European Institute of Innovation and Technology: Policy Experimentation for Pan-European Entrepreneurial Innovation Ecosystems

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Abstract

Established economies face major challenges in renewing their industrial basis, apparent in Europe that is struggling over decades in turning research into innovation. Policy experimentation in the periphery of government and power structures may offer opportunities for radically new policy and governance models and practices. Herein, the 'European Institute of Innovation and Technology' (EIT) is a relatively new policy experiment for entrepreneurial innovation. Created in 2008, the EIT operates through so-called 'Knowledge and Innovation Communities' (KICs) which integrate partners from the Knowledge Triangle of higher education, research and business, encompassing bottom-up 'co-creation' of novel innovation models for Pan-European entrepreneurial innovation ecosystems. While the high political profile of the EIT has constrained partly its freedom to experiment, European-wide networked excellence approach and business logic in managing KICs has created new insights on experimental governance models to be explored further. Building on action research case study the paper codifies some of these developments and opens up an avenue for further work on the experimental governance of Pan-European entrepreneurial innovation ecosystems.

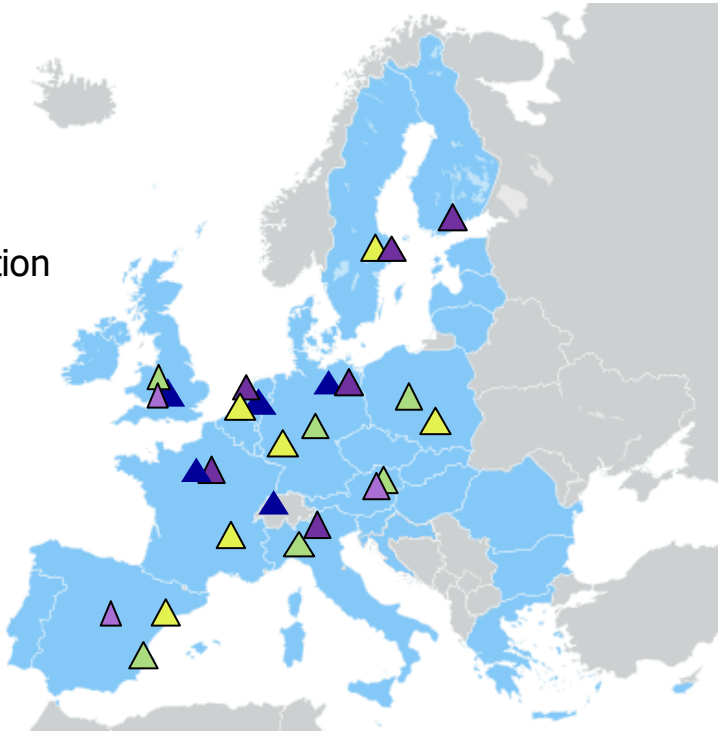
Keywords

entrepreneurial innovation ecosystem, experimental governance, innovation governance, Pan-European, policy experimentation

1 Introduction

Developed economies face major challenges in renewing their industrial bases, particularly apparent in Europe that has struggled over decades how to turn research into innovation (Fragkandreas, 2015). A shift from project-based innovation funding towards innovation partnerships could alleviate the problem, specifically if channelled to form vibrant Pan-European entrepreneurial innovation ecosystems. Towards this end, policy experimentation in the periphery of government and power structures may offer opportunities for developing radically new policy and governance[1] models and practices. Herein, the 'European Institute of Innovation and Technology' (EIT) is a relatively new policy experiment intended to get the EU back on track for entrepreneurial innovation. Created in 2008, the EIT operates through so-called 'Knowledge and Innovation Communities' (KICs) which integrate partners from the Knowledge Triangle of higher education, research and business, encompassing bottom-up 'co-creation' of novel innovation models for Pan-European entrepreneurial innovation ecosystems. This is facilitated through Co-location Centres (CLCs) (see Figure 1).

- Climate-KIC:
  - Co-location Centre
  - RIC (Regional Implementation and Innovation Centre)
- EIT ICT Labs:
  - Co-location Centre
  - Associate Partner
- KIC InnoEnergy
  - Co-location Centre



[1] In line with McGinnis (2011, p. 58), we refer to ´governance´ as the 'process by which the repertoire of rules, norms, and strategies that guide behaviour within a given realm of interactions are formed, applied, interpreted, and reformed''. The generic tasks of governance include production, provision, consumption, financing, coordinating, dispute resolution, and rule-making.

Figure 1. The first three KICs and the geographical location of their CLCs. Source: EIT.

Due to its novelty, the EIT has been covered only partially in academic literature. The few papers published so far focus largely on the period around its foundation till 2008, when the first EIT Regulation was passed by the European Council and Parliament (Jones, 2008; Jofre et al, 2009; Gornitzka and Metz, 2014). Notwithstanding the intense debate which preceded that initial political agreement (Didier, 2010; Tindemans and Soete, 2007; Huisman and de Jong, 2014) there is no substantive research about the EIT's "setup" (2009-2010) and "consolidation" (2011-2014) periods. Further, few research efforts so far address specific aspects related to the EIT, but no overarching analysis on the EIT governance and management is available. For instance, Rohrbeck and Pirelly (2010) built on a literature review and stakeholder analysis to propose a multi-level framework of key performance indicators for the EIT to steer its operations. Haegeman et al (2012) discussed a foresight process coordinated by the European Commission (DG JRC & DG EAC) to develop thematic priority areas for a new wave of KICs. Heger and Boman (2015), in turn, explored the value of networked foresight in one of the KICs, EIT ICT Labs (later on renamed 'EIT Digital').

Despite those earlier efforts, the academic contributions miss the 'insider view' from the EIT Headquarters to learn from the EIT governance model and management practices as a European entrepreneurship and innovation policy experiment. This paper aims at filling this gap by codifying EIT practices and reflecting on the lessons learned for a broader scholarly debate. Our empirical analysis on the EIT builds on the action research paradigm that subsumes a variety of methodologies such as Checkland's soft systems analysis (Checkland, 1981) and Argyris' action science (Argyris et al., 1985), which are inherently cyclic, participatory, qualitative and reflective. The authors are former EIT employees, which allowed engaging in action research over the period of 2011 and 2014.

While the authors engaged in numerous open-ended and semi-structured interviews across the EIT community, the core of the gathered insights were constructed mainly in day to day interaction and engagement in the development of the EIT and building upon testimonials and experience gathered from EIT's constituencies, namely, EIT Governing Board members, KIC CEOs and EIT staff in Budapest. However, while action research, and the case study methodology in more general, is suitable for describing new phenomena, it is also subject to interpretation biases and contingency factors not present or transparent in the final case description (Yin, 2003). Therefore, in our research the findings are attested by proofs documented in empirically grounded materials developed by the EIT and its stakeholders.

Our research shows that while the high profile of the EIT has constrained partly its freedom to experiment, European-wide networked excellence approach and business logic in its KIC management has created new insights and governance models to be explored further. The paper codifies some if these developments and opens up an avenue for further work on governance of Pan-European entrepreneurial innovation ecosystems.

The paper is structured as follows. Section 2 explores the conceptual premises of policy experimentation for developing pan-European entrepreneurial innovation eco-systems. In Section 3 these premises provide guidance for the case study on EIT. Section 4 discusses the findings of the case study and Section 5 concludes the paper.

2 Conceptual premises for policy experimentation for Pan-European entrepreneurial innovation ecosystems

The so called 'linear model' assumes that innovation emerges from science while we know science is neither always needed nor sufficient to make innovation happen. Surprisingly, technological innovation and the linear model are more pervasive in governmental policies than today's business practices (Edquist, 2014). Current policies within the market and system failure paradigms are more useful for addressing a steady state situation in which public policy aims to put patches on existing development trajectories provided by markets, but not to dynamically create and shape new trajectories (Mazzucato 2016). In order to harness the disruptive potential of entrepreneurship and innovation for societal transformation and direct such developments towards societally beneficial pathways, these need to become also an integral part of governance rationales. It is therefore time to develop a new narrative (Mazzucato, 2013) as a basis for a new paradigm of new generation of innovation policy instruments (Borras and Edquist, 2013). This need for paradigm change is the most striking in the European innovation policy that seems to have stagnated in the established paradigm that Muldur et al (2006) characterised by:

- Member states principally responsible for capacity building (including Structural Funds);
- EU and inter-governmental cooperation fostering connections across countries;
- Increasing emphasis on large firms and easing access for SMEs firms;
- Collaboration principally framed by disciplines and business sectors.

Granieri and Renda (2012) question whether there is at all a European innovation policy beyond widespread support for R&D and trans-national collaboration, calling for a much clearer division of labor in the European multi-level governance system. This lack of focus on building Pan-European entrepreneurial innovation eco-systems is somehow surprising taking into account growing interest in a new agenda for innovation studies (Fagerberg et al. 2012). We argue that a new paradigm is needed with the shift from project collaboration to long-term partnerships for enabling ecosystems. This emerging paradigm would consist of:

- Capitalising on existing capabilities and alignment of public support available in Europe;
- Bottom-up community-driven partnerships for co-creation and multilevel synergies;
- Focus on the emergence and growth of world-class young dynamic firms ('yollies');
- Acceleration, the exploitation of tacit knowledge and addressing societal challenges.

Decades ago Hayek (1945) addressed the challenge of governing highly complex systems and suggested that they must be governed by a decentralized "spontaneous order" and systemic coordination in the form of behavioural rules, principles and shared visions. Kuznetsov (2009 proposed, in turn, that escaping from the old paradigm requires new governance structures and policy experimentation via 'Schumpeterian developmental agency'. Breznitz and Ornston (2013) have characterised such agencies where radical policy innovation is more likely to occur: at the periphery of the governmental structures, in low-profile set-ups with relatively few hard resources and limited political prestige and less vulnerable to political interference. At the European-level, EIT has tried to experiment by setting up new governance and management structures.

Stakeholder networks or physically-anchored clusters can be directed to accelerate innovation through interconnected hubs working closer together, not necessarily locally. Moore (1993) applied the notion of "ecosystems" to complex configurations of agents making an analogy between the business ecosystems[2] and the biological ecosystems observed in nature[3]. The both biological and business ecosystems involve interactions between diverse agents and their evolving roles over the succession of analogous stages of emergence, expansion and maturity. Such a system can also be characterised as complex and adaptive to their broader environmental conditions (Richter et al. 2014). Herein, Ács et al. (2014) consider that the *"National System of Entrepreneurship is the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures."* Elsewhere, Russell et al (2011) define the concept of innovation ecosystem to entail: *"the inter-organizational, political economic, environmental and technological systems of innovation through which a milieu conducive to business growth is catalysed, sustained and supported. An innovation ecosystem is a network of relationships through which information and talent flow through systems of sustained value co-creation."* To build the bridge between these two streams (the one on entrepreneurship and the other on innovation), we define the **entrepreneurial innovation ecosystem** as…

> *… the dynamic, inter-organizational, political*, *economic, environmental and technological milieu of interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, mediated by institutions, which drives knowledge and value creation towards a structural change and the enhanced allocation of resources."*

[2] Further to business ecosystems (Moore 1993), this relates to efforts in conceptualising also innovation (Russell et al. 2011) and entrepreneurial (Ács et al. 2014; Mason & Brown 2014) ecosystems.

[3] The biological ecosystem 'community' emerges with relatively few pioneering plants and animals and expands through increasing complexity until it becomes stable or self-perpetuating as a mature community. The "engine" of succession, the cause of ecosystem change, is the impact of established species upon their own environments (Odum 1969).

In line with Hämäläinen (2017), we consider international collaboration crucial for enhancing cognitive variety. Herein, we consider a **Pan-European entrepreneurial innovation ecosystem** the one that wires up local ecosystems across Europe (see also Pombo-Juárez et al, 2016).

The EIT exemplifies an experimental shift from today's EU-level interventions and current emphasis in trans-national collaborative projects (in R&D) to a new paradigm in fostering Pan-European entrepreneurial innovation ecosystems that stresses human capital and attitudes enabling innovation spaces. A shift whereby the European dimension in knowledge-based partnerships would be more about talent than project consortia formation. In similar lines Granieri and Renda (2012) refer to 'network spaces', understood as domains in various degrees of physical and intellectual proximity where knowledge, skills and experience is mediated by a professional operational structure. Hollingsworth (2009) provides further rationales for such co-location centres for radical innovation by way of bringing together financial resources, diverse disciplines and leadership.

The EIT offers an opportunity to learn from European innovation policy experiment to promote the formation of Pan-European entrepreneurial innovation ecosystems and to innovate in policy more generally in connection with European Union institutions. According to Sabel & Zeitlin (2012) experimentalist governance is a recursive process of provisional goal-setting and revision based on learning from the comparison of alternative approaches. Framework goals and metrics for gauging their achievement are provisionally established by the combination of 'central' and 'local' units, of which the later are given broad discretion to pursue their goals with dynamic accountability. This is what is exemplified in the governance of EIT in its monitoring and simplification practices vis-à-vis the KICs. Furthermore, the EIT Headquarters providing guidance to the KICs resembles the original ideas of Hayek (1945) on governance of complex systems, wherein, instead of decentralisation, the central units provide invaluable guidance to local units. In what follows, we examine the EIT as a policy experiment, its managerial practices and derive some initial implications for policy.

3 The European Institute of Innovation and Technology: policy experiment with business logic

The 'European Institute of Innovation and Technology' (EIT) is a relatively new policy experiment intended to get the EU back on track for entrepreneurial innovation. Created in 2008, the EIT crystalizes Europe's political will to approach innovation radically different (EIT, 2012). The EIT operates through so-called 'Knowledge and Innovation Communities' (KICs) which integrate excellent partners from the Knowledge Triangle of higher education, research and business, encompassing bottom-up 'co-creation' spaces or so-called Co-Location Centres (CLCs) (See Figure 1). This case study covers the period of the formation of the KIC concept and putting it in practice by EIT, more precisely, the designation of the first three KICs and the consolidation of their corresponding operations between 2011 and 2014.

The EIT was created by a legislative act of the European Parliament and Council (EIT, 2008) at the proposal of former European Commission President José Manuel Durao-Barroso, to develop for Europe an new innovation approach based on lessons learned from the Massachusetts Institute of Technology (MIT) with its focus on people and ecosystems, thus capturing the human and social factors of innovation. However, the EIT is a distinctive European set up which, unlike MIT, is not a University, though it does aim at mobilizing European higher education institutions by fostering and expanding the so-called third mission' (in addition to Education and Research missions which constitute the XIX century Humboldt university model).

Consequently, the EIT aims to complement existing EU and national policies and initiatives by fostering the integration of the 'Knowledge Triangle' (Higher Education, Research and Innovation) across the European Union, thereby reaching out to business and, ultimately, to society. In complementing action at EU or national/regional level, the KICs build upon existing capabilities and represents a new EU-level agenda, particularly for Higher Education Institutions. Overall, the EIT is not yet another research institute or founding council but an "Entrepreneurial Impact Innovation Institute' which was the vision formulated by the founding Governing Board in 2011 for the Strategic Innovation Agenda (SIA) of the EIT until 2020.

By encouraging teams to partner together across the Knowledge Triangle (Research, Higher education and Business) through its KICs and their CLCs, the EIT foster its partnership communities to "co-create novel innovation approaches". Interestingly, the EIT has been a forerunner in addressing societal challenges which is now one of the three pillars of Horizon 2020, the EU strategic framework programme for research and innovation.

Indeed, the report on new rationales for a European Research Area (ERA) commissioned by the European Commission in 2008 was first to mention 'Grand Societal Challenges' in the search of a renewed mission for European R&D. However, while other ERA instruments see Challenges as opportunities to establish a renewed 'contract' between society and science through mission-oriented research (with similarities about what the US has done for decades), KICs target 'grand societal challenges' as opportunities for innovation-driven entrepreneurship (EIT, 2011; EIT 2012). The first three KICs were designated in 2009 addressing climate change mitigation and adaptation (Climate-KIC), sustainable energy (KIC InnoEnergy) and future information and communication society (EIT Digital, formerly named EIT ICT Labs).

3.1 Policy experimentation with business and investment logics at EIT

KICs are legal entities led and managed by a CEO that operate on the basis of business strategies and plans; they form 5 to 6 entrepreneurship-driven innovation hotspots called "Co-Location Centres" spread across Europe and work across member States. Overall, the enlarged EU budget for the EIT has so far allowed nurturing and scaling up its first three KICs as well as to prepare to gradually increased its portfolio with new KICs. Two

additional KICs were designated by the EIT Governing Board in December 2014 (EIT Raw Materials &; EIT Health) and two more will join in 2016-2017 (Advanced Manufacturing & Food) and another one possibly in 2018 (Urban Mobility) subject to the mid-term evaluation of the EIT planned in 2016-2017. Nurturing its KICs is the EIT's primary mission. In addition, EIT's mission is also to codify and disseminate emerging practices beyond KICs partners to other stakeholders. This is a critical task if the EIT wants to be 'more than the sum of its KICs', inspiring change as 'an Institute for Europe'. Indeed, in policy terms, EIT's ultimate success will depend not just on whether KICs produce innovations, but also new innovation models especially for dissemination. In that regard, the EIT can be seen as an 'innovation policy lab', shaping and implementing new approaches through its KICs framed by grand societal challenges.

The EIT managed about 300M€ over the period 2010-2013. Taking into account its novelty and potential to foster innovation in Europe, backed by evidence of first results from the first three KICs the EU decided in 2013 to endow the EIT with 2.7 billion€ for the period 2014 to 2020 (later on reduced to 2.35 billion€). The EIT Regulation did not specify that each KIC should be run by a CEO nor the principle of 25% EIT 'seed' funding; this principle requires 75 % of a KIC's funding to be gathered from non-EIT sources, including not only contributions by KIC partners themselves but, equally important, also by other regional, national and European programs, thus helping aligning Europe's multilevel innovation agendas.

With regard to the particular novelties of the EIT we refer to KICs' set-up following a 'business logic', on the one hand, and their relationship with EIT shaped by an 'investment logic', on the other (see Figure 3). The 'business logic' of EIT-KICs is characterised by the following aspects:

- High level of integration is sought after in each KIC set up as an independent legal entity, gathering world-class knowledge triangle partners, based on a contractual relationship with the EIT.
- Long-term strategic approach is materialised in each KIC set up for a minimum of 7 years to eventually become self-sustainable.
- Sufficient autonomy and flexibility in KICs is looked for in determining the organisational structure and activities governed by a Board of KIC partner organisations.

Effective governance is sought after in KICs run by a CEO reporting to a specific KIC Governing Board composed of KIC partners and a lean management team at the central and co-location level.

The EIT-KIC 'investment logic', in turn, is characterised by the following aspects:

- The partners are required to provide funding and show high degree of commitment. EIT funding to KICs is max. 25 % of their total budget over time with 75 % to be attracted from other sources.
- The results and high impact oriented activities are sought for by KICs' Business Plan with measurable deliverables, results and impact.

- The investment culture is promoted in KICs to shape entrepreneurial mind-sets in the management of partnerships.

Figure 3. EIT funding and other sources between 2010 and 2015. Source: EIT.

All in all, we stress that KICs are new constructs replacing more traditional contractual arrangements of 'project consortia' and virtual connections which have characterized so far EU's approach to innovation, with a new paradigm based on 'community partnerships' and 'physical presence' linking local buzz to global hot spots and 'pipelines'. KICs integrate the Knowledge Triangle through CLCs, crossing borders as well as management and pillar agendas in practice. These are interesting but challenging departures combining the public nature of the EIT as an EU body with entrepreneurial practices and culture encouraged by KICs and facilitated through their CLCs.

Distinctive features of the EIT model can be found in the way it articulates the relation with KICs' partnerships and KICs with their partners. This is a 'journey' for its constituencies, where both learning the sharing experiences gathered along the way are equally important. Key issues on how EIT operates concern basically three management agendas: i) monitoring, ii) simplification and iii) dissemination, which we examine in more detail.

3.1.1 Monitoring

A monitoring agenda reflects the EIT's results orientation (including both direct outputs as well as behavioural change induced), this being a clear priority commitment for the EIT as an engaged investor. This is the motto that drove the setting up of its relations with the KICs: as investors invest for impact, already in the early days the EIT Governing Board defined a Scoreboard which the EIT further elaborated jointly with the three KICs into a Performance Monitoring System (PMS), illustrated in Figure 2. This EIT PMS comprises EIT's strategy map outlining the Institute's strategic objectives and related performance, serving as a tool to monitor progress over time.

The EIT's PMS includes Key Performance indicators (KPIs) covering three strategic lines: Enabling innovation/value creation (what we do); Operational excellence (how we do it);

and Positioning (where we are). For each strategic line, strategic objectives in four dimensions were defined (social, client, internal and learning). Consistently with KICs' significant level of autonomy, they also set up a number of KIC-specific indicators, reflecting their knowledge dynamics and value creation portfolios. These indicators are applied as one of the criteria to determine the annual funding allocation for each KIC on a competitive basis –which is determined according to a fix budget complemented with a competitive funding according to their performance over time. It is important to note that as KICs have all different dynamics, their results can only be partially compared and statistics can hardly capture the quality of results regarding long-term impact of KIC activities and useful good practice. All in all, the EIT PMS aims to 'smartly steer' KIC partnerships while respecting their autonomy.

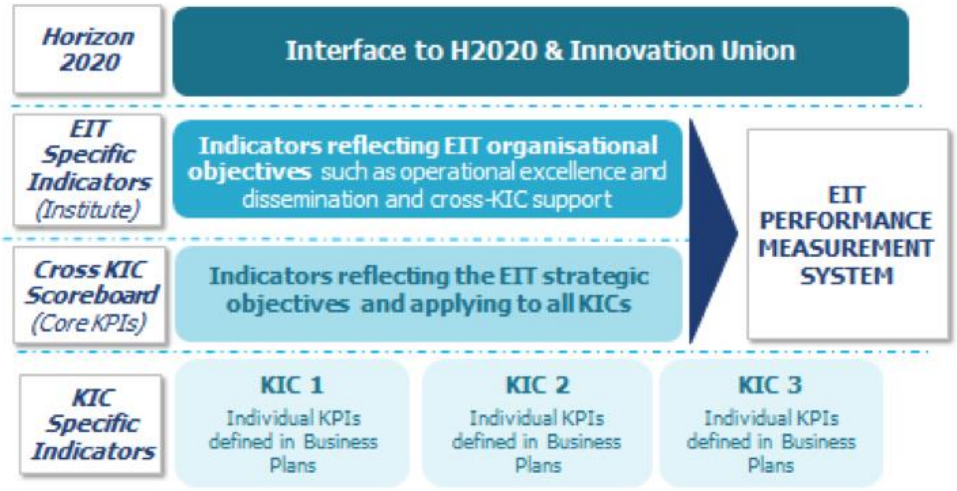


Figure 2: EIT Performance Monitoring System (PMS) and its four accountability levels. Source: EIT.

3.1.2 Simplification

In line with the idea of Sabel & Zeitlin (2012) on 'dynamic accountability', simplification is a second agenda on 'how' EIT manages partnership relations with its KICs. Overall, as a 'smart investor' in KICs, the EIT considers simplification as a dynamic process, embedded in its mission strategy, down to the EIT-KICs partnership operations and administration. Some features are already built into the system; for instance, access and exit of European partners in the KICs as "living partnerships" is decided by these communities themselves and not by the EIT.

KICs comprise diverse partners from business, higher education institutions and research, and maintain a significant level of autonomy. Subtle structuring links between EIT and KICs at governance and management level have been established in an effort to preserve KICs 'enabler role' whereby their creativity and contributions of partners can work bottom-up from the organisational perspective but with strong commitments to their

own agenda. Through an entrepreneurial 'learning by doing' approach, increased guidance has been formulated by the EIT to the first three KICs, which would naturally benefit also future KICs through the lessons learned. Path dependency also applies while development stages are clearly identifiable as follows:

- Early expectations. In very early days of the setup of the first three KICs in 2010, EIT was coupled with large expectations to fundamentally remove all kind of administrative red tape. During the maturation period till 2013, while maintaining that goal, the consensus was formed towards the need for adequate balance between compliance and flexibility in order to make the EIT KIC partnerships sustainable with corresponding levels of accountability.

- Operationalizing improvements. Thereafter the scope of the dialogue between EIT and KICs was further enlarged to cover 'Simplification and Finance' in 2012. And in 2013 Experts designated by KICs and EIT helped mobilize further ideas and experts from KICs day to day operations, thereby securing both urgent, incremental progress, as well as set up the basis for more impactful, breakthrough simplification measures in the longer run.

The simplification 'working space' in which the EIT positions itself for minimizing red tape and maximizing partnership trust through a co-creation process with KICs consists of three layers:

- Financing dimension: Incremental improvements prepare the basis to fully empower KIC Legal Entities for secure internal controls vis-a-vis their KIC Partners. An advisory group of experts was recruited in 2013 to provide recommendations towards this objective, after the latest grant management simplification efforts on other EU programme contexts.

- Management dimension: EIT improved classical funder/beneficiary interactions in planning and reporting e.g. by setting up criteria to select projects at KIC level instead of controlling for actual project activities at EIT level. In this context the role of the EIT would be to help KICs qualify the processes suitable to carry out internal checks on the Institute's behalf, thus avoiding the need for the EIT to do the checks at the activity level.

- Legal dimension: With the goal of creating radical flexibility, the EIT was given the right to propose so-called 'derogations' for approval by EU institutions to be thereafter reflected in the framework of grant agreements. For instance, the EIT enjoys some derogations whereby SMEs and individuals do not need to become formal partners to participate and receive financial support in the activities of the KICs, obviously, within certain margins. Building together an ambitious but feasible "simplification agenda" with EIT and the European Commission is obviously a more challenging task as the EIT is since 2014 an integral part of the Horizon 2020 strategic framework programme for research and innovation.

In close co-operation with the first KICs from 2011, the EIT did developed a risk management and assurance strategy to cope with the future scaling up of operations and funding to the KICs in the mid- to long-term future. Further flexibility by the EIT requires a holistic system of criteria financing, monitoring and evaluation of KICs results. Indeed, simplification and scaling up go hand in hand as the Institute prepares for its enlarged KIC portfolio, operations and budget no other institution, certainly in Europe, has ever gone through before: from 3 to 8 KICs with a 9-fold budget increase.

3.1.3 Dissemination

Through an Strategic Innovation Agenda (SIA), the founding EIT Governing Board vision for the EIT as an 'Entrepreneurial Impact Investment Institute'. This underlines a double role of the EIT as an investor in KICs as well as an institute creating value beyond the KICs, meaning both direct and induced deliverables derived from KICs. Indeed, also stakeholders beyond KIC partners, not taking part in the activities of the KICs should perceive some benefit, from policy makers to innovation practitioners. This is pretty much as a must for the EIT to be more than the sum of its KICs, thus inspiring system change. Hence a third 'how to' agenda on dissemination of models and practices.

Regarding practitioners, the best way to get to know what KICs are is to experience the Pan-European ecosystems they are actually building-up which provide a continuous flow of calls and new activities co-created by KIC partners. Partners with long term interest can apply to join these 'living partnerships'; on the other hand, SMEs can also receive funding without complicated procedures provided that their contribution adds value. Also, individuals can access the KIC through the education, entrepreneurship or innovation agendas, which in KICs are interrelated agendas. Overall, the EIT has managed to effectively 'leverage' support and amplify impact beyond its own budget by aligning KIC support with external interests, which countries such as Germany have done through EIT Digital by entrusting the management of the 'Software Campus' (Seibel, 2013) as well as France and Hungary via different levels of delegation and arrangements with this same KIC.

For policy, taking into account the governance of the EIT whereby member states in particular are not directly involved, the issue is how to best foster knowledge exchange and disseminate emerging KICs practices which public stakeholders in particular could adopt and put at work with their own resources. More or less 'tailored' schemes are directly correlated with complexity to disseminate and put them in practice, consistent with the tacit nature of knowledge. Consequently, since 2011 the EIT has developed a knowledge pool starting with KIC-focused studies and conferences. Studies include a 2012 analysis on KICs as the first level of analysis in order to identify and describe the co-creation of novel schemes undertaken by the KICs across their content agendas: 'Catalysing Innovation in the Knowledge Triangle: Practices from the EIT Knowledge and Innovation Communities'. A second study in 2013 took the European level of analysis assessing how KICs build upon available support in the European multi-level innovation panorama, thus creating synergies and complementarities in practice from the EIT: 'Analysis of Synergies fostered by the EIT in the EU Innovation Landscape'. An EIT

Stakeholders' Forum put in place in 2014 to gather both networks of amplifiers and EU member States will help to structure knowledge, exchange and exploitation of EIT / KIC practices.

3.2 Fostering Pan-European entrepreneurial innovation ecosystems

In stressing the experimental and creative nature of the EIT, the legislating EU institutions in 2008 gave quite some margin to the EIT in translating the political mandate and mission of the EIT down into an operational and viable approach for the KICs. In fact, the 2008 Regulation did not a priori specify all the requirements of what later emerged as the 'KIC model'. Instead, it was the founding Governing Board of the EIT which conceptualized key issues like setting up KICs as autonomous legal entities and the structuring of their activities around five to six so-called 'Co-Location Centres'.

3.2.1 Towards networked excellence in enabling spaces

The first observation concerns the structuring of KICs' operations into five to six innovation 'hot-spots' or so-called 'co-location centres' (CLCs) which the amended Regulation approved by the European Council and Parliament in 2013 then defined as follows: *"co-location centre" means a geographical area where the main knowledge triangle partners are based and can easily interact, providing the focal point for the KICs' activity in that area*". Thus, contrary to most European-level R&D support schemes, managed through consortium agreements, the EIT's KICs are unique as they offer 'enabling spaces' where the collaborative strategies of the partners are facilitated to integrate the Knowledge Triangle 'on the ground' in the KIC CLCs.

According to Allinson et al. (2012) early results indicate that the EIT approach has brought stability to existing cooperation. For example, KICs reported that certain industrial partners who were in competition across CLCs came together as partners in the KIC Steering Committee. For instance, Organisations such as Siemens, Ericsson and other industrial players joined forces through the EIT ICT Labs (now EIT Digital) with the objective of identifying future market trends in ICT.

These CLCs bring together people, regional and local clusters and nodes of excellence towards the integration of the knowledge triangle. Each KIC has five or six CLCs organised and structured according to their respective national and regional innovation context to include partners from research, education, business and at times from local authorities. CLCs involve science parks, existing clusters and regions of competitiveness, which provides much wider access to start ups and SMEs with a potential interest in either engaging with, or using the results of, the KIC activities. Hence, the CLCs are regional, networked eco-systems with a global outreach (Allinson et al. 2012).

Leveraging on capabilities available in Europe is also distinctive feature of the EIT which reflects on the one hand the 'sticky' nature of knowledge as it concentrates in given locations, and on the other hand, the fact that the EIT could hardly contribute to creating new capacities 'ex novo' with the financial means available to it while aiming at world-

class innovation hot spots. In that connection, the founding Board members rightly stressed that the EIT should not become 'another funding instrument' but rather an intelligent broker catalysing partners and resources. By operating through CLCs working at EU level, the KICs are novel approaches to 'networked excellence' across borders focused on generating entrepreneurial mind-sets, ecosystems and education mobilizing Universities' third mission. In the case of Climate-KIC and KIC InnoEnergy, the partnerships of the CLCs are not limited to their regions, as several partners collaborate directly with various CLCs and engage directly at the KIC level. For instance, institutions from Hungary participate in the Co-location Centre in Poland. In the case of EIT ICT Labs, CLCs tend to be tighter geographical nodes with key partners located within 50 kilometres of each other (Allinson et al. 2012).

Also, within CLCs, interaction with KIC partners, researchers, professors, students and entrepreneurs is not confined to progress meetings or dissemination conferences which often characterise contract-based collaborative R&D project consortia. Instead KICs crystallise 'network spaces' inter-connected in various degrees of physical and intellectual proximity where knowledge, skills and experience is mediated by a professional operational structure. KICs catalyse ´network capital´ through co-location centres strategically working across Europe.

3.2.2 Beyond mobility, trans-national incubation and acceleration

While the mobility of practitioners, researchers, students and in some extent professors is extensively and actively promoted at both European and national level through multiple EU instruments (Erasmus, Marie-Curie, etc.), new business creation has until now remained very much a locally rooted policy and practice. This is due, not only to the 'sticky' nature of knowledge again, but also to the obvious limits of public intervention with national tax income. In this connection, a study promoted by the European Commission ECORYS (2011) presents the content, definition and impact that differentiate co-location centres (CLCs) from pure incubation activities (NESTA, 2011). An additional consideration for the EIT is that, as a EU body, the overall ambition must be at least European or even global. In other words, business plans nurtured by KIC should ideally drive 'new to the world' innovations and at least some new ventures eventually scale up to become global leaders.

While CLCs work together, they at the same time exploit and take advantage of their diversity regarding themes, partners and local ecosystems, thereby fostering actual synergies and complementarities across European borders. This has several advantages over pure national policies fostering intra- and entrepreneurship, including wider accessible end-market and therefore larger potential demand, exploiting the ability of CLCs to facilitate 'soft landing', mutual exchange of support, exposure of the start-up business plans to other markets, match-making international partners along the value chains to scale up trans-national impact, etc. In the end, KICs facilitate opportunities to high growth potential ventures which can be nurtured and their growth accelerated with large corporations in the KIC partnerships as these later may become the first customer to such ventures, opening innovation up in exchange to their business portfolio.

Literature on the economics of innovation regarding the internationalization of business R&D with regard to established multinational corporations, presents two key drivers: ´Market access´ (asset exploiting) and ´Knowledge access (asset augmenting). However, as business firms increasingly need open innovation in global networks to remain competitive (OECD, 2008), new forms of knowledge production and exploitation are needed. The EIT concept represents a novel avenue for Europe to spin-off and spin-out successful business models by scaling them up through the combined value propositions and trans-national dynamics of KIC's partner communities. While it is still, very early to assess how KICs are performing overall, they have potential to overcome barriers to growth in a fragmented European markets and boost the innovation in the global scene.

4 Discussion

Notwithstanding the fact that the EIT was set up top-down via 'political entrepreneurship' (Huisman and De Jong, 2014), the founding Governing Board of the EIT conceptualised the KIC model and the dynamics that these communities very much bottom-up. (Granieri and Renda, 2012) expressed the view that the EIT's approach signals a potential paradigm shift in fostering Pan-European networks of inter-connected ecosystem through the CLCs in the KICs. Also, until 2013, evidence was gathered on the 'brokerage' role of the first three KICs as they leveraged three times of public resources from regions and nations for each euro invested from the EIT. One can thus induce that these community-driven ecosystems can also help overcome the currently fragmented public support landscape that characterises Europe's research and innovation landscape today.

In summary, the way EIT has been conceptualised is in itself a policy innovation for Europe. Notwithstanding the many difficulties encountered (ECA, 2016), the experience of the EIT is a interesting innovation in innovation policy. However, the Institute is very much 'work in progress' still today and therefore, its ultimate impact will only be determined and measurable with time. Also, whether the legal and management set up adopted (i.e. KIC as legal entities and managed by a CEO) would ultimately fit the diversity and dynamics in each KIC remains to be seen. Furthermore, 'too large' communities risk losing the focus and possibly leading to incremental rather than radical and/or disruptive innovations. Herein, to de-couple ownership and operations when scaling up the KICs may be more appropriate to ease participation beyond partners. Ultimately, whether KIC ecosystems will spark high growth entrepreneurship or not, will be decisive for its impact at large.

The above findings about the EIT case are relevant also in view of the further conceptual development of Knowledge Triangle Integration and Quadruple Innovation Helix (Carayannis & Campbell, 2011). To that aim, new governance approaches are needed to promote the integration of knowledge triangle (research, education and business) within and across innovation systems. This is so as, despite considerable advances in differently levels of analysis of the governance for Quadruple Innovation Helix and Knowledge Triangle Integration, there have been limited efforts to develop European, or in more

general international communities that would enhance the Knowledge Triangle Integration within and across innovation systems. The EIT experimentation of a Pan-European approach to building innovation ecosystems opens up new perspectives for innovation helix and its actors to consider their role within the broader ecosystems in Europe and beyond.

The report by Ernst & Young and CEPS (2011) titled "Next Generation Innovation Policy: the future of the EU innovation policy to support market growth" explored the role of the EIT as a potential breakthrough for a future European innovation policy. Building on this report Granieri and Renda (2012) questioned former EU's approach to innovation, forecasting that "*without a radical change […] Europe in 2020 will be only slightly different, in terms of goals achieved, from Europe in 2011, but it will cost more."* The authors described a rather gloomy outlook for the future of Europe's innovation, "*unless EU institutions and Member States decide to streamline existing policies and build a "layered" model of innovation, in which 1. governments act as investors in key enabling infrastructure such as ICT and education; 2. as enablers of large technology markets where researchers and entrepreneurs can meet; 3. and as purchasers of innovation when key societal challenges are at stake.*" Notwithstanding the novelty of EIT, the report favourably positioned its KICs amongst the most promising innovation platforms in the world together with the Innovate UK (previously UK Technology Strategy Board) Catapult centres and the US Department of Energy´s Innovation Hubs on the other as simple but holistic innovation platform approaches pointing out that:

> *"The initiatives launched by the EIT are indeed promising, because they also take a pan-European perspective in a setting in which national prerogatives tend to prevail over an otherwise obvious case for centralization. With a strengthened EU legal framework for venture capital, cross-border investment and dispute resolution, Intellectual Property protection and university-industry partnerships, these types of knowledge [and innovation] communities can really bring Europe to higher levels of competitiveness."*

How the EIT managerial challenges are addressed will largely determine its impact in European innovation policy. Based on the case study some future research avenues can be identified.

- With regard to the monitoring of KICs, the EIT performance management system provides an integrated framework focusing on output indicators as a basis for developing future societal and economic impact indicators. In line with EIT's Strategic Innovation Agenda (EIT, 2011), the PMS is structured along four layers, supporting the needs of different constituencies, KICs themselves, EIT (with a double layer reflecting its double role as an Investor – reflected common Core KPIs - and as an Institute) and Horizon 2020 –the EU framework programme for research and innovation where EIT is embedded since 2014. Looking forward, Impact and Outcome-level evaluation is under development taking the advantage of the lessons learned by the KICs on the different ways of approaching their strategies towards addressing their respective grand societal challenges. Potential

methodologies should allow sizing and evaluating impact in both in societal and economic terms, i.e. growth and job potential as well as 'public value' of the EIT intervention including behavioural additionality.

- Simplification remains open to experimentation and innovation which requires creativity and determination, taking also into account the large diversity of partners in the KICs. Through successive grant cycles, the EIT can introduce learnings and be responsive but ambitious in realizing also expectations in this domain as simplification has different meanings for different stakeholders. Tax-payers' money needs to be invested responsibly but, on the other hand, public intervention is ultimately about making what individuals and other market actors cannot make, appetite for experimentation is also a key (Mazzucato, 2013). Future areas of progress into the simplification agenda include the reflection about a 'trusted partner' concept as a way to optimize the KIC management in view of the growing number of future KICs to be managed by the EIT thus empowering the Legal Entities, to widen the use of simplified costs taking advantage of the EIT PMS, ensuring the quality of KIC financial reporting, through a thorough risk assessment strategy to strike an optimal balance between systematic ex post in addition to ex ante verifications, and further explore the potential benefits and practical implications of applying financial instruments either alone or in combination with grants.

- In its dissemination EIT focuses on a 'learning by doing' approach, with ample room to research the innovation models emerging from the practice of the KICs. In so doing, the EIT would not only be able to prepare the basis for dissemination but would also achieve increased recognition as a motor of change inspiring action beyond the perimeter of its KICs. Furthermore, each KIC follows very different objectives and approaches, and their results can only be partially compared. On the other hand, statistics can hardly capture quality, regarding both long term impact as well as useful good practice for non KIC stakeholders. Beyond that, and most importantly, KICs are expected to co-create new innovation models and bring about a systemic change to the European innovation landscape. Looking ahead, this is in line with EIT's overall mission and vision, exemplified in EITs Strategic Innovation Agenda (SIA), which foresees a series of institutional offerings to outreach and create institutional impact beyond the direct impact coming from KICs: a Stakeholders Forum (including a special configuration of member state) and an Alumni network. In addition, a repository of practices should be gathered and made available through the EIT web.

Former EU-level support for innovation policy design to regional stakeholders has essentially been limited to promoting mutual learning and exchange of good practices among regional Clusters (Pro-Inno, e.g.) or, more generally now, Regional Smart Specialization Strategies (RIS3). This is very far away from a strategically aligned and shared programme of action across borders of the scale that the EIT ambitions. On the other hand, most of the EU centralised budget today still concerns trans-national R&D collaboration through contractual agreements amongst project partners. Such

collaboration concerns research and business in particular, much less higher education institutions.

Our findings call for further conceptual development and guidance to design, manage and assess multi-level initiatives developing international (or Pan-European) innovation ecosystems through experimental policy and governance. Further studies could be conducted on the EIT KICs and their CLCs in line with Hollingsworth (2009) to understand the basis and ultimate potential for radical innovation. In addition, the concept of dynamic accountability of Sabel & Zeitlin (2012) could be applied in the studies on KICs to understand their role in the experimentation and development of new governance practices together with the EIT Headquarters. Furthermore, the conceptual framework of 'clusters of innovation' and 'super-clusters' (Engel and del-Palacio, 2009; Engel, 2014) that seemingly relates to the concept of innovation ecosystems (see also Moore, 1993) can provide an invaluable starting point for further research on multi-level governance.

5 Conclusions

In this paper we have studied distinctive features of multi-level structure and governance of the EIT and its KICs. KICs are 'living partnerships' composed of excellent partners from the Knowledge Triangle of higher education, research and business across Europe. We have also stressed that the added value of the EIT is not just its support to existing business but, rather, setting up the enabling conditions for young, dynamic innovative new business firms to start-up and, ultimately, at least some of them to scale up globally. In addition, we discussed in more detail the management approaches and critically assessed the KICs and their CLCs providing some indication how the EIT model is gradually building Pan-European entrepreneurial innovation ecosystems. As these concepts and the EIT itself are very recent but highly relevant for the European innovation, there is an urgent need to join forces in studying them further as well as developing new opportunities for policy experimentation, evaluation and learning. This is particularly important in the context of European fragmented innovation support landscape.

In short, KICs have still to demonstrate their ability to accelerate the pan-European growth of new start-ups, making at least some 'new-to-the world' success cases; it will require a strong interaction between CLCs to fulfil their role in the European innovation landscape in accessing knowledge, markets, finance, talent, etc. if KICs are to articulate true inter-connected ecosystems (Isenberg, 2011). Furthermore, the sustainability of KICs after the seven years commitment is an open debate as their theme and dynamics will dictate to what extent and when this is feasible (ECA, 2016). Much more effort is needed to attract investments and to give their individual activities (e.g. master or doctorate programmes) enough interest to survive and develop by themselves. The three first KICs are entering into the second part of their EIT support mandate and visible outcomes are needed.

Breznitz and Ornston (2013) note that radical policy innovation is more likely to occur at the periphery of the governance structures, in low-profile agencies with relatively few hard resources and limited political prestige, less vulnerable to political interference. At the

European-level, the EIT can be considered only partly to meet such conditions, especially because the EIT was proposed by former President Barroso and this created high expectations leading to risk averse governance sometimes over innovation and experimentation. Hence, with hindsight, similar kind of initiatives could benefit from some more distance to political spheres and from higher autonomy to operate.

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