

## **Demand-side Innovation Policies**

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# Demand-side Innovation Policies

Please note that the report has been subject to revision following discussion by a number of national policy makers in the context of the Enterprise Policy's sub-group on innovation.

## 1 Introduction

### 1.1 Background

The European Commission's Directorate-General for Enterprise and Industry is interested in learning about demand-side innovation policies being implemented in EU Member States.

Demand-side innovation policy instruments may be defined as a set of public measures to increase the demand for innovations, to improve the conditions for the uptake of innovations, and/or to improve the articulation of demand in order to spur innovations and the diffusion of innovations<sup>1</sup>. According to Edler (2009), such a broad definition of demand-based innovation policies implies twin rationales, namely to promote and stimulate innovation and to increase the diffusion of innovation. In addition, this second rationale, the diffusion of innovation, further implies that the concept of innovation extends beyond the scope of 'new to the world' and encompasses innovations that are new to a firm or to a certain geographical space.

From the policy perspective, in recent communications, the Finnish Ministry of Employment and the Economy have noted that, 'innovations achieved by increasing or strengthening demand, i.e. *demand innovations* refer, according to the current perception, to the concept of using policy to increase or strengthen the demand base, that is the market, which in turn should enable enterprises to gain a better return on their innovation efforts. However, the issue is such a new one in policy making that as yet there is no generally accepted definition'.<sup>2</sup>

Why does innovation policy in Europe need to extend to demand-side innovation policy measures? While Europe plays a leading role in science and in fostering the development of science and technology graduates, it seems less successful in converting science-based findings into commercially and societal valuable innovations. At the same time, markets have long been recognised as important drivers of innovation and, more recently, as a target for innovation policy.

More innovation-friendly market framework conditions are necessary in Europe to reduce the time-to-market (as opposed to the time-to-firm) of new goods and services and to enable emerging sectors to grow faster. The improvement of market framework conditions is done by demand-side policies. As a result, companies will see a quicker return on their research and development (R&D) and innovation investments. At the same time, public investment in R&D and innovation programmes should attain greater outputs as measured, for example, by jobs, new-to-market products and patents. The concept most used in academic literature (see Beise 2001), however, stresses that successful innovation must orient the particular design (conceptually, technically and aesthetically) of an innovation to meet the needs of those customers that will set upcoming trends in demand. The key challenge of following a lead market approach to innovation is to identify the markets that will define future trends in demand.

Demand-side innovation policy complements supply-side policy, which mainly uses public investment through grants and other avenues to stimulate innovation in the EU, in Member States, regions or cities. Thus, demand-side policy measures operate alongside supply-side measures, rather than replacing them. According to Edler (2009), the rationale for demand-based policies rests on four pillars:

- (1) innovation policy: overcoming system failures;
- (2) societal goals and policy needs;
- (3) industrial/economic policy: (a) modernisation;

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<sup>1</sup> Edler, J. (2009) 'Theme 5: demand policies for innovation in EU CEE countries'. Paper presented at the workshop Innovation for Competitiveness INCOM Prague / 22-23 January 2009.

<sup>2</sup> <http://www.tem.fi/?l=en&s=2853>

- (4) industrial/ economic policy: (b) pushing local innovation production and creating Lead Market potential.

Market size, the factor that most strongly influences the amount of demand, is clearly influenced by a range of policies. One of the most influential, for example, is the general level of taxation to stimulate end-user demand for innovation, which can affect demand very rapidly. Taxation may also be used as an instrument to influence markets, i.e. drive demand, in specific sectors<sup>3</sup>. However, current innovation policy discussions tend to focus on demand innovations relating to public procurement, regulations and standards, and lead markets. Edler (2009) provides a typology of demand oriented measures (see Table 1).

Demand-side measures may be deliberately linked to other demand-side measures, and also to a range of supply-side instruments. Indeed, this would seem to be a logical prerequisite: policies that promote the demand for innovation must be accompanied by policies that ensure that innovation is in place to be able to meet that demand. Examples of complementary supply-side policies would include, in addition to the more traditional innovation promotion instruments, measures that supported cooperation between users and suppliers, instruments to support user-led innovation, and measures to enhance public confidence in innovation, such as consumer protection regimes.

The Lead Market Initiative (LMI) for Europe<sup>4</sup> is aimed at fostering the emergence of lead markets<sup>5</sup>, i.e. markets with potentially high economic and societal value. The LMI rests on two main pillars: the identification process of six lead market areas that act as pilot market for this approach, and the implementation of their action plans (policy coordination). Six markets have been identified as part of the LMI: eHealth, protective textiles, sustainable construction, recycling, bio-based products, and renewable energies.

These markets are highly innovative, respond to customers' needs, have a strong technological and industrial base in Europe and, to a greater extent than other markets, depend on the creation of favourable framework conditions through public policy measures. The 2007 LMI Communication<sup>6</sup> stressed that any preferential policy treatment for certain sectors or 'picking the winners' should be avoided.

A tailored plan of action for the next three years has been formulated for each market. The LMI consists of coordinated priority actions in each market area, which should lower barriers to bring new products or services into the market. The LMI represents a sort of 'demand-side policy mix', in that it uses a number of demand-side policy instruments that work in synergy. These measures are described in the action plans.

The added-value of the initiative is about developing a prospective, concerted and tailored approach of regulatory and other policy instruments, including legislation, public procurement, standardisation, labelling, certification, and complementary instruments. While the LMI is not primarily about direct funding, the Seventh Framework Programme (FP7), the Competitiveness and Innovation Framework Programme (CIP), and Structural Funds (SFs) may nevertheless potentially fund activities that could support the LMI and its aspirations.

Although the action-plans mainly contain EU-wide measures, the LMI approach and/or the action plans' activities could be linked to ongoing and planned activities in Member States and regions, taking into account the subsidiarity principle. Following the outcome of the mid-term review in September 2009, discussions during the Swedish Presidency in the second half of 2009 will be initiated on the question of whether and how to extend the LMI to include other market areas.

This policy brief seeks to identify those countries in which policy debates and policy adaptations have been taking place, at what levels, which sectors and actors have been impacted or targeted, how have any such initiatives been coordinated, and whether the LMI has influenced national policies.

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3 <http://www.tem.fi/?l=en&s=2853>

4 Further information: <http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm>

5 A 'lead market' is the market of a product or service in a given geographical area, where the diffusion process of an internationally successful innovation (technological or other) first took off and is sustained and expanded through a wide range of different services and products. A 'lead market' is not necessarily the country or market where the innovation was first developed or even used for the first time.

6 COM(2007) 860 final.

Finally, it looks for examples of successful demand-side policies at national or regional levels that could be taken up at EU level.

**Table 1 Typology of demand-oriented measures**

Instrument	Role of State	Functioning
<b>Public demand</b>		
General procurement	Buy and use	State actors consider innovation in general procurement as main criterion (e.g. definition of needs, not products, in tenders).
Strategic procurement (technology-specific)	Buy and use	State actors specifically demand an <i>already existing</i> innovation in order to accelerate the market introduction and particularly the diffusion. This can include the targeted coordination of different government bodies and moderation with manufacturers.
		State actors stimulate deliberately the <i>development</i> and market introduction of innovations by formulating new, demanding needs. This can include the targeted coordination of different government bodies and moderation with manufacturers.
Cooperative procurement	Buy/use moderation	State actors are <i>part of a group of demanders</i> and organises the coordination of the procurement and the specification of needs. Special form: <i>catalytic</i> procurement: the state does not utilise the innovation itself, but organises only the private procurement.
<b>Direct support for private demand</b>		
Demand subsidies	Co-financing	The purchase of innovative technologies by private or industrial demanders is directly subsidised.
Tax incentives	Co-financing	Amortisation possibilities for certain innovative technologies.
<b>Indirect support for private and public demand: information and enabling (soft steering)</b>		
Awareness building measures	Informing	State actors start information campaigns, advertise new solutions, conduct demonstration projects (or supports them) and try to create confidence in certain innovations (in the general public, opinion leaders, certain target groups).
Voluntary labels or information campaigns	Supporting Informing	The state supports a coordinated private marketing activity which signals performance and safety features.
Training and further education	Enabling	The private consumers or industrial actors are made aware of innovative possibilities and simultaneously placed in a position to use them.
Articulation and foresight	Organising discourse	Societal groups, potential consumers are given voice in the market place, signals as to future preferences (and fears) are articulated and signalled to the marketplace (including demand based foresight).
<b>Regulation of demand or of the interface demander – producer</b>		
Regulation of product performance and manufacturing	Regulating, controlling ('command and control')	The state sets norms for the production and introduction of innovations (e.g. market approval, recycling requirements). Thus demanders know reliably what certain products perform and how they are manufactured. The norm affects firstly the producer (norm fulfilment), but spreads to the demander by means of the information about norm fulfilment.
Regulation of product information		
Usage norms		
Support of innovation-friendly private regulation activities	Moderating	The state stimulates self-regulation (norms, standards) of firms and supports or moderates this process and plays a role as catalyst by using standards.
Standards to create a market	Moderating, organising	State action creates markets for the consequences of the use of technologies (emission trading) or sets market conditions which intensify the demand for innovations.
<b>Systemic Approaches</b>		
Integrated demand measures	Combination of roles	Strategically coordinated measures which combine various demand-side instruments.
Integration of demand- and supply-side measures	Combination of roles	Combination of supply-side instruments (R&D programmes) and demand-side impulses for selected technologies or services.

Source: Edler 2009, modified

## 1.2 Methodology

The information contained in this report is based on supporting information provided by the INNO-Policy TrendChart Network of National Correspondents<sup>7</sup> and was collected by means of a brief questionnaire (annexed to this document).

Specifically, the questionnaire sought information on the issues, as follows.

1. The level of debate on the need to complement 'traditional' supply-side innovation policies with demand-side policies (legislation, public procurement, standards, labelling).
2. The existence of programmes specifically implementing these types of measures.

<sup>7</sup> See list of TrendChart correspondents per country at: <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=261&parentID=52>

3. The existence of specific 'lead-market' policies.
4. The focus (in terms of sectors or groups of actors) of such policies.
5. The level of implementation of such policies and the identification of the responsible lead agencies.
6. Mechanisms for the coordination and coherence of such policies.
7. Evidence of national or regional policy developments influenced by the Lead Market Initiative and examples of successful policies that could be taken up at the EU level.

At the time of analysis, responses had been received for the countries noted below.

Austria	Czech Republic	Iceland	Lithuania	Slovakia
Belgium	Denmark	India	Luxembourg	Slovenia
Brazil	Estonia	Ireland	Malta	Spain
Bulgaria	Finland	Israel	Netherlands	Sweden
Canada	France	Italy	Norway	Switzerland
China	Germany	Japan	Poland	Turkey
Croatia	Greece	Latvia	Portugal	UK
Cyprus	Hungary	Liechtenstein	Romania	USA

Note: orange highlight indicates no response.

The results are synthesised in the following sections.

The author gratefully acknowledges the inputs from the Network of National Correspondents, and assistance from Lisa Murray.

## 2 Debate and demand-side policies

An analysis and summary of the responses is included here to present a snapshot overview, while avoiding going into too much detail. The specific question posed here was:

*In your country, is there (or has there been) a debate on the need to complement 'traditional' supply-side innovation policies with **demand-side policies** (legislation, public procurement, standards, labelling)? Are there programmes specifically implementing these types of measures?*

### 2.1 Debate and policy

Responses tended to be grouped into four broad categories; those where, for various reasons: (1) no or very little specific debate has taken place (e.g. Estonia, Greece, Hungary, Ireland, Italy<sup>8</sup>, Slovakia, Slovenia and Switzerland); (2) those where debate is beginning to consider the need for demand side innovation policies (e.g. Bulgaria, Czech Republic, India, Latvia, Lithuania, Malta and Poland); (3) those where debate has focused on related demand-side aspects (e.g. Austria, Belgium, Brazil, China and Denmark); and (4) those where there is a strong and ongoing debate on linking demand-side policies to innovation policy (e.g. Finland, Germany, France, Ireland, the Netherlands, Norway, Spain, Sweden and the UK).

Examples of related demand-side aspects notably focus on the sustainability agenda and include 'green' public procurement, energy-efficient construction and transport, power generation projects using renewable energy sources, bio-fuels, infrastructure for waste management (e.g. Austria, Flanders, Cyprus, Italy, Liechtenstein, Lithuania and Sweden). However, other areas also receive significant attention, such as ICT (e.g. e-government, e-health, e-learning, and e-commerce) and software, infrastructure renewal, public administration, and so forth.

In this context, the use of regulation or legislative change is often cited (e.g. over the use of solar power generation or construction and other industry standards in Belgium, Canada, Ireland and Japan, along with tax concessions, subsidised purchases, and so forth. In general, demand-side policies are often implemented as a mix of public procurement procedures, legislation, and direct

<sup>8</sup> Although some recently introduced programmes to support research and innovation highlight the importance of integrating supply and demand-side policies, notably 'Industria 2015', the industrial innovation programme.

financial incentives (as in Liechtenstein or France, for example). The development of standards has been discussed by several governments as an instrument to spur innovation, with the environmental and service sectors as potential key areas. Lithuania, for example, implements its demand-side related policies through a mixture of direct grants for innovative environmental and energy projects (under SF operational programmes), regulation and legislation (participation in international agreements on renewable energy sources) and implementation of international environmental, energy saving standards, and so forth, in construction and industry.

In some cases, these major public procurement initiatives have been mooted as ways of stimulating the economy and mitigating the effects of the recession. For example, in Austria, it was proposed that the government act as a first mover in the purchase of electric cars to stimulate the automotive industry, and Iceland has focused policy attention on innovation, stimulated by public procurement, as one possible way out of its crisis. Meanwhile, other countries (e.g. Sweden and the UK) have looked afresh at the old models of public procurement as a means to stimulate innovation. In other cases, however, public procurement is generally seen as a policy tool for the support of R&D policy, in areas such as industrial R&D, defence R&D, health R&D, and so forth (e.g. Portugal). Japan has been particularly active, for instance, in the regulation of medical R&D as a way to stimulate innovation.

Some countries (e.g. Denmark and the US) have utilised outsourcing policies and other measures (i.e. privatisation of public sector services) to increase competition within the public sector, with the aim of improving quality and efficiency, potentially via product and service innovations, and reducing the cost of public services. In the Danish case, however, the outcome has been ambiguous. In addition, countries may adopt public policies and programmes (e.g. on environmental protection, energy supply, ICT dissemination, construction, recycling, and so forth) that have a positive although indirect impact on innovativeness and innovation performance, and which are not primarily considered as demand-side policies.

TrendChart correspondents have identified barriers to the development of demand-side policies in a number of countries, such as a long-standing policy reliance on 'traditional' supply-side measures (e.g. Bulgaria, China, Croatia, Czech Republic, France and Latvia), a focus on export promotion (e.g. Israel), low policy planning potential and limited experience of the public administration (e.g. Greece), limited size of the public economy and its power to effectively utilise procurement measures (e.g. Estonia and Ireland) or a lack of critical mass in the private sector to allow utilising such measures (e.g. Croatia).

In the US, recent federal level activity has placed greater emphasis on enhancing framework conditions (e.g. tax credits) rather than on explicit policies to encourage user-led demand policies, although SBIR-type R&D public procurement schemes have been running successfully for decades. More demand-side activity takes place at the state level, where current efforts focus on the use of standards (e.g. at more stringent levels than at the federal level) to encourage innovation in alternative and renewable fuels and sustainability.

Nevertheless, in several countries, debate has led to the formulation and implementation of policies (e.g. Malta, and Poland) or specific programmes to support demand-side innovation (e.g. Belgium, Canada, the Netherlands, Norway, and so forth). See Section 2.2 below.

The role of demand may also be an implicit feature of innovation policy. For example, in Germany, innovation policy is strongly organised along thematic areas and fields of technology. Through stakeholder involvement and thematic reports, policy makers are well informed about the specific needs for successful innovation in their area, including issues such as regulation, standard setting, the role of public demand and the need to communicate with lead customers, and to balance new technology development with the requirements of customers and users. Thus, in practice, demand-side policies are integrated into thematic R&D and innovation programmes (i.e. the Pharmaceutical Initiative) or regulations that aim to foster innovation (such as in the area of environmental policies). As a corollary, there are no specific demand-side innovation policy measures, as such.

## **2.2 Demand-side policies**

Some selected examples of policies that are related to demand-side innovation policies are included below.

### **Sectoral focus**

- The Flemish MIP (Environmental and energy technology Innovation Platform), which coordinates policies in the areas of energy, environment and innovation, and support for the pilot phase of an

action plan on Innovative Procurement and the establishment of a knowledge centre on Innovative Procurement.

- DesignDenmark includes the establishment of a Danish Design Centre to support design service firms and promote the Danish design service sector in general. The strategy also seeks to strengthen the design of public sector services (possibly through the use of procurement policies, although these are not specified).
- The Dutch Innovation Platform has identified three roles for the government in stimulating innovation: (a) as service provider, (b) as investor, and (c) as purchaser and procurer. The resulting Action Plan, 'Government as Launching customer: from best practice to common practice', has a strong focus on the promotion of innovation via demand-side measures. In addition, the Sustainable Procurement programme encourages government authorities to take environmental and social aspects into account in the procurement of products and services, while the Ministry of Economic Affairs uses a programmatic approach to stimulate the innovativeness/competitiveness of 'key areas' in the Dutch economy. The government is also currently developing 'societal innovation programmes' in the sectors safety/security, health care, water, energy, and education, which may include demand-side, measures (e.g. demonstration projects, creating experimentation spaces, and so forth).
- The Chinese government has recently initiated demand-side policies that target critical industries, such as defence, pharmaceuticals, and automotive. In *Implementing Related Policies of State Plans and Programmes for Medium and Long-term Development of Science and Technology (2006-2020)*, the State Council explicitly states the necessity of establishing a financial procurement system oriented toward independent innovation products.

#### **Generic public procurement**

- In Norway, demand-side innovation policies have been in place for several decades, in particular in the form of the OFU and IFU programmes (Public and Industrial Research and Development Contracts). These support schemes, in place since 1968, stimulate innovative firms and improve the quality and efficiency of public services (through the acquisition of new technologies or solutions) by promoting cooperation between companies and public institutions acting as customer.

#### **Pending and early-stage initiatives**

- Although demand and user-oriented innovation policy has a strong presence in Finnish policy documents, and the Ministry of Employment and the Economy is preparing an action plan for demand-oriented innovation policy, there are no programmes that intentionally address demand-side innovation policy needs. However, Tekes, the Finnish Funding Agency for Technology and Innovation, is developing a new funding instrument for innovative public procurement.
- In Malta, one of the measures under the Knowledge and Innovation pillar of the NRP 2008-2010 refers to the introduction of public procurement for Research and Innovation, and the Council for Science & Technology is leading an initiative to draft a national action plan for public procurement 2009-2013, as a driver of R&I and national competitiveness.
- The Polish document, 'New approach to public procurement: Public procurement and small and medium enterprises, innovation and sustainable development' (2008), sets the basis for developing public procurement and, *inter alia*, aims at increasing demand for innovative products.
- In 2006, VINNOVA and Nutek proposed a national framework for innovation public procurement, stressing the need for evaluation to assess the impact and scope of public procurement. Public procurement as a way to spur innovation was also highlighted in the Swedish bill on research and innovation (October 2008). However, specific measures have, so far, been limited. Although, some Swedish agencies (in the energy and transport sectors, for example) are working with methods close to this form of public procurement. In 2008, VINNOVA initiated a number of pilot projects aimed at increasing the knowledge of methods and models to promote innovative public procurement.
- One of the objectives outlined in the UK's 2004 10-year Science and Innovation Investment Framework was to examine how public sector spending power could be used to foster innovation; by adopting new technologies or by encouraging new innovative research, a role extended to involve the Regional Development Agencies. The 2008 Innovation Nation White Paper reaffirmed the role of demand-side innovation policy, identifying lead markets (and lead consumers), together with the power of public procurement as dominant drivers of the innovation process. The latter has been identified as the main pathway for government to play a significant role in



demanding innovation, and in December 2008, DIUS issued a detailed innovation procurement plan<sup>9</sup>. The government's strategy is implemented through measures including the Small Business Research Initiative (which sets targets for public sector procurement from SMEs), the TSB's active leveraging of the government's purchasing power, and the TSB's Innovation Platforms, which address lead markets in specific 'challenge' areas, such as climate change and ageing.

### 3 Lead market policies

Although this section deals with the question of the presence of explicit public 'lead market' policies, it was noted that in order to create a lead market, supply-side elements also have to be considered as well as demand-side measures. However, as such, supply-side measures (notably thematically oriented programmes, such as those in the generic areas of ICT, genome research and systems biology and nanotechnologies and transport, aerospace, security, energy and sustainability) are rather more typical forms of innovation support and are not always explicitly linked to demand-side consideration (these are not included in the following coverage, which is restricted to demand-side initiatives).

In addition, regional and local initiatives based on the 'living lab' concept can approach the 'lead market' idea at the practical level (i.e. Portugal and Finland). It was also noted that some countries participate in the development of 'lead market' policies at the EU level (e.g. Finland and Hungary), while, similarly to the case of demand-side policies, the effectiveness of 'lead market' policies in small countries was also questioned.

It was also noted that the concept of lead markets (as used in innovation management literature) is not always fully understood within innovation policy but rather reflects the desire that new technologies developed with the help of public money should receive great market success and will generate a new market (see Introduction).

A large number of TrendChart Correspondents reported no specific examples concerning lead market initiatives, although some indicated that such programmes were at the early stages of being developed, for example in the Czech Republic. Other TrendChart Correspondents report that types of lead market initiatives, with a strong demand-side focus, were in place but were not designated as 'lead market' specifically, as highlighted below.

- Cyprus has a kind of 'lead-market' initiative in a special pilot study, which addresses both the lack of water resources and the island's total dependence on oil for its energy needs. Run by the Technical University in cooperation with local construction firms, if the pilot is successful and is adopted by the government and the business sector, it may lead to new procurement and new standards, thereby increasing the competitiveness of the local construction sector in the regional market place. The National action plan for Green Public Procurement (GPP) offers another similar example, which uses public procurement to promote market penetration of environmentally friendly products and services.
- DesignDenmark (within design services) and the Danish government's action plan for promoting eco-efficient technology can both be considered 'lead market' policies.
- Public procurement is one of the main instruments through which Spain encourages Lead Market Initiatives for innovative goods and markets and a series of guidelines to encourage public procurement have been developed. The CDTI has developed a programme to support the introduction of innovative products in international markets ('Support to the international commercialisation of innovative products').
- The French Grenelle initiative for the environment supports development in four lead market sectors. In the construction and energy sectors, it focuses on renewable energies and climate change energy. In transport, it prioritises alternative transport modes for air transport. It also has a programme to halt the loss of biodiversity. Moreover, for the future of the Grenelle initiative for the environment, the national French sustainable development strategy of 2009-2012 is under preparation.

Examples of such programmes were also given for Israel (e.g. defence, alternative energy and water supply), India (e.g. upgrading the national infrastructure, transport, energy efficiency and environment, public administration and e-governance via the introduction of ICT), Italy (e.g. Industria 2015, e-

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<sup>9</sup> 'Procuring for Innovation, Innovation for Procurement'.

health), Japan (e.g. ICT, nanotechnology, manufacturing systems, biotechnology, environment, energy, software, and multidisciplinary areas, and so forth), Malta (e.g. the Platforms of Strategic Importance in ICT, Energy-Environment, Health-Biotech and High Value-added manufacturing), the Netherlands (see Section 2), and Norway (e.g. health and e-health, environmental technologies, marine sector and tourism).

Several TrendChart Correspondents noted that sectoral or thematic cluster-type policies may also have lead market characteristics (e.g. Austria, India, Italy and Luxembourg) but that they often have a focus on the more 'traditional' support of collaborative R&D (e.g. Belgium and Bulgaria), and that their effectiveness towards demand-side ideals may be quite limited. Typical focus areas include: agro-industry, eco-building, eco-technologies, automotives, solid waste, micro-technologies, materials, food and nutrition, health, clinical research, ICT, transport/logistics, aeronautics and space, sustainable energy, text/image/sound, building, photonics, and so forth.

Lastly, a small number of countries report the introduction of explicit lead market policies, as follows.

- Under the Ministry of Health, Brazil has a programme directed at the creation and strengthening of a Health Industrial Complex. Its innovation and industrial policies guidelines for 2007-2010 aim to reduce social policy vulnerability by strengthening the so-called Industrial and Innovation Health Complex. The main lead market orientations call for adjustments in the public procurement regulatory framework, together with supply-side measures aimed at cooperation and public-private partnerships. The policy goal is to move from the current procurement model based exclusively on the principles of economic savings and efficiency towards a new procurement model based on legislation that supports the state's purchasing power as an instrument of industrial policy and to promote more health and development.
- Experience in Germany, with the BMBF 'Lead Projects' programme run in the 1990s and early 2000s, produced little evidence that this type of initiative was particularly successful in generating a lead market for certain new technologies. More recently, the notion of lead markets has been taken up by, for example, the new 'Top Cluster' programme. The issue of the role of lead markets in innovation policy was a topic in the preparation of the 2006 High Tech Strategy. Lead market aspects have also influenced policy strategies for promoting new technologies, particularly in biotechnology (role of regulation), health and transport (role of public procurement) and ICT (role of standardisation). Furthermore, a policy paper on how to better use public procurement for triggering innovation has been published, while the federal government's 2008 'Master Plan Environmental Technologies' aims at opening up lead markets for environmental technologies by forming better links between environmental policy instruments and R&D promotion.
- Defence contracting has long been considered the classic lead market activity in the US, with mission-oriented defence procurement stimulating capabilities in private sector defence contractor firms. Recent initiatives include (at the national level), the Technology Innovation Program (TIP), which encourages private sector innovation in areas of critical national need. The TIP programme was established in the America COMPETES Act of 2007, out of the previous Advanced Technology Program. It is focused on needs rather than technologies to meet societal challenges. The current focus is on civil infrastructure integrity, including roads, highways, bridges, and water systems. At the state level, there are explicit lead market policies to encourage innovation. In the energy area, California is among the states that have taken a lead in setting higher Corporate Average Fuel Economy (CAFÉ) standards and renewable portfolio standards to encourage innovation in the automotive and energy industries.

The points detailed above identify programmes and examples where there is a specific thematic or sectoral focus.

The questionnaire also sought to identify particular target groups, such as small and medium-sized enterprises (SMEs). In most cases, the programmes and initiatives described had no specific target and covered a range of innovation actors. These were highly dependent on the nature of the measure concerned, such as SMEs, large firms, universities, research institutes, hospitals (in the case of health and e-health measures), the public (i.e. consumers of specific goods and services), and so forth. This was the case with Austria, Israel, Luxembourg, Spain and the UK, among others. Where there is a specific drive to support innovation through demand-side measures, there tends to be a focus on high-tech and new-technology firms (e.g. China, India and France).

However, SMEs do form the target of some measures (e.g. certain programmes in Denmark, France, India, Ireland, the Netherlands, Portugal, Sweden and the US), although this can just be a consequence of the industrial structure of the country rather than a specific policy focus (e.g. Cyprus, Greece and Malta). In Iceland, the targets are mainly high-tech start-ups and spin-offs. In France, 'Article 26' of the law on 'the modernisation of the economy' aims to facilitate entry for SMEs to high tech markets, thereby also applying to the six lead market sectors.

A commonly-cited policy rationale for targeting SMEs is that they often lack the opportunity to participate in major public procurement activities, yet can represent a source of major innovative potential.

#### 4 Implementation and coordination

Where relevant LMI/demand-side programmes or initiatives are in place, most are run at the national level (with some exceptions, i.e. Austria, Denmark, Spain and UK within the EU, as well as Brazil and India). The relevant agencies/bodies are presented in the table below, which is provided for illustrative purposes only. In general, the body or bodies responsible tend to be those associated with innovation policy in general or in the case that the programme has a sectoral focus, the relevant ministry, department or agency.

Country	National agency(ies)	Regional agency(ies)
AT	FFG – Research Promotion Agency AWSG – Austria Wirtschaftsservice GmbH Federal Ministry of Transport and Technology - bm:vit Federal Ministry of Economics and Labour	local (State level) innovation promotion agencies or cluster initiatives (smaller role)
BR	Ministry of Health	some regional cooperation
CA	Energy Agency Environment Agency	mainly national
CN	Ministry of Science and Technology Ministry of Finance State Administration of Taxation	mainly national
DK	Environment, transport and public efficiency (procurement)	Regional: Health, transport, public care Local: public services, care and education
EE	Estonian eHealth Foundation (under Ministry of Social Affairs)	not applicable
FI	Ministry of Employment and the Economy	mainly national
FR	Ministry for Economics, Industry and Employment	not applicable
DE	Ministry for Education and Research – BMBF Ministry for Economics and Technology - BMWi	not applicable
EL	Ministry of Economy and Finance	not applicable
IN	Ministry of Information and Communication Technology Ministry of Commerce and Industry Ministry of Environment and Forests Ministry of Rural Development	Some State authorities
IE	mainly Enterprise Ireland	not applicable
IT	Ministry for National Infrastructure Ministry of Industry, Trade and Labour Ministry for the Public Administration and Innovation	not applicable
JP	National government ministries, research funding agencies (in particular NEDO)	not applicable
LU	Luxinnovation	not applicable
MT	Malta Council for Science & Technology	not applicable
NO	Ministry of Trade and Industry Ministry of Petroleum and Energy Innovation Norway Gassnova (for CCS)	not applicable
ES	CDTI Cotec	Local actors
UK	HM Treasury Department for Innovation, Universities and Skills Technology Strategy Board Department for Business Enterprise and Regulatory Reform	Regional Development Agencies Devolved Administrations
US	National Institute of Standards and Technology (TIP)	State authorities (energy measures)

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Given the range and variation of demand-side measures reported above (and notably the variation in sectoral focus), it is difficult to present an overall picture of the ways in which their governance is coordinated, let alone the degree of coordination and coherence that they have with the remainder of the innovation policy mix. The latter situation is further complicated by the fact that many of the reported measures are not explicitly part of the innovation policy mix (being either general public procurement policies that are not directly connected to innovation goals or are narrowly tied to the stimulation of R&D, for example). Furthermore, the national context also varies: some countries operate a much broader view of innovation (and hence have a wider policy mix) than others, whilst innovation policy making may be fragmented or coherent to varying degrees. Moreover, where the range of demand-side and/or lead market initiatives that are in place is restricted, there is a greater chance that their coordination will be undertaken through a single agency.

To illustrate the range of variation, some specific examples are given below.

- In Germany, demand-side measures are typically part of a technology programme and the programme administering agency ('Projekträger') coordinates these activities with other programme activities. Where other authorities are responsible for implementing demand-side measures (e.g. adaptation of regulations, public procurement), they are involved through intra-governmental consultation, which can attempt to convince other agencies about the need for adaptation in order to stimulate innovation.
- In Italy, the initiative 'Industry 2015' is coordinated by the Ministry for Economic Development, and the regional administrations are actively involved in the definition of the programme in the five strategic areas, while the PA Innovation Plan is led by the Ministry for the Public Administration and Innovation and coordinated with other ministries depending on the measures concerned (e.g. with the Ministry of Health for the e-health initiative or with the Ministry for Economic Development for the enterprise web portal) and with the regional and local entities.
- In Norway, coherence with the rest of the policy mix is ensured by increased coordination and cooperation between Innovation Norway and the Research Council and SIVA (the industrial cooperation of Norway). While organisational preconditions for coordination and coherence are adequate at agency level, cross-ministerial coordination and coherence for the development of innovation policy is weaker and seen as a challenge.

## 5 LMI-inspired actions

In general, most TrendChart Correspondents did not report any influence from the LMI on their national policies or initiatives, while the question was not felt to be relevant for the non-EU Member States. An exception to this came from China, which noted that (as evidenced by government reports and academic research conducted in China) the adoption of demand-side innovation policy is driven by two factors: a dissatisfaction with the dichotomy between research and commercialisation, which is facilitated by supply-side innovation policies, while the second factor is inspired by the models of Western countries or regions, like the EU, America and Japan.

More specifically, Finland has actively followed the preparation and launch of the LMI and it is possible that LMI has influenced or at least supported national debate and the creation of new demand-oriented innovation policy guidelines. The same is true for Greece, where the LMI is feeding into national debate (although without direct impacts as yet), and in Poland interest in innovative public procurement (as noted in recent policy documents) has been triggered by developments taking place at the EU level. In Spain, the LMI has increased stakeholder recognition of the importance of developing strategies that encourage the commercialisation of innovative products. In Portugal, on the other hand, there may be an indirect connection between the Portuguese eHealth initiative, launched in the context of the Technological Plan, and the European eHealth programme, which is explicitly related to the LMI. It was noted that, for Iceland and the current economic crisis, LMI might prove important in the future.

In Ireland, the LMI intersects with ongoing government innovation policy and more recently in the publication of the government's policy Framework Document, 'Building Ireland's Smart Economy'. A particular focus will be on opportunities arising from research in the renewable energy and environmental technologies areas. Currently, further work is being done on how public procurement policies and practices can contribute to the achievement of stimulating innovation and our environmental objectives.

## 5.1 Good practice examples

Only a limited number of good practice examples of demand side policies were proposed, as follows.

- The Danish wind energy industry: the government, unintentionally, created a national market for innovative wind energy products through subsidies in the 1980s and 1990s. Today, the industry is a world market leader but national demand incentives have disappeared; in 2008, few new turbines were built in Denmark. Many consider that investment subsidies (in essence, a demand-side measure) had an important role in the success of this 'lead market initiative'. However, this type of measure is absent from those found in the EU LMI. A second set of examples is provided by Denmark's successful ICT and medical sectors. The first was caused by a high level of technological knowledge among Danish citizens, which created interest, innovation and markets. The second stemmed from a business sector tradition for R&D cooperation with universities and public hospitals, which created R&D that secured access to world markets.
- France's SME pact<sup>10</sup> was quoted as a successful example of a demand-side fostering measure, and it was noted that the pact will be expanded to allow SMEs to enter new markets abroad. Another good example in France is the green public procurement guide. Although this guide was published in 2004, its activities could still support the four lead market sectors that are linked to sustainable development.
- Innovation policy in the area of environmental protection in Germany may be seen as an example of a successful demand-side policy, though not necessarily designed as such. Through a number of environmental regulations in different areas (water/sewage, waste, energy production, efficient use of energy, air emission, noise emission) over a long period of time (starting in the 1970s), firms and private households were urged to gradually adopt an environment-friendly behaviour. Demand for environmental technologies and services increased, stimulating innovation in these areas. By transferring some types of regulations to other countries (i.e. international diffusion of regulation), German environmental technology producers and service providers were able to serve an increasing number of export markets, and Germany became a lead market for a number of environmental technologies<sup>11</sup>.
- In Spain, the UNE 166002 Standard has been used as a way to foster the implementation of R&D Systems. These are conceived as a series of measures established by enterprises to promote R&D and to ensure that all personnel are aware of R&D opportunities. The certification of a R&D System is a sign of the enterprise's commitment towards R&D, which has already proved to stimulate the commercialisation of products. Thus, the implementation of a R&D System has a similar effect to that of the ISO 14000 (environment) or ISO 9000 (quality). Both ISO 14000 and ISO 9000 are indicators of good performance and prestige. This standard is therefore proposed as an alternative to public procurement.

Other examples included the Irish Industry-Led Networks (sector focused), the Norwegian OFU/IFU programme, which could be taken up by other countries and even at the EU level, and Tekes' development of a new funding instrument in support of innovative public procurement, which may turn out to be an interesting example for transfer at the EU level once it is launched.

## 6 Conclusions

It is clear that debate on lead market and demand-side policies is growing and is already well established by a number of the EU's innovation leaders. Several TrendChart Correspondents also report that specific policies are already in place. The 2008 European Innovation progress Report<sup>12</sup> noted that several of the more 'advanced' countries had adopted framework challenges of a relatively sophisticated nature, including a focus on demand-driven issues, such as innovative public procurement. The evidence reported here seems to suggest that this policy focus is deepening and is also becoming broader across the EU 27.

Environmental technologies and ICT are particularly significant targets for demand-side policies, as are the areas of health, transport and construction. These can all be considered 'big ticket' sectors; hence, public procurement is seen as a major policy tool for driving demand-side measures. In particular, the environmental sector appears to offer a target sector in which innovation policy

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<sup>10</sup> <http://www.pactepme.org/>

<sup>11</sup> See Jacob, et al., 2005

<sup>12</sup> [http://www.proinno-europe.eu/admin/uploaded\\_documents/EIRP2008\\_Final\\_merged.pdf](http://www.proinno-europe.eu/admin/uploaded_documents/EIRP2008_Final_merged.pdf)

interventions (both supply- and demand-side) may realise major market and technological opportunities. For example, the market for environmental goods is open to influence by regulation and standardisation, there is strong consumer support for environmentally 'aware' technologies and products, there are strong incentives for the development of innovative environmental products, processes and services, user- and demand-led innovation drivers are strong, there is scope for large-scale public sector procurement initiatives, and so forth.

Other policy tools include the use of regulations and standards, other forms of legislation, together with direct financial incentives. However, such policies are not always explicitly tied to innovation policy. For instance, public procurement forms a 'traditional' model of industrial support in several countries.

There also seems to be an increased emphasis on public procurement and demand-side measures, both as means to mitigate the effects of the recession on certain, at-risk, industrial sectors and also as a means to support innovation for short-term survival and to accelerate medium to longer-term recovery.

Some Trend Chart Correspondents do report barriers to the adoption of demand-side measures, such as a traditional reliance on supply-side measures and the limited purchasing power of the public sector (often as a corollary of the size of the overall economy).

Moreover, demand-side policies such as lead market initiatives probably require an appropriate balance with supply-side measures (primarily to be able to respond to and deliver the increased uptake of innovative goods and services that results from the creation of a new market).

There was evidence of the use of lead market-type initiatives, which included schemes for the support of clusters and related initiatives, often with a focus on the more traditional support for collaborative R&D and also for explicitly labelled lead market initiatives. These (explicit and implicit) lead market initiatives covered a range of actors with a focus on high-tech and new technology firms. There was limited evidence for these schemes being targeted at SMEs (although cluster-type initiatives do tend to support this range of actors). The level of implementation and governance also varied considerably according to national context and no overall picture was available.

It appears that the EU's LMI has had limited impact in terms of inspiring new initiatives at the national level (although some countries have initiatives that pre-date the LMI). However, its progress is clearly being followed and the outcomes are contributing to debate in several countries.

Finally, a relatively limited number of good practice examples of demand-side policies were reported.

## **ANNEX 1:**

### **Questionnaire on demand-side innovation policies sent to the TrendChart National Correspondents in December 2008 for reply by March 2009.**

1. In your country, is there (or has there been) a debate on the need to complement 'traditional' supply-side innovation policies with demand-side policies (legislation, public procurement, standards, labelling)? Are there programmes specifically implementing these types of measures?
2. Are there explicit public 'lead market' policies in your country?
3. Do these measures have a specific sector focus? Do they address specific company groups (SMEs, start-ups, high-tech, low-tech, etc?)
4. At what level are these measures being implemented (national or regional)? Which ministry or government agency is leading their implementation?
5. How is coordination of these demand-side measures ensured (for instance, are various government bodies involved)? How is coherence with the rest of the 'innovation policy mix' ensured?
6. Following the launch of the European Lead Market Initiative (LMI), is there evidence of any policy development triggered by the LMI? Are there any examples of successful demand-side policies in your country that could be taken up at EU level?