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This paper is a first draft of a book chapter in Ernst, D., forthcoming, *Innovation Policy in the Global Knowledge Economy—Comparing the US, China, Taiwan and Europe*.

# Europe's Innovation Union – Beyond Techno-Nationalism?<sup>1</sup>

by

**Dieter Ernst, East-West Center**

## **Abstract**

This paper traces recent transformations in Europe's innovation policy - the move towards EU-wide policy coordination in the form of an "*Innovation Union*". A deep fiscal crisis and increasingly severe austerity policies are slowing down Europe's move towards greater openness and internationalization of its innovation system.

The paper asks whether Europe has left behind for good "techno-nationalism", or whether government action in support of high-tech industries through various forms of protectionist policies is re-emerging, this time however on a region-wide scale. This question is of relevance to current policy debates about the role of innovation in the US as well as in Asia's emerging economies. The paper specifically explores what lessons the US and emerging Asia might draw from Europe's move towards an EU-wide Innovation Strategy.

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<sup>1</sup> This paper is a first draft of a book chapter in Ernst, D., forthcoming, *Innovation Policy in the Global Knowledge Economy – Comparing the US, China, Taiwan and Europe*.

## 1. Historical background and defining characteristics

Europe has experienced a fundamental change in its innovation policy. Since the turn of the century, a transition is under way from government-centered national strategies to attempts to combine market-led innovation and public policy coordination across Europe.

To a large degree, however, this transformation is still “work in progress”. Somewhat paradoxically, the move towards EU-wide policy coordination in the form of an “*Innovation Union*” now seems to strengthen again the role of public policy relative to market forces. And there are signs that Europe’s fiscal crisis and increasingly severe austerity policies might slow down Europe’s move towards greater openness and internationalization of its innovation system. For instance, researchers from outside Europe (including researchers based in the US) are eligible to apply for EU public R&D funds only if they move to work at a European host organization. And the EU’s recent Enabling Technologies (KET) program stipulates that “the EU should clearly promote an “in Europe first” IP policy”<sup>2</sup>.

This paper asks whether Europe has left behind for good “techno-nationalism”<sup>3</sup>, or whether government action in support of high-tech industries through various forms of protectionist policies is re-emerging, this time however on a region-wide scale. This question is of relevance to current policy debates about the role of innovation as a source of employment-generating growth that helps to address fundamental global challenges, such as climate change, low-cost low-carbon energy, and the vast almost completely neglected health needs of three quarters of the world population who struggle for survival in the so-called developing world. After all, innovation is about converting ideas, inventions, and discoveries into commercially successful new products, services, processes, and business models within reasonably short time frames<sup>4</sup>.

If “techno-nationalism” would raise its head again in Europe, this might well bottle up and stifle the vast reservoir of innovative capabilities in this region. It might also invite retaliatory responses, both in the US, and in China and other emerging economies. For the US, Nelson and Ostry in fact emphasize in their pioneering study that techno-nationalism has played an important role in the rise of American technological leadership, and that techno-nationalism continues to coexist in the United States with techno-globalism promoted by U.S. multinational corporations (Nelson and Ostry, 1995). And in China, techno-nationalism in any case still remains a powerful force, reflecting the country’s latecomer status in industrial development and the legacy of the planned economy, and constraining attempts to move towards a more open innovation system<sup>5</sup>.

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<sup>2</sup> European Commission, 2011, *High-Level Expert Group on Key Enabling Technologies. Final Report*, June

<sup>3</sup> Richard Nelson and Sylvia Ostry define “techno-nationalism” as “government action in support of high-tech industries” through various forms of protectionist policies. (Ostry, S. and R.R. Nelson, 1995, *Techno-Nationalism and Techno-Globalism. Conflict and Cooperation*, The Brookings Institution, Washington, D.C., p.61).

<sup>4</sup> Ernst, D., 2011, *Barriers to Job-Creating Innovation – America’s Challenge*, unpublished manuscript, East-West Center, Honolulu

<sup>5</sup> See, for instance, Kennedy, S., 2010. “Indigenous Innovation: Not as Scary as It Sounds.” *China Economic Quarterly* (Sept.): 15–20; and Ernst, D., 2011, *Indigenous Innovation and Globalization: The Challenge for China’s Standardization Strategy*, University of California Institute on Global Conflict and Cooperation; La Jolla, CA and East-West Center, Honolulu, HI., 123 pages

For America, Europe's move towards an EU-wide Innovation Strategy might provide important lessons for efforts to strengthen its capabilities for employment generating innovation that create large numbers of quality jobs across all sectors, including seemingly lower-tech industries like textiles, light bulbs, automobiles, construction, infrastructure, health care management. On the negative side, should Europe move towards new forms of "techno-nationalism", this might constrain America's access to key markets and sources of innovation and disrupt global value chains for key enabling technologies.

For Asia, and especially China, the direction of Europe's evolving EU-wide innovation strategy has important implications for its own efforts to reform and upgrade its innovation systems. A return to techno-nationalism in Europe would certainly strengthen the opponents of greater openness and internationalization of Asia's innovation systems. Europe's markets are of critical importance for Asia's emerging economies, and Asia needs continuous access to Europe's sources of knowledge and innovation.

Both the US and Asian countries thus need to understand the logic that drives the evolution of Europe's innovation policies towards new forms of cross-border coordination of innovation markets and infrastructure. This paper provides a brief analysis of the defining characteristics and key building blocks of Europe's evolving EU-wide Innovation Strategy.

## **2. The basic philosophy – Europe's seventh framework program for research and technological development (FP7)**

The seventh framework program for research and technological development (FP7) is the EU's main instrument for funding research in Europe<sup>6</sup>. FP7 runs from 2007-2013 and has a total budget of EUR 53.2 billion. FP7 is made up of four broad programs – cooperation (collaborative research), ideas (European Research Council), people (human potential, Marie Curie actions) and capacities (research capacity). Through these four specific programs, the aim is to create European 'poles of excellence' across a wide array of scientific themes, such as information technologies, energy and climate change, health, food and social sciences.

The main aims of FP7 are to increase Europe's growth, competitiveness and employment. This is done through a number of initiatives and existing programs to finance grants to research actors all over Europe, usually through co-financing research, technological development and demonstration projects. Grants are determined on the basis of calls for proposals and a peer review process. However, access to funding is restricted to organizations based in the EU.

Take the European Research Council, established in 2007, which has 7.5 billion Euros (\$9.9 billion US) to support it through its first seven years<sup>7</sup>. Researchers from outside Europe (including researchers based in the US) are eligible to apply so long as they plan to move to work at a European host organization. "The ERC actively

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<sup>6</sup> [http://ec.europa.eu/research/fp7/index\\_en.cfm](http://ec.europa.eu/research/fp7/index_en.cfm)

<sup>7</sup> ERC grants will provide each recipient with between 500,000 and 2 million Euros (\$660,000 -- \$2.6 million US) to support their work for up to five years. Around 200 grants are expected to be awarded each year, and the first call for proposals is now open to researchers who gained their PhDs between two and nine years ago.

encourages researchers to come and work in Europe...<sup>8</sup> . “ERC funds are open to any scientist (of any nationality) based in the EU.”<sup>9</sup> This contrasts for instance with the funding policy of the US- National Institute of Health - the NIH website lists 188 grants made in 2007 to researchers based outside of the US, some for close to \$1 million.

The EU's restrictive approach to international cooperation in science and technology is further emphasized in the EC's policy document, discussed below, that describes Europe's *Innovation Union* commitments. An important objective is to “ensure that leading academics, researchers and innovators reside and work in Europe and to attract a sufficient number of highly skilled third country nationals to stay in Europe [underlining added, DE”<sup>10</sup>.

The FP7 Work Programme for 2012 with about €7 billion is the European Commission's biggest ever funding package under the EU's Seventh Framework Programme for Research (FP7). It is expected to create around 174 000 jobs in the short-term and nearly 450 000 jobs and nearly €80 billion in GDP growth over 15 years. EU-based universities, research organizations and industry will be among more than 16.000 funding recipients. Special attention will be given to SMEs, including a package close to €1 billion.

### ***Insert Graph 1- EC FP7 Budget for ICT, 2007 to 2013[billion EUR]<sup>11</sup>***

The EU industrial R & D investment scoreboard shows that R & D investment by the top 1,000 EU companies grew by 8.1 % in 2008 despite the economic crisis that took hold in the second half of the year. This rate of growth was faster than that recorded for companies from either Japan or the United States, although higher R & D investment growth was registered by companies based in the emerging economies of China and India<sup>12</sup>.

In terms of R&D intensity however, the EU continues to lag behind Japan and the US. At 1.6%, the EU-27's 2010 share of R&D expenditure in GDP trails with a

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<sup>8</sup> Fotis Kafatos, president of the ERC and chairman of its Scientific Council, quoted in “ERC launched today”, *The Scientist - Magazine of the Life Sciences*, February 27, 2007

<sup>9</sup> European Commission spokesperson Antonia Mochan, quoted in Pincock, Steven, 2007, “Could U.S. Scientists Get E.U. Funding?” *Key Enabling Technologies. Final Report*, June

<sup>9</sup> [http://ec.europa.eu/research/fp7/index\\_en.cfm](http://ec.europa.eu/research/fp7/index_en.cfm)

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<sup>9</sup> Fotis Kafatos, president of the ERC and chairman of its Scientific Council, quoted in “ERC launched today”, *The Scientist - Magazine of the Life Sciences*, April 19, 2007

<sup>10</sup> EC, 2010, *Europe 2020 Flagship Initiative Innovation Union. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions* [http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-union/communication/iu\\_en.pdf](http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-union/communication/iu_en.pdf), , page 27

<sup>11</sup> See Appendix.

<sup>12</sup> [http://iri.jrc.ec.europa.eu/research/scoreboard\\_2009.htm](http://iri.jrc.ec.europa.eu/research/scoreboard_2009.htm). Volkswagen had the highest level of R&D investment (EUR 5 930 million) among EU companies in 2008, while Nokia was also among the global top 10, which was led by Toyota Motors (Japan) and Microsoft (United States).

considerable margin Japan's 3.3% share and the U.S.'s 2.7% share<sup>13</sup>. Among the member states, Germany dominates – at 2.54%, its share of R&D expenditures in GDP is much larger than the EU-27 share. More importantly, however, Germany had by far the highest number of patent applications to the EPO, some 22 675 in 2006 (43.0 % of the EU-27 total). In relative terms, Germany was also the Member State with the highest number of patent applications per million inhabitants (275.1), followed by Sweden (243.2) and Finland (226.3)<sup>14</sup>.

Hence it is important to emphasize that national innovation policies continue to differ quite substantially across Europe, both in their overall strategic vision, and in their effectiveness.

### 3. Germany's evolving innovation policy

Take Germany, the continent's dominant economic power. A defining characteristic of the German innovation system is its specialization on high and medium-high technology combined with efficient production and innovative products and services. Germany has a large and diversified science and technology (S&T) base, it is one of the nations in the world with the biggest R&D capital stock, and the output of innovation in terms of patents, new products and high productivity is significant in a European context. Germany has a mature national innovation system, which includes a number of large, well-established research institutions and companies; it has a large and growing share in total OECD high- and medium-high-technology exports, and is the fourth most intensive in applying for patents in the OECD area (adjusted for population)<sup>15</sup>.

The German innovation system is shaped by the needs of four sectors: the automotive sector, mechanical engineering, chemicals and electronic equipment. The main national innovation policy making bodies in Germany are the Ministry of Education and Research (at the Federal level) and the Ministry of Economics and Technology (for innovation-oriented programs). Germany's innovation policy focuses primarily on improving the framework conditions for innovation and on facilitating commercialization. Four main objectives define Germany's innovation policy<sup>16</sup>:

- To improve the innovative capacities of SMEs and to increase collaboration with research establishments;
- To increase the number of knowledge-based business start-ups;
- To strengthen key industrial technologies (energy, transport, aviation, shipbuilding, space research) and cross-sectoral technologies (information technologies, multimedia);
- To strengthen the linkages between industry and research within regional networks and clusters;
- To improve the climate for investment and consumption (supported by policies aiming at innovation in public procurement, innovation-friendly standards, and lower taxes);

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<sup>13</sup> Battelle, *2010 Global R&D Funding Forecast* (R&D Magazine, December 2009), 23, <http://www.battelle.org/aboutus/rd/2010.pdf>

<sup>14</sup> Eurostat, *2010 Yearbook*, p. 606

<sup>15</sup> OECD (2010) SCIENCE AND INNOVATION: COUNTRY NOTES Germany <http://www.oecd.org/dataoecd/17/40/41559102.pdf>

<sup>16</sup> BMWi (Federal Ministry of Economics and Technology) (2011) Policies for innovation and technology <http://www.bmwi.de/English/Navigation/technology-policy.html>

- To develop technology leadership positions in climate change, health, mobility and security.

These efforts have culminated in 2006 in the launch of Germany's *High-Tech Strategy*, the first comprehensive national innovation strategy developed to include all ministries in Germany<sup>17</sup>. Endowed with an initial three-year budget of EUR 14.6 billion, the aim of this strategy is to strengthen Germany's position in 17 priority fields of technology development, with a focus on space, energy, information and communications, health and medical systems, automotive and traffic, nano and biotechnologies.

Of particular interest from a US perspective is the holistic approach that Germany is now pursuing. In January 2011, the Ministry of Economics and Technology launched the *Technology Offensive* which focuses on improving innovation framework conditions, on raising the innovation performance of the German SMEs, and on supporting key technologies<sup>18</sup>. For China, Taiwan and Korea, such an integrated and comprehensive approach to innovation is in line with key elements of their own innovation strategies<sup>19</sup>.

#### 4. Towards an Integrated EU-wide Innovation Strategy

Germany's move towards an integrated innovation strategy is emblematic for a growing trend within the EU to adopt a much more strategic approach to innovation.

In 2000, the EU decided to create the European Research Area (ERA) - a unified area all across Europe to create a "single innovation market". Main objectives are to:

- "enable researchers to move and interact seamlessly, benefit from worldclass infrastructures, and work with excellent networks of research institutions;
- share, teach, value and use knowledge effectively for social, business and policy purposes;
- optimise and open European, national and regional research programmes in order to support the best research throughout Europe and coordinate these programmes to address major challenges together;
- develop strong links with partners around the world so that Europe benefits from the worldwide progress of knowledge, contributes to global development and takes a leading role in international initiatives to solve global issues."<sup>20</sup>

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<sup>17</sup> Federal Ministry of Education and Research (BMBF) (2011) High-Tech Strategy <http://www.hightech-strategie.de/en/350.php>

<sup>18</sup> BMWi (Federal Ministry of Economics and Technology) (2011), Technologieoffensive, <http://www.bmwi.de/BMWi/Redaktion/PDF/Publikationen/Technologie-und-Innovation/technologieoffensive-des-bmwi,property=pdf,bereich=bmwi,sprache=de,rwb=true.pdf> In the key technologies, focus is on developing energy-efficient solutions as the German government aims at cutting its energy usage in half by the year 2050. Furthermore, focus is on developing the electrical cars industry, aerospace industry, and aviation via several research programs.

<sup>19</sup> For China, see Ernst, 2011. For Taiwan, see Ernst, D., 2011, *Industrial Upgrading Through Low-Cost and Fast Innovation-Taiwan's Experience*, East-West Center Working Papers, Economics Series, no. 126, December, <http://www.EastWestCenter.org/pubs/33186>. For Korea, see OECD, 2009, *OECD Reviews of Innovation Policy – Korea*, OECD, Paris, and Ernst, D., 2000, "Catching-Up and Post-Crisis Industrial Upgrading. Searching for New Sources of Growth in Korea's Electronics Industry", in: Deyo, F., R. Doner and E. Hershberg (editors), *Economic Governance and Flexible Production in East Asia*, Rowman and Littlefield Publishers.

<sup>20</sup> [http://ec.europa.eu/research/era/index\\_en.htm](http://ec.europa.eu/research/era/index_en.htm)

In December 2008, the Competitiveness Council adopted a 2020 ERA vision, which seeks to increase the Europe-wide mobility of innovation capabilities through the introduction of a ‘fifth freedom’ across the ERA – namely, the free circulation of researchers, knowledge and technology. And in 2010, confronted with severe budget constraints and pervasive austerity policies, the EC pushed the idea of a single innovation market one step further to maximize EU-wide economies of scale and scope of innovation efforts. Entitled “Innovation Union”, this integrated innovation strategy takes “a medium- to longer-term perspective, where all policy instruments, measures and funding are designed to contribute to innovation, where EU and national/regional policies are closely aligned and mutually reinforcing, and last but not least, where the highest political level sets a strategic agenda, regularly monitors progress and tackles delays.”<sup>21</sup>

Europe’s *Innovation Union Strategy* identifies three main challenges for innovation policy:

- “Under-investment in our knowledge foundation. Other countries, like the US and Japan, are out-investing us, and China is rapidly catching up.
- Unsatisfactory framework conditions, ranging from poor access to finance, high costs of IPR to slow standardisation and ineffective use of public procurement. This is a serious handicap when companies can choose to invest and conduct research in many other parts of the world.
- Too much fragmentation and costly duplication. We must spend our resources more efficiently and achieve critical mass.”<sup>22</sup>

In short, the move towards an EU-wide integrated innovation strategy now seems to strengthen again the role of public policy relative to market forces. There are signs that, in response to the fiscal crisis and the threat or renewed recession, Europe may reverse the move towards greater openness and internationalization of its innovation system. As a result, technological techno-nationalism may again shape Europe’s innovation policy.

## 5. The EU’s Key Enabling Technologies (KET) program

An interesting attempt to operationalize Europe’s integrated innovation strategy is the EU’s Key Enabling Technologies (KET) program<sup>23</sup>.

The European Commission six KETs for Europe, i.e. nanotechnology, micro- and nano-electronics, advanced materials, photonics, industrial biotechnology and advanced manufacturing systems<sup>24</sup>. The selection criteria included their economic potential, their value adding and enabling role as well as their technology and capital intensity regarding R&D and initial investment costs.

KETs are defined as “knowledge and capital-intensive technologies associated with high research and development (R&D) intensity, rapid and integrated innovation cycles, high capital expenditure and highly-skilled employment. Their influence is

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<sup>21</sup> EC, 2010, *Europe 2020 Flagship Initiative Innovation Union. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions* [http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-union/communication/iu\\_en.pdf](http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-union/communication/iu_en.pdf), , page 2

<sup>22</sup> *ibid.*, page 2

<sup>23</sup> EC, 2011, *High-Level Expert Group on Key Enabling Technologies. Final Report*, June

<sup>24</sup> EC, 2009, *Preparing for our future: Developing a common strategy for key enabling technologies in the EU*, Commission Communication (COM(2009)512): ”.

pervasive, enabling process, product and service innovation throughout the economy. They are of systemic relevance, multidisciplinary and trans-sectorial, cutting across many technology areas with a trend towards convergence, technology integration and the potential to induce structural change”<sup>25</sup>. As illustrated in the graph below, KETs are embedded in advanced products and they underpin innovation chains.

### ***Insert Graph 2 - Key enabling technologies and innovation chains***

Multi-core processors and parallel software development, two key technologies required for Advanced Computing, both seem to fit the KET definition, as they are knowledge intensive and associated with high R&D intensity, rapid innovation cycles, high capital expenditure and highly-skilled employment. Like other KETs, advanced computing provides potential first mover advantage, and enables the owner of relevant intellectual property rights to create new lead markets as new technologies substitute old technologies with few or no other players.

An important concern of the EU's KET program is to develop policies that could help to reduce the deeply engrained barriers to industrial innovation. In essence, the KET concept is shaped by the fundamental question: *Why are breakthrough ideas, inventions and discoveries (that were developed with public R&D funds) not transformed into commercially successful innovations within reasonably short time frames?*

The EU KET program suggests thinking about innovation barriers as multiple “Valleys of death” that disrupt the process of innovation between basic knowledge generation and technology development, and between technology development and commercialization of those technologies, i.e. their timely deployment to relevant markets. To capture the systemic nature of innovation barriers, the EU KET program suggests a holistic analysis of multiple causes and their interactions

### ***Insert Graph 3 - Crossing the Valleys of Death***

As shown in the above **graph**, crossing the Valleys of Death requires solutions that allow to bridge three successive gaps:

First, effective “technological research” is necessary to transform “the ideas arising from fundamental research into technologies competitive at world level. These should be both shown through proofs of concept and be proprietary, that is protected by patents”.(EC 2011: page 25).

Second, during “product development”, new technologies need to be effectively exploited to make innovative and cost-effective process and product prototypes internationally competitive. This involves the very costly development of prototypes and pilot production lines to demonstrate manufacturability.

Third, globally competitive advanced manufacturing facilities are needed to speed-up the introduction of new products and processes to relevant markets. Without large-scale advanced manufacturing facilities, even the most sophisticated technological capabilities are of little use to generate jobs through improved international competitiveness. In short, overcoming innovation barriers of the Valleys of Death

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<sup>25</sup> EC, 2010, *Current situation of key enabling technologies in Europe*, Commission Staff Working Document (SEC(2009)1257)

requires the parallel development of R&D-based technological (hard) capabilities and the development of advanced manufacturing capabilities. This requires a concerted Europe-wide strategy that can draw on patient financial and political capital.

The strategic focus of the EC's KET program is derived from an analysis of the impact of persistent innovation barriers. Barriers to industrial innovation not only can disrupt feedback links across the innovation chain. They can also induce European companies to relocate R&D to more attractive locations (innovation offshoring through global innovation networks<sup>26</sup>). For instance, a recent EU report finds "an increasing tendency for European technology know-how financed through national and/or European public funds to be further developed and commercialised outside Europe. Thus, the EU and the Member States are not reaping the possible benefits of their investments in R&D." (Larsen, 2011: p.35)

In short, product development and research will take place in those countries that offer the most favorable incentives and infrastructure for innovation. If the above barriers to innovation persist, the technologies developed in the EU (which are most often funded by public funds out of taxes) may be deployed in countries like China that offer more attractive conditions. Hence, there is a real danger that publicly funded development of new technologies might benefit primarily multinational corporations and their preferred offshore R&D locations, in terms of jobs and growth.

To overcome the above deeply entrenched innovation barriers, the EU's KET program proposes a broad range of coordinated support policies that cover all stages of the "innovation chain", from basic research, through technological research, product development and prototyping up to globally competitive manufacturing. Those policies include (but are not restricted to):

- Massive investments needed to reform the education system across all levels. This is of fundamental importance, as new enabling technologies, such as advanced computing, require new skills and competencies, especially "trans-disciplinarity...[that] ... requires competencies that current linear training and education cannot supply." (EC, KET, 2011: p.38).
- Smart regulations that address the requirements of key enabling technologies.
- Concerted efforts to integrate standards and innovation policies, so that standards can drive markets and build consumer confidence.
- Sophisticated forms of government procurement are needed for generating a critical mass in markets, knowledge, investments and skills. European government agencies can act as "lead users"<sup>27</sup> and "use government procurement to test new ideas and drive innovation in various technology domains." (EC, 2011 KET: p.11)
- Encourage broader cooperation along the innovation chain, by establishing "industrial innovation dialogues". Of particular importance are policies that strengthen SMEs and foster their participation in multiple innovation networks.
- Establish private-public partnerships in R&D funding. For those partnerships to work, it is necessary that private industry " - apart from adequate private

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<sup>26</sup> Ernst, 2009

<sup>27</sup> Von Hippel defines "lead users of a novel or enhanced product, process, or service" as those that "...face needs that will be general in the market place, but...(who) face them months or years before the bulk of that marketplace encounters them..." and who will "... benefit significantly by obtaining a solution to those needs." (Von Hippel, 1988, p.107)

financing - make[s] commitments such as, for example to create jobs, involve ...[domestic] lead customers and/or suppliers (preferentially SMEs) to ensure ... [domestic] added value, use of pilot line for appropriate skills / education training, install pilot lines and establish .... [domestic] manufacturing facilities....” (EC, 2011 KET: p.35).

Specifically, the EC KET program identifies the following five priority areas for Europe's evolving EU-wide innovation strategy:

- Sustain a critical mass in knowledge and funding through effective use of economies of scale and scope;
- Increase market focus of R&D projects;
- Invest in large scale demonstrators and pilot test facilities;
- Provide post-R&D commercialization support
- In the new world of ubiquitous globalization, an important policy tool is trade diplomacy “...to reduce unfair subsidies... and ... to protect ... [domestic] ... companies from unfair trade practices.” (p.33).

The last policy priority is of particular concern for both the US and for Asia's emerging economies. In fact the EU's KET program culminates in a fairly “techno-nationalist” notion of IPR protection:

*“ the EU should clearly promote an "in Europe first" IP policy. At the start of any project, consortium partners should have to demonstrate in their proposal that they have a clear IP plan for both the ownership and first exploitation of IP resulting from the project within the EU. At the end of any project, rules should be implemented to favour the EU exploitation of the results of projects. For example, the European Commission should have discretion over whether to allow a Public Research Organisation or an industrial company to license such results to a non-EU party and to decide whether reimbursement of all or part of the funding received for the R&D project was required within a reasonable timeframe. Moreover, it should not be possible to sublicense the access rights of industrial companies to the results of the other partners of the consortium. The affiliates' definition should also be restricted to European affiliates in order to avoid circumvention.”(EC, KET 2011 report: p.37)*

## Conclusions

An important message of the paper is that Europe's emerging “*Innovation Union*” signals a fundamental change in its innovation policy. Under pressure from a deeply entrenched fiscal crisis and increasingly severe austerity policies, we detect signs that Europe might slow down the move towards greater openness and internationalization of its innovation system.

The paper highlights two indicators of a resurgence of techno-nationalism: (i) researchers from outside Europe (including researchers based in the US) are eligible to apply for EU public R&D funds only if they move to work at a European host

organization, and (ii) the EU's recent Enabling Technologies (KET) program stipulates that "the EU should clearly promote an "in Europe first" IP policy".

However, the paper also emphasizes that this transformation is still "work in progress." Given the deep integration of Europe into the international economy – especially for Germany, Europe's lead economy – a return to techno-nationalism might produce highly negative effects for Europe's exports and overseas investments. Hence, opposition to a revival of techno-nationalism is bound to be strong and might as yet deflect the pressure induced by the fiscal crisis to resort to technology-related protectionism.

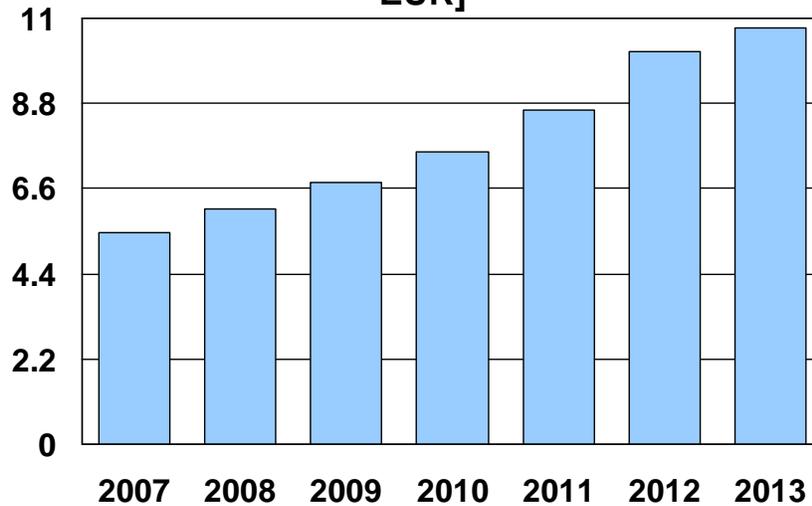
Finally, on the positive side, Europe's move towards an integrated EU-wide Innovation Strategy might provide important lessons for both the US and Asian emerging economies of how to combine market-led innovation and policy coordination of public-private innovation partnerships.

It is thus critically important for both the US and Asian countries to examine the defining characteristics and key building blocks of the Europe's evolving EU-wide Innovation Strategy.

Appendix

Graph 1

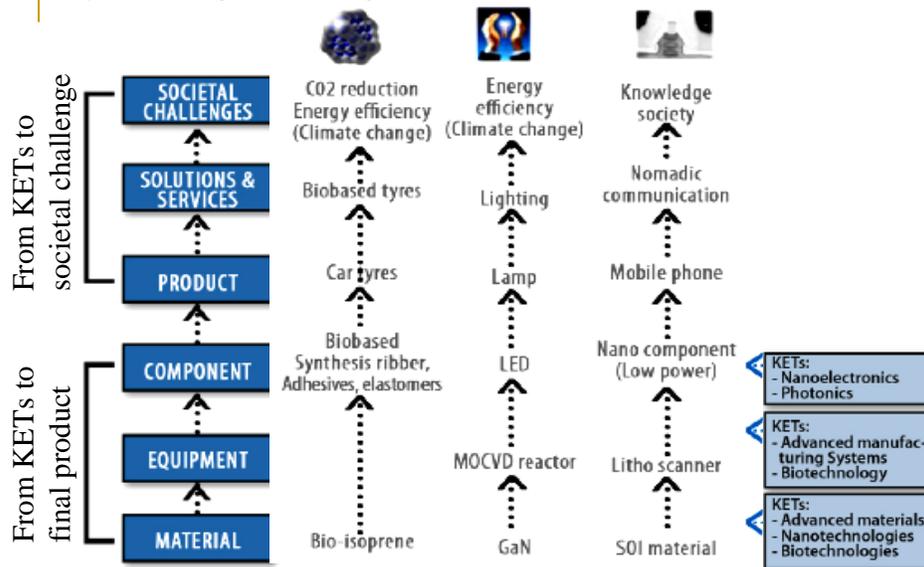
EC FP7 Budget for ICT, 2007 to 2013 [billion EUR]



[http://ec.europa.eu/research/fp7/index\\_en.cfm?pg=budget](http://ec.europa.eu/research/fp7/index_en.cfm?pg=budget)

Graph 2

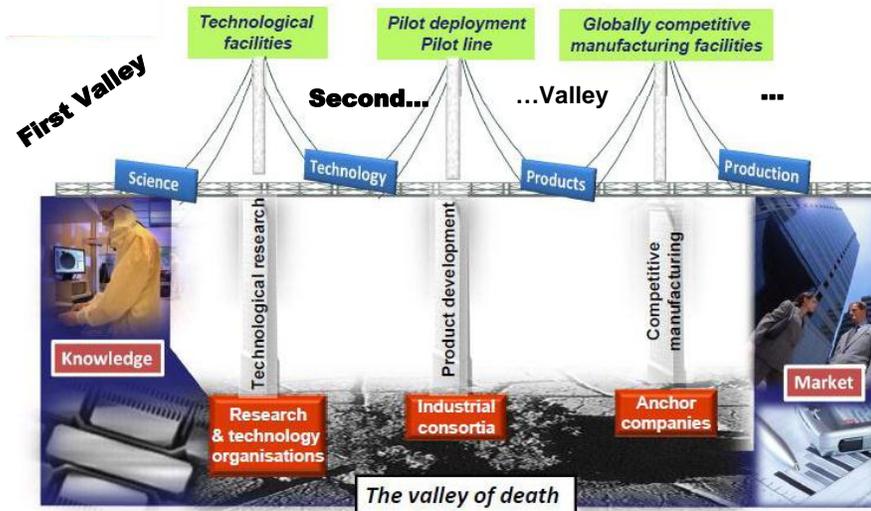
Key enabling technologies & Innovation chains



EC, KET 2011 report

### Graph 3

## Crossing the Valleys of Death



Adapted from Larsen et al, 2011

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