

Edler, Jakob

Working Paper

Demand policies for innovation

Manchester Business School Working Paper, No. 579

Provided in Cooperation with:

Manchester Business School, The University of Manchester

Suggested Citation: Edler, Jakob (2009) : Demand policies for innovation, Manchester Business School Working Paper, No. 579, The University of Manchester, Manchester Business School, Manchester

This Version is available at:

<https://hdl.handle.net/10419/50691>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Working Paper Series

Demand Policies for Innovation in EU CEE Countries

Jakob Edler

Manchester Business School Working Paper No 579

Manchester Business School

Copyright © 2009, EDLER. All rights reserved.
Do not quote or cite without permission from the author.

Manchester Business School
The University of Manchester
Booth Street West
Manchester M15 6PB

+44(0)161 306 1320
<http://www.mbs.ac.uk/research/workingpapers/>

ISSN 0954-7401

The working papers are produced by The University of Manchester - Manchester Business School and are to be circulated for discussion purposes only. Their contents should be considered to be preliminary. The papers are expected to be published in due course, in a revised form and should not be quoted without the authors' permission.

Author and affiliation

Jakob Edler

Manchester Business School

Booth St. West

Manchester

M15 6PB

Email: jakob.edler@mbs.ac.uk

Abstract

The paper discusses demand and demand conditions for innovation as well as demand based policies for innovation in the context of the EU CEE countries. Far from regarding demand policies as a simplistic silver bullet, this paper argues that the EU CEEC catch up process could potentially be accelerated through a more explicit and systematic orientation towards demand for innovation – rather than focusing on supply side conditions. This could at the same time be linked to a better satisfaction of needs of the society and industry alike. The main argument of the paper is that institutional adaptations and a policy mix that tackles the bottlenecks of demand for innovation and supports the articulation of demand can link modernisation of the economy and the public services with innovation impulses for the EU CEEC economies and contribute to a tailored catching up process.

The paper first introduces the current wider context of demand based innovation policies at EU level, presents a conceptualisation of demand based innovation policy and introduces a typology of demand measures. In its empirical section, it starts with the EU CEEC innovation capabilities as a context for demand based innovation policies and argues that our current understanding of the innovation capabilities and conditions fall short when it comes to capture the demand side. The core of the paper discusses some alternative variables to map demand conditions in the EU CEEC and links this discussion with concrete policy challenges. Subsequently, for the sake of illustration, the paper summarises the (still very poor) policy trends towards including the demand side in policy design and implementation in the EU CEE countries. This is illustrative, the paper does not and cannot claim to analyse all demand dimensions in existing policies. The paper finishes with policy challenges and gives a set of policy recommendations to move towards a broader, more balanced mix of policies better suited to tackle the specific situations in the EU CEEC.

How to quote or cite this document

Edler, J. (2009). Demand Policies for Innovation in EU CEE Countries. *Manchester Business School Working Paper, Number 579*, available: <http://www.mbs.ac.uk/research/workingpapers/>

CONTENT

1	Introduction	1
2	The concept of demand based innovation policy	2
	2.1 Context	2
	2.2 Definition and rationale of demand based innovation policy (DBIP)	3
	2.3 The policy tool box	5
3	The role of demand conditions and related innovation policy in EU CEEC	8
	3.1 The innovation capabilities: a challenging starting point	8
	3.2 Demand conditions in EU CEEC – and policy challenges: a closer look	10
	3.2.1 A spectrum of demand conditions	10
	3.2.2 Private demand for innovations	14
	3.2.3 Public Procurement for Innovation	15
	3.2.4 Meeting improved demand	17
	3.3 Policy practice – some observations	19
	3.3.1 Lack of systematic demand orientation	19
	3.3.2 Policy practice at instrument level	20
	3.3.3 Long term demand articulation	23
4	Conclusion and policy recommendations	24

1 Introduction¹

The economies and the innovation systems of the Central and Eastern European EU countries (EU CEEC) are still in a state of transition and catching up. In transforming their innovation systems, one of the major characteristics of European countries with a socialist past is the collapse of the old structures to produce, apply and exploit knowledge in the economy. To re-build their innovation systems, the EU CEE countries have applied different kinds of strategies. Facing poor indigenous private R&D capabilities and the prospect of footloose international firms, the EU CEEC have applied various kinds of policy-mixes, strongly focused on (1) building up indigenous company R&D, (2) attracting foreign companies and incentivising them to innovate within the countries (see Narula 2009), (3) building up R&D capacities by public institutions to be linked to private companies (Reid 2009) and (4) creating institutions that support and enable knowledge creation and transfer. In one way or the other, the CEEC have focused and still focus on providing the governance institutions, technical and knowledge infrastructure, fiscal and regulatory framework conditions and supporting instruments to build up R&D capabilities to spur spur innovation.

In all their differences, it appears that all CEEC have focused on the supply side and have paid little attention so far to the demand side for innovation in the CEEC. This, in fact, is in line with the prevailing policy rationales and academic discussions across the OECD in the last 20 years or so. The question of how demand conditions affect the productivity and innovation dynamic in the countries has not been discussed systematically, let alone considered in policy strategies. This is despite the fact that fostering demand for innovation can have three interdependent effects: (1) leading edge demand can incentivise suppliers to produce innovation, (2) the absorption and application of innovation in industry can severely increase business productivity and (3) to procure and apply innovations in public services can help to better achieve societal goals, potentially improving the performance and responsiveness of the public sector and societal welfare at large.

The paper discusses demand and demand conditions for innovation as well as demand based policies for innovation in the context of the EU CEE countries. Far from regarding demand policies as a simplistic silver bullet, this paper argues that the EU CEEC catch up could potentially be accelerated through complementary demand orientation. This could at the same time be linked to a better satisfaction of needs of the society and industry alike. The main argument of the paper is that institutional adaptations and a policy mix that tackles the bottlenecks of demand for innovation and supports the articulation of demand can link modernisation of the economy and the public services with innovation impulses for the EU CEEC economies and contribute to a tailored catching up process.

The paper first introduces the current wider context of demand based innovation policies at EU level (2.1), presents a conceptualisation of demand based innovation policy (2.2.) and introduces a typology of demand measures (2.3). Sector 3 then turns to the CEEC. This starts with the EU CEEC innovation capabilities as a context for demand based innovation policies

¹ I am grateful for the very valuable comments to a first version by the other authors contributing to the INCOM Workshop in PRage, January 2009, and especially by the coordinator of the conference, Slavo Radosevic. The usual disclaimer applies, all shortcomings remain the sole responsibility of the author.

and argues that our current understanding of the innovation capabilities and conditions fall short when it comes to capture the demand side (3.1). Section 3.2, the core of the paper, then discusses some alternative variables to map demand conditions in the EU CEEC and links this discussion with concrete policy challenges. Subsequently, for the sake of illustration, the paper summarises the (still very poor) policy trends towards including the demand side in policy design and implementation in the EU CEE countries (3.3). This is illustrative, the paper does not and cannot claim to analyse all demand dimensions in existing policies. Section 4 then summarises the main arguments and policy challenges and gives a set of policy recommendations to move towards a broader, more balanced mix of policies better suited to tackle the specific situations in the EU CEEC.

2 The concept of demand based innovation policy²

2.1 Context

Although the various versions of the national system of innovation approaches (e.g. Lundvall 1988, 1992, Edquist 1997) have included demand as a key innovation category (the users of new knowledge and the customers for innovations), the demand side has long been systematically neglected in innovation systems analysis and subsequently in concepts and practice of innovation policy-making within the OECD world. The entire triangle of policy-makers, policy and innovation analysts and the business community had long paid little attention to stimulating demand in innovation policy. In terms of policy, the focus was entirely on supply side strategies and activities, where subsequently the differentiation of research and innovation policy has essentially taken place.

However, within the last 3-4 years, demand orientation has received growing attention again. In recent years some policy studies and expert reports have shed light on demand based policies, supported the new discourse and informed a policy learning processes (see among others Kok et al. 2004, Aho et al. 2006, Wilkinson et al. 2005, Edler et al. 2005, Edler 2007a, Georghiou 2007).³ Meanwhile some countries have included the demand dimension explicitly and prominently into their innovation strategies (Finland, UK)⁴ and a range of initiatives are popping up across Europe (e.g. latest attempts for Lead Markets in eco technologies in Germany)⁵. More ambitiously even, the potential of Lead Markets for the innovativeness and competitiveness of Europe are being tested (European Council 2006, EU COM 2007) and currently the OECD Working Party on Innovation and Technology Policy is considering a sub-group on the issue. Although all this is in its infancies, the discourse on the merits and downsides of demand based innovation policy is gaining momentum. It is far from clear if this new wave of analytical interest and political will translates into substantive and sustainable innovation policy tools with the intended effects of making economies and societies more innovative. Despite all potential, it seems that the implementation of various tools and the shift of rationales appear to be a great challenge – for all countries.

² For a broader introduction see Edler 2007a, Edler 2008 and Edler 2009, from which this chapter draws.

³ For an early account see Edquist 1994 and Edquist, Hommen/Tsipuri 2000

⁴ Finland has introduced its policy mix to the OECD STIP-Group meeting December 4, Paris, and is currently designing systematic ways to tackle demand within innovation policy (see <http://www.tem.fi/?l=en&s=2853>), the UK has outlined the demand side ambitions in its strategy document Innovation Nation within a section on 'Demanding Innovation' (DIUS 2008).

⁵ Based on personal interviews with stakeholders in Germany.

2.2 Definition and rationale of demand based innovation policy (DBIP)

When discussing the potential for demand based innovation policies, it is important to understand the justifications and challenges of demand based innovation policies. In this paper, **demand based innovation policies (DBIP)** shall 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.

This broad definition of DBIP signals a twofold rationale: to spur innovation *and* diffusion of innovation. Diffusion of innovation, further, also signals that the concept of innovation is not confined to 'new to the world', but also encompasses new to a firm or a certain geographical space. This will be, as we argue below, of major importance for countries that are not at the forefront of producing new technology and innovations. Further, the definition contains the articulation of demand, which highlights the importance to define and express societal demands and to capture and translate this societal demand into articulated market demands.⁶

The underlying assumption of this paper is that demand policies shall complement, not substitute supply side measures. Thus, there is no need to engage in the somewhat scholastic debate whether the support of supply or demand is more important for spurring innovation and subsequent productivity and competitiveness. Nor is there room to discuss the various models to understand just how exactly demand may influence innovation. Suffice it to stress that there is an abundance of literature stressing the importance of demand and of challenging demand conditions and diffusion patterns that incentivise innovation, reduce uncertainty for innovators (e.g. Schmookler 1962, Mowery/Rosenberg 1979, Fontana/Guerzoni 2007), provide input to the innovation process (e.g. von Hippel 1986) and contribute to the productivity and competitiveness of firms and markets (more generally Porter 1990, Edquist/Hommen/ Tsipouri 2000, McMeekin et al 2002, Bihde 2006, Anderson 2007)⁷.

Recently, the conceptual claim for the importance of demand in the EU has been underpinned with more empirical analysis to back up the efforts being made. Above all, this serves to raise awareness among policy-makers and the business community as to the potential of public demand for innovations, especially since existing indicators and analyses are insufficient to grasp demand conditions and their meaning sufficiently. Within the InnoMetrics initiative of the EU 26 variables have been tested for the difference they make to innovation performance of countries measured with the summary innovation index of the

⁶ We need to stress that this definition may not be confused with or reduced to demand based approaches of *science* policy, whereby priorities for funding in science are derived from societal or economical preferences, but the measures of support, mainly financial, still are geared towards the supply side, the knowledge creation. This is how Bitzer and Hirschhausen (1998) have defined demand-oriented science and technology policy for CEEC some years ago.

⁷ These authors are illustrative only and represent quite different perspectives on the meaning of demand for market development. We come back to those authors individually further below.

Innovation scoreboard (Hollanders / Arundel 2007). These variables cover market efficiency governance, social equity, institutional framework and demand conditions. 10 out of the 26 variables show a moderate or a strong correlation with innovation performance. Out of those ten, five belong to demand conditions in a wider definition, two of which are moderately correlated (public procurement, demanding standards) and three strongly correlated (trust, corruption, technology absorption). The analysis of Hollanders and Arundel in fact makes a strong point for the meaning of demand conditions.⁸

Against this background, the rationale for demand based **policies** rests on four pillars:

(1) Innovation policy: overcoming system failures

As with supply orientation, we face a range of system failures that are manifest in a set of concrete bottlenecks which justify policy interference. First, there are information and adoption problems in innovation markets. These may be caused by market signals being too weak to build up awareness and trust with potential users, or the radical nature of innovations lead to high uncertainty about the real value in different application contexts. Often, potential users or their organisations lack the skills to absorb a new technology (Cohen/Levinthal 1990), with training and education being severe bottlenecks. Further, markets frequently show a lack of mutual understanding between producer on the one hand, and user and stakeholder on the other hand, caused by a lack of clear articulation of future preferences. This not only impedes concrete signals for innovative adoption or radical innovations through concrete user-producer interaction (von Hippel 1986). The issue is more fundamental: as Mowery and Rosenberg (1979) have nicely shown, human and social needs in general are not automatically translated into clear market demands, and it is within the realm of public policy to turn needs into articulated demands. This inadequate translation may be the result of a lack of organisation of this articulation through adequate inclusive discourse (Smits 2002) or foresight or, more technically, the market process does not succeed in translating needs on the one hand into functional requirements and specifications to be understood by producers on the other hand (Bonaccorsi 2007).

Further, high entry costs of innovations are often detrimental for the initial uptake, and thus block future scale and network effects. There are often clear lock in-effects and path dependencies, as individual market participants shy away from switching costs or are hindered from switching through lack of complementary technologies or networks. This may impede socially desirable switches to new technological trajectories. The stronger the network effect of the innovations, the stronger the case for policy intervention.

(2) Societal goals and policy needs

The second bundle of justifications for demand based innovation policies is, of course, to serve societal needs. Innovation in the public sector leads both to more effective and more efficient public services, and their support can significantly accelerate and improve the achievement of societal and sectoral goals. Most prominently we see this link in eco-efficiency initiatives world-wide that very strongly support demand for those technologies to set incentives for and create new markets. The (potential) examples here are endless, and

⁸ Even if both authors themselves do not classify all the variables mentioned above as demand variables in their more narrow definition, they are clearly part of the overall demand conditions in economies, as trust and corruption directly impinge upon public procurement for innovation and absorption of technology indicates the inclination and readiness of businesses to absorb new technologies.

the major potential of demand oriented innovation policy is in the link to policy geared towards societal needs.

(3) Industrial / economic policy: (a) modernisation

Just as innovations can improve efficiency and effectiveness of public services, they are the major means to realise productivity gains through modernisation of industrial assets. Bihde has argued that downstream activities and the *diffusion* of technologies can potentially result in much higher economic effects through productivity gains (and multiplication and network effects) than the *production* of the innovation at the first place (Bihde 2006). In this reasoning, the locus of the production of innovation is less important than a high rate and speed of diffusion in order to accelerate modernisation of economies. Bihde goes on to claim that the economic advantage of countries rests more on the ability to quickly absorb and make use of new technologies ('venturesome consumption') than of being the locus of forefront production of innovation and R&D (Bihde 2006, p. 18). This analysis is backed by data from Eaton and Kortum, who find that growth in UK, West Germany and France was based much more on results of R&D produced abroad than home grown R&D (Eaton / Kortum 1995).

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

Last but not least – and related to the societal dimension – demand oriented policies are re-discovered as an industrial policy instrument, to incentivise forefront innovation with local, regional or national companies. In its extreme, the argument is that creating lead markets with forefront demand and related production at home can lead to competitive advantage also abroad. Supply-side measures alone cannot do that job, producers seek to be close to lead users and markets with forefront, leading edge demand (Jacob / Jänicke 2003; Beise et al. 2003, Meyer-Krahmer 2004, Edler/Georghiou 2007). The current Lead Market Initiative at EU level is a case in point. However, the argument also holds for small scale initiatives, whereby local demand for innovation may spur local production and help to uplift local clusters around certain products and services, ideally with a view to exporting.

Especially when public procurement is used as an industrial policy tool, there are potential tensions. For example, if public procurement asks for leading edge demand to satisfy a societal need most effectively, the supplier with best value for money might come from abroad. If public procurement is, however, seen as an industrial policy tool to support demand for local products, it might be focused on local suppliers, thereby contradicting the internal market logic as well as the quest for leading edge innovation. That is why lead market approaches best combine industrial policy and policy to satisfy societal needs and demand innovation policy.

2.3 The policy tool box

The policy tool box of demand based innovation policy contains a wide range of approaches (see Table 1 below). The role of the state when it comes to influencing innovation through demand is first that of a purchaser. Public procurement has received the widest interest in recent years (Wilkinson et.al. 2005, Georghiou 2008, Edler/Georghiou 2007). The principle idea is to direct parts of the public purchase towards innovation. Already in the 1970s and 1980s, empirical studies concluded that over longer time periods, public procurement

triggered greater innovation impulses in more areas than R&D subsidies (Rothwell / Zegveld 1981). Dalpé (1994) and Dalpé et al (1992) have shown that especially in research-intensive fields, public administrations are often more demanding than industrial or consumer demand (Dalpé 1994). All this has led to conclusions that procurement policy is a far more efficient instrument to stimulate innovation than any of a wide range of frequently used R&D subsidies' (Geroski 1990, p. 183), as administrations act more often as 'lead users' for new innovations than private demanders (Dalpé et al. 1992, p. 258 ff). Public procurement can also be linked to and trigger off private demand deliberately, as state purchase may be done in order to trigger private demand (catalytical procurement) or if the state bundles demand with companies or private consumers (co-operative demand). The latter two variants have successfully been used, e.g. for programmes to transform energy markets towards more eco-efficiency (particularly well implemented and documented for Sweden Neji 1998; Suvilehto/Överholm 1998).

The second major pillar of DBIP is of course the **direct support of private demand**, most obviously through demand subsidies. This might work through direct payments, tax credits or exemptions or any other financial advantage attached to the use of an innovation.

Further, and more generally, state activity may, however, systematically **improve demand competence** as one of the 'key(s) to diffusion of innovations' (Gatignon and Roberts 1985). Following Porter (1990) and a range of empirical studies (for many see von Hippel 1986), the more demanding and capable users are, the more likely will they ask for and adopt innovations. Policy may improve awareness (marketing support, state as lead user), skills (training, education, demonstration) and transparency (e.g. labels, demonstration projects etc.) and improve the expectation security through all kinds of regulations and supporting of standard setting (see also Blind 2007). The relative meaning of these measures has been demonstrated through a survey on more than 1,000 enterprises and 125 associations, identifying the following four hindrances to purchase and apply innovations as most important (BDL 2003): the uncertainty of customers about security and quality of innovations (75% of the respondents), a lack of awareness about innovations and their functionality (67%), the high costs of the innovation, respectively of the associated products and services (62%), clients' lack of ability to use the innovation (52%).

Even more fundamental, the state can support the **demand articulation**, not only in reaction to existing innovations (risk discourse) but also in trying to better understand societal preferences and their development and how they link to technological trajectories. Societal preferences are often not transmitted sufficiently into signals to the market place – and thus needs remain unheard – , or technologies might be pushed into the market that do not reflect risks and fears attached to this technology.⁹ Both calls for public action to support demand articulation (Smits 2002).

⁹ One means to overcome those asymmetries is constructive technology assessment, a process in which societal actors that are not directly involved with the production of a technology are nevertheless included in a technology discourse at a very early stage.

Table 1 Typology of demand-oriented measures

Instrument	Role of State	Functioning
Public demand		
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 co-ordination 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 co-ordination of different government bodies and moderation with manufacturers.
Co-operative procurement	Buy / use moderation	State actors are <i>part of a group of demanders</i> and organises the co-ordination 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
Direct support for private demand		
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
Indirect support for private and public demand: information and enabling (soft steering)		
Awareness building measures	Informing	State actors start information campaigns, advertises new solutions, conducts demonstration projects (or supports them) and tries 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 co-ordinated 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).
Regulation of demand or of the interface demander – producer		
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		The state creates legal security by setting up clear rules on the use of innovations (e.g. electronic signatures)
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
Systemic Approaches		
Integrated demand measures	Combination of roles	Strategically co-ordinated 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

Finally, there are a **range of combinations conceivable**. Demand side measures may be deliberately linked to other demand side measures and/or to supply side instruments. We follow the argument recently made by David, Aghion and Foray (2008, p. 16) that 'public policy supporting innovation have proven to be especially effective where funding for R&D was combined with complementary policies supporting the adoption of innovation.' Previous examples have shown that individual measures alone most often are not able to

overcome the market entry and diffusion barriers of innovation, but only a systematic mix (Neji 1998). This has been shown for clearly identified products that were deliberately pushed (eco efficiency products in Sweden, Neji 1998), and thus the challenge to create favourable market conditions for whole market segments (as in the EU Lead Market Initiative) are enormous.

This variety and complexity of instruments points to the immense governance and coordination challenges of DBIP. Those challenges are one major reason why demand for innovation has not been at the forefront of innovation policies in EU CEE countries so far. We come back to that below. It is further important to understand that the role of the state differs between the different instruments, the state is not (only) a financier, but a moderator, a facilitator and trainer.

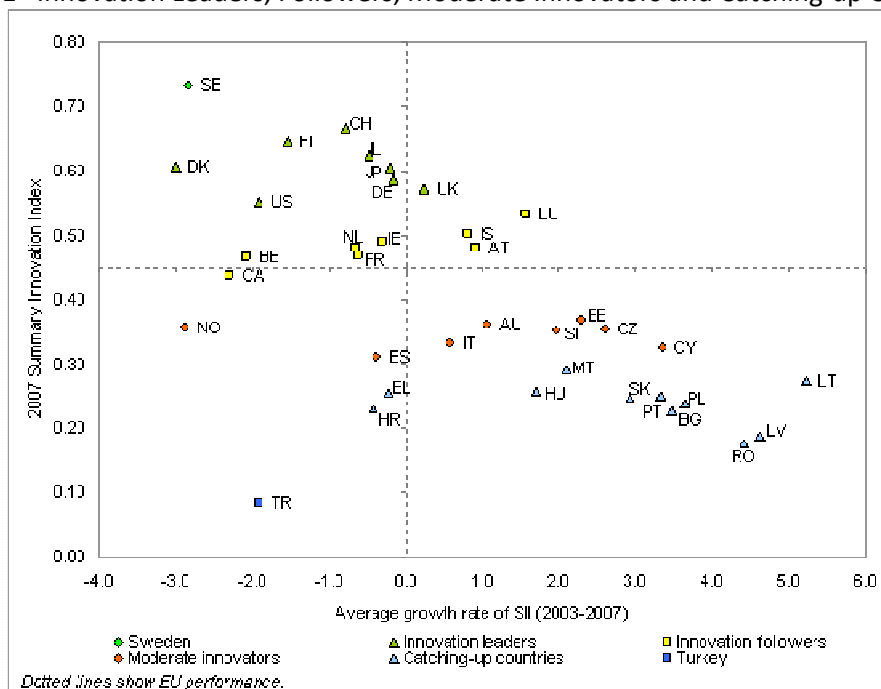
3 The role of demand conditions and related innovation policy in EU CEEC

3.1 The innovation capabilities: a challenging starting point

A discussion of EU CEE countries and their innovation policy option most often starts with an overview on innovation capabilities and on the catching up status. Even if dealing with demand side issues here, this remains important, but it is equally important to stress that this is only half the story.

To start with, we can look at the relative position of the EU CEEC for supply conditions. The European Innovation Index (Figure 1) is an index mainly of the supply side.

Figure 1 Innovation Leaders, Followers, Moderate Innovators and Catching-up Countries



Source: <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=275&parentID=51#>

It is composed of 25 individual measures, none of which indicates demand conditions, while some indicate the penetration of hi-tech into the economy. The figure demonstrates two

important characteristics: (1) in terms of innovation supply, EU CEEC are by and large lagging behind, (2) but there are some significant differences between the EU CEE countries, as some are 'moderate innovators', showing a relatively small gap to the more advanced economies, others are catching up from a low level.

This situation is important as a framework condition: policy attempting to articulate sophisticated demand and to spur demand for innovation unfolds within challenging supply-side context. By and large, this means that supporting demand for leading edge innovations might trigger demand for products and services produced outside the country or by foreign actors. This often raises concerns when it comes to utilise DIBP instruments and must be acknowledged when designing and selecting demand based policy measures.

Several years ago, Radosevic has performed an indicator based comparative analysis of the EU CEE countries (Radosevic 2004a) based on data of the late 1990s/2000. This analysis went beyond the limitations of the Scoreboard and integrated a range of further variables into the four sub-indices absorptive capacity (which is mainly the level and breadth of education), R&D supply, diffusion (which in his model are mainly ICT diffusion and uptake indicators plus ISO 9000 diffusion) and demand (market pull) variables, which then led to one overall National Innovation Capabilities (NIC) indicator.

Not surprisingly, his overall National Innovation Capacity index showed the EU CEEC being behind the EU 15 average and that the countries are heterogeneous (but less so than the then EU 15!). Across all indicators, the EU CEEC are not one distinct group, but southern European EU countries have been located within the range of the EU CEE countries (Radosevic 2004a, p. 653). Especially when it comes to absorptive capacity and to diffusion variables, the EU CEE countries have been very diverse. Radosevic shows that 'the **capacity to generate demand** for innovation is the **weakest aspect** of the national innovation capacity of the EU CEECs' (Radosevic 2004a, p. 655, highlight JE). This in itself is an important finding: apparently the conditions for demand to act as stimulus for innovations appear to be poor to start with, with Hungary, Estonia and to some extent Czech Republic being slightly better placed.

This analysis is highly valuable for the topic of this paper, as it gives some basic context conditions for demand policies and shows that EU CEEC are not a unique block. But it also shows the limitations of our traditional innovation capability indicators if we want to focus on demand and the potential of demand based innovation policy. The variables Radosevic uses for demand conditions are the development of the financial system (stock market capitalization in % of GDP, domestic credit provided by the banking sector), the degree of competition (% of FDI, share of trade in GDP, index of patent rights) and the macroeconomic stability (unemployment, consumer price index), and here some EU CEE countries have performed well.¹⁰ The underlying assumptions are that a well developed financial market, high level of competition and high macroeconomic stability all contribute to a better demand for innovation. Further, the absorptive capacity index is largely based on education and employment in the high and medium tech sector, arguing that better skills and workforce engaged in the high tech sector lays the ground for a catch up of the economy.

¹⁰ For more detail see Radosevic 2005, p. 648.

All these assumptions are not contested, but when one is interested in the concrete potential and prerequisites for policy to actually spur innovation through influencing demand and demand conditions, one needs to go further than that, both for absorptive capacity and for demand conditions.

Hence, one we should look at demand conditions in countries more broadly and also ask for more general socio-economic determinants of innovations. Here the analysis in general is not advanced enough yet. A good start has been undertaken within the Innovation Watch initiative in the context of Europa Innova (Bruno et al 2008), whereby a set of variables from different sources have been compiled. The idea here was to understand and characterise the cultural capital and consumer behaviour in different countries. The scores of CEEC in the so-called overall cultural capital index out of seven variables¹¹ show that on average the EU CEE Countries¹² are below the EU mean. This indicates by and large – and necessarily over-simplified – a lower inclination to take on innovation. The only country above the EU average is Hungary. The analysis further shows how heterogeneous the countries are when it comes to attitudes towards science, risk, and innovation.

Further, absorptive capacity also is the inclination of company decision makers to invest in new technologies, to build up the necessary absorptive capabilities, i.e. to be able to adjust their processes and workforce to the requirements posed by the new technologies, formation and education are the prerequisite not only to produce innovations, but to use them. The related innovation management needs to be understood much more broadly. Even more importantly, absorptive capacity in EU CEEC also is an issue for the public sector: are public administrations willing and able to demand and utilise innovations and act as lead users for private companies and consumers? This then links directly to the demand conditions more generally: what are the conditions producers of innovation face when they enter a EU CEEC market with innovations and how dynamic and leading-edge is the demand in the EU CEE countries to signal to producers potential for innovations?

3.2 Demand conditions in EU CEEC – and policy challenges: a closer look

3.2.1 A spectrum of demand conditions

Within the EU, our data and intelligence on conditions with respect to innovation demand is poor: despite the work cited above (Arundel / Hollanders 2007), we still lack broad and comparable data on buyer sophistication, the scale of innovation in public procurement (even uniform data to define the share of public purchasing out of GDP in each EU country), or the shaping factors for diffusion patterns of new technology of innovation. It is an indicator as to how strongly the academic and policy discourse is oriented towards the supply side that we miss sophisticated data on those kinds of demand conditions.

One source to characterise demand conditions across different countries is the World

¹¹ (1) Interest in S&T; (2) optimism towards science; (3) attitude towards risk from new technologies, (4) attitude towards future, (5) attitude towards environment, (6) attitude towards other cultures and (7) customer responsiveness (inclination of costumers to absorb innovation).

¹² This analysis did not comprise Romania and Bulgaria.

Competitiveness Report by the World Economic Forum.¹³ The data of this report is largely based on surveys of business leaders who give their subjective assessment on a whole series of supply-side and demand side variables. While this is not a hard indication, it nevertheless shows how decision makers *in the countries* perceive the situation, and those perceptions are the basis for decision making. Even if supply-side dominates here also, the WEF data appears to be a comprehensive, international, regular data source that takes demand conditions more seriously, as many of those variables are important as indicators as to how broadly the innovation systems demand innovations and how favourable framework conditions are (WEF 2008, for the methodology see pp. 68-70)¹⁴.

Out of the range of variables the WEF offers, the following discussion and exhibits focus on a selection of variables that are important to characterise demand conditions and a limited number of conditions that are important as context for demand based policies as they characterise the market and the nature of (potential) demand satisfaction more generally. Table 2 provides a definition of those variables.

¹³ The World Competitiveness Yearbook issued by UIMD Switzerland is equally comprehensive in the regular country coverage, however, this data does not provide data on demand conditions.
http://www.imd.ch/research/publications/wcy/Factors_and_criteria.cfm

¹⁴ The sample size of companies who have answered for the EU CEEC ranges from Slovenia 75 firms to Lithuania 109 firms.

Table 2: Variables to describe key market conditions as a basis for demand based policies

Variable	Description
Demand conditions	
The nature of private demand	
Buyer sophistication	Buyers in your country make purchasing decisions (1 = based solely on the lowest price, 7 = based on a sophisticated analysis of performance attributes)
Firm-level technology absorption	Companies in your country are (1 = not able to absorb new technology, 7 = aggressive in absorbing new technology)
Role of public demand	
Government procurement of advanced technology products	In your country, government procurement decisions result in technological innovation (1 = strongly disagree, 7 = strongly agree)
Favouritism in decisions of government officials	When deciding upon policies and contracts, government officials in your country (1 = usually favour well-connected firms and individuals, 7 = are neutral)
Selected key framework conditions characterising the market and the nature of demand satisfaction*	
Nature of competitive advantage	Competitiveness of your country's companies in international markets is primarily due to (1 = low-cost or local natural resources, 7 = unique products and processes) Note (JE): signals the overall assessment of sophistication of markets
Degree of customer orientation	Customer orientation: firms in your country (1 = generally treat their customers badly, 7 = are highly responsive to customers and customer retention) Note (JE): signals how suppliers react or would react to an upgraded, more sophisticated demand for innovation
Availability and use of latest technology	In your country, the latest technologies are (1 = not widely available or used, 7 = widely available and used) Note (JE): indicates the lack of technology within the country (no matter from which origin) and thus is a (weak) proxy for technological sophistication
FDI and technology transfer	Foreign direct investment in your country (1 = brings little new technology, 7 = is an important source of new technology) Note (JE): shows the degree to which companies from abroad actually fill the gap of technology supply in the countries; in terms of demand oriented policies technology transfer through FDI is obviously preferable to import, see main text for further explanation
Imports as a percentage of GDP	Imports as a percentage of GDP (hard data, not WEF survey) ¹⁵ Note (JE): shows how much the countries rely on products / services produced abroad when satisfying their demand

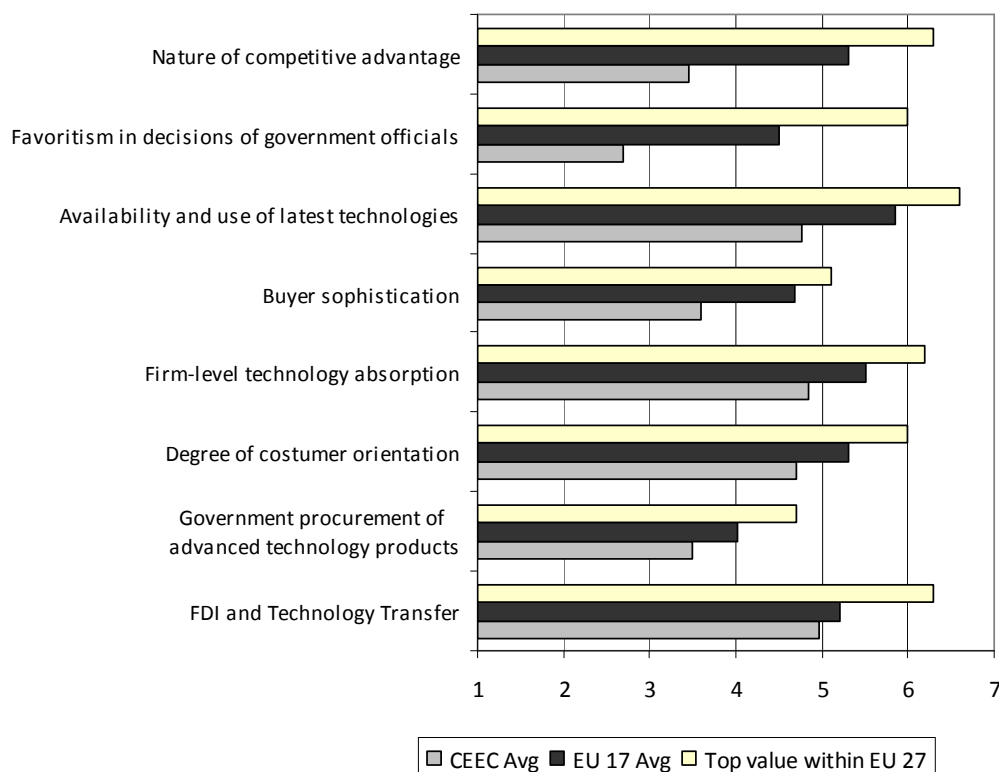
Source: WEF 2008

Exhibit 1 gives a first overall comparison of the mean values for the various key variables **between the EU CEEC group of countries and the remaining EU 17 countries** (without CEEC). To indicate best performance, it also shows the highest single value for any EU country in each of the variables. The main message is that **there is an obvious gap for all those variables**.

The data also shows that the EU CEEC are not a uniform block, but indeed heterogeneous (table 3). In some variables, individual countries are well in the EU average, while others lag far behind that average. The **appendix** provides a web-chart **for all 10 countries** and the variables mentioned above, and the subsequent interpretations include some of the major differences between countries. This heterogeneity is important when talking about the role of policy to support demand for innovation in the EU CEEC region

¹⁵ Source: Economist Intelligence Unit, Country Data Database (May 2008); The World Bank, World Development Indicators 2007; national sources, taken from WEF 2008, 473.

Exhibit 1: Assessment of Context conditions for demand and demand based policies in EU 17 and EU CEEC*, based on World Economic Form 2008



Source: World Economic Forum 2008, own compilation

* Table 2 above gives definitions of the variables, values range from 1 to 7, the higher the value, the more innovation friendly the condition¹⁶,

The variable are sorted so top variable shows the highest gap of EU CEEC to EU 17 mean, the lowest variable the lowest gap

Table 3: Selected variables important for demand and demand based policies WEF CEE country data (1=worst score , 7=best score)*

	CZ	EE	HU	LV	LT	PL	SK	SL	RO	BG	CEEC Avg.	EU17 Avg.
Nature of competitive advantage	3,7	3,5	3,5	3,3	3,6	3,6	2,9	4,5	2,9	3	3,5	5,3
Favouritism in decisions of government officials [#]	2,5	3,5	2,4	2,9	2,9	2,5	2,3	3,2	2,4	2,4	2,7	4,5
Availability and use of latest technologies	5,1	5,8	4,7	4,7	5	4,4	5,1	5,1	3,9	3,8	4,8	5,9
Buyer sophistication	4,1	3,8	3,1	3,5	3,7	3,7	3,5	4	3,6	3,3	3,6	4,7
Firm-level technol. absorption	5,4	5,5	4,7	4,5	5	4,7	5,4	4,9	4,4	4	4,9	5,5
Degree of customer orientation	4,8	5,3	3,9	5,4	4,7	4,6	4,7	5,1	4,1	4,4	4,7	5,3
Government procurement of advanced technol. products	4,3	4	2,9	3,2	3,4	3,7	3,2	3,4	3,5	3,4	3,5	4,0
FDI and Technology Transfer	5,5	5,3	5,5	4,8	4,7	4,9	6	3,8	5	4,1	5,0	5,2
Import as % of GDP	74,3	81,7	77,7	64,7	67,4	43	86,8	73,2	44,6	85,5	69,89	53,82

* For a description of the variables see Table 2 above, order follows exhibit 1 above

Source: WEF 2008

[#] A higher score means *less* favouritism

¹⁶ This is also true for **favouritism**: the higher the score the more neutral is the public contracting.

The following section will further analyse those differences and highlight the heterogeneity within the group of CEE countries. This serves a double purpose: **to discuss demand conditions** in the EU CEE countries that are often neglected in the academic discourse and on that basis to **formulate policy challenges** – as a basis for the policy recommendation in section 4.

3.2.2 Private demand for innovations

One key variable for the importance of demand for innovation is the **buyer sophistication**. This signals the inclination and ability of buyers to select products for their performance rather than the price and thus to take up innovative products and services more readily and to bear the cost of products at the beginning of the life cycle. The higher the buyer sophistication, the more likely costumers are willing and able to judge performance and to weigh the higher entry price of an innovation and the learning and adaptation costs against increased performance and long term value for money. It also is a proxy for the innovation curiosity of the market. One comparative advantage of leading countries such as Finland apparently is the fact that the Finnish population shows a high buyer sophistication, i.e. it is very keen on trying new things, on being leading edge in adopting new technologies (see e.g. Ebersberger 2007). In analysing the drivers for innovation, buyer sophistication has been statistically determined as one innovation drivers (Hollanders/Arundel 2007, p.22).

The **buyer sophistication** in EU CEEC is assessed **lower** than on average in Europe (Table 3). The average in the 1 to 7 scale for EU CEEC is 3.6 compared to 4.86 in the remaining 17 EU countries. The WEF data allows an assessment beyond EU, against 134 countries globally. Out of the countries surveyed world wide, the best ranked countries of the EU CEEC group are Czech Republic (41), the least ranked EE countries are Bulgaria (87) and Hungary (95). The only countries *outside* the EU CEEC group ranked *within* the range of the EU CEE countries are Malta (54) and Greece (51). However, besides those two exceptions, the contrast to buyer sophistication in non EU CEEC is stark, as 12 of the EU 17 countries are ranked among the top 22 in the world.

This data means that buyers in EU CEEC are not very prone or able to buy leading edge technology and innovation more generally. Thus, the pre-conditions for innovations to be absorbed in the market are challenging. One reason for lower buyer sophistication are obvious limits of disposable income of private consumers. But beyond obvious income limits we lack further analysis of the reasons for the low sophistication. Generally speaking this low sophistication calls for demand policies that target awareness, attitudes and skills. Demand oriented policies would have to influence the innovation culture in the market, making buyers more risk taking, aware of innovations and empower them to use them. Further, it would have to offer a rather large premium for the demander (some sort of demand subsidy) to overcome the innovation resistance. In fact, it points towards the overriding importance of those measures if those countries want to become markets for innovation.

In a next step, we can analyse the **readiness of firms to adopt latest technology**, which indicates the absorptive capacity for technologies.¹⁷ The business to business market is key

¹⁷ This variable is not independent from the supply of technology, but the way it is defined highlights the will or ability of firms to ask for and absorb new technologies (see table 2).

not only for the uptake of innovation from the original supplier (and thus providing return on investment for the supplier and his innovative effort). Adoption of technology is also key to modernise the industry through a rapid diffusion of sophisticated new services, equipment and parts and thus leads to supply and demand effects at the same time. The meaning of this variable for the overall innovation performance of countries cannot be over-estimated, it is one of the four out of 26 variables that is statistically strongly correlated with the summary innovation index (Hollanders/Arundel 2007, p. 35).

Here the assessment in the survey is **slightly better when compared to the assessment of the general buyer sophistication**, the mean for EU CEEC is 4.8 compared to 5.5 for the remaining EU 17. Again, to put it into a global perspective, the EU CEEC are still lagging behind, the highest ranked country of this group is Estonia (rank 30 globally), which makes it number 13 out of all EU countries, followed by the Slovak Republic (37) and the Czech Republic (38). The EU CEEC in which the companies are least ready to adopt latest technologies are Romania (94) and Bulgaria (114).

This variance demonstrates again how different policy would have to be designed, e.g. in Estonia compared to Bulgaria or Romania, when it comes to firms demanding latest technology. For EU CEE countries like Bulgaria and Romania the hindrances for diffusion of modernisation technologies are apparently extremely high, and innovation policy that sets highest standards for the uptake of technology might not trigger a catch up but create a deadlock. Thus, broad awareness and enabling measures would be needed, and incentives that overcome short-termism. At the same time, we would expect that in more advanced countries like Estonia diffusion and adoption policies can be more demanding, targeting actors at a higher level of innovation capabilities and awareness. Still, for the EU CEEC by and large, the data show the limitation of supply-side only policies, measures to boost the innovation output of companies that equip and deliver to other businesses would need to be complemented by policies that increase the inclination and readiness of firms to modernise, and to do so through adopting latest technology.

3.2.3 Public Procurement for Innovation

Judging from the analysis above, the EU CEEC to various degrees represent ‘immature’ environments for innovation demand, meaning that the private sector by and large is not willing strongly enough or not able to procure and adopt innovations (Edquist et al. 2000, p. 304). This situation is one entry point for demand boosting through public activity, most notably public procurement. The meaning of public procurement of innovations for the overall innovation performance is apparent, it is statistically moderately correlated with the EU summary innovation index and has positive effects on innovation and entrepreneurship (Hollanders/Arundel 2007, p. 35).

In light of comparatively weak buyer sophistication and lower readiness of companies to demand for innovations, can and does **public demand** fill a gap, and play a lead role in adopting innovations? Although the overall leverage of public procurement is undisputed, again we lack solid, internationally comparable data as to the relative weight of public demand in the various European countries at local, regional and national level. The World Economic Forum survey has recognised the importance of the public purse to stimulate innovation. It specifically asks if **government procurement decisions result in technological innovation** (1 = strongly disagree, 7 = strongly agree). Based on the assessment of business

leaders, the first important finding is that public procurement **in general is not regarded** as an **engine for innovation, neither in EU 17 countries nor in EU CEEC**, the averages are low (4.0 and 3.5).

While the CEEC lag behind, the **gap to the EU mean is smaller** here (Table 3). The perception of public demand for new technology in some leading EU CEE countries is well within the average of all EU countries, but again with a great disparity. The country of the EU CEEC group assessed best is the Czech Republic, which is ranked 18th globally, making it the 6th highest among the EU countries, with a score above average of the EU 17 group. The second highest ranked EU country is Estonia, the lowest ranked is Hungary (116), which, however, has the same score as Italy and slightly better than Greece.

While the Czech Republic and Estonia – in the assessment of business leaders – have already caught up with some leading EU countries, the bulk of the EU CEE countries have a great potential to use their regular procurement for innovation and add additional innovation demand in the system. But we need to keep in mind that the absolute score for this variable is low for all EU countries. This points to a set of general obstacles that will pour water into the wine when it comes to mobilising public demand for innovation in EU CEE countries.

The **first set of challenges** is related to **governance and coordination issues** in public procurement, and the EU CEEC share those by and large with all EU 17 countries, although more pronounced still. As said above, public purchasing to trigger innovative action in companies or to enable the diffusion of new products or services ideally combines efficient purchasing (value for money) with better public service or sectoral policy goal achievement (functional specifications, improved performance). For this link to occur, policy and administrative practice must overcome many organisational, incentive and skill challenges (see Edler / Georghiou 2008 for more detail). What is asked for is joint strategy making including the definition of public demand as an innovation policy leverage and well established coordination mechanisms. Further conditions conducive for the public purchase of innovations are risk taking, procurers with sound market knowledge, the right incentive structure to take the risk, experienced and sophisticated risk management activities and last but not least political decision makers which defend higher entry costs of innovations for the sake of life-cycle costing¹⁸ and improved functional performance.

All these governance conditions are important for all countries, but as all reviews and analyses show (see EW and TC reports), the bulk of the EU CEE countries is still in a stage of transition, institution building and learning. We find a high level of administrative fragmentation accompanied by a low level of inter-administrative coordination (which is true for many non EU CEE countries as well!). To set up sophisticated procurement approaches meeting all the requirements needed, is still a very long journey for the EU CEEC countries. This is certainly true for the national level, while we see some encouraging examples at local level, where a much simpler governance structure and a higher level of awareness and skill enables more advanced procurement activities (Baltic region, see below).

The **second set of challenges** is related to **transparency and fairness**. This is again not unique to EU CEEC, but much more pronounced here as compared to the average in EU 17

¹⁸ This means that products are not purchased on the basis of their initial cost, but on the basis of the overall costs over the life cycle of the product, which includes running costs, maintenance etc.

countries. Among the key requirements for public procurement for innovation is a systematic, transparent, open and objective procurement process. To incentivise companies to invest in innovation activities and to enter into the public market companies they need to feel that the competition is based on clear criteria and that the best value for money ratio succeeds. Therefore, corruption, bribery and favouritism in public purchasing decisions is a severe hindrance for innovation procurement, especially since market newcomers face a high risk of unfair competition. Without open access and market entry into the public market, competition tends to be less innovative. It is no statistical artefact that the variables 'trust' and 'corruption' are two out of the four variables (within 26 overall) that are strongly correlated with innovation performance (Hollanders / Arundel 2007, p. 35).

The question posed in the WE forum was: 'When deciding upon policies and contracts, government officials in your country' usually favour well-connected firms and individuals (=1) or are neutral (=7). Here, compared to the non EU CEEC, the **EU CEEC are assessed much worse**, their average value is 2.7 compared to 4.5 for EU 17 (Table 3). The best ranked country of the EU CEEC group is Estonia (44 globally), which makes it only number 16 out of all EU countries overall, followed by Slovenia (62), Lithuania (81) and Latvia (83), the lowest assessed country is the Slovak Republic (116 out of 134, worldwide, lowest EU country).

This WEF finding is confirmed by the World Corruption Index compiled by Transparency International¹⁹. On a score from 0 (highly corrupt) to 10 (highly clean) the EU 17 (without EU CEEC) score an average of 7.44, while the EU CEEC score 5.02.²⁰ We must stress that this data is highly subjective and may be built equally on old clichés as on own experience. But no matter what the basis is, the image of the EU CEEC in terms of fair public procurement practices is bad.

3.2.4 Meeting improved demand

When discussing the role of demand for innovation, we need to take into account the interface between supply and demand not only in terms of the purchasers, but also in terms of the supplier responding to the needs and early signals of customers. One prerequisite of demand based innovation therefore is that **companies are open to costumers**, oriented towards their real needs and in fact help to anticipate and define future needs. Asked about how companies in general treat their customers ('treat their customers badly' (1) to 'highly responsive to customers orientations' (7)), the picture is mixed. The variation between the countries is enormous. Lithuania (21 globally), Estonia (24) and Slovenia (30) are among the top 30 countries globally, ranked as 11, 12, and 13 among the EU countries overall, the laggards are Romania (100) and Hungary (114). Data from the European Community Innovation Survey gives a slightly more encouraging picture. In the EU CEE countries²¹ the share of companies reporting to **use users as source for innovation** is as high as within the rest of the EU or even higher (the only exception being Poland, Bruno et al. p. 34). This more open interface between producers and users is a potential asset for demand based policies, as signals coming from the users are received, companies are open.

¹⁹ See Transparency International 2008:

http://www.transparency.org/news_room/in_focus/2008/cpi2008/cpi_2008_table

²⁰ There is one striking deviation between the WEF data and the Transparency International, Slovakia is rated better in the latter, we might speculate that one reason is that WEF is more oriented towards business community while TI is more oriented towards political system.

²¹ This analysis does not include Romania and Bulgaria.

In addition, we can assess if the **latest technologies in the countries are widely available and used**. This is a hybrid variable, it indicates both supply and demand issues: if the score is high, the economy is able to provide the latest technology and willing to absorb it at the same time (see definition in table 2 above). We see, again, Estonia as by far the highest ranked country of the EU CEEC (rank 21 overall, and 12 among all EU countries). However, the rest of the EU CEEC lag far behind, with the Slovak Republic as second best ranked 46 and Bulgaria lowest ranked (103).²²

Finally, if we assume that local producers are not yet capable of producing the necessary quality and quantity of innovation, we need to ask for the **role of imports and the role of FDI when it comes to technology transfer**. The idea behind this is that an increased demand for innovations locally within the EU CEEC can take advantage of FDI bringing in technology or trigger more technology transfer through FDI and thus upgrade the system. The counter argument for the short term, however, is that more demand for innovation might lead to value added abroad if the innovation demand is satisfied not through FDI, but through imports.²³ We come back to this issue below.

The hard data on percentage of GDP that can be allocated to import shows that all EU CEE countries but Poland and Romania are above EU average, the **dependency on imports is obviously high**. In terms of innovation and therefore economic policy, policy makers may want to prefer FDI over imports. But to do so, FDI to the country must be technology intensive and provide for technology transfer (see Narula 2009). Looking at the assessment of companies in the countries as to whether **FDI brings little new technology (=1)** or is an important **source of new technology (= 7)**, there are clearly **two distinct groups of EU CEEC**. In four EU CEEC, foreign firms are said to contribute considerably to technology transfer, with the Slovak Republic ranked second highest among all EU countries and the Czech Republic, Hungary and Estonia ranked 5, 6 and 8 among the EU countries, while the other EU CEEC are ranked much lower, with Bulgaria and Slovenia ranked lowest within EU 27.²⁴ Therefore, while in some countries an increased demand for innovation could build upon a strong FDI that is potentially able and willing to deliver new technologies, other countries would struggle and would have to rely on imports or on the build-up of indigenous capabilities.

The above considerations are not academic, but have severe consequences for the DBIP rationale, especially in countries which are less able to deliver leading edge innovations. Assuming a country triggers more demand for innovation, the political debate will inevitably raise the question where those innovations are produced and how the local environment can react to the innovation demand. If local producers, including foreign companies producing in the country, are responsive to costumers' needs and can make technology available, the effects immediately show within the country. If, however, innovations are mainly imported and FDI does not contribute to a transfer of technology and innovation,

²² There are, again, Italy and Greece as two non EE outlier countries that are ranked lower than 5 EE countries.

²³ The problem of insufficient domestic supply *and* FDI to meet raising demand is repeatedly mentioned in the analysis of innovation systems in EE, see for example Romania TC report 2007, p. 26.

²⁴ For a country like Bulgaria, which has by far the lowest company R&D within the country in all Europe (Erawatch 2008, Edler et al. 2008) this is a particularly problematic assessment.

then demand focused innovation policy might trigger secondary effects in terms of innovation production elsewhere.

However, as we have already stressed above, the potential supply bottleneck is a severe issue for demand oriented innovation policy *only* if we neglect the benefit of technology and innovation diffusion for society and economy as such. Innovation demand and application of latest technologies trigger modernisation effects at home, both in firms and in public administrations (for many: Bihde 2006). In addition, applying latest technology, even if not bought from local or national suppliers, can also trigger spill over effects into the local economy through maintenance, service or demand for complementary products, all provided from local firms, as well as pressure on local firms to adopt in terms of skills.

3.3 Policy practice – some observations

3.3.1 Lack of systematic demand orientation

The 2007 Innovation Report of Bulgaria based on a survey of highly innovative Bulgarian companies draws a conclusion as to how **demand** is a major bottleneck:

‘Together with their strong commitment to innovation, the companies from this study mention a list of problems which explain why the number of innovative enterprises in Bulgaria is so low. In general, there is limited local demand for innovation products. Bulgarians do not easily accept new technologies and even those companies that recognise the need for innovation and modernisation of production and would like to invest in R&D have problems realising their goals... (Ministry of Economy and Energy of Bulgaria 2007, p. 94)

only to highlight in the summary a couple of lines later the request for **supply** side measures –with the exception of ‘marketing’ support:

‘In summary, the main barriers before innovative companies are the insufficient human resources, the lack of financial mechanisms for high-risk projects, the lack of resources for active marketing and tax incentives as well as the need to create a favourable (sic) environment for start-up companies’ (Ministry of Economy and Energy of Bulgaria 2007, p. 94-95).

This quote sums up much of the situation, and also of the shortcomings. There is poor demand for innovation in many parts of the EU CEEC economies, and even if this is recognised, the demand for a solution is most often still supply-side.

Against this background of poor demand for innovation and poor demand conditions more generally, what has been the role of policy to spur demand? This paper cannot claim to analyse in-depth all innovation policy and all policy influencing demand conditions – this would need a study on its own. Based on report and data from EU Trendchart²⁵, EU ERAWATCH²⁶, policy mix²⁷ and all those OMC peer review reports that are available for the

²⁵ <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=261&parentID=52>

²⁶ <http://cordis.europa.eu/erawatch/>

²⁷ On behalf of the EU Commission, the Policy Mix project has produced a framework to understand the interplay of RTDI policies see <http://www.policymix.eu/PolicyMixTool/page.cfm?pageID=201>

EU CEE countries (Estonia, Lithuania, Bulgaria, Romania), however, there is one clear finding: the policy mix in research, technology and innovation in the EU CEE countries has not yet taken into account more systematically the meaning of demand conditions for the dynamics of the innovation system. To improve demand for innovation, public or private, does not appear to be a strategic priority. This is true not only for the EU CEE countries, but has a specific meaning for them given their need to catch up on many dimensions. The document analysis reveals that ‘demand’ is still largely understood as company demand for (public) research or demand for skilled labour, but not as demand for innovative products and services.

The modernisation programmes within the Operational Programmes of the Structural Fund implementation seem to miss a chance. When screening the types of innovation related activities funded, the programmes in the Operational Programmes are mostly not explicit in their support for innovations to be purchased and applied, but rather support innovation projects in companies through – among other things – a subsidy for purchasing necessary assets and machinery.²⁸ The potential to link the demand for modernisation to improve internal innovation capability is thus not fully realised. While, as in the Czech case, the purchase of used machinery is excluded from funding,²⁹ there is most often *no* premium, no specific incentive to buy innovations, e.g. machinery or services that are new to the market.

Thus, at strategic level, Radosevic’s finding from some years ago (2004b) is still valid and has been confirmed in all available policy reports: the EU CEE countries have focused on High Tech, on re-creating the science base and the research capacities in the private sectors and, more recently, on re-establishing the link between the two. In fact, the strategic discourse in the EU CEE countries is still very much driven by a science-based, high tech model that takes diffusion into account, but mainly as a secondary condition.

3.3.2 Policy practice at instrument level

While in strategic documents the demand side is still largely missing, what can we see at the level of individual instruments? Innovation policy activities are meanwhile abundant, and the Trendchart database shows that around 30% of all measures are from EU CEE countries. There is a large number of measures in place to increase the innovation capacity of the economy more broadly.³⁰ The existing classification of measures does not fully take account of demand based innovation measures (which is another indication of a lack of awareness). It is thus not possible to match the database of innovation policy measures with the catalogue of demand based instruments as outlined above in Table 1.³¹

The policy database and classification we do have indeed points towards a mixed picture when it comes to demand based measures in the CEEC compared to other EU Member States. There is one major category out of five that captures some of the demand measures discussed above: ‘markets and innovation culture’. Here, especially the two sub-categories

²⁸ See also the evaluations of the structural funds and the innovation and knowledge dimension, http://ec.europa.eu/regional_policy/sources/docgener/evaluation/rado_en.htm

²⁹ <http://www.czechinvest.org/data/files/innovation-text-of-the-programme-412.pdf>, p. 6.

³⁰ Since the overall policy mix is dealt with in another paper to this workshop (Reid 2009), we can focus on the demand side of innovation policy.

³¹ A statistical analysis as to the relative weight of demand oriented measures on the basis of Trendchart is thus not feasible.

‘support of innovation culture’ and ‘support to the creation of new markets’ are most relevant. First, the overall number of measures in those sub-categories is extremely low, **across all EU countries**. The EU CEEC have only one out of nine measures to support innovation culture, although demand begins with curiosity, with a positive attitude towards innovation and sufficient abilities to absorb them. Further, half of the EU CEE countries do not have any innovation policy measure to support the diffusion of innovation through fiscal means (while the other EU Member States have only two altogether).

However, amidst this overall lack of demand oriented policy measures a systematic scan of all measures in the Trendchart Database reveals some interesting examples.³² Within the category ‘support to the creation of new markets’, Poland has a set of measures within the Operational Programme that focus on the application of new technologies. For example, the programme ‘New investments with high innovation potential’ supports new private investments covering application of new highly innovative organisational and technological solutions in production and services, including those leading to reduction of an adverse impact on the environment’. The Polish ‘Technology Credit Scheme’ equally supports the implementation of new technology, whereby here there is a strong focus on novelty which has to be certified by independent experts. In the Czech Republic, the measure ‘Marketing’ supports especially SMEs in their international marketing efforts, e.g. in international trade fairs. In Lithuania,³³ the programme ‘Modernisation of enterprises and implementation of Innovations’ (SPD measure 3.1.1) links the purchase of ‘modern’ equipment (focus on IT related equipment) with the consultation of companies to enable the take up and application of the innovative product, thus upgrading business demand for innovation.

One area of more systematic support for modernising through innovations is **eco-efficiency**. Here, in the wake of the Lisbon Strategy most countries have started to put a high emphasis on eco-efficient technologies and their diffusion. There are examples of programmes that support investing in eco-efficient technologies. In the Czech Republic, the Operational Programme of the Structural Fund has one programme on ‘eco-efficiency’³⁴ that combines a societal goal, eco efficiency, with modernisation of the Czech industry by supporting the investment in leading edge eco efficiency technologies. It does not fund R&D of the companies, but the purchase of new technologies and the change of energy consumption behaviour. However, while the programme demands to purchase improved technologies, it does not specify that the technology to be purchased must be an innovation. Similarly, in Bulgaria, one activity within the Operational Programme is designed to serve the modernisation of industry by having special financial incentive for eco-efficient technologies as part of the modernisation investment. Even if the target here is diffusion of existing leading edge eco-efficient technologies (and not new to the market innovations), the visibility of green procurement is much higher than innovation procurement. It is still far too early to assess how this will materialise, but it could to be one of the entry points for a broader understanding of the options demand orientation actually offers.

We also find a small number of measures in the category support of the creation of favourable innovation cultures. For example, the InnoAwareness programme in Estonia sets

³² The scan has shown that not all measures within these category do support demand, some are R&D support measures.

³³ <http://www.proinno-europe.eu/index.cfm?fuseaction=wiw.measures&page=detail&id=9040>

³⁴ See <http://www.czechinvest.org/data/files/eco-energy-aj-1086.pdf>

out to make the public in general and companies more specifically realise the importance of innovations and their diffusion by various means of publication and mobilisation. In Hungary a measure to improve the 'Social conditions of technological development' supports activities to disseminate and absorb results of S&T activities.

The information we have on **public procurement** on innovation indicates that this is simply not part of the policy arsenal and rationale of decision makers,³⁵ even if we find a growing awareness in some parts of the EU CEE, the general European discussion has been influential. The challenges the systems still face with public procurement in terms of inefficiencies and favouritism (see above) are obvious, and the build up of efficient and transparent procurement structures and practices must be a preparatory step for serious public procurement measures to spur innovation.

There are two areas in which public procurement is linked to innovation, **green procurement** (linked to the Lisbon strategy goals in this area) and **eGovernment**. Green procurement has been included in most of the National Reform Programs, but progress is rather slow and in fact is oriented towards diffusion of existing eco-efficient technologies. However, it is an entry point to enlarging procurement rationales.³⁶ For eGovernment, innovations are linked to raising efficiency in public administrations. Through European intelligence (www.epractice.eu/) we know about the eGovernment initiatives in all EU countries. Here we find a linkage between improving public service and trying to diffuse the usage of the internet and ICT technologies as well as specifying demanding demands to the ICT industry. For example, the Estonian Information Society Strategy 2013 claims that the

'...public sector is a smart customer, ensuring that as much freedom as possible is left for innovative solutions as regards in public procurement' (eGovernment Factsheet Estonia, p. 9)

At the same time, the strategy strikes a balance with latest innovative developments already out there, employing latest technologies in order to increase their diffusion (i.e. the innovative eID Card). The development and introduction of the electronic ID card in Estonia is another concrete example of technology procurement with spill over effects. A novel technology was developed and specific variations and adaptations have subsequently been introduced for different services, such as personal identification, digital signature electronic voting, ID tickets for public transportation. The latter is an example of broader initiatives of the Baltic city region, where there have been a set of public procurement projects that have deliberately demanded for innovation and linked specific goals of the City Council with innovation, among them Riga and Tallinn (Lember et al. 2007). The box below depicts the example of the ID transportation card in Tallinn, which shows how a whole range of services was introduced in connection with the electronic ID card and how this innovative solution has spread to a second market already (Box 1). The example shows some obvious principles for public procurement of innovation (highlighted in the box).

³⁵ Based on a set of interviews in Bulgaria and Lithuania

³⁶ Interview with EU official responsible for green procurement in the Lisbon Strategy.

Box 1: ID-ticket for the Public Transportation System, Tallinn*

The ID-ticket is an electronic ticket in the public transport system (bus-tram-trolley) which is sold to the user via the electronic payment collection system and which the user proves with his or her personal identification document (national ID-card). Thus, it will be sufficient to carry one's ID-card along when using public transportation that needs to be presented to the controller, who has a special machine for controlling the validity. ID-tickets can be purchased via the Internet bank, a mobile phone or from sales points. Estonia started issuing national ID-cards in January 2002 (**new functions, increased effectiveness**, JE). Without the existence of this infrastructure, several innovative public services in Estonia (e.g. eVoting) would not be possible (**multiplier effect of new technological trajectory**, JE). In addition to being a physical identification document, the card has advanced electronic functions facilitating secure authentication and a legally binding digital signature for public and private online services. An electronic processor chip (a respective smart card reader is needed for operation) contains a personal data file as well as a certificate for authentication. Certification Center Ltd, is the key organization, which was established as a 100% privately owned company in 2001, and as of 2007 is the only certification authority, providing certificates for authentication and digital signing for Estonian ID-cards (**public private partnership**, JE). The procurement process generated bids from six applicants; one was a joint tender AS Certification Center, AS EMT (mobile telephone operator) and AS Eesti Ühispank (bank), and this one was selected. The service was introduced successfully in 2004. There was no fixed price agreed upon. The price was to be formed on the turnover of tickets sold: 4.49% of returns in favour for the procuring company (**intelligent incentive structures**, JE). As a result, the company was interested in the application to work as efficiently as possible. Next to the small financial risks, the technological risk was small as well as the technologies developed relied on already existing ID-card-based infrastructure (**novel combination an introduction to new contexts rather than radical innovation**, JE). The main concern was how the new service would be welcomed by the users (**successful absorption**, JE). The ID-ticket was not planned to replace the old channels of distribution, but to create additional ones. Also, it has turned out to be a very efficient service, especially from the standpoint of controlling the usage of tickets: (1) the ticket is personalized, so it is not possible to diffuse tickets among users, as was the case with paper-based tickets; (2) mechanisms to control the validity of tickets in public transport is quick (**increased effectiveness**, JE). The ID-ticket was one of the services that generated interest towards obtaining a national ID-card. Today, a similar service has also been launched in Tartu, Estonia (**potential infant lead market**, JE). The Intellectual property remained with the Certification Center. In sum, the ID-ticket is an example of successful innovation where product, process and organizational innovations are combined.

* **Example and text (slightly shortened) taken from Lember et al., pp 43-44, highlights in bold JE.**

3.3.3 Long term demand articulation

One **strategic prerequisite** for long term successful innovation policy based on demand is obviously a clear **definition of (future) societal demands** into policy programmes and foci. More fundamentally, demands are market signals, and as already hinted to above, 'in order to become meaningful in the marketplace, needs must be translated into demands expressed in and mediated through the marketplace' (Mowery/Rosenberg 1979)³⁷. One means to define long term societal demands and articulate them into the marketplace is obviously **foresight**.

Scanning through the foresight processes in the CEEC countries in the last years, one must concede that lots of activities, some of them rather large scale, have been conducted. (Nyiri 2002, Radosevic 2004, 2002, Havas/Keenan 2008). However, most of those foresight processes discussed have one thing in common, they concentrate on the supply side – even if they include wider institutional contexts and link the S&T preference setting to societal goals. Most often they have asked for future directions of the science base and the

³⁷ Mowery and Rosenberg have stressed the distinction between "need" and "demand" strongly, and have defined the latter as a function of preferences and income, denoting a systematic relationship between price and quantities (ibid., p. 140).

knowledge production more generally and how priority setting there can be guided (see for example the Czech approach 2001, *ibid.*, p. 297-299).

There are very few examples of foresight processes that are designed to agree on clear and specified demands and/or take clearly specified demand as starting point for further innovation and S&T policy initiatives. One conceptually promising example of demand driven foresight has been eGovernment foresight in Bulgaria. This foresight activity was conducted in the context of the European FORETECH project (<http://foretech.online.bg>). In its conceptual report we find a summary of effects that demonstrate the linkages of satisfying forefront societal demands and triggering modernisation and spill over effects in other areas:

Crafting e-government is a process with significant multiplication effects – it will improve quality of service delivery, reduce corruption and save citizens’ and business’ time and thus increase productivity and welfare. The side effects could be a growing ICT industry, greater demand for IT specialists and higher requirements for civil servants, and increased computer penetration. Building e-government foresight will probably result in building scenarios or even foresights in other tangent areas such as education or ICT industry (ARCF/CCIT 2003, p. 6).

It is obvious that foresight activities starting with a specific societal demand are extremely challenging, as, for example, the experience of Germany and the development of lead vision through participatory foresight showed (Cuhls 2008, Cuhls/Georghiou 2004), but essential for long term demand oriented policy making.³⁸

4 Conclusion and policy recommendations

As regards demand based innovation policy, despite high hopes and many policy papers, not much systematic policy design and implementation has happened so far, not at the EU level³⁹ and not at Member State level, neither in old Member States nor in new ones. The observations outlined in this paper have shown that the demand conditions in the EU CEE countries are challenging in all respects. Consumers are not very sophisticated and risk taking, and have income limitations, companies shy away from investing in innovations, public procurement does not really inspire innovations (as in EU 17 so far) and the overall idea of public procurement as provider of transparent and functionally defined tenders does not work in EU CEE countries so far. The partly problematic image in terms of favouritism certainly plays its role, but this is only part of the story.

Our limited canter through the multitude of relevant innovation policy measures based on the EU Trendchart does not do justice to the various attempts undertaken and falls short of any quantitative and qualitative assessment. Country specific studies would be needed to assess activities more thoroughly. However, the overall finding remains true: in the EEC

³⁸ Recently, Georghiou / Harper suggested such a more demand oriented approach to make foresight more relevant for future innovation policy making in Europe (Georghiou / Harper 2008).

³⁹ The latest Lead Market Initiative of the EU Commission has just started and it is premature to assess if this takes off ground. At first sight, its overall design of measure mix appears, in light of the ambitious aims, slightly under-designed.

countries efforts to articulate and support demand for innovations, public and private, do not keep pace with the attempts to boost supply (of science and technology) and compete in the global race for better supply conditions.

Defining needs, overcoming absorption bottlenecks, investing in skills and attitudes of the workforce and the consumer by and large is time consuming, costly and may not yield the impact hoped for. All countries, without exception, struggle with the demand orientation in innovation policy. In fact, countries leading the way in demand oriented innovation policy discourse such as the UK have had sound analysis and strategic roadmaps (e.g. for public procurement, 'Kelly Plan') for quite some time, but are less than happy with the implementation record – even if a new wave of initiatives now seems to get off the ground.

The reasons for the lack of demand orientation and the slow pace of change are manifold. In section three, when discussing the challenging demand conditions, a set of policy challenges and consequences have already been proposed. In the following a set of recommendations for the EU CEE is suggested to tackle challenges and design complementarities based on the demand side. It must be stressed that these recommendations are of a general nature for the EU CEE. They take account of some common context conditions as outlined above, but there is not enough room for a differentiated list of recommendations for the various individual countries.

(1) Establish a new, complementary strategic rationale

Demand oriented innovation policy faces ideational challenges. New thinking needs time to diffuse and policy-making and administrations in the EU CEE – and certainly not only in those – are locked into established analytical and policy models that are transferred cross-border and often not questioned in their suitability for their diverse contexts in the CEE countries. While the supply side, the build up of research capabilities and related infrastructure is important, the dominance of the science-based, high tech model in the science and innovation policy discourse is counterproductive. Demand oriented approaches must also counter resistance from established science communities who fear for the freedom of science even if demand oriented innovation policies do not dictate research lines, but formulate problems and seek solutions and applications. Policy to support demand and supply of technology must not be conflicting. As the Aho report has rightly pointed out, the supply side especially in cohesion regions of the EU is best served if linked to their own context and the needs of this local context (Aho et al. 2007 p. 47). The CEE countries need a stronger policy discourse to find their own conceptual ways. As the example of the electronic ID card shows, a strategy linked to a clear mission enables leapfrogging more advanced countries and defines areas of leading edge innovation application.

Given the obvious challenges of the supply side in the EU CEE countries, demand based innovation policy is more likely to face resistance if satisfying leading edge demand at home means to rely on foreign suppliers who might not invest in the country (demand satisfaction through imports). As we have seen above, this is a severe issue not for all, but for some of the EU CEE countries. However, demand policies can be selective in areas in which local producers are in a good position to compete and deliver, e.g. because of the need for local involvement and knowledge of local demand conditions etc. More importantly, and linked to the next recommendation below, policies would have to focus on absorption and diffusion

to modernise industries rather than focussing solely on a couple of champions. They have to rely on an up-grading of the specific industries, whereby foreign supply is matched by local maintenance or sub-contracting and, potentially, foreign firms start producing near the demanding market. In other words, the lack of leading edge suppliers at the beginning of demand based policies does not impede a whole range of benefits for the local economy, directly and indirectly, stemming from demand based policies.

(2) Innovation policy strategies should formulate three clear priorities

(a) Demand oriented policies should try to influence the innovation culture in the society in general, trying to encourage more risk taking in consumers (alongside firms and administrations) as buyers, making them aware of innovations and empower them to use them. This starts with primary education and runs through the whole arsenal of education and formation programmes.

(b) Innovation should be systematically linked to the modernisation of the industry, with the build up of a more daring business community capable of absorbing technologies and organisational innovations. This should be one major focus of innovation policy.

(c) A new understanding is needed that innovation is not only a policy goal in its own right, but much more powerful if linked to other societal policy goals. Policy support for innovation should be much more defined in terms of meeting societal challenges. This would alter the role of innovation policy fundamentally, leave innovation policy much more as a moderator, facilitator and enabler for other ministries and administrations, and it would automatically link innovation efforts with demand articulated in policy discourses in other areas.

(3) Institutions and governance mechanisms need to be brought in line with new requirements

Currently, governance structures are not designed for a broader innovation policy approach as suggested. Above all, new and much more committed horizontal coordination between ministries is needed to facilitate all-government approaches for large-scale demand driven activities and to set clear priorities. The facilitating supporting role of innovation policy needs new forms of coordination. The existing coordination in most CEE countries in terms of science and innovation policy (if the two are coordinated at all) is mainly geared towards supply-side issues and often not even suited in this traditional model. New structures need to be governed through leadership and coordination mechanisms such as overall visions for the mix of supply and demand, clearly formulated priorities across all government and a set of clear policy principles (e.g. innovation targets within other policy areas).

(4) Start the long journey towards using public procurement for innovation

A major institutional challenge lies within public procurement in administrations. The example of the ID-ticket for the Public Transportation System, Tallinn, showed what kinds of benefits can occur and how they can be met. It is obvious that for public administrations at all levels the list of challenges is enormous for any country. It is equally apparent that the challenge of favouritism and administrative capabilities adds a specific layer of complexity in most of the CEE countries. There is no use in denying this: to establish the appropriate level of trust and to build up credible structures which check against unfair practices is the most important single prerequisite for procurement to take off as a meaningful mechanism to

boost innovation in EU CEE countries. Procurement of innovation necessitates flexibility, open formulation of functional specification, the allowance of variants in the bidding process and, as needed, the application of complex negotiation or technical discourse procedures as outlined in the EU directives. All these requirements are hard to meet for any country, but the air of favouritism does not help a transition towards those practices. In other words, favouritism not only impedes innovations to occur, it also impedes the system to open up to innovative practices.

Beyond the obvious need to play by the rules, there are a set of further governance lessons. Public procurement needs to be organised in ways that make procurement less risk averse, bring the purchasing decision maker, the actual administrative user and the procurer closer together, and the procurement process as such must be open to dialogue both to external users and to industry in general. In fact, procurement must be driven by those responsible for the sectoral or administrative mission and those knowledgeable about the applications, the user requirements and the supplying markets. This also involves the build up of skills to define needs in functional terms in order to enable industry to respond with innovations. For innovations to be purchased with the public purse, the legal and financial experts may support and warn, but not drive the process. The Tallinn example has also shown that procurement needs to define functional requirements and check for intelligent adaptations (rather than limit innovation procurement to radical innovation), think about spill over and multiplier effect of its investment and mobilise public-private partnerships.

(5) Make good use of European initiatives and support

The support from the EU level, mainly in form of the structural funds, should be monitored and checked for the principles outlined above. Instruments should be given priority which demand for or accelerate the diffusion of innovations, with all the spill-over effects discussed. It appears that the potential of the money flows is not realised along those lines, although the various EU CEE countries have quite different models and records.

Further, the administrations of EU CEE countries should more broadly and intensively engage in those practices and instruments that help administrations to learn. For example, the OMC-Nets appear to offer options for EU CEE countries with their specific structural challenges to brainstorm about demand oriented policies, specific market needs and policy instruments best suited for them. Procurement networks across the EU to implement the EU Lead Market initiative should actively be followed up, even if the economic benefit on the supply side in those markets is not immediately obvious. Those activities can also be a laboratory for independent initiatives to bundle specific demands in a set of EU CEE countries and to realise large scale public procurement or new sectoral or infrastructure initiatives in specific regions.

(6) Think in terms of instrumental complementarities

Too often, individual policy instruments are designed and implemented in isolation. The idea of ideal policy-mixes is an ex post construct to make sense of complexities rather than a principle of conscious policy design. However, the bottlenecks for the demand for and diffusion of innovations are different, more numerous and often less obvious than those for the supply side (awareness, absorptive capacities etc.). Thus, the design of policy initiatives

must include an analysis of potentials and bottlenecks and ensure that all complementary instruments are designed that are needed to tackle restrictions. Individual instruments are not enough. Needless to stress that a pull from demand should be accompanied by supply side measures whenever indigenous potential appears sufficient to meet the forefront demand in the long run.

(7) Build up and utilise appropriate strategic intelligence within and outside administrations

Demand oriented innovation policy also needs the analytical, evidence providing and supporting underpinning. The role of strategic intelligence in demand based approaches is complex, it must support

- formulating policy rationales and intervention logics (as strategic intelligence has done with the supply side for many years)
- understanding and measuring effects and support in learning,
- understanding of bottlenecks on the demand side and thus rationale for intervention,
- technology and market intelligence, not to pick winners, but to understand how functional requirements can potentially be met by suppliers.
- the organisation of the discourse between users and the potential supplying firms,
- the articulation of demand.

The latter is particularly important: new ways of defining and articulating societal demands and fears when it comes to technology and innovation need to be found, to define joint visions, raise awareness, ensure responsiveness of the innovation system and to bring in the demand dimension into the long term strategy of innovation policy more generally, in fact to base long term strategy on future societal demands. The fixation on technology foresight should make way for a more balanced approach to define future visions of the society and different sectors.⁴⁰ Therefore, governments need to build up the capacities needed to meet those challenges.

(8) Communicate the approach: it is not big government knowing it all

As stated in the introduction, demand based policy is no silver bullet, and as this overview has shown, it would pose severe challenges especially in the EU CEE countries, and those challenges are still very different between the EU CEE countries. However, a bundle of principles and reforms as outlined above may slowly lead to a different understanding of what demand based innovation policy finally is: it serves the economy *and* the society, and it complements supply side policies rather than substituting them. Mobilising all government functions to make society and industry more prone to innovation is not about building up a technocratic machine to pick winners and fine-steer markets, but to organise discourse on best ways and strategies based on demands. Demand orientation is more than yet another type of instruments. It has to do with innovation culture, with the readiness and willingness to ask for and adopt innovation within all society and to make the system more responsive to needs and to tackle challenges we all share and challenges that are specific to individual countries. To communicate those benefits clearly and to avoid the misperception of a

⁴⁰ For a discussion on the meaning of foresight for innovation policy strategy making and the role of demand therein, see also Georghiou / Harper 2008.

relentlessly intervening state will be the most prominent task for the mobilisation needed.

References

- Anderson, E. S. (2007): Innovation and Demand; in Hanusch, H.; Pyka, A. (eds.), Elgar Companion to Neo-Schumpeterian Economics: Cheltenham.
- ARCF / CCIT (Applied Research and Communications Fund/ Coordination Center on Information, Communication and Management Technologies) (2003): Background Paper: E-GOVERNMENT FORESIGHT IN BULGARIA, Sofia, April 2003
<http://foretech.online.bg/docs/Background%20paper-e-gov-Bg.pdf>
- Aho, E. et al. (2006), Creating an Innovative Europe. Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit. Rapporteur: Luke Georghiou; January 2006.
- Bihde, A. (2006): Venturesome Consumption, Innovation and Globalization. Paper for a Joint Conference of CESifo and the Center on Capitalism and Society "Perspectives on the Performance of the Continent's Economies" Venice, 21 - 22 July 2006,
http://www.bhide.net/bhide_venturesome_consumption.pdf
- Beise, M. et al. (2003): The Emergence of Lead Markets for Environmental Innovations; FFU report 02-2003, Berlin
- BDL (2003), 'The Power of Customers to Drive Innovation', Report to the European Commission, Brussels.
- Blind, K. (2007): Regulation in nachfrageorientierte Innovationspolitik (Regulation in Demand oriented Innovation Policy); in J. Edler (ed.), Nachfrageorientierte Innovationspolitik. Benchmarking-Studie im Auftrag des Deutschen Bundestag, (forthcoming) (Demand-oriented Innovation Policy. Benchmarking Study on behalf of the German Parliament), pp 277-289.
- Bitzer, J.; Hirschhausen, C. (1998): Science and Technology Policy in Eastern Europe - a Demand-Oriented Approach, in: DIW Quarterly Journal of Economic Research, Nr. 2, e1998, pp. 139-148
- Bonaccorsi, A. (2007): Grammars of creation. Thinking for radical innovation. Paper presented at the ESOCE net Workshop. Creativity in collaborative environments, Rome December 3 2007.
- Bruno, N.; Miedzinski, M.; Reid, A.; Yanzi, MR (2008): Socio-cultural determinants of innovation, WP 10 within Innovation Watch Project. <http://www.technopolis-group.com/resources/downloads/WP10-Socio-cultural-factors.pdf>
- Cohen W.; Levinthal, D (1990): Absorptive capacity: a new perspective on learning and innovation; in Administrative Science Quarterly 35(1) pp 128-152.
- Cuhls, K. (2008): Foresight in Germany; in: Georghiou, L., Harper, J.; Keenan, M.; Miles, I., Popper, R. (ed.), The Handbook of Technology Foresight; Cheltenham, pp. 131-153.
- Cuhls, K. /Georghiou, L. (2004): Evaluating a participative foresight process: 'Futur — the German research dialogue', in: Research Evaluation 13 (3), pp. 143-153
- Dalpé, R. (1994): Effects of Government Procurement on Industrial Innovation; in Technology in Society vol 16 (1), pp. 65-83.

- Dalpé, R., C. DeBresson and H. Ciaoping (1992): The public sector as first user of innovations, in *Research Policy*, 21 (3), pp. 251-263.
- David, P.; Aghion, P., Foray D. (2008): Science, Technology and Innovation for Economic Growth: Linking Policy Research and Practice in "STIG Systems", MPRA Paper No. 12096, <http://mpra.ub.uni-muenchen.de/12096/>; posted 11. December 2008
- DIUS (2008): Innovation Nation, March 2008
<http://www.dius.gov.uk/publications/ScienceInnovation.pdf>
- Eaton, J.; Kortum, S. (1995): Engines of growth. NBER Working Paper No 5207.
- Ebersberger, B. (2007): Nachfrageorientierte Innovationspolitik in Finnland (Demand-oriented Innovation Policy in Finland); in: J. Edler (ed.), Nachfrageorientierte Innovationspolitik. Benchmarking-Studie im Auftrag des Deutschen Bundestag (Demand-oriented Innovation Policy. Benchmarking Study on behalf of the German Parliament), pp. 115-129.
- Edler J. (2008). Demand Based Innovation Policy. Working Paper 9, Manchester Institute of Innovation Research
- Edler, J. (2009): Demand Based Innovation Policy; in: Smits, R.; Kuhlmann, S.; Shapira, P.; Innovation Policy – Theory and Practice. An International Handbook, Cheltenham, UK (Edward Elgar), 2009 (forthcoming)
- Edler, J. (2007a): Nachfrageorientierte Innovationspolitik – eine konzeptionelle Einführung; in: Edler (Ed.), Bedürfnisse als Innovationsmotor – Konzepte und Instrumente nachfrageorientierter Innovationspolitik (Needs as drivers for innovation – Concepts and instruments of demand oriented innovation policy), Berlin: Sigma
- Edler, J. (ed.) (2007b): Bedürfnisse als Innovationsmotor – Konzepte und Instrumente nachfrageorientierter Innovationspolitik (Needs as drivers for innovation – Concepts and instruments of demand oriented innovation policy), Berlin: Sigma
- Edler J.; Beatson, M.; Hodson, Kaarly, R.; Koch, P. (2008): Policy Mix Peer Reviews: Country Report Bulgaria, Manchester, Brussels
- Edler J.; Beatson, M.; Smits, S.; Pukl, B. Windmüller, J. (2007): Policy Mix Peer Reviews: Country Report Lithuania; Manchester, Brussels
- Edler, J.; Hommen, L; Papadokou, M.; Rigby; Rolfstam, M.; Tsiouri, L.; Ruhland, S. (2005), Innovation and Public Procurement. Review of Issues at Stake, Study for the European Commission, final report.
- Edler, J., Georghiou, L. (2007), 'Public procurement and innovation—Resurrecting the demand side', in *Research Policy* 36, pp 949-963.
- Edquist, C. (1994), 'Technology Policy: The Interaction between Governments and Markets', in: G. Aichholzer, / G. Schienstock, (eds.), *Technology Policy. Towards and Integration of Social and Ecological Concerns*; Berlin/New York: Walter de Gruyter; pp. 67-94.
- Edquist, C. (Ed.) (1997), *Systems of Innovation. Technologies, Institutions and Organizations*, London, Washington: Pinter Publisher.
- Edquist, C., Hommen, L.; Tsiouri, L. (2000a), *Public technology procurement and innovation*, Boston.

- Edquist, C., Hommen, L.; Tsipuri, L. (2000b): Policy implications; in Edquist, C., Hommen, L.; Tsipuri, L. (ed.), *Public technology procurement and innovation*, Boston. pp. 301 – 311.
- EU COM (2007): Communication from the Commission to the Council, the European Parliament, the European Social and Economic Committee and the Committee of Regions: A lead market initiative for Europe; Brussels, SEC(2007) 1729, SEC(2007) 1730
- European Council (2006), Decision of establishing a Competitiveness and Innovation Framework Programme (2007-2013), 26.09.2006, Brussels
- Fontana, R.; Guerzoni, M. (2007): Incentives and Uncertainty. An empirical analysis of the impact of demand on innovation; SPRU electronic Working Paper Series NO 163, <http://www.sussex.ac.uk/spru/documents/sewp163.pdf>
- Gatignon, H.; Robertson, T. S. (1985). A propositional inventory for new diffusion research; in *Journal of Consumer Research*, 11, pp. 849-867
- Georghiou, L. (2007), 'Demanding Innovation Lead markets, public procurement and innovation,' NESTA Provocation 02, February; London. www.nesta.org.uk/assets/pdf/demandinginnovation_provocation_NESTA.pdf
- Georghiou, L; Harper; J. C. (2008): FTA for research and innovation policy and strategy. Paper delivered to the Third International Seville Seminar on Future-Oriented Technology Analysis: Impacts and implications for policy and decision-making – Seville 16-17 October 2008
- Geroski, P.A. (1990), 'Procurement policy as a tool of industrial policy'. In: *International Review of Applied Economics*, 4 (2), pp. 182-198.
- Guy, K. (2006): Policy mix per review-Country Report, CREST Policy Mix Working Group. Report, in conjunction with IPTS, March 2006;
- Havas, A.; Keenan, M. (2008): Foresight in CEE Countries; in: Georghiou, L., Harper, J.; Keenan, M.; Miles, I., Popper, R. (ed.), *The Handbook of Technology Foresight*; Cheltenham,
- Hollanders, H.; Arundel, A. (2007): Differences in socio-economic conditions and regulatory environment: explaining variations in national innovation performance and policy implications. INNO-Metrics Thematic Paper, www.proinno-europe.eu/admin/uploaded_documents/eis_2007_Socio-economic_conditions.pdf
- Jacob, Klaus and Martin Jänicke (2003): Lead Märkte für Umweltinnovationen. (Lead Markets for environmental innovations), in *Politische Ökologie*. 21 (84), pp. 19-21.
- Kok, W. et al. (2004), *Facing the Challenge. The Lisbon Strategy for Growth and Employment. Report from a High Level Group*. November 2004, Luxembourg.
- Lember, V; Kalvet, T.; Kattel, R; Penna, C.; Suurna, M (2007): *Public Procurement for Innovation in Baltic Metropolises*, Tallinn.
- Lundvall, B.Á. (1988), *Technological change and economic theory - Innovation as an interactive process, From user-producer interaction to the national system of innovation*, London
- Lundvall, B.Á. (ed.) (1992), *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning*; London: Pinter Publ., 1992

- McMeekin, A., Green, K., Tomlinson, M. and Walsh, V. (eds.) (2002): *Innovation by Demand: An Interdisciplinary Approach to the Study of Demand and its Role in Innovation*, Manchester and New York: Manchester University Press.
- Meyer-Krahmer, F. (2004): *Vorreiter-Märkte und Innovation. Ein neuer Ansatz der Technologie und Innovationspolitik*; in: F.W. Steinmeier, M. Machnig (eds), 'Made in Germany '21. Innovationen für eine gerechte Zukunft', Hamburg: Hoffman und Campe, pp. 95-110.
- Ministry of Economy and Energy (2007): *Annual Report on the Bulgarian National Innovation Policy*; Sofia
- Mowery, D; Rosenberg, N. (1979), 'The influence of market demand upon innovation', A critical review of some recent empirical studies; in *Research Policy* 8 (2), pp. 102-153.
- Narula, Rajneesh (2009): *Multinational Firms, Globalization and Innovation Systems: Policy Implications for New Member States of the EU*; Paper presented to the INCOM Workshop of the Czech Presidency, January 22 and 23 2009.
- Neji, L. (1998), *Evaluation of Swedish Market Transformation Programmes*. Lecture at the ACEE Summer Study on Energy Efficiency in Buildings, Panel II
- Nyiri, L. (2002): *How to turn 'mobilising regional foresight potential' into a structural contribution to integration*; paper presented at the ETAN Conference Mobilising the Regional Foresight Potential for an enlarged EU, July 2002, <ftp://ftp.cordis.europa.eu/pub/foresight/docs/9-howtoturn.pdf>
- OECD (2008): *Recommendation of the Council on Enhancing Integrity in Public Procurement* <http://www.oecd.org/dataoecd/62/24/41549036.pdf>
- Polt, W; Koch, P.; Pukl, B.; Wolters (2007): *OMC Policy Mix Review Report Country Report Estonia*, October 2007 http://ec.europa.eu/invest-in-research/pdf/download_en/omc_ee_review_report.pdf
- Porter, M.E. (1990): *The competitive advantage of nations*, New York.
- Radosevic, S: (2004a): *A Two-Tier or Multi-Tier Europe? Assessing the Innovation Capacities of Central and East European Countries in the Enlarged EU*, in: *JCMS* 2004 42 (3). pp. 641–66
- Radosevic, S. (2004b): *(Mis)Match between demand and supply for technology: Innovation, R&D and growth issues in Central and Eastern Europe*, in: Walter Leal Filho (ed.) *Supporting the Development of R&D and the Innovation Potential of Post-Socialist Countries*, IOS Press, 2004, pp. 71-82.
- Radosevic, S. (2004c): *Foresight as S&T and innovation policy tool: Policy lessons from Bulgarian, Romanian, Czech and Hungarian Foresight Exercises*, paper prepared within the Foretech project, presented to the FORETECH Conference May 27, Brussels
- Radosevic, S: (2002): *Regional, National and Regional Foresight in Central and Eastern European Candidate Countries*, paper presented at the ETAN Conference Mobilising the Regional Foresight Potential for an enlarged EU, July 2002, <Brusselsftp://ftp.cordis.europa.eu/pub/foresight/docs/8-regionalpolicy.pdf>

- Reid, Alasdair (2009): EU innovation policy: Towards a differentiated approach across countries. Paper presented to the INCOM Workshop of the Czech Presidency, January 22 and 23 2009
- Rothwell, R.; Zegveld, W. (1981): Government regulations and innovation - Industrial Innovation and Public Policy, London: Rothwell, R./Zegveld, W. (ed.), Industrial Innovation and Public Policy, London, pp. 116-147
- Schmookler J. (1962): Economic sources of inventive activity; in: The Journal of Economic History 2(1): pp 1-20
- Smits, R. (2002), 'Innovation studies in the 21st century. Questions from a user's perspective', in Technological Forecasting and Social Change, 69 (9), pp. 861-883.
- Suvilehto, H.-M. (1997), 'An evaluation of NUTEK's programme for more efficient use of energy', Final Report: National Board for Industrial and Technical Development.
- Suvilehto, H.-M., Överholm, E. (1998), Swedish Procurment and Marcet Activities – Different Design Solutions on Different Markets. Presentation at the 1998 ACEEE Summer Study on energy efficiency in buildings
- von Hippel, E. (1986): Lead Users, 'A source of novel product concepts', in Management Science 32 (7), pp. 791-805.
- Wilkinson, R., Georghiou, L. (Rapporteur) , Cave, J. (Rapporteur), Bosch, C. Caloghirou, Y.; Corvers, S.; Dalpé, R.; Edler, J, Hornbanger, K.; Mabile, M.; Montejo, M.J.; Nilsson, H; O'Leary, R.; Piga, G.; Tronlin, P.; Ward, E. (2005), Public Procurement for Research and Innovation. Report of an expert group, commissioned by the European Commission; Brussels.
- World Bank (2007): BULGARIA. Accelerating Bulgaria's Convergence: the Challenge of Raising Productivity Volume II, Main Report
- World Economic Forum (2008): Global Competitiveness Report 2008-2009

Appendix

The assessment of key demand conditions and a set of selected supply conditions for the EU CEEC, based on the World Economic Forum Competitiveness Index

Note: All variables except import as a % of GDP are based on an assessment of business leaders, with -3 being the lowest and +3 the highest score. The data is normalised, with EU 17 average (EU without CEE EU) = 0 to include 'import as % of GDP' which is hard data, not assessment. For a definition of the variables see **table 2 above**.

To read the charts: For all variables – except for import as % of GDP – the simple rule is, the higher the score, the more innovation friendly or innovation driven is the condition and the better is the starting point for innovation based policies.

