

THE DEMAND-SIDE INNOVATION POLICIES AND SUSTAINABLE DEVELOPMENT IN THE SMALL EU COUNTRY¹

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Abstract

Various regulations, standards, public procurement activities, subsidies for private demand, and other similar support measures form the demand-side innovation policies. In the modern era, countries and governments dedicate more and more attention to the economic, social, and environmental sustainability of development and entrepreneurship. Sustainable development aims to meet human needs so that economic and social conditions will improve or at least not deteriorate and environment is preserved in order to allow future generations to meet their needs as well. Several demand-side innovation policy measures target also sustainability either as primary or secondary goal. Such policy measures tend to suffer from overshooting effects or fail to influence the behaviour in a desired manner. The purpose of this study is to offer suggestions concerning demand-side policy measures in order to improve their impact on the sustainability of development.

Keywords: demand-side innovation policy, sustainable development, small country context

JEL Classification: O31, O33, O38, Q01

Introduction

The sustainability of economic and social development is interwoven with the need to introduce new innovative solutions, which would also preserve the environment. However, the innovations that contribute to the development tend to be radical and thus related to high uncertainty and risks. Entrepreneurs are often hesitant to undertake so risky projects, because the returns are uncertain and difficult to estimate. Yet, for the society, it is important and desirable to support solutions that enhance economic, social, and/or environmental sustainability.

The demand-side innovation policy measures help to make demand conditions for the new innovative solutions more transparent and may catalytically facilitate private interest in application of them. The enactment of relevant standards and regulations, public procurement programs, subsidies and other tools are targeted at changing the behaviour of companies and consumers towards more sustainable pattern, which improves the development opportunities.

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Unfortunately, the policy makers themselves face the situation of considerable uncertainty, because policy measures tend to create imperfect outcomes by underestimating the influence of adverse side-effects or long-term consequences. These measures could also over-compensate for the market or system failures they address. Such overshooting, even if only temporal in nature, might introduce new problems and disequilibrium situations. Thus, the key issue is to fine-tune policy mix so that positive outcomes would clearly outweigh distortions.

The experiences from past and the practices of other countries provide some indications of what might be appropriate tools, but these sources are not flawless. In the dynamic world, the past is not the best guide because framework conditions change and sometimes very rapidly. The best practices of other countries might not be transferable or suitable due to crucial differences in development pattern or culture. This implies that policies could benefit from the additional analysis of various viewpoints, policy dimensions, and elements in order to clarify their impact.

The purpose of this study is to offer suggestions concerning demand-side policy measures in order to improve their impact on the sustainability of development. The analytical discussion focuses on the literature explaining the nature and features of demand-side innovation policies and sustainability. In addition to these theoretical and empirical contributions, some examples from Estonian practice are introduced as well.

The study is structured as follows. The first section introduces the views concerning demand-side innovation policies. Thereafter, the discussion focuses on the sustainability of development. Some specific features of sustainability-oriented demand-side policies in small country context are outlined next. Then we discuss demand-side innovation policies in the light of sustainable development in Estonia and develop a set of suggestions. The conclusions summarise the main results, limitations, and suggestions for future research.

The concept of demand-side innovation policy

Edler (2009) defines demand-side innovation policy 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' (Edler 2009, p. 5). The definition is in some respect more general and yet more precise than the earlier version provided in Edler (2005). It introduces some novel aspects, like the conditions for the uptake and improved articulation of demand, to the notion. With this, the refined definition emphasises framework building and demand clarification as central functions of demand-side innovation policy.

The demand-side measures are linked to policy aims like sustainability, energy efficiency, infrastructure, or health care system (Edler 2005). This shows the importance of demand facilitation on the way towards more forward looking and

sustainable consumption pattern. Such policy aims combine welfare creation with the concern for the future generations.

The demand-side innovation policies are used because (see Edler 2009):

- 1) innovation policy needs to help overcome market and/or system failures;
- 2) societal goals and policy needs determined for example by elected politicians;
- 3) industrial or economic policy that calls for modernisation via innovations;
- 4) industrial or economic policy seeks to facilitate forefront innovation production with local, national or regional companies and to create lead market potential.

The demand-side policy measures have more purposes than overcoming deficiencies of the market for innovative solutions or systemic problems in initiation or diffusion of innovations. Societal goals and policy needs as the purposes involve considerable risks. Their subjective nature creates potential for emergence of biased solutions and corruption. Very transparent and well-founded goal-setting should help to reduce such dangers.

The experiences of national innovation systems are likely to provide valuable guidance. Replication of them without adaptation is not very good option. Each system has differences, which are related to path-dependencies and other factors. Such differences may render replicated measures inappropriate and useless. The solid foundation based on transparent and well-founded decision mechanisms should be prioritised to the policies that try to replicate best practices. However, policy learning should still be part of this decision mechanism as one of the stages.

Successful innovation policy contributes to the increase in productivity by encouraging companies to modernise their production systems. Leading-edge technologies and innovative processes make the companies and the economy more efficient. However, the innovation-oriented industrial policy should be related to the analysis of domestic companies' capabilities to participate in this process. If local innovative capabilities are low, then the demand-side policies might contribute more to the import than to the development of national business setting. Knowledge transfers from abroad are also important. Ultimately, the national policies should create conditions for domestic innovations as well. (see also Edler, Georghiu 2007; Edler 2009)

Innovation policy is not the only field where the differentiation between supply-side policy and demand-side policy is relevant. Lindbeck and Snower (1990) analyse the mix of supply-side and demand-side policies to increase employment; Minford (1999) offers support for stringent monetary control and supply-side macroeconomic policy and more recently Kandil (2009) analysis the role of demand-side stabilization policies. These examples reveal that supply-side and demand-side policy division has been one of the major elements in macroeconomics. Unlike neoclassical and Keynesian views in macroeconomics, the contemporary views of innovation policy do not support substitutability between the supply-side and demand-side policies, but tend to discuss them as complements.

Some forms of demand-side innovation policy, like for example public procurement, are not novel. Already in 1970s and 1980s several studies discussed public procurement has a policy measure that can impact innovations. (Edler, Georghiou 2007) Thus, the elements of demand-side innovation policy have been discussed for decades. However, the contemporary views on subject do add considerable value by taking more interconnected and interactive standpoint. Each policy measure is to be viewed in a broader context in order to account for the general impact of the entire innovation policy. While the demand-side innovation policies have their own narrower focus, they should be also viewed as elements of the wider policies. The public procurement as demand-side policy measure is still separable focus area. Rolfstam (2009) discusses within this field the role of institutions in using public procurement as policy measure.

The innovation policy has developed in accordance with the evolution of innovation theory and models (see Mytelka, Smith 2001). Edquist and Hommen (1999) discuss that co-evolution in detail. The linear innovation models view technology push from supply-side as the primary catalyst of innovations. Contemporary or systemic views value the close interaction between various system members as the main force facilitating innovative growth. The role of demand or the role of producer-user interaction is very important in several well-known concepts related to innovation system approach. The demand-side is incorporated into chain-linked model, distributed process model (see also von Hippel 1988), interactive learning theory, network analysis, and development block theory (more details in Edquist, Hommen 1999).

During Finnish presidency in 2006, the EU expert group led by Mr. Esko Aho released a report outlining the need for fostering the demand-side initiatives. This report addressed in particular the creation of lead markets, by (Aho *et al.* 2006):

- creating a harmonised regulatory environment across the EU that would favour innovations and predict the future needs early on;
- the use of standards-setting powers to require high technical performance levels and a reorganisation of the processes so that agreements on new standards are reached quickly and efficiently;
- the use of public procurement to facilitate the demand for innovative goods, while at the same time improving the level of EU's public services;
- building a globally competitive intellectual property rights regime that requires the Community Patent to be achieved and, in the short term, finalisation of the draft European Patent Litigation Agreement;
- a cultural shift which celebrates innovation, using the media and other means to encourage citizens to embrace innovative goods and services in order to develop Europe as natural home for innovators.

Harmonised regulations, standards, public procurement, intellectual property rights, and innovative culture are in short the five key issues in the EU report. The early articulation of innovation demand is part of described regulatory setting. This somewhat declarative report and other documentation from the same period (see

Moran *et al.* 2007; Zuleeg *et al.* 2007 for details) are steps toward EU-wide recognition of a need for better balance between supply-side and demand-side innovation policy measures. This requires more focus on demand-side measures.

Appelquist *et al.* (2009) argue about the demand for innovation-based solutions that it needs to be stimulated by appropriate lead market policies. The policy focus should be on the introduction of measures, such as novel ways of using public procurement and support for user-driven innovation projects. The innovation policy should be fast and synchronised. This suggests quick reaction to the problems and reduced complexity of the policy portfolio, while having wider policy scope.

The example of computing industry illustrates how the general assumption that new technological paradigms emerge only from advances in science and developments in technological knowledge can be misconception. This presumes that demand simply influences the selection among rivaling paradigms or the course of paradigm. Yet, the study on topic demonstrates that in the development of computing technology a distinction can be made between periods when demand and/or knowledge development was the main enabler of innovation. New technological paradigms or sub-paradigms emerged even in these demand-pull periods. (van den Ende, Dolfma 2002) Such results offer another valid argument for usage of demand-side innovation policies. They also indicate that the importance of demand facilitation may be dynamic over time and across sectors. Thus, such policies should be subject for periodic revisions and readjustments.

Kuhlmann (2001) defined three possible scenarios for future governance of innovation policy in Europe (Kuhlmann 2001, p. 967):

1. Increasingly transnational, centralised, and European innovation policy arena, where EU-level dominates – This scenario assumes weakened national authorities and partially strengthened regional autonomy.
2. Progressive decentralisation and open competition between repositioned national or regional innovation systems and related policies.
3. Mixture of competition and co-operation between diverse national or regional innovation cultures that are centrally mediated From EU-level – In other words, multi-level governance based on a problem-based redistribution across levels.

The strong interconnections with EU-level standards, procurement guidelines, and industrial policy regulations suggest that demand-side policy measures are to some extent to be governed union-wide. Still, the national innovation potential can be effectively facilitated only by using agile systems and good responsiveness to contextual changes. Thus, third scenario is more realistic option than the first overly centralised policy development scenario, at least for demand-side innovation policy.

The discussion of theoretical underpinnings for demand-side innovation policies outlined interrelations with innovation system developments. The demand-side policies are important complements to the supply-side measures, which tend to dominate in less advanced innovation systems and policy settings. In the EU, the major innovation policy challenge is to achieve shift towards demand-side measures.

The concepts of sustainable development and sustainable entrepreneurship

According to the United Nations the 'sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations to come' (Sorin, Irina 2009, p. 230). Sorin and Irina (2009) argue also that the economic crisis took place because of the large quantitative and artificial growth within a decade prior to 2008. The more sustainable development path in production and jobs creation could help to remedy such occurrences. O'Brien (2002) discusses that the concept of sustainable economy is used to address the problems with energy conservation, the reduction in greenhouse gasses, environmental protection, recycling and the conservation of natural resources.

The sustainability is often used as more general notion in social sciences to imply the viability and continuation of certain trends or development processes in the future as well (see for example Chaudhury, 2010; Collins, Grimes, 2008). In this context, the term sustainability tends to remain defined more vaguely, while it incorporates economic, social, and environmental aspects. From this viewpoint, the sustainability is often associated with socio-technical system or setting.

Socio-technical system incorporates production, diffusion and use of technologies in connection with societal functions, for example transportation, communication, and nutrition. The elements of these systems include artefacts, knowledge, capital, labour, cultural meaning, and others. This systems approach refers to an elaborated understanding of the user side of technology that goes beyond passive knowledge diffusion. Innovation should be understood as an outcome of the continuous alignment of technology and the user environment in a co-evolutionary manner where adaptation takes place on either side. (Geels 2004)

Lee and Hsieh (2010) discuss the relationship between entrepreneurship and sustainable competitive advantage. The results show that entrepreneurial organisational culture should be supported by the development of marketing and innovation capabilities in a company. These capabilities have additional influence on the sustainability of the competitive advantage. Levie and Lichtenstein (2010) argue that instead of traditional stages approach to entrepreneurial growth it is more appropriate to apply dynamic states view. This view suggests that tension is built up by contradiction between need for stability and adaptability, and prescribes flexible reactions to changes in business environment. This implies that dynamic nature of capabilities is basis for lasting entrepreneurial success. Networking provides another dynamic feature in entrepreneurial management used not only for exploiting the entrepreneurial opportunities, but also for creating opportunities (Moensted 2010).

Some socio-technical settings could be more supportive to ecologically conscious sustainable entrepreneurship than others could. The transition management literature is one possible source for a guidance concerning broader sectoral and institutional shifts toward more sustainable entrepreneurship in addition to the changes within companies. (Gibbs 2009) Application of sustainable development principles in an

economy is a complex process that should involve micro, meso, and macro levels of economy. It should use legal, economic, and information tools as well as various procedural and analytical tools to address selected target audiences – government, stockholders, supply chain, public, and academia. Grundey (2008)

Interesting results are offered by Horio and Watanabe (2008). They show how the transition has revealed the paradox of service-oriented economy. In this setting information was expected to substitute for constrained factors, like for example energy, but actually the energy consumption has relatively increased in comparison to industrial era. Thus, the modern service-oriented economies are not in every respect more sustainable than earlier stages of development. Sirbu *et al.* (2009) argue on the contrary that building knowledge based economy facilitates accelerated and sustainable growth, while strengthening social cohesion and concerns for environmental protection. Service-orientation and knowledge based development are not entirely synonymous. Still, there is strong connection between the two, because information is essential by both concepts.

The sustainability of economic development could benefit from improved national development planning. The new system should incorporate a unified process that connects different planning levels and created documents as well as a national and EU funding investments. This supports synergy between various investment sources and better connectivity between planning documents and policy guidelines. More generally, it would offer enhanced linkages between budget planning and development. (Vitola, Senfelde 2010) There is a possibility to model general equilibrium of an economy so that it incorporates environmental indicators that monitor sustainability. It is more advanced approach than tracking the changes in economic, environmental, and social variables, which indicate the sustainable path of development. (Ferguson *et al.* 2005)

Woodward and Bishop (2003) suggest that the sustainable development is often viewed as primarily macro level concern that includes intergenerational fairness as a norm. However, the sectoral level planning and projects has an important role in suggesting the tradeoffs between sectors in order to pursue optimal sustainability. There could be developed criteria for planning and project analysis that help to find tradeoffs supporting sustainability goal. (Wooward, Bishop 2003)

The long development experience of Netherlands reveals that by 2005 the sustainability of economy was facilitated by off-shoring manufacturing to developing countries and by focusing retained manufacturing industries to niche-markets and on specialized machinery and installations (Lambert *et al.* 2010). This suggests a dynamic development from pre-industrial and pre-market self-sustained household economy to post-industrial sustainable entrepreneurship. It might also be seen as an indication that sustainability of economic development in one country is closely related to that of other countries and regions. The industrial off-shoring might have detrimental effect on the ecosystems and social development in target economies. This argument has found support by the economic analysis of unilateral

sustainability in open economy setting, where it is called import of sustainability (Klepper, Stahler 1998).

According to O'Brien (2002), the developing countries face a constraint – to achieve economic levels of developed economies without extensive pollution and stress to the environment. At the same time, the developed countries have a challenge in maintaining access to raw materials needed for continuing economic development, so that development opportunities of future generations are retained and environmental problems of developing countries are not increased. In the global economy, the manufacturing has special responsibility to set and follow international standards for sustainability.

Collins and Grimes (2008) discuss the role of foreign-owned affiliates in facilitating sustainability. Their results reveal on the example of Ireland that the development led by inward FDI is not just about favourable tax policies and grant schemes offered by host government. Foreign-owned affiliates have benefited from the organisational changes and inward transfers by increase in their autonomy and importance in the multinational intra-corporate production network. This increase in contribution does facilitate the sustainable development of the host economy.

Parrish and Foxon (2009) show that sustainable entrepreneurs design their companies with the intention of mutually supportive contribution to improved environmental quality and social well-being. These entrepreneurs can potentially function as catalysts to larger structural socio-economic transformations that support sustainability. This catalytic influence could be explained by using a co-evolutionary framework that links the interactive dynamics of change in technologies, institutions, and business strategies.

Entrepreneurship as a dynamic force for change has growing importance in contributing to the sustainable development as broad social goal. However, the sustainability values prescribe different approach to the organisational design that diverges considerably from the conventional principles of entrepreneurship. These focus on resource perpetuation, wider benefits, satisfactory outcomes of multiple objectives, and worthy contributions to the enterprise. (Parrish 2010)

Sustainable entrepreneurship is 'a spin-off concept from sustainable development that can be defined as the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce, their families, local communities, society and the world at large, as well as future generations' (Crals, Vereek 2005, p. 173).

Although market imperfections (inefficient companies, externalities, flawed pricing mechanisms, and information asymmetries) might contribute to environmental degradation, they provide at the same time opportunities for the creation of new technologies and innovative business models. These opportunities establish the foundations for a sustainable entrepreneurship by enabling entrepreneurs to obtain

economic rents, while improving local and global social and environmental conditions. (Cohen, Winn 2007)

Brouwers (2006) finds that innovations for sustainability are often oriented primarily at process variables, such as reduction of resource use, energy saving, and recycling. However, several companies make also subsequent innovations in product design and develop new technologies. Larson (2000) uses a special term sustainable innovation to distinguish the changes undertaken in order to increase sustainability.

To conclude, the sustainable entrepreneurship is a concept that integrates the elements of entrepreneurship as dynamic change with sustainability of development concepts. This integration means co-evolutionary transformation of organisational features that characterize entrepreneurship and innovation towards more balanced values that target economic, social as well as environmental concerns.

The smallness of country and demand-side innovation policies on sustainability

The population and the gross domestic product (GDP) are commonly used key indicators for defining the small country. The size of population is a proxy for the market size, scale of indigenous industries, scope of specialization, and aggregate levels of savings and investments. There is growing consensus among international organizations and development bodies that a population of 5 million is a limit below which the economy and institutions tend to be severely constrained and some national institutions, services, and infrastructural arrangements could become somewhat uneconomic. (Forsyth 1990)

The experiences of national innovation systems in Singapore and Ireland allow describing the specific nature of small-scale innovation systems as follows (see also Wong and Singh 2008; O'Malley *et al.* 2008):

- 1) The small systems are more dependent from the inflow of foreign direct investments, because of the insufficiency of local investment capital.
- 2) Inward transfers of knowledge and technologies play an important role in the rapid development of small economies and their innovation systems.
- 3) To enhance the development of domestic R&D activities, innovations, and entrepreneurship - the small-scale innovation systems need to rely on well-developed policy schemes and integrated efforts.
- 4) The international cooperation, foreign openness, and enhanced cross-boarder network ties beyond FDI and knowledge inflows are very important replacements for restricted capabilities of domestic support.
- 5) The well-defined and focused scope of innovation activities is due to limited resources and capabilities of small-scale national innovation systems more important for success than in larger systems.
- 6) The human and social capital in small-scale national innovation systems is essential for coping with inherent financial constraints that characterise these systems.
- 7) The smallness of systems offers flexible policy adjustment opportunities.

These notions give also some indication about the specific features of innovation policy in a small country context. The flexible nature of small systems allows adjusting innovation policy measures to the context changes much quicker than in large-scale systems. In times of economic growth, the need for public support is in several aspects somewhat smaller than during economic downfall. Economic difficulties increase the incentives for innovative activities. Public sector in a small country has better opportunities to re-adjust the policies. However, small countries tend to have less policy options in terms of fiscal leverage and dept-based financing schemes. This tends to prescribe the knowledge-based or intelligence-based solutions instead of financially expansive development schemes.

Small economies are usually open to the foreign trade and investments. This openness helps to attract additional financial and knowledge resources from abroad. The innovative capabilities of a small country are related to the absorptive and complementary capabilities of various organisations. Restricted market potential in domestic market offers yet another argument in favour of international cooperation.

These positive and negative features of small country setting suggest that even demand facilitation using demand-side policies cannot have solely domestic focus. Instead of aiming at achieving technological supremacy in selected target fields, the more appropriate demand-side policy should support domestic as well as foreign agents. Enhancing of the market opportunities and system capabilities should commence in close interaction with regional (in case of Estonia with Nordic), EU-level, or global partners. The benefits for international partners are related to the flexibility and transparency of these policy schemes. The complementarities would exist between supply-side and demand-side measures as well as across borders.

The sustainability agenda is in the focus of several demand-side policy aspects. The examples of policy topics include 'green' public procurement, energy-efficient construction and transport, power generation projects using renewable energy sources, bio-fuels, and infrastructure for waste management (Cunningham 2009). Caviglia-Harris *et al.* (2003) offer a more elaborate discussion of demand-side policies aimed at the sustainable usage of renewable resources. According to them demand-side policies promote the long-term conservation of natural capital assets, the attainment of economic efficiency, and provide better political acceptability in comparison to supply-side policies. International Energy Agency (IEA) has initiated special programme to promote demand-side aspects. This Demand-Side Management Programme (DSM) is a collaboration of 20 countries in order to develop and promote opportunities for demand-side management. It offers solutions to various problems like load management, energy efficiency, strategic conservation, and related activities. (IEADSM 2011)

Shah *et al.* (2011) show the important role of educational, science, and technology policies in building up the awareness about potentials of renewable energy. The low awareness is one demand-side obstacle on the path of sustainable development. Schilling and Chiang (2011) argue that depletion of non-renewable resources causes

non-sustainable externalities for the future generations and this fact reinforces the arguments for sustainable development initiatives oriented on renewable resources.

In a small country context, the interesting approach is taken in Norway in interconnection with European Economic Area (EEA) grants. According to this policy guide, the elements of sustainable development are often organised into three dimensions, namely environmental, economic and social. On the basis of this division, for the purpose of sustainable development policy environment is the basis, economy is the tool, and social welfare is the target of sustainable development. (EEA 2006) This basis-tool-target relationship offers additional possibilities to create more holistic policy schemes.

From the perspective of Finland, the most significant development trends and challenges of sustainable development for a small country relate to climate change, coping with rapid global economic changes, and demographic changes. In addition to that, even small economies participate in solving global issues such as poverty, inequality and population growth. (Towards ... 2006)

The demand-side innovation policies in small country would benefit from focusing not only on the facilitation of domestic innovation activities, but inward-outward FDI and on their linkages, EU funding schemes, participation in joint research and development, and other international dimensions. Albeit international in nature, the demand-side policy measures should still help to foster domestic innovation and absorptive capabilities. The articulation of demand for innovative solutions should consider broader international context, but local companies should be able to benefit from it by making key contributions into the provision of these solutions.

The demand-side policy measures and sustainable development in Estonia

The innovation policy in Estonia is specified mainly in the economic development plans, the application plans of Knowledge-based Estonia strategy 2007-2013, and in the plans developed by Estonian Ministry of Economic Affairs and Communications (Estonian Ministry of Economic ... 2011). Majority of the activities focuses on the supply-side of innovations. However, some programs and initiatives include at least partial demand-side considerations and aspects. The innovation vouchers for example function to some extent also as enablers of projects, which might be otherwise disregarded. Science and development programs for energy technologies and biotechnologies facilitate sectoral demand for innovations. Estonian Development Fund initiates innovation awareness measures and screening studies that support the increase in future demand. The Estonian Research and Development and Innovation Strategy 'Knowledge-Based Estonia 2007-2013' does outline the stimulation of demand for new technologies primarily through public procurement (Estonian Research... 2007). In policy practice, the explicit demand-side measures are at the infant development stage and the innovation policy as a whole is still dominated by supply-side policies. This low attention to demand-side innovation policies in Estonia is also mentioned in the Pro Inno report by Cunningham (2009). According to him, unlike Estonia, Latvia and Lithuania have that policy debate.

Enterprise Estonia (EAS) is perhaps the main executive body in the support provision process. It was established in 2000, with a general purpose to promote business and regional development in Estonia. Subordinated to the Ministry of Economic Affairs and Communications, Enterprise Estonia provides financial assistance, advisory, cooperation opportunities and training for entrepreneurs as well as for research establishments, public sector and third sector. Since Estonia joined EU in 2004, the majority of programs and grants offered by Enterprise Estonia are co-financed from the EU structural funds. Enterprise Estonia is responsible for the governance of such innovation policy measures as product development grants, technology development centres program, job creation for development personnel, innovation vouchers program, and test labs program. (EAS 2010)

There are innovation procurement initiatives that include changes in regulatory environment and subsidies to boost the usage of local energy resources. The public procurement and regulatory initiatives support also the collection of used packages, wind energy production, and changes in waste collection. However, several of these examples reflect the impact of EU-level policies on local standards. Thus, they are not novel in the broader international context, but still new solutions for Estonia.

The Estonian study of foreign owned enterprises includes the evaluations of obstacles to innovations (see Figure 1). It can be seen that low profitability and demand problems are somewhat relevant as demand-side deficiencies for foreign owned enterprises.

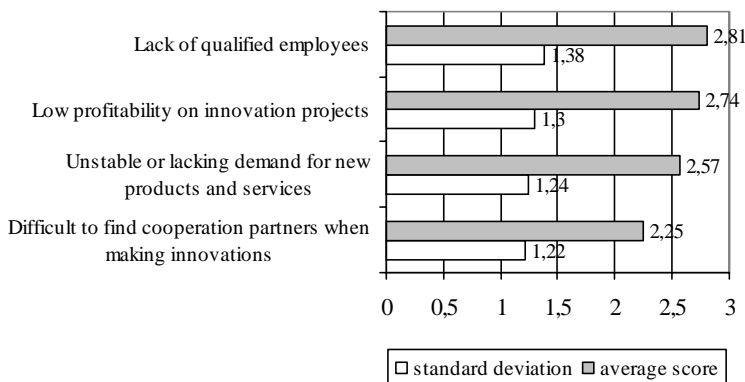


Figure 1. The average evaluation scores and standard deviations of most important obstacles to innovation (1-unimportant...5-very important) (Source: Foreign Investor 2009)

The paramount milestone in the development of strategies and policies for sustainable development was the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in June 1992 where governments of

more than 178 countries adopted strategic documents – Agenda 21, the Rio Declaration on Environment and Development, and the Statement of principles for the Sustainable Management of Forests. ‘Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment’ (UN 2011). In order to ensure follow-up of UNCED, to monitor and report on implementation of the agreements at the various levels in December 1992 The Commission on Sustainable Development (CSD) was created. The commitment of countries to Agenda 21 has been reinforced in other world summits for example in 2002 and the next follow-up summit is planned in 2012.

The next level from worldwide cooperation on sustainability is the EU level. Since 1997, the sustainable development is a fundamental objective of the EU. The first EU Sustainable Development Strategy was adopted in June 2001 and the large strategy revision took place in 2009. The aim of the EU Sustainable Development Strategy is to identify and develop actions in order to enable the EU to achieve a continuous long-term improvement of quality of life through the creation of sustainable communities. These communities should be able to manage and use resources efficiently, to tap the ecological and social innovation potential of the economy and in the end to ensure prosperity, environmental protection and social cohesion. The challenges outlined in the strategy are climate change and clean energy; sustainable transport; sustainable consumption and production; conservation and management of natural resources; public health; social inclusion, demography and migration; and lastly global poverty and sustainable development challenges. (European Commission 2011) In 2010, the EU adopted new growth strategy for the coming decade called Europe 2020. According to this strategy, EU intends to become a smart, sustainable and inclusive economy. With this aim, it has set five ambitious objectives to be reached by 2020 (see Table 1).

Table 1. EU-wide targets of the growth strategy Europe 2020

Field of objective:	Targets to be achieved by 2020:
Employment	- 75% of the 20-64 year-olds to be employed
R&D / innovation	- 3% of the EU's GDP (public and private combined) to be invested in R&D / innovation
Climate change / energy	- greenhouse gas emissions 20% (or even 30%, if a satisfactory international agreement can be achieved to follow Kyoto) lower than 1990 - 20% of energy from renewables - 20% increase in energy efficiency
Education	- Reducing school drop-out rates below 10% - at least 40% of 30-34-year-olds completing third level education (or equivalent)
Poverty / social exclusion	- at least 20 million fewer people in or at risk of poverty and social exclusion

Source: Europe 2020, 2011.

More integrated approach to EU policy making, based on better regulation and on the guiding principles for sustainable development adopted by the European Council of June 2005, should enhance synergies and reduce trade-offs. The external dimension of sustainable development, such as global resource use and international development concerns, is incorporated into EU internal policy making and supported by integration of sustainability considerations into external policies as well. (European Commission 2011)

In Estonia, the parliament approved The Act on Sustainable Development in 1995. This legal document focuses primarily on environment issues, but long-term plans on sustainable development are to be elaborated in the energy, transport, agriculture, forestry, tourism, chemical industry, building materials industry and food industry sectors. In 1996, an advisory body to the Government on the issues of sustainable development called Estonian Commission on Sustainable Development started work. The tasks of the Commission are: 1) to analyse the policy of the state on sustainable development; 2) to make proposals to the Government and to state and local government institutions ensuring synergy among developments in the economy, social affairs and environmental areas; and 3) to propose drafting legislation and organising research on the subject. (Estonian Ministry of the Environment 2011)

In 2005, Estonia adopted also Estonian National Strategy on Sustainable Development 'Sustainable Estonia 21', development of which was supervised by this Commission. This national-level strategy is a conception focused on sustainability of long-term development of the Estonian state and society until the year 2030. The development goal for Estonia, as seen in 'Sustainable Estonia 21', is to integrate the need succeed in global competition with a sustainable development pattern and preservation of the traditional values. The interconnected long-term goals for Estonian society as analyzed in the Strategy aim at the viability of Estonian cultural space, growth of welfare, coherent society, and ecological balance. (Estonian National ... 2005) Implementation of the Estonian National Strategy on Sustainable Development is related with joint efforts of several ministries and other institutions. They are responsible for pursuing of goals, monitoring, and reporting in their respective fields. Since 2006, Strategy Unit of the State Chancellery coordinates these initiatives.

The viability of culture as a sustainability goal reflects the aspect in policy making that is characteristic only to the small countries that are on the verge of cultural demise. The authors of 'Sustainable Estonia 21' propose synthesised development scenario – Estonia as knowledge society. This scenario combines the elements of business-as-usual scenario, conservative development path scenario, and social partnership scenario into knowledge-based and learning-based management view that sets focal importance to knowledge resources and social interactions. (Estonian National ... 2005) In the small economy, the material resources tend to be limited. Knowledge resources can to some extent substitute for this deficit. Thus, the selected scenario should be appropriate in a small country context.

In terms of demand-side innovation policy for sustainable development various ministries are implementing several activities and measures that more or less address also demand for more sustainable solutions. Estonia's report on the implementation of the European Union Sustainable Development Strategy, compiled in 2007, outlines several policy measures, such as plans to promote the use of biomass and bio-energy or the national energy technologies programme under clean energy goal, that relate also to demand. Similar policy measures and development plans are developed in all major target areas stressed in EU-level strategy. These measures are accompanied by quantified targets for programme periods and by intentions to use national initiatives in combination with EU funding. (Estonia's report... 2007)

The sustainable development policies are perhaps more international in nature than other industrial or economic policy concerns. This is a virtue and dangers at once, because global and EU support to implementation of goals expands possibilities, but at the same time limits the flexibility in goal setting and might lead to misalignment between supported policy actions and national-local context. This conflict could be especially relevant by demand-side policy instruments, because institutions, customers and intermediaries could be too underdeveloped for being able to absorb fully the benefits of advanced demand-side policies championed on the EU level. In such situations, the national governing bodies will still establish policy schemes in line with EU support, but the actions taken focus more on compliance with funding requirements than on policy impact. Unfortunately, this means domination of short term results over long term strategic agenda. Without sufficient absorptive capacity in terms of catalytic results, sustainable development policies might prove to be ironically unsustainable in nature. Thus, it is important to select national level policy actions, which account for development lag in the market structure and institutional framework as well as higher level policies and related expectations.

The knowledge and capability of government agencies to promote real technological progress might be called into question. Indeed, the policies are engineered by humans and they can be sometimes erroneous in interpreting or foreseeing trends. However, the government bodies do usually have superior position and means for seeking best expertise available. Thus, as far as these agencies promote learning culture and willingness to open consultation with experts in a particular field, the capability to make sustainable impact in desired direction should be obtainable. It suggests that the governments should be cautious about isolated decision making that does not account for the market impulses and projections. The efficiency of government spending is yet another closely related matter. Gottret and Schieber (2006) offer more in depth discussion and comparison of these issues in the context of health financing. The general logic of their arguments is applicable to other government policies as well.

The policy development track record in Estonia suggests that government agencies do cooperate with experts and industry representatives. However, the National Audit Office of Estonia produced in 2010 a report about the impact of state's enterprise support measures on the competitiveness of Estonian economy. The auditors found that the general effect of these support measures on competitiveness is very minor.

(National ..., 2010). This highly disputed result suggests that there are potential efficiency problems with extrinsically motivated support policies. For example, a selection bias by which the recipients of support are these companies who would proceed without help and not the ones who would considerably benefit from it.

The demand-side innovation policies for sustainable development in Estonia focus primarily on the successful implementation of programmes targeted on achieving particular sustainability sub-goals. Relatively less attention is devoted to general awareness about sustainable development path as a holistic concept. Despite the cross cutting nature of the strategy and certain policies, the responsible bodies do not have elaborate motivation schemes in place to seek advanced integration between various goals and address the overlapping areas with rigour.

Although, since 2006 national level coordination tasks have been assigned to the Strategy Unit of the State Chancellery, this governance arrangement does not serve the integrative purpose in sufficient manner. The coordinating body is indeed closely linked to the Government. Yet, due to its focus on strategy and reporting, it fails to address public and society as the thought provoking leader of the sustainability concept. In short, it serves better EU and officials than it serves the need for building awareness and subsequently genuine intrinsic demand for sustainable solutions. Estonian Commission on Sustainable Development does engage the members of scientific community and expert practitioners into the process, but knowledge society scenario is still perceived by public more like an abstract myth than unifying and well-defined goal.

Particular demand-side policy measures, such as public procurement initiatives, improved regulations, supportive standards, and catalytic promotion schemes, may cause over-shooting effects. Indeed, there is a considerable discussion in Estonia about the support schemes devoted to clean energy production. Although, in essence the problem is exaggerated supply, there are demand-side factors behind it.

The discussion above and general sustainable development policy context in Estonia allows providing following suggestions for policy development:

- In order to gain all the benefits from more advances EU-wide support schemes, Estonian policy for sustainable development should focus on system development towards more rigorous national policy mix, including novel and explicit demand-side policy measures;
- The public awareness about sustainable development could be increased by establishment of new coordinating body that would continue to govern national policy actions, but in addition function as a promoter of topic by involving public as well as private initiatives and contributors;
- The enhanced integration of sustainable development sub-goals into holistic view should be facilitated by additional demand-side measures that bring the interaction of sub-themes into spotlight;

- The demand-side initiatives for sustainable development should be more catalytic in nature by involving dynamic policy measures that evolve over time, instead of relatively inflexible measures that are likely to cause over-shooting;
- The implementation of knowledge society development scenario could be facilitated by the provision of explicit and well-defined development milestones, which would make the concept more tangible and less abstract;
- The sustainable development initiatives should focus more on value adding innovations by using innovation policy tools, including demand-side innovation policy measures;
- Estonian demand-side innovation policy for sustainable development should also adopt the basis-tool-target approach, but in addition to environment, the cultural and knowledge aspects should be included into the defined basis.

The sustainable development policies in Estonia are complex, often cross cutting various policy areas, and highly influenced by EU and global policies. However, the demand-side aspects of related policy fields are often dominated by supply-side initiatives. The demand for innovative and sustainable solutions could be facilitated by more explicit communal policy coordination that would help to build awareness and set development milestones for society as a whole, not just by policy fields.

Conclusions and implications

The demand-side innovation policy and sustainable development are both relatively new concepts that aim at advances in society. Some elements of them, like public procurement or environmental concerns, are not new as such. Yet, the holistic approach to innovation and to societal development in general has been in the policy spotlight only about two decades. These concepts offer integrated view on policy.

The demand-side innovation policy for sustainable development in Estonia is highly influenced by global and EU level strategies and policy schemes. Therefore, some national initiatives are perhaps too focused on using EU funds without sufficient capacity to gain genuine long terms benefits. The implementation of policy could be enhanced by more integrative coordination, dynamic catalytic measures, increased focus on innovations and education, and well-defined development milestones.

The limitations of this study relate to the lack of information about the impact of demand-side policy measures on sustainable development. The strategy documents, evaluative reports, and overviews do not cover the entire complexity of issues. They enable making some initial generalizations, but identification of more implicit interactions requires additional research.

The theoretical implications from this study relate to the potential of combining demand-side policy concepts, and innovation policy views in particular, with sustainability literature not only in the country studies, but in comparative research and organisational research as well. This could provide several new research topics.

The implications to management suggest possibility to use demand-side policy measures that are targeted to companies in order to adopt sustainable entrepreneurship initiatives in the corporate management, which are also likely to improve the image of company among its customers, suppliers, and other partners. Public-private partnerships for sustainability offer also some profit opportunities.

The future research should focus on the particular role of demand-side innovation policy measures in provision of even more integrated sustainable development programmes and support schemes. The defining of milestones on the path to knowledge society deserves also considerable interdisciplinary research attention and public discussion. The development of advanced and sustainability-oriented innovation system is another valuable research path to take.

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