delivery of foods of superior quality. However, the challenge now is for the whole knowledge and innovation community to steer innovation in the food sector using a 'fork to farm approach' and thus towards consumer health and well-being. This, in the long term, will have a huge societal impact *inter alia* by reducing health care costs. Indeed, as an example, dealing with the shift in age profile of the consumer and the corresponding changing needs presents huge challenges. Thus, it is highly advisable to direct the food sector towards science-based food products and ingredients that can rightfully claim positive health effects including, for example, the reduction of blood serum cholesterol levels, or an increase in bone strength and immunity. The above needs to be viewed against a backdrop of (inter)national food policies and increased regulation of the introduction of novel foods or ingredients on the market (see for instance GRASS regulation). This rightfully demands close collaboration between stakeholders with complementary expertise, in particular in the areas of food science and technology, health-related functionality of food or ingredients in model systems and humans, and socio-economic aspects related to food and health.

In the light of these new requirements and models, EU policies (e.g. Common Agricultural Policy) are driving a wide spectrum of actions for the agro-food sector, with the aim of:

- Strengthening the European agro-food industry and natural resources sectors through innovative processes for food safety, security, and quality;
- Linking the agro-food sector with environmental sustainability and energy production sectors;
- Encouraging the exploitation of local opportunities (quality of life in rural communities, management of natural resources, recreation, and tourism).

The food and drink sector (next to the construction sector) is currently the most important manufacturing industry in terms of added value created (approx. EUR 200 billion) and employment (approx. 4.4 million people). This amounts to a share of approx. 11.0% and approx. 13.5% of the total added value and employment of the total European manufacturing industry, respectively. In terms of turnover, the food sector is the largest manufacturing sector in the EU (approx. EUR 965 billion, i.e. 12.9% of the total European manufacturing industry) with a net trade balance of approx. EUR 1.1 billion. The European food and drink industry is strongly fragmented, consisting of around 310,000 companies with a very large share of SMEs (> 95%) that account for approx. 48.7% of the food and drink turnover and approx. 63% of employment in the sector. However, despite its size, the European food and drinks industrial sector's R&D expenditure has been low, amounting to no more than around 1.05% of net sales.

Moreover, food production is a significant contributor to greenhouse gas (GHG) emissions in Europe today: by 2050 it could account for 40% of our GHG emissions. As the global population grows from 6.5 billion to over 9 billion by 2050, the challenge of reconciling increased food production with a reduction in GHG emissions will become increasingly pressing. Ways to address emissions from livestock (genetic modification of animals and diets), and through better land management will be important. These will be competing with pressure to grow bio-energy crops as well as food crops and the need to use soils for carbon capture and sequestration. The key to increased yet sustainable food production will be an increased feed conversion and the prevention and/or reduction of animal diseases. Changing consumer diets and reducing food waste will be part of the challenge. Nevertheless, there are many obstacles to overcome: agricultural practises and dietary habits are difficult to change and to monitor, there are gaps in our understanding of the science of carbon in soils, and there are sensitive public acceptability issues around genetic modification of plants (let alone animals for human consumption), and governments are reluctant to enter this politically sensitive domain. The scope for development and implementation of new technology, processes, and practices in farming and food processing, and new ways to influence consumers is huge and is a relatively unexplored area in which Europe could gain the advantage of being an early mover.

## The EIT Added Value

In order to maintain or strengthen its strong position on the international market, the European food and drinks sector should unlock its potential by stimulating an international multidisciplinary research environment and by capitalising on the internationally-renowned food science & technology and biomedical education and research at European universities. Food-and-health clusters have been fragmentally formed in a number of EU Member States and their integration on a European level in a KIC would significantly increase their impact at European and global level and would guarantee the alignment between scientific excellence and the real priorities of the sector. It is evident that the field of food and health provides excellent opportunities for education and entrepreneurship, research and innovation, and new business creation, all of which are within the EIT scope. More specifically, the EIT added value to the theme of Food4Humans resides in:

- A **systemic vision** connecting the different levels of responsibility from private entities to public administration;
- **Entrepreneurship** able to integrate technologies and distributed intelligence techniques with the food production, processing and distribution lines inside the new value chains;
- Consolidation of innovative **funding solutions** at local level through the action of co-location centres;
- **Entrepreneurship** and entrepreneurship education making a difference by supporting the translation of academic research into food products.

The EIT model can contribute to the consolidation of knowledge-based rural economies by re-interpreting the existing higher education policies and creating clear career perspectives for sector researchers.

The EIT/KIC approach could add much value to many research and innovation efforts in the agro-food sector: The KIC mechanisms are particularly productive in a research support environment which is fragmented, and which requires greater coordination among the European regions. It is universally recognised that significant challenges exist at both food production and socio-economic levels.

As regards the food production processes, the KIC interdisciplinary approach and its mission to connect research, innovation and education within the same value chain are particularly suited:

- to understand food-physiology interactions and thus optimise the nutritional effects on health,
- to improve horticultural quality and animal health and welfare,
- to assess the potential role of bio and nano technologies.

A KIC co-location centre is ideally placed to conduct local experiments in innovation processes beneficial for the rural economy, also in support of public policies and regulation. This can be done by verifying:

- the social impact (e.g. the interaction between urban and rural dimensions) and the sustainability of new agro-food value chains;
- the effects of consumer requirements and choices on farm strategies;
- the wide perspectives of rural communities in light of sustainability and cohesion criteria (management of natural resources, soil, water, forestry, infrastructures and biodiversity, climate change and adaptation for crop yields and livestock management).

#### 4. MANUFACTURING BY AND FOR CREATIVE HUMAN BEINGS

Manufacturing is a central component of every economy: the value chain of all sectors comprises manufacturing as a step in producing goods or services for customers. Despite its central role, the manufacturing sector is under considerable strain in developed countries: global sourcing, low cost production in developing countries, new international competitors, and scarcity of raw materials have put high pressure on the manufacturing companies to increase productivity whilst decreasing costs.

In order to strengthen the competitive position of those companies, concepts like “added/high value manufacturing” or “product-service systems” have emerged. They are based on the premise that additional value and growing revenues can be generated by an integrative approach to service and product (system approach) or even an extended approach including many actors along the whole value chain (lock-in). If they adopt this new perspective manufacturers are not only innovators: they need to become inventors, supply chain managers, and service providers in a knowledge-intensive context where companies create financial, strategic, and social value for different stakeholders including customers, employees, the State, and investors.

The 2007 Sainsbury report<sup>1</sup> defines “high value manufacturing” as follows: “High value manufacturers are manufacturing firms that do not compete primarily on cost. Instead they deliver value for one or more of their stakeholder groups by contracting for capability, delivering product/service innovation, establishing process excellence, achieving high brand recognition and/or contributing to a sustainable society.”

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<sup>1</sup>Sainsbury Review: The Race to the Top – Lord Sainsbury’s review of the UK Government’s Science and Innovation Policies, 5 October 2007.



Before the last economic crisis, the manufacturing sector accounted for 17.1% of EU GDP and 22 million jobs (2007). However, the figure increases to 37% if power generation, construction, and associated business services are included. Manufacturing has a strong future in the European Union. Not only do high value manufacturers have robust financial performance, they also generate significant value externally. High value manufacturing companies contribute significantly to national R&D budgets and, in terms of corporate social responsibility, to job policies and the scientific/technological consciousness of a community.

The European manufacturing sector is currently facing some fundamental challenges. There is a need to maintain a high degree of innovation and labour productivity on the global scene in terms of value generation. This means:

- Preserving and managing knowledge assets, and the uniqueness and exclusivity of products and services in the global distribution of labour;
- Identifying and capitalising on the most promising value chains by avoiding fragmentation and gaining advantages by finding the right balance between make-or-buy and local-or-global sourcing decisions;
- Pursuing high production flexibility, high precision manufacturing, and adopting product orientation and quality control mechanisms based strictly on customer views and societal needs;
- Pursuing sustainable production methods in order to reduce the negative externalities of the production process by monitoring and planning the energy foot print over the entire life-cycle, and by developing new processes using high performance materials;
- Making extensive use of ICT for automated production (smart factories), for monitoring the performance cycles and for planning efficient production networks (digital/virtual factory).

## The EIT Added Value

The high value manufacturing model is a cross-sectional and cross-disciplinary theme for a new KIC that involves technical, economic and social science related disciplines.

The challenges facing the manufacturing sector require radical transformations of knowledge management and business organisation. New innovation models such as open innovation and user innovation will bring about the required changes. To tackle them appropriately, manufacturing must invest in creativity, entrepreneurship, and advanced education paradigms, including lifelong learning. Co-operation with academia becomes essential; not only to improve the knowledge transfer process from research to innovation, but also to identify the education paradigms that best meet the emerging requirements. The EIT/KIC model offers a natural cultural environment to make the co-operation between academia and industry effective and focused on shared objectives.

High value manufacturers can play a variety of market roles: service-led producers, product manufacturers, service manufacturers or system integrators and these roles can be linked to one another. Accordingly, manufacturing is not a linear set of activities. Instead, it can involve a large number of different companies acting together, whereby each company undertakes many activities. How production capabilities, product-related services, and the overall production network can reach and react to the proactive customer is a key issue for manufacturing.

The EIT added value consists in finding new ways to integrate different strands of education and thus create a better work force, and in directing more industry driven investments in the EU. The KIC mechanism enables stronger co-operation and joint agreements on common goals and priorities. Within the KIC, a critical mass can be achieved by pooling public and private resources (including SMEs) and R&D projects can be launched over a period of several years. In parallel, a suitable policy for education can be established to maximise the synergy between industry, public organisations, and academia.

In summary, the EIT can provide added value and foster the manufacturing renaissance of Europe by offering:

- A **systemic vision**, connecting the production of goods and services with procurement and supply chain management, and connecting the different levels of responsibility, from private entities and public administration to the individual social and global needs of people involved in such new production approaches;
- New forms of **entrepreneurship** able to integrate new business models fostering added value in new combinations of goods production, services provision, value chains, procurement and global societal dimensions;
- Entrepreneurship and entrepreneurship **education** which are able to support the translation of the new business models into socially acceptable and welfare generating solutions.

## 5. SECURITY AND SAFETY

**Security** refers to the protection against danger, damage, loss, and criminal activity; in short it provides **both individual safety and a safe society**, in which individuals are being protected against physical, social, financial, political, occupational, psychological, and other consequences of failure, damage, error accidents, harm, or any other event that could be considered non-desirable.

Security as a form of protection refers to structures and processes that provide or improve security as a condition. Security must take into account the actions of people attempting to cause destruction or damage. In a global and interconnected world, security issues are becoming increasingly important for individuals, businesses, and governments. There is huge potential for technological development to ensure the proper identification and prevention of identity (ID) theft, to improve the security of web transactions, to safeguard the security of homes, offices, cars and transportation, to protect information systems, to implement data encryption, or to fight transnational fraud and organised crime. At the same time, European citizens remain very sensitive to the loss of privacy that could be a result, *inter alia*, of security enhancing technology. Additionally, the use of the most advanced solutions is still limited in practice, although the worldwide market for security solutions is very large: A recent study values this market at USD 10 billion for the US alone.

The **Grand Challenge/Opportunity** in this area is to reform inadequate infrastructures to eliminate harmful effects on individual and collective human life. Suggested priorities for new and reformed (safe) infrastructures include: free, secure and ubiquitous Internet communication; sustainable and environmentally safe access to energy; safe human mobility; secure and skilled medical care; unharmed and high quality food, to mention but a few. It is obvious that security and safety aspects must be integrated within these new infrastructures. In fact, for some infrastructures the safety/security aspects are so critical that they will be dysfunctional if these aspects are not addressed.

Information security is based on the core principles of confidentiality, integrity and availability. A non-secure Internet puts the whole idea of a free flow of information and a global market built on Internet transactions at risk. At the same time, safe road traffic is still only a dream: fatalities and debilitating injuries caused by traffic accidents are so common that they can be seen as a global 'disease'. A disease, which is in fact ranked 9<sup>th</sup> among global diseases in terms of casualties: traffic accidents claim close to two million lives per year and over 200 million more injuries. A KIC proposal could address the security/safety aspects of these and/or other vital infrastructures.

**National security** is the desire to protect the **nation-state** with the help of **economic, military, and political power and diplomacy**. Initially focusing on military power, national security now encompasses a broad range of facets, all of which impinge on military or economic security and the values espoused by the national society. Accordingly, in order to ensure national security, a nation needs to possess **economic security, energy security** and safety, **environmental safety**, etc. Security threats involve not only conventional foes such as enemy **nation-states** but also non-state actors such as terrorist organisations, narcotic cartels and multi-national organisations; some authorities also include natural disasters and severe environmental damage in this category.

**Physical security** deals with any risk of damage to an individual's life or health, theft, damage to property and goods, and so on. This risk is the basis for a huge service sector, which provides additional safety features not necessarily guaranteed by society.

**Computer, communication and transaction security** is a branch of computer technology known as network and information security (NIS) as applied to computers and networks. The objective of computer security includes the protection of information and property from theft, corruption or natural disaster, while allowing the information and property to remain accessible and useful to its intended users. The term computer system security refers to the collective processes and mechanisms by which sensitive and valuable information and services are protected from publication, tampering or collapse by unauthorised activity, untrustworthy individuals or unplanned events, respectively. The strategies and methodologies of the computer security domain generally differ from most other computer technologies because they aim to prevent unwanted computer behaviour rather than to enable desired computer behaviour.

A broader thematic view on security and safety needs to tackle the gap and often lack of communication between various aspects of security and attempt to integrate them into a consolidated approach. In particular, security management issues have historically been addressed with little co-ordination in the corporate world, often by separate departments for IT security, physical security and safety, and fraud prevention. Today, there is greater recognition of the interconnected nature of security requirements, an approach variously known as 'holistic security', 'all hazards management', and other terms.

Some European companies are very active or even leading in this field, supplying hardware and software security solutions. Europe's financial sector has been leading in the use of smart cards and Europe also has top research capabilities. More collaborative work between information technology and social science research should consequently enhance marketing strategies.

Thus, the following might be considered areas suitable for KIC proposals:

IT Realm	Physical Realm	Political Realm	Monetary Realm
Application security	Airport security	Homeland security	Financial security
Computing security	Port security/ transportation security/ Supply chain security	Human security	
Data security	Food security	International security	
Information security	Home security	National security	
Network security	Hospital security	Public security	
	Physical security e.g. in cars		
	School security		
	Shopping centre security		
	Infrastructure security		

## The EIT Added Value

The added value resides in the implementation of the security/safety through:

- A **systemic vision** connecting the different levels of responsibility from private entities to public administration;
- Entrepreneurship able to integrate technologies and distributed intelligence techniques with the various IT support technologies and new value chains which will emerge with the increasing need for security;
- The consolidation of **innovative funding solutions** such as pre-commercial procurement;
- Entrepreneurship and **entrepreneurship education** will make a difference by supporting the translation of academic research on (e.g.) data security into real life products;
- Other KIC themes address Grand Challenges where security/ safety is a crucial component, thus EIT could serve as a **hub** for European innovation, research and education for this sector.

## 6. HUMAN MOBILITY AND SMART CITIES

In the medium term, European cities and territories will need to adapt to new anthropological, environmental and cultural requirements inducing radical transformations of their urban and sub-urban landscape. Urban configuration and urban mobility will evolve under the twofold pressures of reducing air pollution and improving the use of resources (land and fossils). This evolution will be affected by technological and process advances in the automotive, energy, and construction sectors.

More than 70% of Europeans live in urban areas, which represent more than 25% of the EU territory. Work, leisure and cultural models, social advances and contradictions are incessantly evolving in these areas. The growing proportion of the aged population and the increase of immigration flows are generating new social needs and new collective behaviours. The advances in telecommunication and information technologies are leading to new trends in many different human actions: work (home and co-operative working, virtualisation, and remote control mechanisms), entertainment and cultural activities (social networking, personalised content streaming), commerce (e-commerce), and social services (e-government).

Mobility processes are quickly changing as a result of the boost in traction technologies (electric and hybrid engine), the integration of different modalities (e.g. fast trains/urban transport, biking) and new mobility-control mechanisms (dynamic stream control, real time parking management, mobility credits and taxation measures).

Problems of congestion and associated urban sprawl have important social and economic consequences. These include, for

example, problems of access to essential services or to the workplace and the reduced attractiveness of cities as locations for business investments. Under present mobility conditions, car usage has significant impacts on carbon dioxide emissions and consequently climate change. Even though there have been significant improvements in vehicle technology – in particular in fuel efficiency, which also means lower CO<sub>2</sub> emissions – this has not been enough to neutralise the effect of increased traffic and car size. While the EU as a whole has reduced its emissions of greenhouse gases, the CO<sub>2</sub> emissions from road transport have increased by 26% from 1990 to 2004.

Urban conglomerates are energy-greedy entities. More recently, however, the concept of the smart city has emerged as an attempt to make such conglomerates more sustainable. The energy footprint of a city can be substantially reduced by adopting energy-efficient solutions for buildings and sustainable energy production systems at any level (from building to district to town). This is made possible thanks to new energy-related technologies (from materials to storage techniques, to energy-production systems) and can be implemented by completely new processes (e.g. city optimisation of energy production, storage and conversion). In a wide sense, the smart city concept includes mobility and transport. The interdependency between the two sectors is particularly evident in the framework of electro-mobility as well as in the joint planning of transport and urban configurations in accordance with energy footprint criteria.

The totality of these new models will radically change the demands on urban configuration and on transport technologies and processes. New and different urban organisations, services and infrastructures will be required in order to adequately provide for local cultures and social characteristics.

## The EIT Added Value

All the changing factors mentioned above are the essential components for defining smart, sustainable, and inclusive territorial and urban configurations. Even if a territorial system is changing very slowly, it is essential that the above factors and their effects are identified, studied and experimented with (possibly on a small scale) under a common and inclusive framework, due to the strong interdependencies arising among them. The EIT model integrates stakeholders of different natures under common business perspectives. In this case the driving and unifying force is their territory.

The automotive and transport industries are facing strong challenges, in particular due to the growing constraints on fuel consumption and GHG emission figures, and are therefore working on new concepts for engines. Not only is the necessary research difficult and high-risk per se, but in addition, the new technologies need to be inserted into the emerging mobility models. Location-aware, logistic and mobile internet services need to be studied in the developing urban environment. One such branch of research and new products which addresses urban infrastructure and energy-related issues is electro-mobility. Energy-supply industries will face production, distribution and transport problems, all closely tied to the sustainability objective of a smart city. The development of smart grids, metering and smart appliances will help to increase the use of renewable energies in these new configurations.

Public administrations need to study, plan, and experiment with territorial configurations, urban and sub-urban mobility plans and related social services. At the same time, public administrations need to consider how the new energy production/distribution systems are affecting the urban configuration, mobility demand and control. In addition to important technological challenges (e.g. high efficiency engines and electrical storage) research bodies will tackle intriguing problems such as the integrated planning of urban and mobility configurations, the economic optimisation of new processes, and the definition of energy-impact evaluation metrics.

This wide and challenging perspective requires the KIC to consider and launch innovative education models, in which the involved stakeholders play an active role in co-operation with the educational bodies. Entrepreneurship education is particularly needed due to the variety of unexplored business opportunities that are introduced by adopting sustainable mobility models and smart city perspectives.

All the stakeholders are interested in how cities and mobility models are evolving (the elaboration of a common framework) to be able to orientate their strategic choices more precisely. This common framework must be established dynamically and in advance (anticipatory model) with respect to the large scale implementation of products and services, so that it can really drive the development perspectives for the stakeholders. The EIT/KIC structure is well suited to exploring the emerging business models: innovative solutions can be deployed and critical success factors evaluated. The joint efforts will also enable the KIC community to produce useful indications for the regulatory and industrial policy mechanisms suited to making the new business models economically sustainable.

Territorial policies are implemented locally and they are context dependent in a wide sense (from geography to culture). The co-location model is ideal to implement this characteristic. Each co-location could reflect local needs and values, and build on these to create new ventures and entrepreneurial experiences. The alliance with (and the support of) public administrations is essential to define and experiment with the necessary infrastructure and to test the social acceptance of new mod-

els. In summary, the EIT added value resides in the implementation of smart cities and human mobility through:

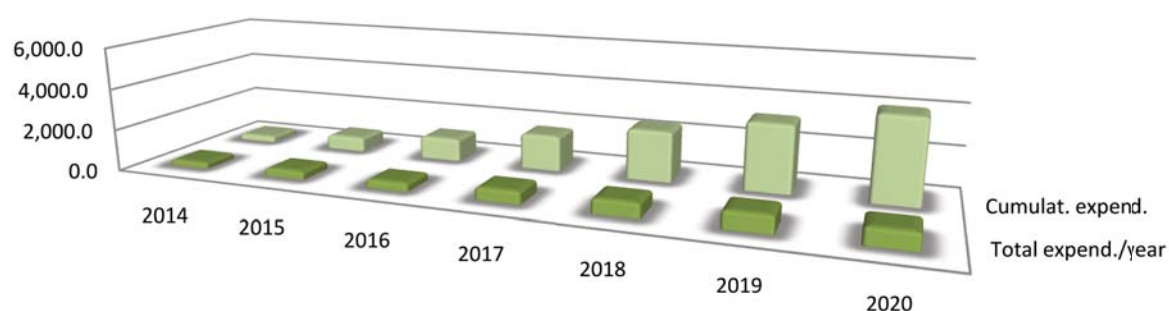
- A **systemic vision** connecting the different levels of responsibility from private entities to public administration to individual person needs;
- **Entrepreneurship** able to integrate emerging technologies with the new value chains;
- The consolidation of innovative public-private co-operation schemes and **funding solutions**;
- An **entrepreneurship education** profited on the new opportunities and well suited to support the translation of academic research on (e.g.) mobility into real life products and services



# BUDGET FOR NEW AND EXISTING KICS (2014-2020)

KIC		2014	2015	2016	2017	2018	2019	2020
Waves	Indicative No. of KICs	(m EUR)	(m EUR)	(m EUR)	(m EUR)	(m EUR)	(m EUR)	(m EUR)
Existing KICs	3	200	250	250	250	250	200	100
1st wave	3	90	140	140	200	250	250	250
2nd wave	3				140	185	200	250
3rd wave	3						140	185
EIT administrative budget		10	10	10	15	15	15	15
EIT operational budget (other than grants)		4	5	5	5	6	6	6
% of administrative cost from total budget		3.40%	2.53%	2.53%	2.52%	2.17%	1.88%	1.90%
	Total expend./year	304.0	405.0	405.0	610.0	706.0	811.0	806.0
	Cumulative expend.	304.0	709.0	1114.0	1724.0	2430.0	3241.0	4047.0

## KIC funding request 2014-2020 (m EUR)



	2014	2015	2016	2017	2018	2019	2020
Total expend./year	304.0	405.0	405.0	610.0	706.0	811.0	806.0
Cumulat. expend.	304.0	709.0	1,114.0	1,724.0	2,430.0	3,241.0	4,047.0

## UNDERLYING ASSUMPTIONS:

### EIT contribution to added value activities: max 25%

1. The existing KICs are fully prepared in 2014 to make use of a combined KIC budget of EUR 200 million with their existing (and possibly new) partners, rather than the EUR 125 million originally planned.
2. Their joint budget will reach a maximum of EUR 250 million in 2015, which is twice the originally planned amount.
3. The budget remains constant at EUR 250 million for a few years, then decreases slightly in 2019 (8 years after the start of the KIC) and then decreases dramatically to EUR 100 million in 2020. This reflects the fact that the KICs will either become self sustainable or fail.
4. The crux here is of course that for European innovation to scale up to become world-class, this doubling of efforts is needed in 2014 at the latest! In fact an earlier increase would have been desirable.
5. The first new wave of KICs in 2014 starts with a budget of EUR 90 million, which is significantly more than the KICs have been granted in 2011. This is justified because the KICs should be able to build up more quickly given their experience. The first wave of new KICs will then also be more attractive for partners to join or to strengthen their participation.
6. The build-up of this wave of KICs is aggressive and has reached EUR 250 million already in 2018.
7. The second new wave of KICs in 2017 starts with a budget of EUR 140 million but builds up even more rapidly than the first wave.
8. The final third wave of KICs starts at a similar level, EUR 135 million, and builds up equally aggressively.
9. The EIT HQ budget must increase in 2017 to be able to handle the volume of the investments, but remains very lean at about 2% of the overall EIT budget.

# EIT SCOREBOARD

	Strategic Objectives	Strategic Indicators	Measures
1	Develop EIT Brand and Label	KIC's contribution to EIT brand	<ul style="list-style-type: none"> <li>• KIC Activities</li> <li>• EIT Brand survey</li> <li>• EIT labeled degrees and diplomas</li> </ul>
2	Create New Businesses	Spin-offs, and related market value generated by KICs	<ul style="list-style-type: none"> <li>• # of new spin-off companies created by the KICs</li> </ul>
3	Provide growth to Existing Businesses	Prototypes products, processes and services developed and licenses issued	<ul style="list-style-type: none"> <li>• # of licenses</li> <li>• Major improvements generated by co-location centers</li> </ul>
4	Attract, keep and work with top-class talents	Talent Attractiveness	<ul style="list-style-type: none"> <li>• KIC Employee Value Proposition (vision/mission, management)</li> <li>• # top-class faculty, post-docs, PhD students and entrepreneurs</li> </ul>
5	Develop educational eco-system for entrepreneurship	Entrepreneurship Education	<ul style="list-style-type: none"> <li>• # of Entrepreneurship training courses developed</li> <li>• # of Entrepreneurs teaching pathways</li> </ul>
6	Produce research and innovation breakthroughs	Scientific Publications, Citations and Patents	<ul style="list-style-type: none"> <li>• Bibliometrics analysis</li> <li>• Patents filed by EPO</li> <li>• User driven innovation: integration of end users with R&amp;D&amp;I</li> </ul>
7	Organise people mobility across co-location centers	People Mobility	<ul style="list-style-type: none"> <li>• # of people mobility across co-location centers and domains</li> </ul>
8	Bring together partners and people	KIC Members Interactions	<ul style="list-style-type: none"> <li>• Cross-functional interactions within KICs (social networking analysis)</li> <li>• Mobility in/out KIC</li> </ul>
9	Attract Contribution from 3 <sup>rd</sup> parties	Third parties KIC funding	<ul style="list-style-type: none"> <li>• Level of funding from third parties</li> </ul>

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