



**EXPERT EVALUATION NETWORK  
DELIVERING POLICY ANALYSIS ON THE  
PERFORMANCE OF COHESION POLICY 2007–2013**

**TASK 1: POLICY PAPER ON INNOVATION**

**ESTONIA**

**VERSION: FINAL DRAFT**

**DATE: AUGUST 2010**

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**A report to the European Commission  
Directorate–General Regional Policy**

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## 1 EXECUTIVE SUMMARY

Estonia is a single NUTS II and Objective 1 region; there are no regional priorities in R&D and innovation policy, and innovation-policy support measures at the local level remain limited.

The main R&D and innovation policy document *Estonian R&D and Innovation Strategy 2007–2013* sets out three main objectives: (1) competitive quality and increased intensity of R&D, (2) innovative enterprises to create new value in the global economy, and (3) innovation-friendly society aimed at long-term development.

ERDF plays an important role: facilitating R&D and innovation are important priorities of the OPs, and the most effective policies are co-funded by ERDF and have thus contributed to the achievement of strategic targets.

The main intervention area supported by ERDF is boosting applied research and product development, followed by supporting knowledge transfers and poles, and creating an innovation-friendly environment. The most important implemented policy measures are (1) R&TD infrastructure development, (2) Competence Centres, (3) the Centres of Excellence Programme, and (4) the R&D Financing Programme. Of the total ERDF resources for innovation (265 Million EUR), these four measures account for 189 Million EUR (71%).

Several of these support measures were introduced in the 2002–2006 programming period and were maintained for the 2007–2013 period. Most of the measures have evaluation reports, all of which report positively on the implemented measures and their relevance to the strategic document. Still, some challenges remain.

First, the recent evaluations call for the measures to place more emphasis on the enterprise sector (vis-à-vis current orientation towards infrastructure-related investments). Similarly, different evaluations (starting from 2003) call for more balance between research policy and innovation policy measures and for more emphasis on the local enterprise sector and on increasing its capacities and capabilities.

Second, the issue of more effective governance of innovation policy (as regards coordination between authorities), the problem of fragmentation and duplication of support and the effective merging of support for RTDI with support for human capital development need to be addressed more efficiently.

Third, there are no regional priorities in R&D and innovation policy, and innovation-policy support measures at the local level remain limited. More emphasis should be put on the reinforcement of the regional dimension of RTDI, but also on the promotion of transnational cooperation as Estonian organisations are already quite deeply involved in Nordic networks.

Fourth, expenditure related to research infrastructure investments vis-à-vis priorities set in national strategy have given rise to some critical comments. Also, several technology programmes

given priority in the national R&D strategy still have to be developed and implemented; the concept of those programmes remains fuzzy and administrative capacities to prepare and administer them are weak.

Finally, some planned instruments still lack substance and application mechanisms, while others still lack financial commitments. Some important R&D and innovation policy measures funded by ERDF need increased financial support in order to be continued, including the R&D Financing Programme.

## 2 NATIONAL AND REGIONAL INNOVATION POLICY AND THE CONTRIBUTION OF ERDF

### 2.1 NATIONAL AND REGIONAL INNOVATION POLICY

The key document in Estonian R&D and innovation policy is *Knowledge Based Estonia–Estonian R&D and Innovation Strategy 2007–2013*, which is the follow-up to the Estonian R&D Strategy of 2002–2006. The strategy sets out three main objectives:

1. Competitive quality and increased intensity of R&D. This objective foresees the need for an increase in top-level specialists, greater R&D intensity and quality, the advancement of research management, and a major upgrading of R&D infrastructure. Target levels for 2013 include the increase of researchers and engineers to 8 per 1 000 employees, the share of upgraded infrastructure to 80%, the growth of GERD to 3% of GDP (share of public sector 1.4%), and a substantial increase in high quality publications and patents.
2. Innovative enterprises to create new value in the global economy. This objective emphasises internationalisation, inward technology transfer, and foreign investments focusing on developing innovative products and services. Target levels for 2013 include growth in enterprise productivity per employee to 80% of the EU25 average and growth in BERD to 1.6% of GDP. The objective also includes growth of innovation investments by enterprises, growth of sales revenues of new products and services, and growth of employment in medium-to-high technology industries.
3. Innovation friendly society aimed at long-term development. This objective addresses a number of broader institutional and social issues, including the development of a legislative and business environment conducive to R&D as well as increasing political and social awareness of the challenges facing the Estonian economy and society as well as the role of R&D in overcoming these challenges. Target levels for 2013 include advancing towards the 5<sup>th</sup>–10<sup>th</sup> position on the EU Innovation Scoreboard, an increased inflow of foreign researchers and students, and a high position in e-government rankings.

Estonian (pre-)accession to the EU has led to the Europeanization of Estonian R&D and innovation policies. Thus, other important R&D and innovation policy documents and strategies include the

Action Plan for Growth and Jobs 2008–2011, the National Strategic Reference Framework 2007–2013, and various Operational Programmes (hereafter OPs).

Co-financing by EU Structural Funds plays a significant role in Estonia in the implementation of the respective policies—67% of Estonian R&D and innovation policy measures are co-financed by those funds (INNO–Policy TrendChart... 2009, 17). Of the total ERDF resources, 42.5% of the resources for the OP for the Development of Economic Environment and 4.5% of the resources for the OP for the Development of Living Environment are related to innovation support. Consequently, 22% of the overall budget of those two OPs is related to innovation support (Table 1 of Annex A).

Estonia is a single NUTS II and Objective 1 region; there are no regional priorities in the R&D and innovation policy. Innovation policy support measures at the local level still remain limited, despite attempts to establish regional innovation strategies, such as the Tartu Region Innovation Strategy (TRIS), followed by the Estonian Regional Innovation Strategy (ERIS) initiative for West Estonia, North Estonia and East Estonia, which have resulted in policy analysis and policy recommendations. Although many of the recommendations proposed both by the TRIS project (2002–2003, run by Tartu City government and Tartu Science Park) and ERIS (2005–2008, co-ordinated by Tallinn Technology Park Development Foundation) have been implemented or are under implementation by now (especially those related to the development of R&D infrastructure, science and technology parks, and human capital, etc.), one of the most crucial ideas – to develop and implement sector-specific cluster policies for those clusters that are engines of economic development in those regions – and present in recommendations of both strategies (see especially Tiits 2007) has not been developed further nor implemented by the central government.

## 2.2 ERDF CONTRIBUTION ACROSS POLICY AREAS

The main intervention area supported by ERDF (foreseen budget is 314 Million EUR; 47% of total ERDF resources to innovation) is boosting applied research and product development, followed by supporting knowledge transfers and poles (265 Million EUR; 40%), and supporting an innovation-friendly environment (90 Million EUR; 13%) (Table 2 of Annex A).

Three priority fields dominate in the R&D and innovation policy mix receiving ERDF funding (ibid):

1. Support for R&D activities in research centres (184 Million EUR; 28% of total ERDF resources to innovation<sup>1</sup>). The main measure is support given to the Competence Centres,<sup>2</sup>

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<sup>1</sup> One policy measure can be counted under different fields of intervention. For the classification of the most important policy measures implemented, see Table 4 of Annex A.

<sup>2</sup> Estonia has one scheme for the support of Centres of Excellence (*Teaduse tipppeskused* in Estonian) defined as consortia of internationally recognised high-level research units that have common, clearly defined research objectives. The objective of the Competence Centres (*Tehnoloogia arenduskeskus* in Estonian) programme, on the other hand, is to increase the competitiveness of Estonian enterprises through strategic cooperation between the research and enterprise sectors; the Competence Centres are established and operated by at least three enterprises and one R&D institution.

which are platforms for cooperation between the enterprise sector and institutions of higher education. The goals are (a) to increase the international competitiveness of the enterprises by pooling and developing a critical mass of top-level competence, (b) to increase the quality and volume of applied economic research directed towards the creation of added value, (c) to increase the number of R&D personnel oriented to the needs of entrepreneurship and improve their capacity to work with both entrepreneurs and research establishments, and (c) to strengthen long-term strategic development activities and management ability in companies and research establishments (Majanduskeskkonna arendamise... 2007, 87–88<sup>3</sup>).

2. Support for R&D infrastructure and centres of competence in a specific technology (133 Million EUR; 20%). To ensure the necessary foundation and conditions for high-level R&D and the training and attraction of researchers and top specialists, the establishment and modernisation of corresponding infrastructure will be supported, including (a) the creation of contemporary campus-style research environments for R&D activities, comprising different universities, research institutions, and R&D-intensive businesses (with the aim, amongst others, of developing interdisciplinarity among R&D activities); (b) renovation and equipping of the existing research buildings or the construction of new ones, if necessary; and (c) developing the supporting infrastructure (e.g., research labs, libraries). The Centres of Excellence<sup>4</sup> will receive support for conducting internationally competitive, high-quality R&D activities. In addition, activities needed for establishing and developing the centres will be supported as will cooperation with other research teams, the transfer of knowledge between them, etc. (ibid, 88–89). The Estonian R&D strategy foresees the development of technology programmes in specific technology fields as well.
3. Support for technology transfer and improvement of cooperation networks (116 Million EUR; 17%). Stimulating cooperation between enterprises, research entities, and higher education institutions remains a significant challenge, which must be addressed by further strengthening the professional level of technology and knowledge-transfer units at universities and other higher education institutions. These units are responsible for the evaluation and commercialisation of intellectual property generated at those institutions. This measure provides further support for innovation infrastructure in close proximity to universities and other higher education institutions such as science and technology parks and business incubators to create a favourable business environment for spin-offs and other technology- or knowledge-intensive businesses (ibid, 70–71). The priority axis “Integral and balanced development of regions” (in the OP for development of the living

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<sup>3</sup> [OP for the Development of Economic Environment 2007–2013]. Page numbers refer to the official version in Estonian.

<sup>4</sup> Should not be confused with Competence Centres, see footnote 2 above.

environment) will also contribute to the implementation of the Estonian R&D and innovation strategy objectives as the operations are directed towards developing and strengthening regional innovation systems, business networks, and competence centres (Elukeskkonna arendamise... 2007, 109<sup>5</sup>).

Support for investments in firms directly linked to research and innovation (81 Million EUR; 12%), including support for technology investments in companies is another important policy instrument. These four policy areas account for 77% of ERDF funding.

A further significant measure is support for services and technology applications for citizens (e-health, e-government, e-learning, e-inclusion, etc.) (63 Million EUR; 9%) that also has relevance for innovation as a possible demand-side innovation policy measure.

Estonia participates in the European territorial cooperation programmes financed by ERDF. The programmes for 2007–2013 will supplement the OPs, providing additional opportunities for achieving objectives related to R&D and innovation. Estonia also prioritizes participation in territorial co-operation with Latvia, Finland, and Russia. The Estonian budget for these activities is 52.4 Million EUR, dominated by two programmes:

1. The Central Baltic INTERREG IV A cross-border co-operation programme (23.3 Million EUR); the following NUTS III regions can participate: North-East Estonia, Central Estonia, North Estonia and West Estonia. The OP for the Development of Economic Environment will have linkages with this programme within the following sectors: (a) co-operation in the field of ecological innovations and clean technologies; (b) co-operation in improving maritime safety; (c) exchange of know-how concerning innovation systems, support OP for the development of an economic environment that will cluster networking and technology transfer; (d) marketing the region in order to attract investments; and (e) common efforts to transform research (ibid, 150–151).
2. Estonia and Latvia cross-border co-operation programme (15.5 Million EUR); participating NUTS III regions are: South Estonia and West Estonia. The OP for the Development of Economic Environment will have linkages with this programme within the following sectors: (a) development of ICT connections; (b) enhancing joint services in energy and water supply, health care, and rescue work; (c) joint solutions to similar environmental problems; (d) joint management of protected areas and nature reserves; (e) increasing the attractiveness of the regions for visitors; (f) enhancing the link between education and enterprises and development of cross-border educational infrastructure; and (g) developing the accessibility and quality of local public services and recreational infrastructure in rural areas (ibid, 150–151).

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<sup>5</sup> [Operational Programme for Development of Living Environment 2007–2013].

### 3 EVIDENCE AVAILABLE ON THE PERFORMANCE OF INNOVATION MEASURES CO-FINANCED BY ERDF

#### 3.1 ACHIEVEMENTS UNDER THE CONVERGENCE OBJECTIVE

**The main policy instrument supporting applied research and product development is the Competence Centres programme<sup>6</sup>.** Initiated in 2002, it gave rise to the creation of five Competence Centres, where partnerships between 29 companies and 4 universities have been established (Majanduskeskkonna... 2009, 91–92 and 103<sup>7</sup>): Competence Centre of Electronics, Info and Communication Technologies; Competence Centre of Food and Fermentation Technologies; Competence Centre of Healthy Dairy Products; Estonian Nanotechnologies Competence Centre; Competence Centre of Cancer Research. The instrument has been continued, and additional Competence Centres were established in 2009: Software Technology and Applications Competence Centre; Competence Centre on Reproductive Medicine and Biology; and Innovative Manufacturing Engineering Systems Competence Centre. The financial support allocated from ERDF is 63 Million EUR (for community amounts allocated to different fields of intervention, see Table 4 of Annex A)<sup>8</sup>. Carried out in 2008, – the emphasis was on learning (‘formative’ rather than ‘summative’) – the mid-term evaluation of this support instrument concludes, “the instrument is appropriate in the Estonian context because it is employed to extend the quantity, quality and time horizon of the innovative activities of a nationally important consortium, while focusing research and education activity on areas of national need”<sup>9</sup> (Arnold et al. 2008, 10). It is concluded that the Competence Centres programme has encouraged universities to begin concentrating research and educational resources in areas of national need and improve links with industry. The research community also benefited from increased funding and produced significant numbers of research outputs – some directly useful to industry; others longer term in nature. The Competence Centres have attracted over 100 Bachelor, Master and PhD students (Table 6 of Annex A), the centres also have a substantial number of publications to their credit (75 in refereed journals; Table 7 of Annex A) and the centres have also begun to produce patents (9 international patents; Table 8 of Annex A). The evaluation concludes that additional research and innovation

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<sup>6</sup> For more details on the main policy measures implemented, see Inno Policy Trendchart (<http://www.proinno-europe.eu/page/policy-measures>).

<sup>7</sup> [Implementation Report, Operational Programme for the Development of Economic Environment 2007–2013, 1.01.2007 – 31.12.2008].

<sup>8</sup> The cost structures of each competence centre are different; the main expenses are labour, equipment, materials and requisites, and services purchased from partners. For expense details of the five competence centres, see Arnold et al. 2008, 15–17.

<sup>9</sup> The study was based on the analysis of the respective documents, interviews with stakeholders (number not available from the report) and a survey (25 respondents) carried out among the researchers involved.

support instrument are needed to complete the policy mix. A key success factor is a workable balance between industrial and academic interests in steering the direction of the centres. The adoption of for-profit structures in a majority of cases by the Competence Centres had unexpected and negative consequences for the programme, encouraging behaviour likely to maximise private rather than public benefits. (Arnold et al. 2008; see also Annex – Summary of Mid-Term Evaluation of the Competence Centre Programme). Also, the importance of the instrument in supporting the Competence Centres in the field of ICT RTD and spillovers that have followed for the whole ICT RTD community is described in an audit of ICT RTD in Estonia by Tiits and Kalvet (2010)<sup>10</sup>.

One of the policy areas—investment in firms directly linked to research and innovation—does not have any financial commitments as of 13 April 2010 (Table 3 of Annex A).

For other measures designed to stimulate research and innovation and entrepreneurship in SMEs, 47 Million EUR (11.7% of the foreseen budget) has been allocated (Table 3 of Annex A). An important instrument aimed at increasing R&D and innovation activities in the Estonian enterprise sector is the R&D Financing Programme. It provides support for feasibility studies as well as applied research and/or product development in companies; the instrument has remained stable over time (for community amounts allocated to different fields of intervention, see Table 4 of Annex A). An impact assessment carried out in 2006 regarding a scheme implemented in 2001–2003 concludes that, compared to other evaluated business-support measures, the R&D Financing Programme is one of the programmes with the least deadweight, and considerable behavioural additionalities<sup>11</sup> have been identified (Jürgenson 2007)<sup>12</sup>. Studying behavioural additionality has gained popularity in the evaluation of the R&D support programmes and the Estonian case study fully confirms the relevance of such a concept, especially in the long run. The existence of many behavioural additionalities, especially acceleration, cognitive capacity, management, network and scope additionalities were noted. The network and scope additionalities target the major problems of the Estonian innovation system. The study shows that some indicators could not be identified (e.g. increased turnover, export turnover and jobs created owing directly to the support) (see also Annex – Summary of Impact Assessment of R&D Financing Programme).

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<sup>10</sup> The study consisted of review of literature, analysis of statistical data (including the participation in the FP6 and FP7 ICT theme) and 27 interviews with the major ICT RTD actors.

<sup>11</sup> This assessment is mainly based on data obtained directly from the beneficiaries via a web survey that was complemented with face-to-face interviews.

<sup>12</sup> Altogether eight enterprise policy support measures implemented in 2002–2004 (largely continued for 2007–2013) have been evaluated (Kuusk and Jürgenson (2007), although the R&D and innovation dimension was studied in depth only for the R&D Financing Programme.

A Cluster Development Programme was introduced in late 2009 to stimulate exports and to promote cooperation among companies (both within and between sectors), and between companies and research organisations.

Two main policy instruments provide **support for knowledge transfers and poles**: support to the R&TD infrastructure and centres of competence in a specific technology.

First, R&TD infrastructure development has been supported to the amount of 68 Million EUR (Table 4 of Annex A). At the time of the preparation of the 2008 Annual Implementation Report, decisions were made concerning two R&TD infrastructure development projects (Majanduskeskkonna... 2009, 104–105); as of April 2010, the number of R&TD infrastructure development projects supported by ERDF has risen to 12 (for more details, see Archimedes 2010b).

Second, the Centres of Excellence programme, established in 2001, has been continued and funding amounts to 30 Million EUR (Table 4 of Annex A); all together, seven Centres of Excellence are funded today (Majanduskeskkonna ... 2009, 104; for more details, see Ministry of Education and Research 2010; Archimedes 2010a). No general evaluation of the Centres of Excellence programme measure has been conducted. However, the evaluation of each Centre of Excellence, selected in 2001/2002 and 2008, was conducted by the international teams of experts<sup>13</sup>. Positive evaluation of the centres of excellence's positive impact can be found in different studies. For example, Tiits and Kalvet (2010) conclude, "the Centres of Excellence and Competence Centres programmes have done an excellent job in identifying, through a competitive process, the strongest nodes in the ICT RTD system in Estonia, and allocating extra resources for strengthening of these."

In the field of technology transfer and improvement of cooperation networks, the main costs so far are related to a measure aimed at promoting the emergence of spin-off companies from academic institutions. SPINNO+ programme, running from 2001, has supported the establishment of support infrastructure to assist commercialisation and collaboration as well as developed IPR-related competencies of staff of the R&D establishments. SPINNO+ has supported four projects (Majanduskeskkonna ... 2009, 92). Impact studies of the SPINNO programme activities of 2001–2006, evaluated in 2007, concluded that "SPINNO should continue; it has helped develop the 'infrastructure' for knowledge transfer, in the sense of underlying capabilities and enthusiasms to transfer knowledge as well as relationships with enterprises. This is important and needs to be built on in the future but it is unlikely to be sustained by institutions without continuing financial support" (Brighton and Kells 2007, 9)<sup>14</sup>. However, of the 116 Million EUR budgeted for this priority

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<sup>13</sup> Evaluations of each Centre of Excellence remain publicly inaccessible.

<sup>14</sup> The study was based on a review of background information and interviews with stakeholders (number not available from the report).

field, less than 6% has been allocated as of April 2010 (Table 3 of Annex A). The previously described R&D Financing Programme is also related to several fields of interventions: support related to R&TD assistance, particularly in SMEs, as well as to the field of technology transfer and improvement of cooperation networks.

In the priority theme **innovation friendly environment**, the allocated budget for the services and applications for citizens (e-health, e-government, etc.) as of April 2010 is 31 Million EUR, 50% of the foreseen budget (Table 3 of Annex A). Actions anticipated include increasing Internet access in rural areas and for the less-included target groups; increasing information-society-related awareness, skills, and motivation; and encouraging further development of public sector e-services, including horizontal growth and cooperation with the private sector (Majanduskeskkonna arendamise... 2007, 87). The annual implementation report for 2008 (Majanduskeskkonna... 2009) does not analyse the impact on R&D and innovation (33–37).

Still, there are different ways to relate e-government services to innovation, most obviously via public procurement for innovation. It has been stated that “State orders constitute a considerable part of the ICT sector’s turnover. However, in public procurements the determining factor usually tends to be the price, which is why the private sector often lacks the motivation to offer the best solutions. By becoming a smart customer, the public sector can, in addition to meeting its own needs better than so far, contribute to the development of competitive products and services that could be marketed abroad” (Government of Estonia 2006, 10). Evidence shows that Estonia has been successful with public procurement for innovation, most notably by initiating and funding two strategic projects: (1) connection of government information systems and databases via the Internet through a service known as the 'X-Road', which creates unified interfaces for existing databases and a data-exchange layer that allows officials as well as legal entities and private individuals to process data from national databases within the limits of their authority, and (2) adoption of the Estonian ID-card, a compulsory identity document for all citizens that includes electronic authentication and authorization mechanisms. As a result of such catalytic procurements, several innovative services have been developed, including e-voting (see Kalvet 2009), although thorough evaluations and impact assessments are largely missing (for discussion on the role of the public sector in framing R&D and innovation-related developments, see Kalvet et al. 2002, Kalvet 2004, Högselius 2005, Kalvet and Aaviksoo 2008, Kitsing 2008).

Estonia is participating in the **European territorial cooperation programmes** financed by ERDF. In the Estonia-Latvia cross-border co-operation programme, Estonian partners were granted 12 Million EUR, of which 13% is to support entrepreneurship. Of the Central Baltic INTERREG IV A cross-border co-operation programme, Estonian participants were allocated 10 Million EUR (Majanduskeskkonna... 2009, 44–48).

Regarding the period 2007–2013 and a more explicit focus on the Community Funds, two more general evaluations also stand out.

First, in 2007 Tallinn University of Technology carried out an *ex ante* evaluation of the National Strategic Reference Framework 2007–2013 and OPs. The expert team’s overall assessment of the evaluated document was positive. Regarding R&D and innovation, the report stated, “Very detailed and thorough is the treatment of connections of the priority trends for OP of Economic Environment in field Research and Development” (Tallinn University of Technology 2007, 58).

Second, in 2009 a study of OPs was carried out by a consortia led by Ernst & Young Baltic. The main objective was to evaluate and make recommendations for changes in OPs in the light of the global economic and financial crisis. On the R&D and innovation measures the report concludes that their general considerations concerning the overall economic situation were correct. Still, it is claimed that more emphasis should be put on measures focusing on the enterprise sector and that the current OPs place too much emphasis on infrastructure-related investments. The report also notes that R&D and innovation measures need much more funding than is currently foreseen. Most notably, it is proposed that the budget from ERDF sources and venture capital support instrument for start-ups should amount to 32 Million EUR<sup>15,16</sup>. Concerning research support measures it is claimed that the implementation plan of the Knowledge Based Estonia 2007–2013 strategy lacks priorities. First, it is noted that several technology programmes prioritised in the national R&D strategy, including the ICT Technology Programme, still have to be developed and implemented, and that the concept of those programmes remains fuzzy and administrative capacities are weak. Second, in the R&D financing measures (for example, investments in research infrastructure) the linkages with priorities set are questioned. Also, co-ordination between different measures in priority fields (addressing different bottlenecks like infrastructure, human resources, curricula development, etc.) should be addressed better. (Struktuurivahendite rakenduskava hindamine... 2010; see also Annex – Summary of Evaluation of the Operational Plans on the use of Structural Funds).

Several other studies looking at the Estonian support instruments and institutions from a wider perspective have been carried out recently. For example, the Ministry of Economic Affairs and Communications has commissioned an analysis of possible tax incentives to promote R&D in Estonia, concluding “Our analysis showed that several tax incentives can be implemented in the Estonian income tax system to encourage research and development. The short term costs as well as impact of different incentives vary. Which R&D tax incentive to implement eventually has to be carefully contemplated considering how much resources the government is willing to invest in R&D and which costs or objectives are the priorities” (An analysis of tax incentives... 2010, 14).

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<sup>15</sup> A study on access of enterprises to venture financing in Estonia was completed in 2004 by De Lange et al. and led to the creation of the Estonian Development Fund in 2006 with venture capital activities.

<sup>16</sup> The Ministry of Economic Affairs and Communications is already working on a concept for financial instruments for young innovative enterprises, which at the moment covers only early-stage investment and support for start-ups, training and possible business acceleration teams. The draft proposal at the moment covers around 25 Million EUR.

The Ministry also commissioned a study on the meaning and relevance of ‘open innovation’ for Estonian entrepreneurs and policy-makers; the study concludes that as opposed to merely seeking ways of inducing open innovation-based business strategies and models, the Estonian government should tackle three fundamental national challenges that are the main obstacles to private sector growth and socio-economic catching-up: (1) coordination of policy efforts, (2) development of internal demand and networking capacities, and (3) overcoming the high-technology bias of innovation policy (Kalvet et al. 2010).

In autumn 2009, the National Audit Office of Estonia started an audit regarding the impact of enterprise support measures in the period. The audit not only covered support measures for productivity, export growth, etc., but also R&D and innovation funds given to enterprises by Enterprise Estonia and KredEx in the period 2004–2009. The audit focused on the impact and results of support measures to selected economic areas (covering over 30% of Estonian enterprises by net sales calculations). Thus, no distinction between the EU planning periods (2004–2006 and 2007–2013) will be made in the forthcoming audit. However this audit is critical of the planning for enterprise support measures as well as of the entrepreneurial policy of Estonia and the innovation policy. The audit will be made public in fall 2010.

To conclude, there is a wide range of evaluations available that have been carried out by outstanding consultants. In several cases, though, the details of the methodology are unclear (e.g. the number of interviews carried out). Also, mostly evaluations have been carried out based on interviews without the introduction of more quantitative evidence. While this is quite common in studies relating to R&D and innovation, they might have been complemented with company-level indicators (impact on employment, value-added, etc.) where appropriate. Still, as a result of these evaluations and earlier studies, the problems of the Estonian R&D and innovation system are quite clear, and the analysis have served as input to respective policies and a lot of steps have already been taken.

## **4 CONCLUSION: MAIN CHALLENGES FACED BY COHESION POLICY PROGRAMMES**

Based on the analysis carried out, it can be concluded that funding from ERDF plays an important role in the Estonian R&D and innovation policy: facilitating R&D and innovation are important priorities of the OPs, and the most influential policy measures are co-funded by ERDF. Those policy measures have all contributed to the considerable progress of Estonia in implementing and achieving the targets set in the Estonian R&D and innovation policy *Knowledge Based Estonia–Estonian R&D and Innovation Strategy 2007–2013*. The implementation report notes that continuous growth can be observed in R&D funding and in the number of researchers and engineers (especially in the private sector for both), in the number of scientific publications, etc.

(Aruanne strateegia eesmärkide... 2009<sup>17</sup>). Considering the important role ERDF funds have played in 2002–2006 and are playing in 2007–2013, many of those achievements can be related to ERDF, especially as individual evaluation reports of ERDF co-funded support measures are positive.

The importance of strategic planning in a holistic way and including evaluations as part of the policy cycle has increased considerably with accession to the EU and with the explicit demand for such activities. The current analysis shows that many evaluations in the fields of R&D and innovation have already been carried out and are planned in the future (see Programmiperioodi 2007–2013 struktuurivahendite hindamise... 2008<sup>18</sup>).

The more general performance of the Estonian R&D and innovation policy has been evaluated in two studies commissioned by the Estonian Ministry of Economic Affairs and Communications: Evaluation of Policy Instruments for Intensifying Business Innovation (Reid 2003) and Evaluation of the Design and Implementation of Estonian RTDI Policy (Reid and Walendowski 2005). The former concludes that more focus should be put on increasing the number of enterprises benefiting from support, considering that current measures were mostly targeted at more research-intensive enterprises. The latter also points out that one of the main challenges for the 2007–2013 period is achieving an appropriate balance between research policy and innovation policy measures. An externally initiated study, the Evaluation of Estonian RTDI Policy Mix initiated by CREST Open Method of Coordination (OMC) Policy Mix exercise, concludes that “national policy has risen to the level of good international practice in a very short time, especially in terms of strategy formulation, design of policy instruments and policy learning activities (including evaluation)” (Polt et al. 2007, 41), but emphasises similarly the need to improve the governance of RTDI policy, the capacity for policy implementation and the mix of policies, and to find the right balances when addressing the problems of different stakeholder groups in the innovation system. This is still a major problem originating from the different value systems: the funding of the academic community is mostly dependent upon its correspondence to research outputs (largely publications in international journals), while the national innovation system calls for complementarities between academic and enterprise sectors. So, there should be more emphasis on the local enterprise sector and on increasing its capacities and capabilities.

Relatedly, the issue of more effective governance of innovation policy (as regards coordination between authorities), the problem of the fragmentation of support and duplication and the suitable combination of support for RTDI with support for human capital development needs to be better addressed. Considering that several policy instruments implemented by different ministries and agencies, partially overlap, more co-operation between the key players—Ministry of Economic

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<sup>17</sup> [Report on achieving the objectives and implementing the Estonian Research and Development and Innovation Strategy 2007–2013 “Knowledge-based Estonia” in 2009].

<sup>18</sup> [Principles and Action Plan for Evaluation of the use of Structural Funds].

Affairs and Communication on the one hand, and the Ministry of Education and Research on the other, and the respective main implementing agencies (Enterprise Estonia, Archimedes Foundation)— is crucial. While a shift from the rather top-down approach to policy-making toward a greater involvement of social partners can be noticed in the current programming period, more can and must be done to access local know-how in developing the priorities, measures, and respective results and performance indicators.

There are no regional priorities in R&D and innovation policy, and innovation-policy support measures at the local level remain limited. More emphasis should be put on reinforcing the regional dimension of RTDI, but also on promoting transnational cooperation as Estonian organisations are already involved in Nordic networks.

Although the national R&D and innovation strategy sets priorities, they may not be followed. Several technology programmes prioritised in the national R&D strategy, including the ICT Technology Programme, have to be developed and implemented, and the concept of those programmes remains fuzzy and the administrative capacities to administer them are weak. Second, for some ERDF-supported measures the linkages with the priorities set are being questioned.

It can be also concluded that OPs have been used as guiding documents in the implementation of ERDF funds. However, in some policy areas no financial commitments have been taken. At the same time, important R&D and innovation policy measures funded by the ERDF need to be increased financially in order to be continued, including the R&D Financing Programme.

## REFERENCES

### *List of interviewees*

The author is grateful to all individuals who contributed significantly to the completion of the research, especially to

- Kaie Küngas, Ministry of Economic Affairs and Communications
- Erkki Karo, Tallinn University of Technology
- Prof. Dr. Rainer Kattel, Tallinn University of Technology
- Maarja-Liisa Kärp, Ministry of Education and Research
- Mihkel Randrüüt, Ministry of Economic Affairs and Communications
- Dr. Indrek Reimand, Ministry of Education and Research
- Marek Tiits, Institute of Baltic Studies
- Piret Tõnurist, State Audit Office.

### *The official documents and the evaluations*

All links valid as of 20 May, 2010.

Archimedes Foundation. 2010a. Centres of Excellence. Available online at

<http://str.archimedes.ee/et/struktuurifondid/toetatud/Majanduskeskkonna-arendamise-rakenduskaava-raames-toetatud-projektid/tippkeskused>.

Archimedes Foundation. 2010b. R&TD infrastructure development. Available online at

<http://str.archimedes.ee/et/struktuurifondid/toetatud/Majanduskeskkonna-arendamise-rakenduskaava-raames-toetatud-projektid/TA-ning-korghariduse-infrastruktuuri-arendamine>.

Aruanne strateegia eesmärkide ja rakendusplaani täitmisest 2009. aastal [Report on achieving the objectives and implementing the Estonian Research and Development and Innovation Strategy 2007–2013 “Knowledge-based Estonia” in 2009]. 2009. Government of Estonia. Available on-line at <http://www.hm.ee/index.php?popup=download&id=9819>.

Baltic Sea Region Programme 2007–2013 Annual Implementation Report 2008. 2009. Baltic Sea Region Programme Monitoring Committee.

Central Baltic Interreg IVA Programme 2007–2013 Annual Implementation Report 2008. 2009. Programme Monitoring Committee.

COWI AS. 2007. Ex ante Evaluation and Strategic Environmental Assessment of the Baltic Sea Region Programme 2007–2013 – Transnational cooperation for the Baltic Sea Region.

Deabaltika. 2007. Ex ante Evaluation of Estonia – Latvia Cross–Border Co–operation Programme 2007–2013.

Elukeskkonna arendamise rakenduskava 2007–2013 [Operational Programme for Development of Living Environment 2007–2013]. 2007. Republic of Estonia. Available online in English at [http://www.strukturifondid.ee/public/elukeskond\\_ENG.pdf](http://www.strukturifondid.ee/public/elukeskond_ENG.pdf).

Elukeskkonna arendamise rakenduskava seirearuanne. Aruandluse period 1.01.2007–31.12.2008 [Implementation Report, Operational Programme for Development of Living Environment 2007–2013, 1.01.2007 – 31.12.2008]. 2009. Elukeskkonna arendamise rakenduskava seirekomisjon.

Estonia – Latvia Programme 2007–2013 Annual Implementation Report 2008. 2009. Estonia – Latvia Programme Monitoring Committee.

Government of Estonia. 2006. Estonian Information Society Strategy 2013. Available online in English at: <http://www.riso.ee/en/system/files/Estonian%20Information%20Society%20Strategy%202013.pdf>.

Knowledge Based Estonia – Estonian R&D and Innovation Strategy 2007–2013. 2007. Riigikogu, Riigi Teataja, Part I, No. 16. Available online in English at [www.hm.ee/index.php?0&popup=download&id=6175](http://www.hm.ee/index.php?0&popup=download&id=6175).

Majanduskeskkonna arendamise rakenduskava 2007–2013 [Operational Programme for the Development of Economic Environment 2007–2013]. 2007. Republic of Estonia. Available online in English at [http://www.strukturifondid.ee/public/maj.keskond\\_ENG.pdf](http://www.strukturifondid.ee/public/maj.keskond_ENG.pdf).

Majanduskeskkonna arendamise rakenduskava seirearuanne. Aruandluse period 1.01.2007–31.12.2008 [Implementation Report, Operational Programme for the Development of Economic Environment 2007–2013, 1.01.2007 – 31.12.2008]. 2009. Majanduskeskkonna arendamise rakenduskava seirekomisjon.

Ministry of Education and Research. 2010. Centres of Excellence. Available online at <http://www.hm.ee/index.php?044831>.

National Audit Office of Estonia. 2007. Eriaruanne Euroopa Liidu toetusraha kasutamisest Eestis 2004–2006 [Special Report on the use of the EU Structural Funds in Estonia 2004–2006]. Special report to the Parliament of Estonia.

Operational Programme of Baltic Sea Region Programme 2007–2013. 2007.

Operational Programme of Central Baltic Interreg IVA Programme 2007–2013. 2007.

Operational Programme of Estonia – Latvia Programme 2007–2013. 2007.

Programmperioodi 2007–2013 Struktuurivahendite hindamise korraldamise põhimõtted ja tööplaan [Principles and Action Plan for Evaluation of the use of Structural Funds, 2007–2013]. 2008. Rahandusministeerium. Available on–line at [http://www.struktuurifondid.ee/public/hindamiste\\_tooplaan\\_2007\\_13.pdf](http://www.struktuurifondid.ee/public/hindamiste_tooplaan_2007_13.pdf).

Riiklik struktuurivahendite kasutamise strateegia 2007–2013 [National Strategic Reference Framework (NSRF) 2007–2013]. 2007. Republic of Estonia. Available online in English at [http://www.struktuurifondid.ee/public/Estonian\\_NSRF\\_21June07\\_ENG.pdf](http://www.struktuurifondid.ee/public/Estonian_NSRF_21June07_ENG.pdf).

Struktuurivahendite programmperioodi 2007–2013 strateegiline aruanne 2009 [National Strategic Report 2009]. 2009. Rahandusministeerium.

Sweco Eurofutures. Ex–ante Evaluation and Strategic Environmental Assessment of the Central Baltic Cross–border Programme 2007–2013. 2007.

Tallinn University of Technology. 2007. Ex ante evaluation of the National Strategic Reference Framework 2007–2013 and Operational Programmes. Final Report to the Ministry of Finance.

### ***Statistical information***

Estonian Register of Structural Funds. 2009. Data on community amounts allocated for selected operations. Data from Estonian Register of Structural Funds, Appendix to the Struktuurivahendite programmperioodi 2007–2013 strateegiline aruanne 2009 [National Strategic Report 2009]. 2009. Rahandusministeerium.

Estonian Register of Structural Funds. 2010. Data on community amounts allocated for selected operations. Data provided by Kaie Küngas, Ministry of Economic Affairs and Communications, 13 April 2010.

### ***Evaluation evidence available<sup>19</sup>***

An analysis of tax incentives to promote research and development in Estonia. 2010. KPMG Baltics AS, Praxis Center for Policy Studies, Staehr, K. Available online in English at <http://www.mkm.ee/public/TA-Maksuuuring-2010-01.pdf>.

Arnold, E., Männik, K., Rannala, R., Reid, A., Bayer, B., Ljungström, S. 2008. Mid–Term Evaluation of the Competence Centre Programme. Innovation Studies 12. Available on–line in English at [http://www.mkm.ee/failid/IS12\\_competence\\_center\\_programme\\_2008.pdf](http://www.mkm.ee/failid/IS12_competence_center_programme_2008.pdf).

Brighton, R. and A. Kells. 2007. Impact Evaluation of Spinno Programme in 2001–2006. Implications for the EU Structural Funds Programming Period 2007–2013. Innovation Studies 8. Available on–line in English at

---

<sup>19</sup> Studies and evaluations exemplifying good practice will be proposed based on additional interviews carried out for the preparation of the country report.

[http://www.mkm.ee/failid/Impact\\_Evaluation\\_of\\_Spinno\\_Programme\\_in\\_2001\\_2006\\_SQW4.pdf](http://www.mkm.ee/failid/Impact_Evaluation_of_Spinno_Programme_in_2001_2006_SQW4.pdf).

De Lange, L., De Bruin, G., Kleyn, B., Favalli, A., Muñoz, E.V., Di Anselmo, A. 2004. Access of Enterprise to Venture Financing in Estonia: Feasibility Study of Government Support Scheme. Innovation Studies 5. Available on-line in English at [http://www.mkm.ee/failid/Innostudy\\_no.5.pdf](http://www.mkm.ee/failid/Innostudy_no.5.pdf).

INNO-Policy TrendChart – Innovation Policy Progress Report: Estonia. 2009. Available on-line at [http://www.proinno-europe.eu/page/extranet/upload/countryreports/Country\\_Report\\_Estonia\\_2009.pdf](http://www.proinno-europe.eu/page/extranet/upload/countryreports/Country_Report_Estonia_2009.pdf).

Jürgenson, A. 2007. Teadus- ja arendustegevuse finantseerimise programmi mõjude hindamine [Impact Assessment of R&D Financing Programme]. Praxis Toimetised 36. Available on-line at [http://www.praxis.ee/fileadmin/tarmo/Toimetised/toimetised\\_36\\_2007.pdf](http://www.praxis.ee/fileadmin/tarmo/Toimetised/toimetised_36_2007.pdf).

Kalvet, T., Karo, E. and R. Kattel (eds). 2010. Eesti ettevõtete uued võimalused – ärimudelid, avatud innovatsioon ja riigi valikud [New Opportunities of Estonian Companies – Business Models, Open Innovation, and Options for a State]. Innovation Studies 14. Available on-line at [http://www.mkm.ee/public/ipup\\_14.pdf](http://www.mkm.ee/public/ipup_14.pdf).

Kuusk, K. and A. Jürgenson. 2007. Riiklike ettevõtlike tugimeetmete mõjude hindamine [Evaluation of State Enterprise Support Measures]. Praxis Toimetised. Available online at [http://www.praxis.ee/fileadmin/tarmo/Toimetised/toimetised\\_32\\_2007.pdf](http://www.praxis.ee/fileadmin/tarmo/Toimetised/toimetised_32_2007.pdf).

Nedeva, M. and L. Georghiou. 2003. Assessment of the Estonian Research, Development, Technology and Innovation Funding System. Estonian Ministry of Science.

Polt, W., Koch, P., Wolters, A. 2007. Evaluation of Estonian RTDI Policy Mix. Results of OMC Peer Review Report 2007. Country Report for Estonia. Innovation Studies 10. Tallinn: Ministry of Economic Affairs and Communications. Available online in English at [http://www.mkm.ee/failid/Evaluation\\_of\\_Estonian\\_RTDI\\_Policy\\_Mix.pdf](http://www.mkm.ee/failid/Evaluation_of_Estonian_RTDI_Policy_Mix.pdf).

Reid, A. 2003. Optimising the Design and Delivery of Innovation Policy in Estonia: an Evaluation of Policy Instruments for Intensifying Business Innovation. Innovation Studies 4. Tallinn: Ministry of Economic Affairs and Communications.

Reid, A. and Walendowski, J. 2005. Evaluation of the Design and Implementation of Estonian RTDI Policy: Implications for Policy Planning. Innovation Studies 6. Tallinn: Ministry of Economic Affairs and Communications.

Struktuurivahendite rakenduskava hindamine. Uuringuaruanne [Evaluation of the Operational Plans on the use of Structural Funds. Research Report]. 2010. Ernst & Young Baltic, Poliitikauuringute Keskus Praxis, Säätva Eesti Instituut, Balti Uuringute Instituut. Available

online at

[http://www.strukturifondid.ee/public/Strukturivahendite\\_rakenduskava\\_hindamine.pdf](http://www.strukturifondid.ee/public/Strukturivahendite_rakenduskava_hindamine.pdf).

SQW. 2003. Evaluation of the SPINNO programme. Available on-line in English at

[http://www.mkm.ee/failid/Evaluation\\_of\\_the\\_Spinno\\_Programme\\_\\_\\_2003.pdf](http://www.mkm.ee/failid/Evaluation_of_the_Spinno_Programme___2003.pdf).

Technopolis. 2006. Strategic Evaluation on Innovation and the Knowledge based Economy in relation to the Structural and Cohesion Funds, for the programming period 2007–2013.

Available in English at

[http://ec.europa.eu/regional\\_policy/sources/docgener/evaluation/pdf/evalstrat\\_innov/estonia.pdf](http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/evalstrat_innov/estonia.pdf).

### ***Other references***

Högselius, P. 2005. The Dynamics of Innovation in Eastern Europe: Lessons from Estonia.

Cheltenham: Edward Elgar Publishing.

Kalvet, T. 2009. 'Management of technology: the case of e-voting in Estonia', Proceedings of the International Conference on Computer Technology and Development (ICCTD 2009), 512–515, IEEE Computer Society Press.

Kalvet, T. 2004. The Estonian ICT Manufacturing and Software Industry: Current State and Future Outlook. Seville: Institute for Prospective Technological Studies–DG Joint Research Centre, European Commission.

Kitsing, M. 2008. 'Explaining the e-government success in Estonia', Proceedings of the 2008 International Conference on Digital Government, Digital Government Society of North America.

Tiits, M (ed). 2007. Kaupmeeste riik [The Nation of Merchants]. Tallinn: Eesti Teaduste Akadeemia.

## **ANNEX A – BACKGROUND DATA ON EU COHESION POLICY SUPPORT TO INNOVATION**

**Table 1 – Total ERDF resources allocated per programme (2007–2013)**

<b>Programme</b>	<b>Total ERDF resources for innovation</b>	<b>Total ERDF</b>	<b>Innovation support as % of total ERDF</b>	<b>Main initiatives implemented</b>
Operational Programme for the Development of Economic Environment	596 520 651	1 404 628 046	42.5%	The main measures implemented are the establishment and modernisation of R&D infrastructure, support to the Competence Centres and the Centres of Excellence, and the R&D Financing Programme.  See 3.1 for details and Table 4 for details on allocation of the ERDF

				funds as of April 2010.
Operational Programme for the Development of Living Environment	72 341 595	1 607 314 506	4.5%	
<b>Total Objective 1</b>	<b>668 862 246</b>	<b>3 011 942 552</b>	<b>22.2%</b>	
<b>Overall total</b>	<b>668 862 246</b>	<b>3 011 942 552</b>	<b>22.2%</b>	

Source: core team on EC data.

**Table 2 – ERDF contribution to innovation by policy area (2007–2013)**

***a – Convergence Objective***

Policy Area	Categorisation of Expenditure (FOI codes)	Total ERDF	%
<b>Objective 1</b>			
Assistance to SMEs for the promotion of environmentally-friendly products and production processes (...)	06	8 793 732	1.3
Investment in firms directly linked to research and innovation (...)	07	80 671 839	12.1
Other measures to stimulate research and innovation and entrepreneurship in SMEs	09	40 586 453	6.1
R&TD activities in research centres	01	183 876 050	27.5
<b>Boosting applied research Total</b>		<b>313 928 074</b>	
Advanced support services for firms and groups of firms	05	15 135 365	2.3
Developing human potential in the field of research and innovation, in particular through post-graduate studies ...	74		
Information and communication technologies (...)	11	12 213 516	1.8
Information and communication technologies (TEN-ICT)	12		
Other measures for improving access to and efficient use of ICT by SMEs	15		
Services and applications for citizens (e-health, e-government, e-learning, e-inclusion, etc.)	13	62 633 416	9.4
Services and applications for SMEs (e-commerce, education and training, networking, etc.)	14		
<b>Innovation friendly environment Total</b>		<b>89 982 297</b>	
Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)	04	15 771 094	2.4
R&TD infrastructure and centres of competence in a specific technology	02	133 324 620	19.9
Technology transfer and improvement of cooperation networks ...	03	115 856 161	17.3
<b>Knowledge transfers and poles Total</b>		<b>264 951 875</b>	
<b>Total Objective 1</b>		<b>668 862 246</b>	<b>100</b>

Source: core team on EC data.

**Table 3 – Community amounts allocated to selected operations (EUR)**

Code	Priority Theme Description	Community amount – Allocated in OP (EUR)	01.01.2007 – 28.10.2009		01.01.2007 – 13.04.2010	
			Community amount – Allocated to selected operations (EUR)	% allocated	Community amount – Allocated to selected operations (EUR)	% allocated
01	R&TD activities in research centres	183 876 050	66 430 265	36.1%	67 063 154	36.5%
06	Assistance to SMEs for the promotion of environmentally-friendly products and production processes (...)	8 793 732	555 511	6.3%	799 881	9.1%
07	Investment in firms directly linked to research and innovation (...)	80 671 839		0.0%	0	0.0%
09	Other measures to stimulate research and innovation and entrepreneurship in SMEs	40 586 453	28 310 967	69.8%	47 490 233	117.0%
	<b>Boosting applied research Total</b>	<b>313 928 074</b>	<b>95 296 743</b>	<b>30.4%</b>	<b>115 353 268</b>	<b>36.7%</b>
05	Advanced support services for firms and groups of firms	15 135 365		0.0%	0	0.0%
11	Information and communication technologies (...)	12 213 516		0.0%	0	0.0%
13	Services and applications for citizens (e-health, e-government, e-learning, e-inclusion, etc.)	62 633 416	18 432 224	29.4%	31 495 629	50.3%
	<b>Innovation friendly environment Total</b>	<b>89 982 297</b>	<b>18 432 224</b>	<b>20.5%</b>	<b>31 495 629</b>	<b>35.0%</b>
02	R&TD infrastructure and centres of competence in a specific technology	133 324 620	68 838 665	51.6%	104 299 182	78.2%
03	Technology transfer and improvement of cooperation networks ...	115 856 161	5 039 685	4.3%	6 606 949	5.7%
04	Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)	15 771 094	5 351 650	33.9%	7 548 918	47.9%
	<b>Knowledge transfers and poles Total</b>	<b>264 951 875</b>	<b>79 230 000</b>	<b>29.9%</b>	<b>118 455 048</b>	<b>44.7%</b>
	<b>Innovation support total</b>	<b>668 862 246</b>	<b>192 958 967</b>	<b>28.8%</b>	<b>265 303 946</b>	<b>39.7%</b>

Sources: Estonian Register of Structural Funds 2009; Estonian Register of Structural Funds 2010.

**Table 4 – Most important policy instruments implemented as of April 2010 by policy area (EUR)**

Policy Area \ Policy Instrument	Categorisation of Expenditure (FOI codes)	R&D Financing Programme	Competence Centres Programme	Centres of Excellence Programme	R&D Infrastructure Development Programme	Total
<b>Objective 1</b>						
R&TD activities in research centres	01	3 935 011	63 128 143			67 063 154
Assistance to SMEs for the promotion of environmentally-friendly products and production processes (...)	06	793 490				793 490
Investment in firms directly linked to research and innovation (...)	07					0
Other measures to stimulate research and innovation and entrepreneurship in SMEs	09	13 894 092				13 894 092

<b>Boosting applied research Total</b>		<b>18 622 593</b>	<b>63 128 143</b>	<b>0</b>	<b>0</b>	<b>81 750 736</b>
Advanced support services for firms and groups of firms	05					0
Information and communication technologies (...)	11					0
Information and communication technologies (TEN-ICT)	12					0
Services and applications for citizens (e-health, e-government, e-learning, e-inclusion, etc.)	13					0
Services and applications for SMEs (e-commerce, education and training, networking, etc.)	14					0
Other measures for improving access to and efficient use of ICT by SMEs	15					0
Developing human potential in the field of research and innovation, in particular through post-graduate studies ...	74					0
<b>Innovation friendly environment Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
R&TD infrastructure and centres of competence in a specific technology	02			29 984 771	68 562 363	98 547 133
Technology transfer and improvement of cooperation networks ...	03	1 519 393				1 519 393
Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)	04	7 366 949				7 366 949
<b>Knowledge transfers and poles Total</b>		<b>8 886 341</b>	<b>0</b>	<b>29 984 771</b>	<b>68 562 363</b>	<b>107 433 475</b>
Not indentified		19 148				19 148
<b>Total</b>		<b>27 528 082</b>	<b>63 128 143</b>	<b>29 984 771</b>	<b>68 562 363</b>	<b>189 203 359</b>

Source: Author based on Estonian Register of Structural Funds 2010.

## ANNEX – SUMMARY OF MID-TERM EVALUATION OF THE COMPETENCE CENTRE PROGRAMME (2008)

### Name

Mid-Term Evaluation of the Competence Centre Programme

### The content and coverage

The Competence Centres programme, initiated in 2002, resulted in five Competence Centres – Competence Centre of Electronics, Info and Communication Technologies (ELIKO in the following tables); Competence Centre of Food and Fermentation Technologies (FF); Competence Centre of Healthy Dairy Products (Dairy); Estonian Nanotechnologies Competence Centre (Nano); Competence Centre of Cancer Research (Cancer). A rather early (mid-term) evaluation of those Centres was undertaken in spring 2008, the emphasis was on learning ('formative' rather than a 'summative' evaluation).

### Method

- Analysis of documents, which range from the programming documentation and monitoring reports of the programme to evaluations of competence centre systems outside Estonia

- Interviews with the Ministries of Economic Affairs and Communications and Finance, programme management, representatives of universities at department and university level, company partners, self-evaluations by all five competence centres
- Centre reviews by an international three-person panel
- A survey of researchers to explore their motivations and experiences in working at the centres

### ***Main findings and recommendations***

The mid-term evaluation concludes that generally the instrument is appropriate in the Estonian context. All the centres have progressed towards their goals – some more than others (Table 5).

**Table 5 – Centre Performance Summary**

Centre performance	ELIKO	FF	Nano	Dairy	Cancer
Critical mass of R&D	()	✓	✓	✓	✓
Shared facilities, platform building	()	✓	✓	()	()
Extended industrial planning horizon	X	✓	X	✓	X
Extended academic planning horizon	✓	✓	✓	✓	✓
Shared understanding of mid-term priorities	()	✓	()	✓	✓
Human resource production and mobility	✓	✓	✓	✓	✓
Engaging international companies	X	()	X	X	()
<b>Outcomes in academia/centres</b>					
Change from project to programmatic planning	✓	✓	✓	✓	✓
Efficiency of corporate management	()	()	X	()	()
More awareness of industrial research needs	✓	✓	()	✓	✓
Increased attractiveness of their R&D fields	✓	✓	✓	✓	✓
<b>Industrial outcomes</b>					
Companies realise strategic objectives via cooperation	X	X	X	X	X
Business to business cooperations	()	()	X	✓	()
Academic work reorientated to industrial needs	()	()	()	()	()
Human resources trained and meet industrial needs	✓	✓	()	✓	✓
More international R&D cooperation	X	()	X	X	✓
<b>Likely centre sustainability</b>					
With continued high subsidy level	✓	✓	✓	✓	✓
With medium subsidy level	✓	✓	X	✓	X
With low subsidy level	X	X	X	X	X

Key: ✓ = Yes; X = No; () = partly

Source: Arnold et al. 2008, 66.

Overall, the Competence Centres programme has encouraged universities to begin concentrating research and educational resources in areas of national need and improve links with industry. Companies increased their R&D capabilities and were better prepared to tackle high-risk innovation. The research community also benefited from increased funding and produced significant numbers of research outputs – some directly useful to industry; others longer term in nature.

Influencing and contributing to university education is an important function of competence centres and the Estonian Competence Centres have attracted a reasonable number of students from all levels: over 100 Bachelor, Master and PhD theses have been written or are in preparation (Table 6). The centres also have a substantial number of publications to their credit (Table 7) and have also begun to produce patents, as indicated in Table 8. The number of patent applications remains limited at this stage but gives rise to optimism for the future once further research activities reach a more mature stage.

**Table 6 – Degree Activity Reported by Centres**

	BSc		MSc		PhD		Report Date
	Defended	Ongoing	Defended	Ongoing	Defended	Ongoing	
ELIKO	20	2	15	7	3	13	21.12.07
FF	0	4	9	5	3	3	19.11.07
Nano		5	0	11	2	14	27.03.07
Dairy	0	0	4	7	0	8	27.03.08
Cancer	0	4	0	8	0	2	09.05.07
Total	20	15	28	38	8	40	

Source: Arnold et al. 2008, 17.

**Table 7– Centres' Publication Outputs**

	ELIKO	FF	Nano	Dairy	Cancer	Total
Reporting date	21.12.07	1.11.07	27.03.07	27.03.08	04.06.08	
Refereed journal papers	15	9	13	24	14	75
Conference papers	68	16	24	28	20	156
Others (books, monographs, PhD theses)	4	6	11	11	6	38

Source: Arnold et al. 2008, 18.

**Table 8 – Patent Applications Reported by 2007**

Centre	Estonian	International	JPR Owners
ELIKO	2	2	ELIKO, TTU
Food and Fermentation	1	0	LDI
Nanotechnology	0	3	TTU, TU, Nano Centre
Dairy	1	1	Dairy Centre
Cancer	1	3	Cancer Centre, TTU, Prosyntest, Kevelt, InBio

Source: Arnold et al. 2008, 18.

It is recommended that the Competence Centres programme continue but with greater continuity of funding and a seven-year funding guarantee for the next round of centres. Pressure on the centres to perform and to maintain quality standards should be applied through mid-term evaluation and there should also be a final impact-focused evaluation. More flexible consortium membership arrangements should be permitted in order to allow entry and exit in the rapidly

changing circumstances of the Estonian economy. One need not presume that future Competence Centres will be 'high tech', though by their nature they should be knowledge intensive. Greater internationalisation should be fostered through international scientific committees and the Competence Centres should be part funded by the international members of the consortium. Improved 'corporate governance' is required to take account of the fact that the centres are funded by public funds and a shift towards not-for profit arrangement to reduce the incentives for opportunism would be the optimal solution.

## **ANNEX – SUMMARY OF IMPACT ASSESSMENT OF R&D FINANCING PROGRAMME (2007)**

### ***Name***

Impact Assessment of R&D Financing Programme

### ***The content and coverage***

The objectives of the Estonian R&D Financing Programme (2001–2003) had the goal to apply the developed technologies and innovations in business, thus increasing the effectiveness and improving the performance figures of the company implementing the project and the Estonian business sector as the whole. The R&D Financing Programme had three main sub-instruments: (1) support for feasibility studies, (2) applied research support for R&D institutions (also respective loans issued before the introduction of the EU Structural Funds in 2004), and (3) applied research and/or product development support and loans for companies. Additionalities of the Estonian R&D Financing Programme were studied in 2006–2007.

### ***Method***

The main sources of information for assessment of impact carried out were the databases of Enterprise Estonia (EAS), which were supplemented by data obtained directly from the beneficiaries and consultants. To that end a web survey was carried out among all applicants. Also, face-to-face interviews were carried out with the implementers of the projects.

### **Main findings and recommendations**

The additionality analysis of the projects shows that only few projects would have been implemented without the support from the R&D Financing Programme indicating a small deadweight of the programme.

The analysis of the successfulness of the projects both on the technological development as well as economic effects revealed that in most cases the planned development was successful, but nearly half the projects of the companies were economically rather unsuccessful.

The study of behavioural additionality has gained popularity in the evaluation of the R&D support programmes and the Estonian case study fully confirms the relevance of such a concept, especially

in the long run. The existence of many behavioural additionalities, especially acceleration, cognitive capacity, management, network and scope additionalities were noted. The network and scope additionalities target the major problems of the Estonian innovation system, largely based on Soviet legacies: weak linkages between public R&D institutions and enterprise level R&D; negative incentives retarding innovation at enterprise level (quantitative planned production targets during Soviet era, cultural path dependencies carried over to the following periods); weak, almost non-existent user-producer linkages. Low administrative capacities of organisations regarding R&D activities have also been improved with the current programme.

The study shows that some indicators proved not be identifiable (e.g. increased turnover, export turnover and number of jobs created owing directly to the support). If these are to be measured, continuous collection of respective data by companies should be demanded from companies and information should be collected regularly.

## **ANNEX – SUMMARY OF EVALUATION OF THE OPERATIONAL PLANS ON THE USE OF STRUCTURAL FUNDS (2009)**

### ***Name***

Evaluation of the Operational Plans on the use of Structural Funds. Research Report.

### ***The content and coverage***

Study of OPs was carried out in 2009 by a consortia led by Ernst & Young Baltic. The main objective was to evaluate and make recommendations for changes in OPs in the light of the global economic and financial crisis.

### ***Method***

Analysis of financial data from the Ministry of Finance and various agencies; interviews (more than 120) with experts, implementing agencies and social partners.

### ***Main findings and recommendations***

The report concludes that considering the overall economic situation R&D and innovation measures were on the whole appropriate, that more emphasis should be put on measures focusing on the enterprise sector and that the current OPs place too much emphasis on infrastructure-related investments.

The report also notes that R&D and innovation measures need much more funding than is currently foreseen. Most notably, it is proposed that the budget from ERDF sources and venture capital support instrument for start-ups should amount to 32 Million EUR. It is also noted that some planned instruments still lack substance and application mechanisms.

With regard to research support measures it is claimed that the implementation plan of the Knowledge Based Estonia 2007–2013 strategy does not follow clear priorities and in addition does not follow the order of the priorities it has set. First, it must be clarified that several technology programmes prioritised in the national R&D strategy, including the ICT Technology Programme, still have to be developed and implemented, the concept of those programmes remains hazy and administrative capacities are weak. Second, in the R&D financing measures (for example, investments into research infrastructure) the linkages with priorities set are being questioned (155, 158). Also, co-ordination between different measures in priority fields (addressing different bottlenecks like infrastructure, human resources, curricula development, etc.) should be addressed.

## ANNEX B – CLASSIFICATION OF INNOVATION POLICY AREAS, INSTRUMENTS AND BENEFICIARIES

Policy area	Short description
Innovation friendly environment	<p>This category covers a range of actions which seek to improve the overall environment in which enterprises innovate, and notably three sub groups:</p> <ul style="list-style-type: none"> <li>• innovation financing (in terms of establishing financial engineering schemes, etc.);</li> <li>• regulatory improvements and innovative approaches to public services and procurement (this category could capture certain e-government investments related to provision of services to enterprises);</li> <li>• Developing human capital for the knowledge economy. This category will be limited to projects in higher education aimed at developing industry orientated courses and post-graduate courses; training of researchers in enterprises or research centres.</li> </ul> <p>The category also covers initiatives geared towards improving governance capacities for innovation and knowledge policies (e.g. specific technical assistance funding, support for regional foresight)</p>
Knowledge transfer and support to innovation poles and clusters	<p>Direct or indirect support for knowledge and technology transfer:</p> <ul style="list-style-type: none"> <li>• direct support: aid scheme for utilising technology-related services or for implementing technology transfer projects, notably environmentally friendly technologies and ITC;</li> <li>• indirect support: delivered through funding of infrastructure and services of technology parks, innovation centres, university liaison and transfer offices, etc.</li> </ul> <p>Direct or indirect support for creation of poles (involving public and non-profit organisations as well as enterprises) and clusters of companies</p>

	<ul style="list-style-type: none"> <li>• direct support: funding for enterprise level cluster activities, etc.</li> <li>• indirect support through funding for regrouping R&amp;D infrastructure in poles, infrastructure for clusters, etc.</li> </ul>
Boosting applied research and product development	<p>Funding of “Pre-competitive development” and “Industrial research” projects and related infrastructure. Policy instruments include:</p> <ul style="list-style-type: none"> <li>• aid schemes for single beneficiaries or groups of beneficiaries (including IPR protection and exploitation);</li> <li>• research infrastructures for non-profit/public organisations and higher education sector directly related to universities.</li> </ul> <p>Any direct or indirect support for the creation of innovative enterprises (spin-offs and start-ups)</p>

Instruments	Short description
Infrastructures and facilities	<p>Building and equipment for laboratories or facilities for university or research centres,</p> <p>Telecommunication infrastructures,</p> <p>Building and equipment for incubators and parks for innovative enterprises</p>
Aid schemes	<p>Grants and loans for RTDI projects</p> <p>Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises</p>
Education and training	<p>Graduate and post-graduate University courses</p> <p>Training of researchers</p>

Beneficiaries	Short description
Public sectors	<p>Universities</p> <p>National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc..)</p> <p>Public companies</p>
Private sectors	<p>Enterprises</p> <p>Private research centres</p>
Others	NGOs
Networks	<p>cooperation between research, universities and businesses</p> <p>cooperation between businesses (clusters of SMEs)</p> <p>other forms of cooperation among different actors</p>

## ANNEX C – CATEGORISATION OF EXPENDITURE TO BE USED FOR CALCULATING EU COHESION POLICY RESOURCES DEVOTED TO INNOVATION

FOI Code	Priority Theme
	<b>Research and technological development (RTD), innovation and entrepreneurship</b>
01	R&TD activities in research centres
02	R&TD infrastructure (including physical plant, instrumentation and high-speed computer networks linking research centres) and centres of competence in a specific technology
03	Technology transfer and improvement of cooperation networks between small businesses (SMEs), between these and other businesses and universities, postsecondary education establishments of all kinds, regional authorities, research centres and scientific and technological poles (scientific and technological parks, technopoles, etc.)
04	Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)
05	Advanced support services for firms and groups of firms
06	Assistance to SMEs for the promotion of environmentally-friendly products and production processes (introduction of effective environment managing system, adoption and use of pollution prevention technologies, integration of clean technologies into firm production)
07	Investment in firms directly linked to research and innovation (innovative technologies, establishment of new firms by universities, existing R&TD centres and firms, etc.)
09	Other measures to stimulate research and innovation and entrepreneurship in SMEs
	<b>Information society</b>
11	Information and communication technologies (access, security, interoperability, risk-prevention, research, innovation, e-content, etc.)
12	Information and communication technologies (TEN-ICT)
13	Services and applications for the citizen (e-health, e-government, e-learning, e-inclusion, etc.)
14	Services and applications for SMEs (e-commerce, education and training, networking, etc.)
15	Other measures for improving access to and efficient use of ICT by SMEs
	<b>Human capital</b>
74	Developing human potential in the field of research and innovation, in particular through post-graduate studies and training of researchers, and networking activities between universities, research centres and businesses