



Evidence-based Cohesion Policy and its role in achieving Europe 2020 objectives

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**NATIONAL
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for Poland's development



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Every opinion and conclusion presented in the report are the exclusive responsibility of the author(s), and do not necessarily reflect the opinion of the Presidency.

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Abbreviations:

ALMP - Active Labour Market Policy
CBA - Cost-Benefit Analysis
CF - Cohesion Fund
CIS - Community Innovation Survey
CIVITAS - City-VITALity-Sustainability
COH MS - Cohesion Member State
CSP - Concentrated Solar Power
CUTE - Clean Urban Transport for Europe
DCT - Deepwater Container Terminal
DG - Directorate-General
EAP - Environmental Action Plan
ECEC - Early Childhood Education and Care
EEA - European Environment Agency
EEA - European Economic Area
ERDF - European Regional Development Fund
ERTMS - European Rail Traffic Management System
ESF - European Social Fund
ESPON - European Spatial Planning Observation Network
ETAP - Environmental Technologies Action Plan
EU - European Union
EU-12 - New EU Member States: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia
FUA - Functional Urban Areas
GDP - Gross Domestic Product
GHG - Greenhouse Gas
HGV - Heavy Goods Vehicle
HSR - High Speed Railways
ICT - Information and Communication Technology
ISPA - Instrument for Structural Policies for Pre-Accession
ITS - Intelligent Transport Systems
LCA - Life-Cycle Assessment
LPG - Liquefied Petroleum Gas
LTL - Lithuanian Litas
MCA - Multi-Criteria Analysis
NEG - New Economic Geography
NON COH MS - Non-Cohesion Member States
OECD - Organisation for Economic Co-operation and Development
PATHE - Patras-Athens-Thessaloniki-Evzoni Transport Corridor
PEIT - Plan Estratégico de Infraestructuras y Transporte
PP - Priority Project
PSM - Propensity Score Matching
RIS - River Information Services
R&D - Research and development
R&TD - Research and Technology Development
RTDI - Research, Technological Development and Innovation
SCGE - Spatial Computable General Equilibrium
SESAR - Single European Sky ATM Research
SME - Small and Medium Enterprises
SWOT - Strengths, Weaknesses, Opportunities, Threats
TEN-E - Trans-European Energy Networks
TEN-T - Trans-European Transport Networks
TGV - Train a Grande Vitesse
TTC - Third Tagus Crossing
WFD - Water Framework Directive 2000/60/EC
VC - Venture Capital
VOC - Vehicle Operating Costs

Executive Summary

The synthetic overview of the main results of meta-analysis provides us with some of the most important horizontal conclusions which have also been well founded in many prior analysis and evaluation studies.

Evaluation results demonstrate that **thematic concentration allows for an increase in the effectiveness** of public intervention by reaching a **critical mass** which has a real impact on the socio-economic situation of the country and respective regions. Gathered evidence proves that thematic concentration is the best way to deliver the added value of public intervention within Cohesion Policy. Policy concentration means not only the choice of a few most important core strategic priorities but also **the need to concentrate on the most effective and efficient policy instruments to deliver intended results.**

A range of intervention measures implemented in the form of **complementary and precisely directed packages of public goods and services on all policy levels** (for example integrated projects at the lowest level of the CP implementation) is a precondition for achieving effectiveness and efficiency of Cohesion Policy. Evaluation studies demonstrate that traditional sectoral understanding of socio-economic problems and challenges creates an **inefficient policy segmentation**. Evidence from evaluation also indicates that **integrated interventions must be tailored to places**. Cohesion Policy intervention is less effective where specific territorial potential and problems are not taken into account. The **sustainability of Cohesion Policy effects is enhanced when interventions (both ERDF and ESF instruments) are implemented in accordance with an overall strategic vision.**

One of the most important lessons drawn from the process of policy evaluation shows that effectiveness and efficiency of Cohesion Policy is **closely related to the quality of other national and European public policies**. **Better coordination** between policies (for example with the Common Agriculture Policy) and **structural reforms** within the main strategic areas of public policies intervention are the key factors determining the success of Cohesion Policy and EU 2020 implementation.

It should be emphasized that despite the system barriers identified throughout the evaluation process **Cohesion Policy and its system of governance can be treated as a good practice for other national and European policies (especially in the EU-12)**. Ex post evaluations indicate **many types of spill-over effects** in this area. Methods of governance and standards specific to the Cohesion Policy (monitoring, evaluation, partnership, multi-level governance etc.) **may be applicable in the process of delivering policy objectives under EU 2020 strategy implementation**. Nevertheless there is still room for improvements particularly in shifting towards a more result-orientated Cohesion Policy model.

Gathered evidence proves that **European Cohesion Policy brings economic benefits for the entire European Union**. Economic growth triggered by structural funds in beneficiary Member States translate into **positive socio-economic effects (not sensitive to financial crises) for other Members States**.

The results of this meta-analysis, *“Evidence-based Cohesion Policy and its role in achieving Europe 2020 objectives”*, which attempts to utilize evaluation findings from different EU countries allows the formulation of many useful thematic conclusions for the Cohesion Policy. The most important may be treated as a **source of knowledge for those who will be involved in the programming of future Cohesion Policy** and it may be an **inspiration for choosing the appropriate policy mix with the principle of flexibility** (relevant to potential, challenges and the socio-economic situation).

- It is important to remember, that **although Europe is likely to experience a policy shift to a wider use of financial engineering measures and indirect measures, the choice of the remedy must correspond to the problem.** Therefore also in the **future enterprise support will need a broad range of both direct and indirect cohesion policy measures.**
- Although there is no evidence of a general superiority of repayable support (e.g. financial engineering) versus non-repayable support (grants and loans) – or vice versa – it seems that **non-repayable support is more effective for innovative, R&D intensive projects far from the market, while financial engineering is more appropriate when a lack of private financing is due to financial market failure and not an asymmetry of information.** The risk involved in innovative activities, and particularly in R&D activities, sometimes cannot be resolved by repayable support alone. Such barriers should be addressed by non-repayable forms of support also in the future.
- On the other hand much support from current structural funds in the form of non-repayable grants could and should be given in the form of loans and other repayable support measures. This includes especially support for investment projects, when not the risk, but financial market failure alone is the most important barrier for an entrepreneur. Financial engineering measures proved to be effective in supporting SMEs (in both innovative and non-innovative activities), but underestimation of **legal and organisational complexity of venture capital and loan funds is a common problem.**
- The “innovation system” approach proves that to enhance innovativeness and competitiveness of the economy also **indirect support, influencing the business environment, is important.** This is particularly important in case of services for SMEs, but the evidence shows that in indirect support a bottom-up approach is crucial – that is support **should be designed and granted in line with the existing, specific needs and potentials of the beneficiaries.**
- **Public research organisations (universities and various institutes) are crucial counterparts for companies in the innovation system;** at the same time their effectiveness in generating relevant innovations differs across countries and sectors. **Cohesion policy at national and regional level should play an important but supplementary role (to the EU and national policies) by enhancing cooperation as well as stimulating research activities.**
- Human capital is a crucial factor for productivity growth and innovativeness of the economy. Most measures of cohesion policy affect the business environment indirectly in this regard (i.e. increase of human capital is achieved mostly thanks to the policies within the educational and training system), but enterprises play an important role in lifelong learning programmes and increasing the adaptability of workers. **Smart growth needs therefore a strong focus on human capital.**
- **Modern transport¹ connections in metropolitan areas accelerate the diffusion of knowledge between the inner city and its suburbs and hinterland.** Providing an easy, effective and comfortable access to the metropolitan areas from their hinterland **is crucial for smart growth. Construction of bypasses is needed,** taking into account the increase of car ownership, in particular in the EU-12 states. Investments in **roads leading out of towns and improving railway connections lead to better access for people commuting daily within the metropolitan areas.** A balanced polycentric urban system cannot work without a modern freight transport network. The huge increase of traffic in the EU-12 states is the best explanation for the need for hard infrastructure. **There is no smart growth without opportunities to travel quickly and safely by air.** Cohesion Policy should aim at improving the access to airports, by rail in particular. Young people from all around Europe should have a chance to be ‘on the move’.

¹ The role of transport within the EU 2020 strategy is not particularly highlighted. However, directly and indirectly, transport infrastructure contributes in many different ways to smarter, more sustainable and more inclusive growth. Modern transport connections in the metropolitan areas of smart growth accelerate the diffusion of knowledge between the inner city and its suburbs and hinterland. Sustainable transport promotes a more resource efficient and greener economy. Last but not least, transport networks deliver territorial cohesion making the growth more inclusive. It is worth to mention the overarching goal of the Common Transport Policy which is: *the promotion of an efficient, sustainable, safe and secure transport system capable of enabling trade and mobility (smart growth) whilst minimizing costs for users and society as a whole (inclusive growth) and its key objectives: a competitive internal market for the provision of transport services, support for investment in prioritized transport facilities, improved safety and security and environmental sustainability (sustainable growth).*

- **Environmental, energy and sustainable transport projects funded under Cohesion Policy can have a significant contribution to the development of a sustainable European economy which uses its resources in an effective way.** Many of the hitherto supported projects have had a significant direct or indirect impact on the more rational use of resources, energy conservation, energy efficiency, the reduction of CO₂ emissions and the enhancement of ecosystem services.
- Eco-efficiency, cost-effectiveness and often also the feasibility of particular solutions that are highly dependent on regional conditions. Decisions **regarding the selection of forms of support are dependent on regional conditions and should therefore be taken at the level of individual Member States.**
- Part of the activities implemented in the period 2000-2006 under Cohesion Policy were characterized by equally high ecological and economic efficiency. A significant barrier to the widespread implementation of green technologies was **the limited spread of knowledge about the economic benefits.** Decisions regarding the selection of forms of support should be based on the most recent empirical data and forecasts of the effectiveness of available options. It is advisable to use different support mechanisms depending on the degree of relevance and viability of individual activities.
- The **most effective and desirable forms** of stimulating the broad implementation of green technologies in the case of high-yield activities seem to be: **financial support for demonstration projects (the effect of promotion and incentives), wide dissemination of knowledge about the most effective solutions, proactive advisory support, stimulating various forms of cooperation in the field of environmental technology, support mechanisms for investment lending and stimulating demand for green technologies.**
- In the period 2000-2006 a strong sectoral approach was observed. Projects contributed to the objectives of environmental policy but had a limited effect on the generation of beneficial effects in other fields. **Projects with a comprehensive and integrated approach to solving the problems identified had a greater impact on maximizing effects in different areas of activity.** Beneficiaries showed little ability to generate large and comprehensive projects.
- Methods up to now to stimulate integrated and complementary projects have proven to be ineffective. In some areas, **moving away from funding independent projects should be considered. More support should be given to the implementation of integrated, spatially concentrated programmes.**
- A substantial part of the discussion on the contribution of Cohesion Policy to the environment, energy and transport objectives of the Europe 2020 strategy **should include the development of effective support mechanisms for the preparation and execution of comprehensive projects.** Member States should place greater emphasis on the development of dynamic institutions. The lack of an adequate preparation and implementation strategy may cause the ambitious goals of the EU 2020 strategy to collide with the realities of the beneficiaries' limited capacity to generate comprehensive and innovative projects.
- **Railways are environmentally-friendly and must be developed more speedily.** The share of rail in intra- and inter-metropolitan passenger traffic and long distance freight should be increased. However, a railway renaissance will not be successful without the careful evaluation of demand. Urban public transport is essential for a city to function properly on a daily basis. **Tram, light rail, the metro and ecobuses are environmentally friendly and should receive more attention.**
- **The introduction of intelligent transport systems makes urban life run in a smart way.** Policy measures **should aim to decrease overall reductions in emissions rather than specific modal shift.** Particular attention should be paid to the promotion of renewable and alternative transport energy sources like biofuels and private vehicles' design improvements. Intelligent transport systems (ITS) are crucial for many modes. In metropolitan areas, where noise and traffic concentration is at its highest, ITS are of special importance for a "resource-efficient Europe".
- **Inland waterway transport, being a safe, efficient and environmentally friendly transport mode, can be a driver to sustainable growth.** Inland barges and railways should have **better access to seaports.** The intermodal ship-to-rail transfer of containerised cargos is **not possible without modern railway linkages.** **Improving access to seaports by rail should be treated as a priority for both Cohesion Policy and 'industrial policy for the globalisation era'.**

- Within the Europe 2020 framework, **Cohesion Policy should provide actions aimed at higher employment rates, improved skills and lower poverty**. Investments in skills are also crucial to achieve the strategy's first and second priority, i.e. enhanced innovation and competitiveness.
- The reviewed evidence suggests that in the field of human capital, **interventions concentrated on early childhood are the most cost effective and the most needed**, as they translate into higher employment, lower school drop-out rates and lower poverty. Reducing early drop-out rates from education may be helped by designing pathways to employment and individual learning plans. In vocational education combining specific education with apprenticeships offering on-the-job training facilitates school to work transitions.
- Conclusive evidence on the effects and returns to training is limited, though **training schemes appear to work well if they address local and regional labour market needs and if they are well tailored to the particular group's needs and abilities; they are also more effective if they provide a certification**. **Public sector sponsored training appears to be mostly ineffective**, especially for men and young people, at least in the short run. Training provided for the unemployed appears to boost overall employment, in particular among women; though they are likely to be less effective in the short run. Positive employment effects also appear once they include a strong on-the-job component.
- Employment subsidies appear to bring positive results, in particular **if they are short, well targeted at people on the margins of the labour market and provided in an integrated package of services**. Grants to start self-employment may be an effective way of helping the jobless to exit unemployment, in particular for disadvantaged groups. Start up support programmes are more effective if designed as a place-based policy, well tailored to the local market needs.
- **Job search assistance is one of the most cost effective ways of increasing employment**. It yields better results if it is targeted at those with shorter unemployment spells. It may also prove more effective for women and the young people. Individual approaches and personalised actions improve job search assistance efficiency and it may work better if accompanied by monitoring and sanctioning components. The skills of the service providers are also important, as is cooperation with other stakeholders.
- **Subsidising transport costs, mobility allowances for travel to work and/ or relocation and accommodation costs may promote job mobility**, in particular an increase in commuting, hence lowering the spatial dimension of labour market mismatches. Improvements in job quality, including working conditions, translate into higher productivity.
- **Support to take up a job is the most effective way of lifting people out of poverty and in-work benefit schemes appear to be an effective instrument in this respect**, though actions targeted at vulnerable groups need to be more complex and comprehensive. ALMPs appear to be a less effective tool in countering unemployment and social exclusion of the young people than measures in the area of education. Older workers will need flexible working hours and improved training participation. Approaches integrating rehabilitation, education, job search assistance and some work elements tend to be the most effective way of helping disabled people into work.
- **Transport infrastructure investments have important implications for territorial cohesion** and accessibility in countries where the transport network is limited and fragmented. Accessibility analysis shows the effects of transport investments on territorial cohesion in peripheral and rural areas and gives some important recommendations for transport policy. At the European level it is clear **that improving the accessibility of Romania, Bulgaria, the Baltic States and north-eastern Poland is the highest priority**. For measurement of inclusive growth, the provision of minimum standards of services of general interest, including availability of public transport should also be taken into account. **Moreover, low cost public transportation has a positive influence on inclusive growth**.

Introduction

The adoption of the *Europe 2020* strategy established a new framework for implementation of Cohesion Policy. **Cohesion Policy may and should make a significant contribution to the implementation of the EU 2020 strategy and its objectives.** Most of the Cohesion Policy intervention areas are aligned with the new strategy priorities and objectives. The key question is: what is the real logic of implemented interventions and how do they influence **positive socio-economic changes** - especially in the context of EU 2020 goals? The future Cohesion Policy should be much more strongly focused on the change at which it is aimed. The essential role of evaluation is to deliver knowledge. Knowledge which enables us to build the **appropriate theory of change** at the programming stage (what needs to be changed and how to achieve it) and then to verify **the real contribution of the intervention to observed and intended changes.** The present document is an attempt to deliver such knowledge by providing evaluation evidence on effectiveness and efficiency of different types of interventions implemented to date within Cohesion Policy which are coherent with the objectives of Europe 2020. In this respect:

The main aim of the report is to further explore the available evaluation findings in order to initiate evidence-based debate on how the future Cohesion Policy may contribute to the successful implementation of the *Europe 2020* strategy.

The document utilizes evaluation findings from different EU countries in order to draw more general conclusions. The purpose of this paper is not to deliver guidelines with firm recommendations but **to foster a high-level discussion** on the basis of the conclusions drawn in the report. The report may also be treated as a source of knowledge for those who will be involved in the programming of future Cohesion Policy and it may be an inspiration for choosing the appropriate policy mix with the principle of flexibility (relevant to territorial potentials, challenges and socio-economic situations).

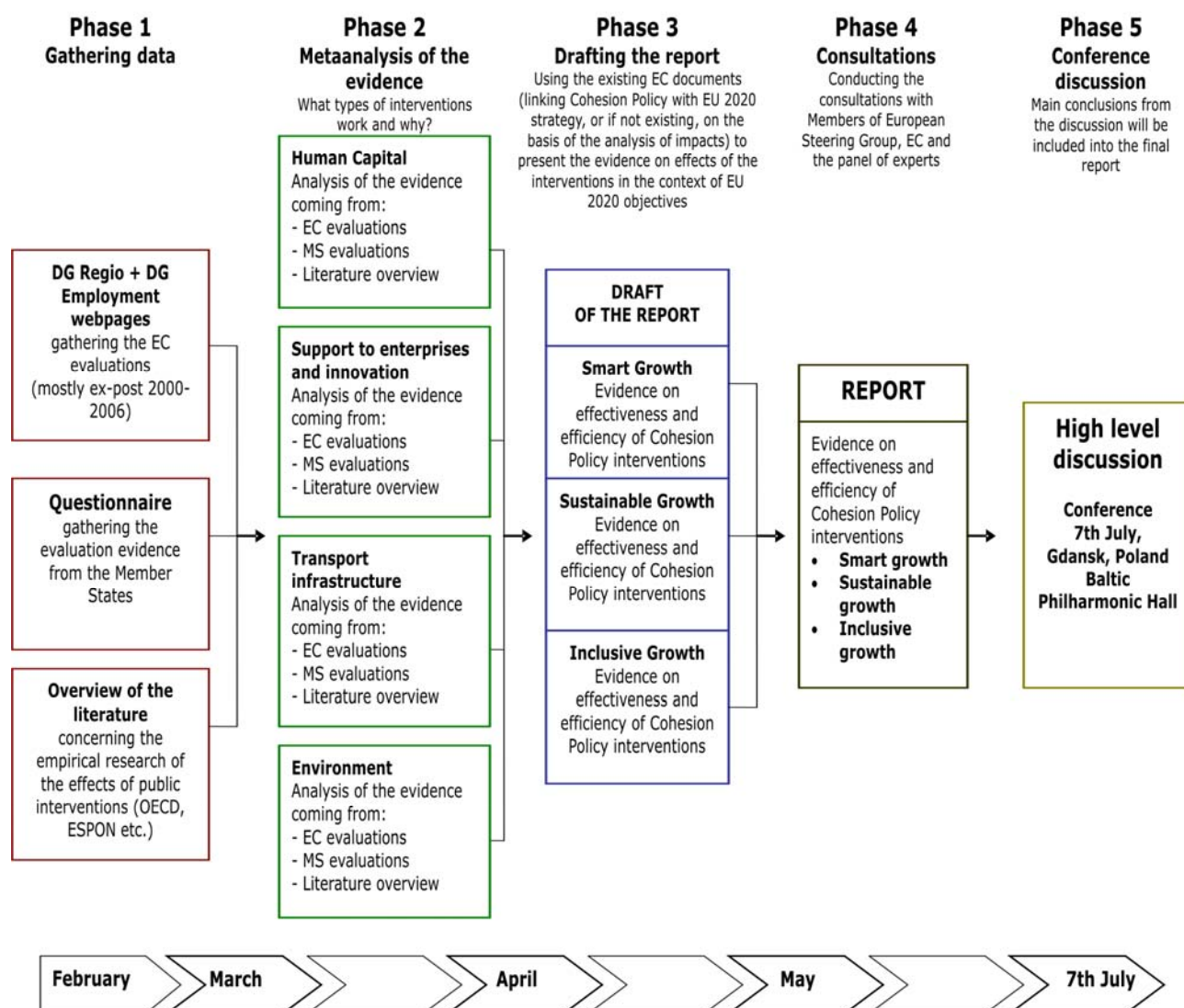
It should be noted that some important areas of intervention are not mentioned in the report and this cannot be perceived as a full picture of role of Cohesion Policy in Europe 2020 implementation. Conclusions have been formulated only if credible evidence was available. Also the synthetic nature of the document created some limitations in this respect. Where there was a lack of evaluation evidence, the analysis was supplemented by findings from other empirical studies which should be treated as a credible source of information for the Cohesion Policy.

Results of the evaluation process are presented in the report in line with the three main priorities of the EU 2020 Strategy: smart, sustainable and inclusive growth. The *Executive Summary* includes also the most important horizontal lessons learned based on the synthetic overview of the gathered evidence.

Methodology

In order to prepare this report, the Polish Ministry of Regional Development initiated the research process. For this purpose **meta-analysis of evaluation and other empirical studies** (from the European Commission and Member States) was conducted by a team of external experts. Because of a lack of visible long-term effects of 2007-2013 period interventions, analysis has been mainly concentrated on evidence from the 2000-2006 period (with some credible evidence from the 2007-2013 perspective). Below the logic model for the preparation of the report is presented.

LOGIC OF THE EVALUATION



The basic data source for the analysis was a **questionnaire completed by Member States**. Almost all EU countries (**24 countries**) contributed to the project by sharing their most important evidence concerning the effectiveness and efficiency of Cohesion Policy intervention. In this regard more than one hundred evaluations have been used.

In order to ensure the whole process maintained a high level of quality and to take into consideration different perspectives, a **Steering Group** composed of the representatives of Member States (Austria, Bulgaria, France, Hungary, Italy, Latvia, Lithuania, Slovenia) and the European Commission was set up.

1. Cohesion Policy and „Smart growth“ within the EU2020 strategy – remarks and conclusions

1.1. “Smart growth” within the EU 2020 strategy

Smart growth, defined as developing an economy based on knowledge and innovation, is one of three priorities of the Europe 2020 strategy. The strategy underlines that **knowledge and innovation should be the drivers of future European growth**. There is no doubt that productivity and innovativeness are the most effective, long term solutions to European problems – macroeconomic standstill and rising demographic challenges. Europe 2020 recognises that Europe already has to challenge several macroeconomic and structural weaknesses that prevent Europeans from utilising their full innovative potential. At the same time the strategy identifies and covers a broad range of bottlenecks and structural problems which limit the innovativeness of Europe, thus making both smart growth difficult and average growth rates low. These limitations are of a different nature and occur in various areas, but **Europe 2020 calls for action in three major areas:**

- increase of R&D spending in Europe and better conditions for private sector R&D;
- better education, training and lifelong learning;
- development of digital society.

These three areas are to be addressed by flagship initiatives: “Innovation Union”, “Youth on the Move” and “A Digital Agenda for Europe”. Within the initiatives, as well as in the Commission’s communication “Regional Policy contributing to smart growth in Europe 2020”, a number of aims to achieve the goals of smart growth were outlined. Much has to be done at institutional, legal and organisational levels. The European Union will play an important role in this regard, setting new regulations, creating a better legal environment for innovation and intellectual property and better rules for scientific cooperation and education. At the same time Europe 2020 identifies significant barriers preventing smart growth, which can be overcome only with the help of cohesion policy. The main areas for intervention foreseen for cohesion policy in the next programming period have been proposed recently by DG Regional Policy and DG Employment:

- strengthening research and technological development;
- promoting innovation and smart specialization;
- enhancing accessibility, use, and quality of information and communication technologies;
- strengthening SME competitiveness;
- improving the quality and performance of education and the training system at all levels and increasing participation in tertiary or equivalent education.

It is not certain how these areas will translate into the praxis of cohesion policy in the next programming period. **Europe 2020 moves us away from a sector approach, at the same time it does not provide clear demarcation between specific measures of sector policies.** Therefore the following chapter discusses the measures supporting innovation (both through strengthening innovation of enterprises – including SME – and research performance).

As spatial effects are important both for smart growth and the design of cohesion policy, the importance of improving access to metropolitan areas, interagglomeration accessibility as well as the role of metropolitan areas, and the relationship between transport and smart growth also need to be discussed. Staffan Nilsson, President of the European Economic and Social Committee had highlighted that: *We need to maintain our metropolitan areas as “motors of growth” and maintain them capable of remaining competitive at the highest levels in a global economy. We need to ensure that growth in urban areas is spread evenly and equitably within them, and also reaches out to their surrounding regions. (...) Major issues still remain in areas such as **infrastructure**, R&D investments, and, crucially, innovation².* Therefore the discussion about upgrading transport facilities and networks in the metropolitan areas and between them meets the needs of smart society in the best possible manner.

Better education, training and lifelong learning are also crucial for smart growth. In this chapter their role for smart growth is discussed, while evidence for the particular measures of support is discussed in detail in Chapter 3.

² Speech by Staffan Nilsson, President of the EESC at 5th Cohesion Forum in Brussels: “How to Align EU Cohesion policy with EU 2020?”, Thematic Workshop on “Inclusive Growth”, 31.01.2011.

1.2. Business innovation support

Productivity is the **decisive factor behind the long term per capita growth**. Developed economies have achieved high levels of welfare thanks to gradual improvements of productivity due to new technologies as well as know-how and organisational developments. Business innovation and competitiveness are indispensable for economic success and the fulfilment of Europe 2020 smart growth goals. This chapter will focus on direct and indirect measures of business support – with most attention paid to the actions supporting innovativeness, as this aspect of business support seems to be the most important in the context of the Europe 2020 strategy.

There is a **convincing theoretical rationale for direct support of enterprises' innovation**. Theoretically, the main reasons for public intervention are the **asymmetry of information** (i.e. uncertainty of results, unpredictable time of return from an investment) and the **financial market failure** (both as a result of asymmetry of information and the financial sector's inability to assess innovative projects). Another important factor is that **scientific progress and knowledge in general are close to public goods** (and thus incentives for the private sector to finance scientific research – especially basic – are moderate). As a result, private financing of RTDI activities is below the level optimal for the whole economy.

In recent years, a growing amount of research suggests that the innovation process in its complexity is influenced not only on a micro level by market failures, but is **also shaped by the institutional and historical context**. Thus enterprise specific measures are not sufficient to stimulate innovation and public intervention should be aimed at the innovation system – and all of its stakeholders – as a whole.³

Business support systems includes not only innovation support measures, but also activities aimed at direct or indirect support to specific types of enterprises (like SMEs) or enterprises from a specific region or sector regardless of their impact on innovation.

All developed economies have their enterprise and innovation support systems; measures supporting innovativeness and competitiveness are also already an important part of cohesion policy, although the goals of the EU intervention were often defined very broadly.⁴ National and regional intervention in the area of business support is financed mostly by ERDF resources and covers not only innovation support, but also a broad range of other issues. Along with cohesion policy business support all European economies have their own business support systems.

Europe 2020's smart growth goal moves policy priorities towards innovativeness, which confirms the tendency observed in the ERDF expenditures during previous programming period. In the past the importance of innovation support was widely recognised, but other priorities – like job creation or the quality of employment – were equally important. In 2000-2006 more than 6 bln euro of ERDF resources were spent annually in support of enterprises, only 27 per cent of which was spent on RTDI support. Spending projected for period 2007-2013 illustrates the important policy shift: not only is the overall support for enterprises much higher (almost 11 bln euro per year), but the RTDI share is also dramatically higher ([European Commission, 2010](#)).

Figure 1.1. provides a more detailed insight into the support of enterprises in the current programming period. It is apparent that the more developed countries tend to allocate a greater share of ERDF resources to the support of enterprises. The structure of enterprise support expenditures is highly diversified, but the overall **innovation support to SMEs and RTDI and linked activities form 20 per cent of ERDF expenditures – out of 28 per cent of ERDF expenditures in support of enterprises**.

In the 2007-2013 programming period the ERDF plays an important role in supporting R&TD policy especially in the EU12 countries – in Poland, Slovakia and Latvia ERDF financing of RTDI is larger than financing from national sources; in Lithuania, Bulgaria and Estonia it goes from 60 to 99 per cent ([EC EVAL. 2010 \[1\]](#)). In the other EU12 countries and in Portugal it amounts to more than 20 per cent of national expenditures. On the other hand in the EU15 countries the cohesion policy contribution to the national innovation support systems is much lower –

³ Overview of rationales and instruments for public policies supporting innovation provides Tokalo (2009). An overview of innovation system approach is provided for example by Soete et al. (2010).

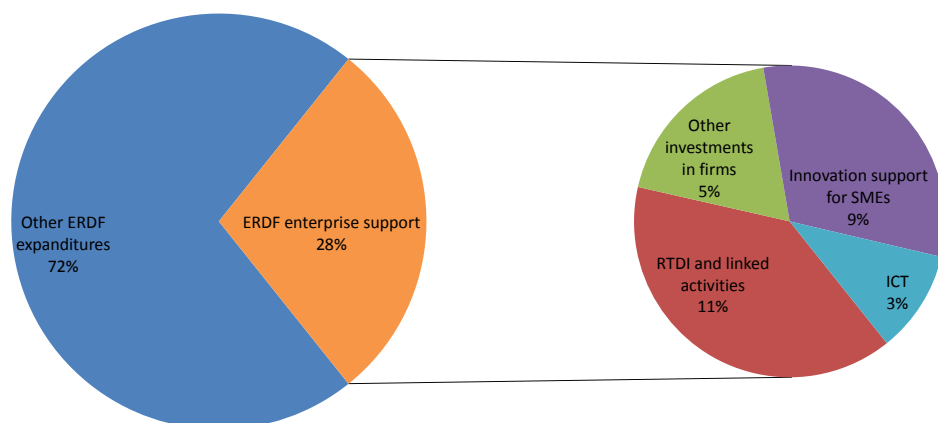
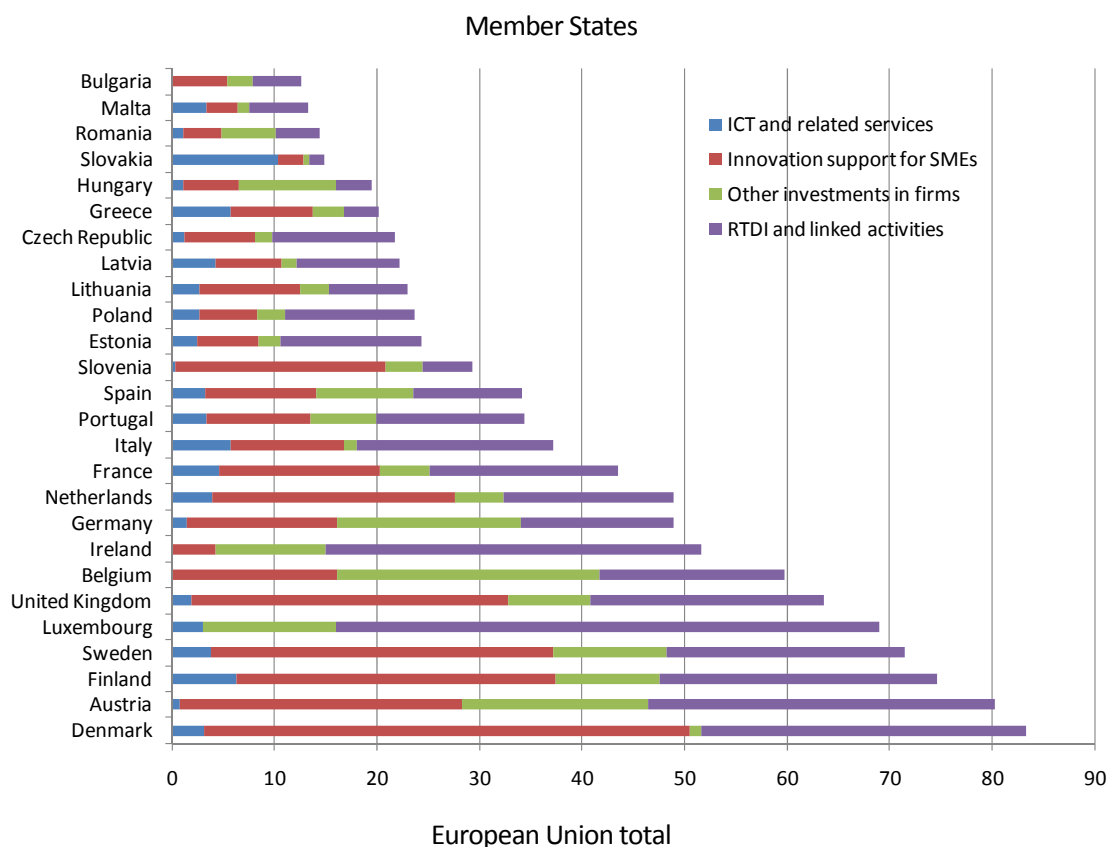
⁴ For example enterprises support programs of 2000-2006 perspective focused on increasing regional economic growth, improving the competitiveness of enterprises and regions and increasing and stabilizing employment – in case of regional programs. Innovation support was one of the main objectives of some of the national programs ([EC EVAL. 2010 \[1\]](#)).

partly due to the lower per capita allocation, but mostly because of higher relative and absolute public expenditures.

As demonstrated by OECD data, there are dramatic differences in the direct support of business R&D (see figure 1.2.). The data are incomplete (as not all EU members are at the same time OECD members), but shows the different role of EU financing – depending on overall EU and national expenditures.

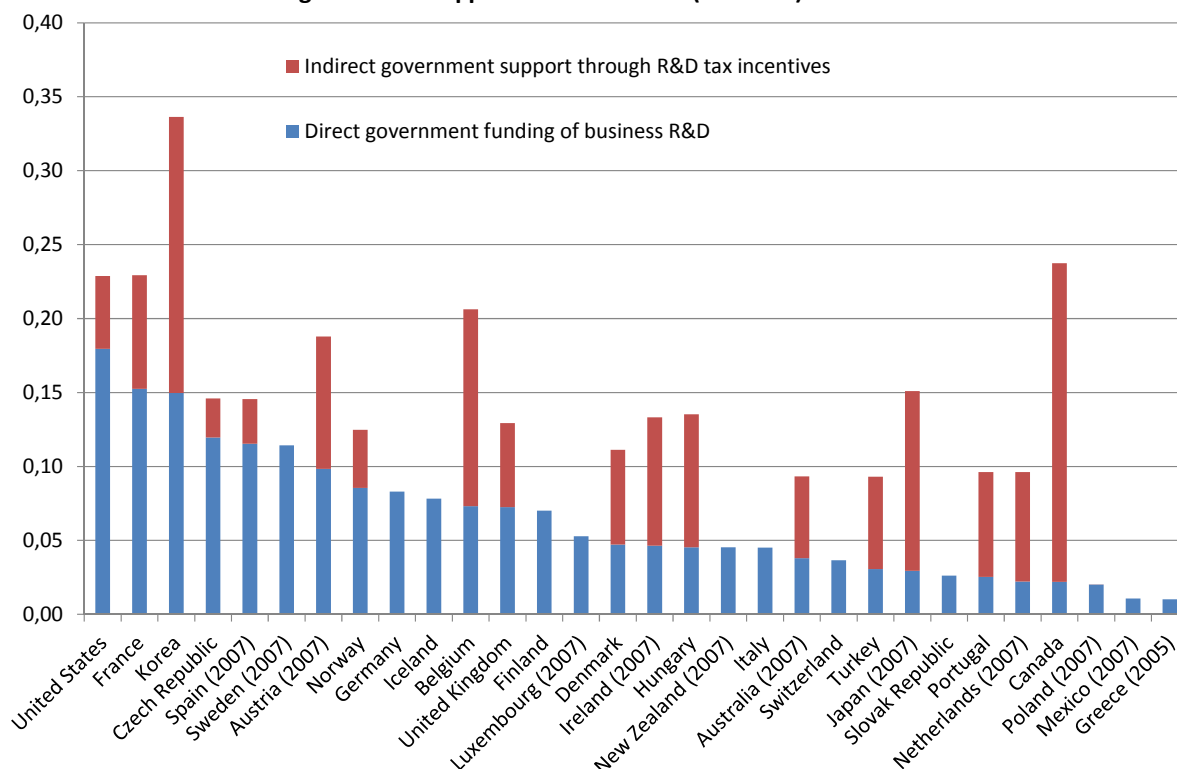
It is also important to note the great diversification of tax systems, which some of the European countries use extensively to support business R&D. R&D tax incentives are beyond the scope of this report, as they are nationally funded policies with no involvement of cohesion policy.

Figure 1.1: Enterprise support structure from ERDF (% of total ERDF allocation) under Convergence and Competitiveness goals in the programming period 2007-2013 (as for 2009).



Source: EC EVAL. 2010 [1], Table A.2. and A.3., numbers presented are subtotals of “Total enterprise support” category.

Figure 1.2: Direct and indirect government support of business R&D (% of GDP) in 2008



Note: The estimates of R&D tax expenditures do not cover sub-national R&D tax incentives. The Austrian estimate covers only the refundable research premium. The estimate for the United States covers the research tax credit but excludes the expensing of R&D. Italy, Greece and Turkey offered R&D tax incentives in 2008, but estimates of the foregone tax revenues are not yet available. Claims under the French R&D tax scheme totalled EUR 4.2 billion in 2008 (or 0.21 per cent of GDP), but France's scheme allows carry-forwards and a 3-year lag before total refunds of unused credits, and because the tax credit was much lower until 2007, only EUR 1.5 billion (or 0.08 percent of GDP) is registered as government forgone tax revenue in the above figure.

Source: OECD (2010)

Europe 2020 recognises that innovation and productivity growth are the ultimate way to create growth and jobs. Focus on smart growth and innovation support should be the way to use the scarce resources of cohesion policy in the most effective and productive way. The exact shape of business support in the future cohesion policy is not known at the moment, but it seems that in the smart growth priority **Europe will focus on innovation and smart specialisation, so the share of RTDI support expenditures should be at least not lower than in the 2007-2013 programming period.**

This subchapter examines the effectiveness of different measures of spending on enterprises support, with special focus on innovation support. Innovation and enterprise support is an important and lasting part of public policy both at the European and national level, thus a vast empirical evidence on the effectiveness of different measures is available. Support to introduction and development of information and communication technologies by companies is one of the important goals of direct support – and as in this report a broad perspective of types of intervention is taken, ICT support is not discussed separately.

Direct support

Direct support includes direct financial aid to enterprises⁵ in a form of grants or loans or equity-based instruments (the two former usually with the mediation of an external financial institution or specialised agency). The most likely areas of intervention for direct measures within the Europe 2020 cohesion policy are:

- Private R&D and innovation infrastructures;
- Assistance to R&D activities in SMEs;

⁵ In innovation support research, non-for-profit institutions (both public and private) may be recipients of grants – which is discussed in subchapter 1.3.

-
- Assistance to R&TD activities in large companies;
 - Direct support to spin offs, spin outs and new technology based firms;
 - interregional cooperation to promote research and innovation.

An important distinction between the types of direct support is also the nature of process to be supported. For RTD based innovation, the range of potential market failures is much broader than for adaptive innovation. On the other hand, in non-innovative SMEs support, the type of market failures addressed and the policy goals are different than for innovative support. Therefore, it is very important to distinguish between:

- support to R&TD driven innovation and R&TD activities;
- support to adaptive innovation (especially technology absorption based on investment);
- support to innovative or non—innovative start-ups (including equity-based instruments);
- support not inducing innovation (usually investment support to SMEs).

The choice of measure has to depend on the failure to be addressed, expected outcomes as well as other factors specific for a given country or region. The scope of the intervention depends on the economic situation in the country or region. According to the above indicative list of areas of intervention, direct support under Europe 2020 is likely to concentrate on innovative support and SMEs support.

The effectiveness of support should be measured on the basis of additionality. In evaluation the following categories of additionality are used ([here described as by Boekholt, 2002](#)):

- input additionality (public innovation support enhances private spending innovation),
- output additionality (results of innovative projects are better with public support than without it)
- behavioural additionality (public support modifies company behaviour - i.e. innovative projects are larger or started earlier thanks to the support).

Negative effects of direct, non-repayable support, opposite to the additionalities, are deadweight loss (when the support was not necessary for the beneficiary to complete the project) and displacement effects (when beneficiaries carry out projects at the expense of non-beneficiaries).

The evidence of the effects of non-repayable forms of support strongly depends and the aims of the support – programme aimed at R&TD and innovation produces significantly different outcomes than investment support programme.

In both cases studies prove, that firms receiving financial, non-repayable support tend to achieve better financial results and higher dynamics of incomes and employment than companies without support. This result of support is often impressive and on the European scale it aggregates to large numbers, for example evaluation studies of the previous programming period showed **that between 2000 and 2006 the overall number of supported companies in the 30 largest programmes reached 804 000 and 625 000 gross jobs were created** ([EC EVAL. 2010 \[2\]](#)).

The conclusion is that direct support is often very successful in terms of meeting the targets set by the indicators, especially in terms of investment and employment. At the same time the simple fact of meeting the output indicators does not mean that intervention outcomes are positive in terms of additionality.

Input additionality is one of the most commonly measured indicators of effectiveness for R&D direct non-repayable support – that is, determining if public support increased or decreased private spending on R&D. In general, most the studies confirm that **public R&D support is not crowding out private expenditures and thus induce input additionality**. For example a study of Belgian subsidies' beneficiaries showed that they tend not only to increase their private R&D expenditures, but also increase intensity of R&D activities ([Aerts and Czarnitzki, 2004](#)). Another study on a sample of Italian manufacturing firms showed positive input additionality also related to the greater credit financing for R&D activities in companies receiving subsidies ([Carboni, 2008](#)).

At the same time the effects vary significantly and depend on both the firm and region characteristics.

Larger firms tend to face smaller liquidity constraints as SMEs, thus intuitively should be able to finance their RT&D activities – and in fact usually they tend to secure internal financing of such activities. **On the other hand, SMEs have a more difficult access to external financing, lower liquidity and might face significant barriers in undertaking their own research.** Depending on the scale of the resources needed, the stage of the company

development and business environment, the external capital might be inaccessible or available at much higher cost than for larger companies.⁶

There is significant empirical evidence, that **input additionality of R&D subsidies is significant for SMEs, while for larger companies crowding out of private financing may counteract positive effects**. For example, a study on a large sample of Swedish firms showed that R&D subsidies on average significantly increased per employee R&D expenditures (also when controlling for firm characteristics) in smaller companies (up to 50 employees), without input additionality for larger companies (Löf and Heshmati, 2005). Positive impact of R&D support has been confirmed also in Germany for small and medium companies, but the same study suggests that support for large firms is likely to substitute private expenditures (Czarnicki and Fier, 2002). This was also confirmed by the Belgian experience, **where a positive impact of subsidies on R&D by SMEs has been found**, with mixed evidence of impact on large companies (Meeusen and Janssens, 2001). Further studies of this phenomenon indicates that **in case of subsidies for large Belgian firms substitution is apparent** (Suetens, 2002).

The study of Italian firms based on CIS (Community Innovation Survey) data showed a slightly different results. The highest input additionality was found for firms above 20 employees (including large firms) as well as firms from knowledge intensive sectors and from the southern part of the country. On the other hand crowding out appears for the low knowledge intensive service sectors, for small firms and the auto-vehicle industry. The input additionality for larger firms was to national regulations – namely the inclusion of the “additionality” (Cerulli and Potì, 2008).

The study of more than 2000 Spanish manufacturing firms finds that R&D subsidies are potentially effective, but most of the supported companies would have performed innovative activities even without the public support, with the level of private financing on a very similar level – which suggests that there is no crowding out of private expenditures, however the support is inducing only minor input additionality. Again subsidies were more effective in inducing own R&D activities in small rather than in larger firms (Gonzalez et al., 2005).

There is less evidence on the importance of regional characteristics for the R&D subsidy effectiveness. Comparison of the R&D policy effectiveness in former Eastern and Western Germany finds that input additionality is significantly higher for companies from former Eastern Germany (Czarnitzki and Licht, 2005). In the above mentioned study of Italian companies, better results of support have been observed for companies from the southern part of Italy (Cerulli and Potì, 2008). On a theoretical and empirical basis it seems however that **regional circumstances matter mostly in terms of regional (or national) business environment and most notably – availability of external financing**.

The risk of innovative project is an important factor distinguishing the effectiveness of public support. A lot of evidence suggests that subsidies for R&D activities stimulate private expenditure for “far from the market projects” – **that is when the needed research effort and risk are greater** (Clausen, 2007). On the other hand, subsidies for projects “close to the market” crowd out private spending. The conclusion again is that subsidies should be directed to very innovative projects far from the commercialization phase. These results are strongly in line with the theoretical framework on the market failure rationale for innovation support.⁷

Although the importance of RTD support within ERDF is increasing, still a significant part of enterprise support takes the form of investment support. This kind of support – even if connected with a firm-level innovation thanks to, for example, new technology of production due to new machines – is significantly different than support to RTD activities. As explained above, **RTD activities are connected with significant risk – the greater the farther the product is from the market**.

For investment projects (both innovative and non-innovative), the risk involved usually does not exceed the regular risks of business activities. Therefore the rationale for public support is different than in the case of support for RTD activities. The aim of direct support for firms in the form of grants or subsidies is to increase investment and employment in lagging regions, support adaptation to changes of a specific sector or to stimulate SMEs. As such, it is to counterbalance insufficient access to capital and stimulate economic activity in less developed areas.

⁶ Complex summary of so called “funding gap” is provided in the study by Hall and Lerner (2009).

⁷ The literature is not fully consistent at this point – for example research for Flanders shows slightly different results, arguing that additionality can be observed only for development support projects and not research support (Aerts and Torwath, 2008).

In general, studies show **that investment support is successful in terms of employment growth and investment**. The European Commission's ex post evaluation of the 2000-2006 period (EC EVAL. 2010 [3]) showed, that investments per employee for treated firms in Eastern Germany were 1.4-1.5 times higher than in non-treated firms (20,400 euro compared to 7,200 euro), and around 1/3 of the increase was due to the input additionality – which means a net positive effect at the level of investments. The same research shows a significant (greater than in case of investment grants) input additionality of R&D grants and no significance of firm size for the effectiveness of the support (although the last result might be sample specific effect). The case of investment subsidies in Eastern Germany was also explored earlier (Ragnitz, 2003). The evidence shows that the level of investment is significantly higher in treated companies. At the same time it is suggested that due to the crowding-out effects in Western Germany and lower capital productivity in Eastern Germany, state aid in a form of investment subsidies should be reduced.

Evidence from Finland (in the form of a detailed microeconomic evaluation of subsidies for enterprises) suggests that **“the schemes which reallocate subsidies from developed regions to less-developed regions lower deadweight spending”**. The deadweight loss tends to be smaller for newly established companies and to decrease over time, which probably illustrates the improvement of the selection processes by the implementing authorities (Tokila and Haapanen, 2008).

The overall picture of non-repayable direct support is mixed. The additionality of evaluated programmes strongly depends on the aim of the programme, regional barriers and circumstances as well as selection procedures. The following observations appear repeatedly in the evaluations and should be considered when planning cohesion policy contribution to Europe 2020 policy goals:

- RTD support is more effective for further to the market and more risky projects comparing to the closer to the market, less risky projects;
- comparing RTD support to investment support, additionality is greater and risk of deadweight loss smaller for RTD support;
- in cross-regional comparisons both subsidies to private R&D as well as subsidies to investments in firms tend to be more effective in less developed regions;
- support is more important for SMEs, as larger firms usually are able to secure sufficient funding of their projects from internal or external sources;
- support to SMEs seems to be more effective than support to larger firms.

When comparing the effects of direct non-repayable support it seems that it is a potentially valuable instrument for stimulating smart growth in case of R&TD projects. Stimulating private R&TD and assistance to R&TD activities in SMEs should be supported in the future with the use of non-repayable support. **In case of investment support, as well as support for large companies, such instruments should be used with caution.**

Both in cohesion policy and national policies there is a growing recognition of the role of repayable measures in the direct support of enterprises: loans and equity-based instruments. As the European Commission points out: “grants to enterprise and R&D are a useful tool, but too often in the past they have been used at the expense of other instruments. The trend towards a more balanced mix, including financial engineering (loans and venture capital) as well as ‘indirect’ instruments (i.e. non-financial instruments such as advice, networking and clustering) is a welcome one.” (EC, 2010a).

The importance of repayable measures in the previous programming period was much smaller than of non-repayable measures, but they were present in most operational programmes and at least in some cases they formed a significant part of the policy intervention. What is more, **the credit crunch during the financial crisis had a positive impact on the performance of loan funds and provided additional rationale for this type of intervention** as financial markets failed to provide firms with necessary funding (EC EVAL. 2010 [2]).

Repayable instruments have significant advantages when compared to non-repayable support:

- they create strong cost effectiveness incentives to beneficiaries;
- as the support is eventually returned, the resources might be reused thus allowing support of a larger number of projects;

- the necessity to pay back the support means that the project is subject to market verification and thus risk of failure is shared by the beneficiary, which minimizes rent seeking behaviours and other negative effects and maximizes positive additionality;
- they are an effective way of overcoming liquidity constraints resulting from financial markets' underdevelopment.

At the same time **repayable support is characterised by higher legal and organisational complexity than subsidies** (which historically at least partly explains why non-repayable forms of support were developed and widely expanded before the repayable forms). The repayable support needs institutions to run the funds (either loans or venture capital funds) and select the applicants. The legal provisions are usually more complex than in the case of subsidies and managing and implementing authorities (not to mention the institutions operating the funds) are still learning how to effectively use the repayable measures.

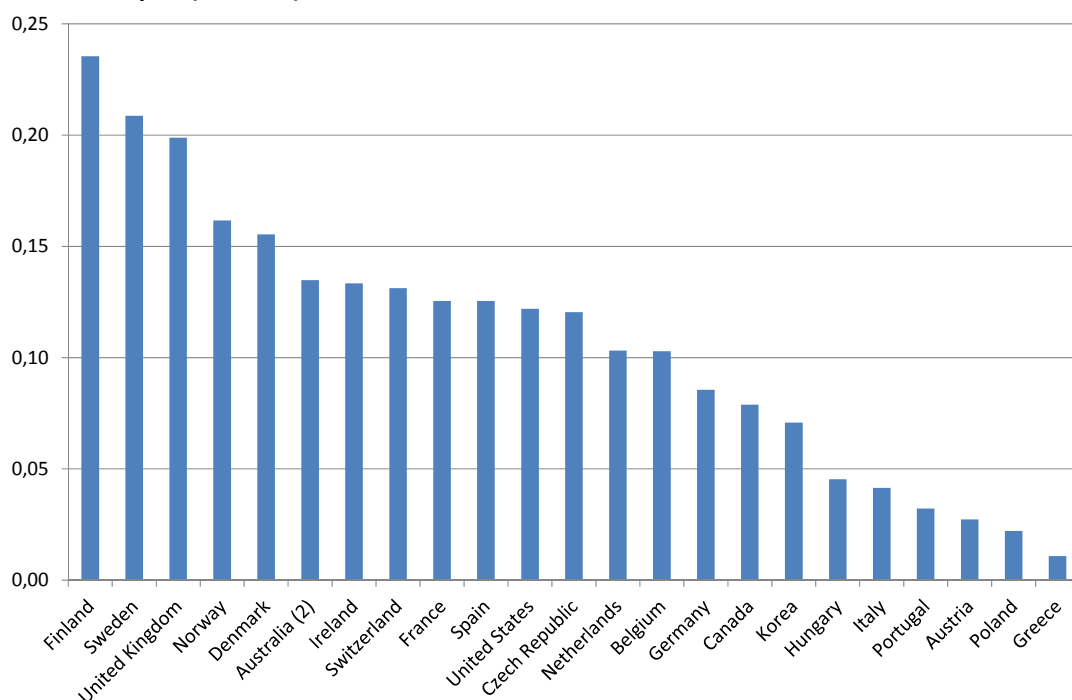
These observations on organisational complexity are true even in the case of Sweden, where experiences of the previous programming period proved, that financial engineering could be an important part of the system of innovation and enterprises support and pilot programmes were introduced (SWE EVAL. 2006 [1]). In the current programming period twelve regional co-investment funds are run in ERDF co-financed projects. An on-going evaluation from Sweden gives an interesting insight into this process (SWE EVAL. 2010). The funds provide fast growing SMEs that meet the capital availability barriers with support in the form of equity capital. This type of support is difficult to design and must be gradually developed and carefully adapted to the country's regulatory and cultural context. On the basis of international experience it is certain, that providing venture capital support in an effective way is not an easy task. Therefore the study summarizes the basic formal requirements for the funds in Sweden to ensure efficiency:

- The funds shall supplement the market and work on commercial terms.
- The funds are public venture capitalists that shall normally make equity capital investments of around SEK 1–10 million directly in SMEs in the start-up and expansion phases.
- The funds are co-investment funds and shall invest on equal terms with independent private commercial actors.
- The funds can only invest in their own respective regions.
- The funds aim to be revolving – returns shall be reinvested in the region.
- The funds have a ceiling of 3% of the capital base for management expenses.

The Swedish experience also shows, that sometimes it is difficult to find good investment objects and capital-strong and competent private co-investors – especially in regions with a less developed private venture capital market. What is more, the **above - mentioned requirements are sometimes mutually exclusive**: it is difficult to invest in start-ups and generate returns in time to revolve them. The study concludes that still a lot is to be learned by the stakeholders to build the final equity-based support system.

Venture capital funds in the USA provide an interesting insight both into the nature of market failure on the VC market and the effectiveness of public intervention (Gompers and Lerner, 2003). During the last business cycles clear cyclical effects on the VC market were visible, with a visible boom and bust pattern. **During the boom period the private sector tends to overinvest in the most promising sectors, which causes ineffectiveness in many projects.** "In particular, all too often these periods find venture capitalists funding firms that are too similar to one another. The consequences of these excessive investments are frequently the same: highly duplicative research agendas, intense bidding wars for scientific and technical talent culminating with frequent defections from firm to firm, costly litigation alleging intellectual property theft and misappropriation of ideas across firms, and the sudden termination of funding for many of these concerns." Bust-time reduction of availability of venture capital leads to greater effectiveness but also, eventually, to underinvestment in some sectors. In the past, public intervention concentrated on the hot industries in boom periods, which is rather irrational. A number of reasonable policy interventions may be proposed, mainly focusing on technologies and markets not popular among private venture capital funds and supporting promising initiatives with follow-up capital if they fail to maintain financing when the venture capital market is declining. It is important to note that the American financial market is much different to the European one, and in case of some European countries the potential of the domestic private venture capital market might be insufficient to appropriately finance innovative companies, while in others venture capital funding is significantly higher than in the USA (see Figure 1.3).

Figure 1.3 Venture capital (% of GDP), 2008



Note: The OECD defines here venture capital as the sum of “seed/start-up stages” and “early development and expansion stages”. The coverage of VC stages within these two broad groups differs across countries and the data may therefore not be fully comparable. See notes at the end of chapter 3 for further details.

(1) 2006 instead of 2008 for Japan.

(2) Venture capital in Australia includes seed, start-up, early and late expansion, and turnaround investments. Australian data are overestimated.

Source: OECD (2010).

It is natural that venture capital funds target mainly start-ups or the development of SMEs with high growth potential. Although the common understanding of venture capital funds often undermines their importance for the development of companies in non-high-tech sectors, they have an important role also in traditional sectors – as long as an investment is reasonable from the market perspective. **VC funds are thus an instrument not only of innovation policy, but also of traditional business support and regional policy.**

A good example of financial engineering instruments not limited to innovation support aiming at broader sets of goals comes from the United Kingdom ([UK EVAL. 2007](#)). In England and Wales 21 venture capital and loan funds were funded in the previous programming period with the support of ERDF resources. The funds were managing 450 million pounds, including 238 million pounds capital grant from ERDF. The supported funds included: umbrella funds, which mix equity and loans with pre-matched finance from other public or private sector sources, pre-matched single purpose funds and equity based co-investment funds.

The funds acted regionally, but usually without focus on a specific sector, although in many cases the funds focused on the specific phase of SME development. The evaluator noted, that also in this programme the legal and organisation complexity of establishing the funds was underestimated, which caused significant delays in most of the projects. That in turn potentially creates pressure to invest at the expense of a higher risk profile. The overall assessment of the funds is positive, although the authors note that at the moment of evaluation the unit costs of outputs and impacts were high.

To summarise our knowledge on repayable support funds it should be stressed that venture capital funds and loan funds:

- can be instruments of both innovative and non-innovative support to SMEs;
- loan funds are the most appropriate measure to support non-innovative undertakings of SMEs and innovative but low-risk projects, while support to venture capital funds (and other equity-based

instruments) should supplement private capital in the areas where investment risk for private sector alone is too high;

- can be used as instruments of regional policy to support employment and investments in a specific area.

It is also apparent that **in case of investment projects repayable support is more appropriate than non-repayable means**. That in general will probably also include assistance to SMEs for promotion of environmentally-friendly products and production processes, as well as investment in energy efficiency in SMEs- as long as these activities are not connected with intensive R&D efforts.

On the other hand it must be noted that the scope of public support should vary significantly depending on availability of private resources – and especially for VC activities **the public support should supplement and not substitute private resources**. Many studies also showed, that the financial engineering measures tend to be more complex and difficult to implement than was anticipated by the authorities – which should be taken into account by managing authorities in the future. The above was true even for the countries with well-developed financial systems like the United Kingdom and Sweden.

Human capital development

Human capital is an important production factor both for the economy, as well as the company. It plays a significant role in the economic growth theory and its accumulation (together with innovations thanks to R&D efforts) explains long term growth in modern endogenous growth theory (see for example Barro and Sala-i-Martin, 2004). The development of human capital is a necessary part of growth – and particularly of “smart growth”. Europe 2020 recognises that and in the “smart growth” priority enumerates different areas of intervention, including the lifelong learning, the training system and the quality of education. It is important to note, that both the theoretical and empirical framework of modern economics shows, that human capital development is crucial for the long-term growth and competitiveness of the economy. Therefore **successful attempts to increase the level of human capital also increase competitiveness and the innovative potential of the economy**, thereby indirectly supporting companies, their innovativeness and competitiveness.

The intervention of the EU structural funds in the area of human capital is mostly by the European Social Fund and takes place in a variety of forms and measures. These issues are discussed in detail in Chapter 3., and in the context of smart growth and innovation support it should be noted, that:

- improving human capital is a continuous process and should be supported at each life-cycle stage, although early investments are the most cost efficient;
- training is more effective if it is designed with stakeholders (including employers) and if it corresponds to the local demand.

The support of human capital development **in some cases takes form of direct support to companies**. The support might be granted in many forms, with the aim to facilitate employees participation in education and training activities, increase adaptability of the company and its human capital level. The positive effects of training should be apparent both for employer (who benefits from increased employee productivity) and employee (who benefit from better adjustment to labour market). **For the economy a life-long learning strategy is the answer to the need for high adaptability of labour market**. European Social Fund finances activities aimed at increase of human capital of employees under the heading of adaptability and lifelong learning EC EVAL. 2010 [4]).

As noted above, involvement of all stakeholders in the design phase of the intervention is important for successful support. Evidence from previous programming periods indicates, that significant but unfocused support to employee training produced mixed results (POL EVAL. 2010). **The measures to directly support human capital in enterprises have to take into account stakeholders’ needs and the barriers they face**.

Indirect support

In the previous section, devoted to direct support to enterprises, the measures aimed directly at firms to counterbalance market failures at the microeconomic level were discussed. In recent years there has been growing understanding that innovation policy should not only cover firm-level problems, but also face more general imperfections and problems of the so called innovation system: “the central idea in modern innovation systems theory is the notion that what appears as innovation at the aggregate level is in fact the result of an interactive process that involves many actors at the micro level, and that next to market forces many of these interactions are

governed by non-market institutions“ (Soete et al., 2010). **Thus policies to counterbalance market failures are insufficient – to fully utilise the innovative potential of an economy it is also necessary to take systematic actions in different fields.** In this subchapter the indirect support measures aimed at enterprises and the business environment are discussed. Innovation systems support also means the support to research performance (which is discussed in the next subchapter) as well as human capital development (discussed in the third part of this study).

Based on what is known so far on the future of cohesion policy under Europe 2020, it seems that indirect support will take place under the heading R&TD, innovation and business development in the following categories:

- Investment in science parks
- Small scale business infrastructure
- Technology transfer and cooperation networks (including cluster support)
- Advanced support services for SMEs and groups of SMEs

The catalogue of possible measures is very wide – and very often projects belonging to these categories include other components –direct subsidies or training services for employees. Therefore the picture emerging from the analysis of the evidence is mixed and complex.

In addition to what was said above on the support of innovation system, it is important to note that some aspects of indirect support are often not connected with innovation stimulating measures. This is especially the case for some measures designed to support SMEs. The measures aimed at enhancing cooperation and networking (which to some extent is the goal of most indirect measures, like support to clusters, science parks, cooperation networks, etc.) **recognise the importance of spill over effects and the economies of scale** – which are very often connected to increased productivity and innovativeness growth. On the other hand the beneficiaries of support for science parks or cluster support are mostly SMEs.

Science parks refer to a complex and holistic idea of supporting the development of innovative companies and cooperation between business and science, including support of commercialization of research results. Thus science parks incorporate activities in the field of providing infrastructure and support to start-ups (including pre-incubation and incubation), networking, technology transfer and enhancing cooperation networks. Empirical research on science park effectiveness focuses on three main areas: comparison of performance of different types of parks and their role for regional development, comparison of performance of firms belonging to science parks with control group and analysis of cooperation between science parks and scientific institutions. The evidence of science parks effects is as follows:⁸

- there is a positive relation between development of science parks and development of the region, but the causality of this relation is uncertain and some facts suggests that parks develop thanks to the development of the region and not vice-versa;
- parks have a positive impact on the business environment, as indicated by productivity of research activities of enterprises belonging to science parks as well as their employment and sales;
- companies in science parks have easier access to public support and are characterized by a higher level of human capital;
- parks enhance cooperation between firms and universities, but this cooperation is usually on an informal basis; at the same time science parks seem to influence the fields of research in research institutes.

A very **important policy conclusion is that science parks can facilitate the development of innovative companies and cooperation between business and research institutions**, but they have to rely on external human resources – therefore science parks must utilise available regional resources, especially human resources and comparative advantages of regional academic institutions. Because of that, science parks are not an effective tool of convergence oriented regional policy, as they help in full utilization of regional potential and not in generation of new development opportunities for a lagging region. In this context it is worth noting that the first and most successful science parks were created by the leading American universities to facilitate commercialization of their research activities.

⁸ An overview of science parks functions and the role of public policy is provided in a study by IBS (2008).

An important feature of science parks is to support networking activities and cooperation between different stakeholders. Cluster is a particular form of such a cooperation: “clusters are geographic concentration of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition” (Porter, 1998).

The OECD (2007) provides a synthetic summary of factors behind cluster support programmes. The study points out that “there is quantitative evidence that many industries remain relatively concentrated in specific regions and that firms and research generators in proximity can out-perform their counterparts located in less rich environments. Countries are seeking to strengthen or replicate the success factors that have encouraged the concentration of innovative firms associated with the new economy, as exemplified by the Silicon Valley.” Also the fact that **clusters may be a convenient measure of restructuring the regional economy as well as building cooperation networks, reducing transaction and co-ordination costs**, is important for the policy makers.

Although the theoretical framework behind cluster support is convincing, in practice indirect measures do not always produce the expected results. Support of clusters and innovation systems was an important part of the previous programming period in Sweden, as it consumed 10 per cent of the EU structural funds allocated to Sweden. These resources were used in support of 183 projects connected to 29 clusters and innovation systems. **Most of the supported initiatives were developed from a “bottom-up” perspective as a result of creative process makers’ ability to translate plans and visions into actual projects.** Stakeholders of the evaluated projects underlined that the cooperation was very important in ways other than product and service development – they also stressed importance of networking and knowledge development. At the same time concrete results of this process “are very limited in the form of new products and services, primarily because companies are not involved with capital, knowledge, and market contacts”. The enhanced use of PPP formula and financial engineering could be a solution to that problem (SWE EVAL. 2006 [1]).

More evidence from Hungary suggests that clusters tend to be more successful if the support is provided to an already existing cluster – **hence public support may be an effective measure of supporting the development of cluster, but not of cluster creation.** In Hungary a number of cluster initiatives emerged because of availability of funds and not necessarily due to the real needs (HU EVAL. 2009 [1]). The Polish experience with technological clusters confirms the importance of supporting existing cluster initiatives, as public support can use and strengthen the potential of the existing network, but fails to create one (IBS, 2009).

Science parks and cluster support are not the only measures of supporting networks and business-science cooperation. **Innovation Consortium Scheme** is a Danish instrument of subsidising and facilitating cooperation between private firms and research and knowledge institutions. Cooperating institutions can apply for financial grants for expenses incurred by the research and knowledge institutions whilst undertaking a cooperative project. Usually grants amounted to approx. 1-2 million euro. The firms participating in the programme achieved a significant increase in both gross profit and employment, with the effects stronger for smaller firms. Although an impact on gross profit and employment is appealing, the other effects of intervention were not explored (Kuhn, 2010).

Another mechanism of supporting cooperation between business and science is the Dutch innovation voucher. The measure is designed for SMEs and is granted to SMEs in a form of 7.500 euro worth voucher for cooperation with public knowledge institutes. Out of ten vouchers eight were used for projects that would not have been commenced without the support, one was used for a project that would have been conducted anyway and one was not used. The demand for support was confirmed by the fact that more than one thousand SMEs applied for one hundred vouchers available (Cornet et al., 2006).

An interesting example of an effective measure to enhance cross-regional R&D cooperation comes from Germany. The effects of subsidies granted to firms from under-developed regions for cooperation with a broad range of partners from other regions shows, **that subsidies for cross-regional cooperation are effective for stimulating innovation efficiency** (Broekel, 2011).

The experience of innovation support in Slovenia shows **that cooperation support was the most important incentive for innovation activity.** At the same time the measure was effective only towards domestic cooperation (and not towards international cooperation), was more effective for inter-firm cooperation, and not for cooperation engaging universities and R&D institutes (Jaklič et al. 2008).

The importance of cooperation was also confirmed by an evaluation conducted in Greece, which revealed that although the evaluated regions exhibited considerable dynamism in the field of research and development (mostly

by universities), **only a very small part of the research output was utilized effectively by business and business-science cooperation virtually did not exist** (GR EVAL. 2005). Underutilisation of the results of public research is a general European concern. Canton et al. (2005) find that the U.S. shows a better performance in cooperation; on the other hand the most innovative European countries are not performing systematically worse than the U.S.

Indirect support covers not only networking and cooperation, but also a broad range of different measures supporting the development of business infrastructure and the business environment. A wide range of enterprise support measures was used in Sweden in the previous programming period. According to the available evidence, guidance projects aimed at supporting enterprise development tend to be more effective if the competence development measures are design in close collaboration with the target groups. **The most important benefit to new business owners is the chance to make new contacts and build networks.** What is particularly interesting, the demand for public consulting is lower in the regions with many small enterprises, as entrepreneurs learn from one another. Once the start-up is successful and a firm enters the take-off phase, the main growth obstacle tends to be lack of capital to sustain firm development. In this context the structural funds are potentially important to provide risk capital and cooperative solutions for capital provision. The last observation concerns sustainability of supported networking and points out that networks are vulnerable once the project ceases – some solutions like membership fees or other methods of providing financial support to ensure network sustainability could be proposed (SWE EVAL. 2006 [2]).

The evidence for indirect support is complex, diversified and sometimes inconsistent, but some general conclusions seem to emerge from the above overview:

- bottom-up support is the effective approach to designing support in guidance projects and other measures providing complex services to SMEs, as it ensures that support will be appropriate to the needs of beneficiaries;
- cluster support should use existing potential to cooperate and science parks should be focused on regional potential (or existing) advantages: these measures can facilitate the effective use of existing potential, but will not generate the potential itself – the existence of such potential should be carefully considered, as there is an evidence of overestimating both chances and impacts of science parks and cluster initiatives;
- financial incentives to facilitate business-science cooperation can be effective, but in general the wider context of the cooperation has to be considered – which is partly discussed above for cooperation inside science parks, and further deepened in the next subchapter.

1.3. Research performance

Smart growth is a result of innovations and R&D of private companies. Their activities are strongly related to performance of non-for-profit institutions – like universities or research institutes. There is a strong correlation between R&D investments and intensive university-industry research collaboration (Canton et al., 2005).

Scientific institutions not only play an important part in R&D activities, but also perform most of the fundamental research. For a number of reasons research cannot be financed by private resources alone. The most important is that knowledge is close to public good. Private financing of research would result in a socially suboptimal level of resource allocation and output. **Therefore support for research activities is – especially in the longer run – inevitable for any successful smart growth strategy.** It is also crucial to address the most important barriers to cooperate with business faced by a public institution, which are as follows (according to Canton et al., 2005):

- the reward structure of academic scientists – scientists are usually not rewarded for cooperation (but for education and research only), what is more - scientists are interested in publishing the results of research while firms tend to keep them secret to increase competitive advantage;
- the lack of entrepreneurial culture – scientists and inventors at universities are not able to successfully commercialise – and at the same time universities do not recognise commercialisation as their task;
- the determination of the research agenda – which may limit the opportunities to cooperate if it is not compatible with business needs and plans.

It is important to note that support for scientific institutions is provided mostly at the national level (national financing of universities). European support is focused on framework programmes and as such is not a subject of this study (see Horst et al. (2006) for the discussion of the most appropriate level of policy for different segments of research support). The rationale for public support of research activities is very well explored and the need for

public involvement is clear, which is also expressed in Europe 2020. At the same time the role of **cohesion policy seems to be supplementary to national policies and the EU framework programmes.**

Cohesion policy intervention aimed at research institutions will probably focus on enhancing research performance and cooperation (as discussed above – but with the focus on public research institutions) with the use of the following measures:

- R&TD and innovation infrastructures in public institutions;
- R&TD activities in public research centres.

At the moment our knowledge of measures that will be used in the future is insufficient to draw any final recommendations and policy conclusions, but it is important to note that concentration on infrastructure of public R&DT institutions and funding public research needs to take the regional circumstances, drawbacks and opportunities into account. The final goal of support is to increase business innovativeness, so resources should be focused on areas where at least potentially there is a competitive advantage for the region.

The role of public research organisations in innovation processes is different depending on the sector and country. The most prominent are the organisations from the United States (comparing with Japan and Europe⁹), as well as from the chemical, drugs and medical sectors – their patents were more relevant to the market than corporate patents. **European public research institutions seem to be weaker in producing important inventions and are successful only in specific technological fields** (Bacchiocchi and Montobbio, 2006).

This proves that there is space for public support to enhance research performance as well as business-science cooperation. At the same time direct and indirect measures for business to facilitate cooperation with science often omit the second part of the equation, that is the scientific institutions. Such an approach is problematic, as the **university-industry relationship is two-way exchange for the benefit of both sides** (Perkmann and Welsh, 2010). Access to industry technology is beneficial to universities, as it enables scientists to increase their knowledge and generate innovations in technology: “instead of making scientific research directly relevant to industrial applications, policy should promote the capability of academic researchers as skilled experts and consultants rather than entrepreneurs.”

Interestingly, the highest level of collaboration is not necessarily connected with the involvement of companies in R&D activities. In fact there is evidence for European countries, that “firms that outsource research and development (R&D), and patent to protect innovation and to signal competencies show higher levels of collaboration.” Also larger companies tend to collaborate more (Fontana et al., 2005). This again **proves the importance of public research organizations for innovation processes.**

An insight into the effects of different institutional solutions in support of research performance is provided by comparison of French and German experiences in cooperation with public research organisations. Although in both countries there are evident positive effects of business-science cooperation (both in terms of product and process innovations), the effects are much stronger in Germany than in France. The nature of this difference is not certain, but **it seems that an important role might be attributed to the decentralised nature of public support to research collaboration in Germany**, versus complicated and sometimes very centralised support in France, which implies additional costs and ineffectiveness (Robin and Schubert, 2010). Evidence suggests that **decentralised policies to foster public research in cooperation with business might be more effective than centralised programmes.**

Another important area is the increase of participation in tertiary or equivalent education – although it does not increase the scope of cooperation directly, it is important to ensure sufficient human capital for the smart growth economy. **Students from disadvantaged backgrounds are much less likely to enter higher education and more likely to drop out, which is driven mostly by lack of early education investment, crucial for obtaining fundamentals for further progress on the educational ladder** (OECD, 2009). Policies that aim to promote and increase access to higher education among the disadvantaged focus on various forms of financial aid (tuition reduction, scholarships). Most studies suggest they have a positive impact (Dynarski, 2003; Cornwell et al., 2006; Steiner and Wrohlich, 2008). Some evaluations show that student aid recipients graduate quicker than comparable students who are supported by the same amount of parental/private transfers only (Glocker, 2011). Complexity in the aid process does little to improve the targeting of both student loans and grants (Dynarski and Scott-Clayton, 2008). Programmes which offer mentoring, educational services and financial rewards to disadvantaged high-

⁹ In the study only four European countries were included: France, Germany, Italy and United Kingdom.

school youth, with the objective to improve high-school graduation and post-secondary schooling enrolment, may have positive results, which however fade away quickly and may even be negative in the long run (Rodriguez-Planas, 2010). Higher education dropout rate may be lowered via programmes that offer a combination of services (e.g. peer advising) and incentives (merit-scholarships), though the effect may be positive only for women (Angrist et al., 2009). Tuition reductions also decrease university drop out, though again, the effect is higher for women (Dynarski, 2008). The evidence on the educational impact of financial rewards (for e.g. obtaining good grades or passing all exams) is somewhat mixed. Leuven et al., 2010 find positive effects on achievement of high-ability students, but a negative impact on achievement of low-ability students. There are also suggestions that conditioning education subsidies on parental income may be a desirable redistribution instrument (Dur, 2004).

Direct support for development of human potential in research and innovation is provided in cohesion policy by ESF, addressing a wide range of topics, including support for tertiary education (and access to education), mobility and international cooperation and raising the skills profile (EC EVAL. 2010 [5]).

1.4 Metropolitan area 'growth pole' competitiveness, transport and polycentric development

Transportation, especially transport terminals but also modern transport linkages, play a significant role in the process of making the growth pole smarter. They are a good start for the development of growth poles both at the local level, inside the metropolitan areas, and also at the national level, by improving the linkages between FUAs (Functional Urban Areas) (ESPON 1.1.1, 2005). Particular attention should be paid to the sections linking the city centre with its suburbs, the nearest airport and the surrounding region so that more people can use the opportunity of smart growth. Investments in major transport corridors connecting the main cities by road or rail and creating a polycentric network of growth poles, as opposed to monocentric urban system, also have a strong impact on smart growth. Balanced polycentric urban systems cannot work without a modern transport network linking agglomerations. Access to the airports is important, particularly for the youth who are 'on the move'. Therefore this subchapter related to the role of transport in smart growth is divided into three sections: 1. Access to metropolitan areas; 2. Access to the interagglomeration network and polycentricity; 3. Access to airports.

Access to metropolitan areas

Since the time of Christaller (1933), the central place theory introduced economies of scale to explain the reasons behind the distribution patterns, size, and number of cities and towns which can create a **multilevel polycentric system**. According to neoclassical theory, under conditions of perfect competition, constant return to scale and no externalities, and in the long term - flows of the capital, labour and trade will lead to income convergence among regions and countries. However, for Myrdal (1957) due to the barriers to mobility and agglomeration effects, cumulative circular causation will lead to spatial polarisation between the rich and the poor areas. According to **growth pole theory**, the growth takes place around the specific pole which is an industry or a group of firms within an industry (Perroux, 1955). In fact, the growth pole is located usually in the major city of the area.

A smart growth transportation strategy should therefore refer to the construction or upgrading of the transport infrastructure in the growth poles. **Particular attention should be paid to the sections connecting the city centres with the suburbs and growth poles in the metropolitan area.** In many European states there are still bottlenecks in the metropolitan areas, adversely affecting the competitiveness of businesses and worsening the quality of life (EU EVAL., 2010, [3]).

Evidence of successful cohesion policy and good practises in the area of smart transportation should be based on several indicators like travel time/cost savings, reducing congestion/increasing capacity or improving quality of life via removing traffic from built-up areas. Moreover, the types of tools available to transportation agencies to accomplish smart transportation should also include many aspects of transportation design, traffic calming and planning for community bypasses (Smart Growth..., 2005). Table 1.1 summarizes the major annual economic benefits by Priority Axis (including Urban) in Bulgaria. The expected major benefits, like time savings and reduction in vehicle operating costs (VOC) savings, have been quantified.

Table 1.1 Major annual economic benefits by priority axis in Bulgaria for base year (2005)

		Priority Axis 1 - Rail	Priority Axis 2 - Road	Priority Axis 3 – Urban
Passengers	Thousand	33.8	*	260
Passenger - kilometres	Mio	2.389	46.407	*
Average speed increase	km/h	11.3	35-40	26.0
Time saving / passenger	Min	4.1	*	14.0
Accident savings	Mio Euro	*	*	1.15
VOC savings	Mio Euro	*	285	6.2

*Not Defined

Source : BG EVAL., 2006, [1].

Cluster or agglomeration effects can be strengthened by decreasing travel times and relieving bottlenecks. **Imposing congestion pricing schemes** is the idea of charging drivers a daily fee for entering the city during rush hours.

Box 1.1: Congestion charge zones

One of the largest congestion charge zones is in London. The other examples are Rome, Stockholm and Milan. Congestion pricing schemes introduced in some Member States have proven to be an efficient method for regulating congestion. The European Union should continue to promote the development of technological solutions for congestion pricing. However, getting public acceptance prior to implementation is still an obstacle. Ten or more road pricing proposals were abandoned for that reason in the United Kingdom (EU EVAL., 2009, [1]).

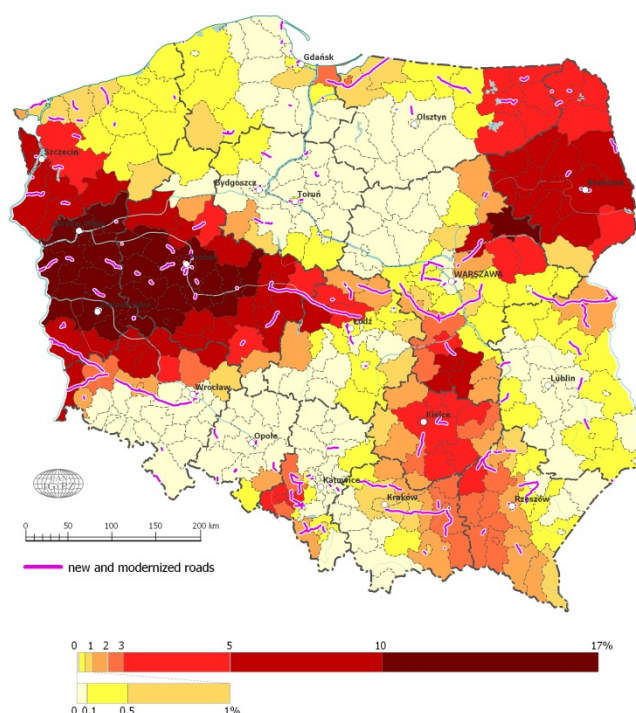
The other solution to relieve bottlenecks, which is within the scope for Cohesion Policy, is to construct **bypasses of the most heavily congested parts of towns**. One of the good examples is the Vilnius Southern bypass road which is the missing chain in the International IX B transport corridor. This project, financed by the Cohesion Fund was well designed and implemented in a timely manner. It has helped in removing local and transit traffic that had destroyed the historic district of the city (EU EVAL., 2010, [2]). Another example from the EU-12 is the construction of the eastern section of the M0 Budapest Ring Road in Hungary, financed by the Cohesion Fund and the European Investment Bank. The project led to traffic relief and decongestion benefits in the centre of the city. However, the overall traffic growth across the network has been less than anticipated (EU EVAL., 2010, [2]). There are generally still many metropolitan areas in the EU-12 which immediately need the construction of bypasses. In Polish cities such as Warsaw, Wrocław, Kraków and Łódź lack of bypasses leads to transit traffic going right through the city centre. The absence of town (but also village) bypasses is also considered as a weakness of the Czech transport system (CZ EVAL., 2006, [2]). Bypasses can still have an impact on the regional transport system also in the EU-15. The project financed by the Cohesion Fund, the Agiou Konstantinou bypass which is a part of the PATHE (Patras-Athens-Thessaloniki-Evzoni) corridor has led to considerable time savings. This bypass prevents the congestion problems commonplace particularly in the summer months because the previous road ran between the sea and the town (EU EVAL., 2010, [2]).

Box 1.2: Motorization rate increase

The increase of car ownership is a major driving macroeconomic factor that leads to traffic congestion in metropolitan areas and GDP losses. **Motorization rate (number of cars/ 1000 people) has increased** in the EU-27 from a value of 380 in 1995 and 417 in 2000 to about 470 in 2008. At the national level, **the largest increases in the years of 2000-2008 were reported in the Eastern European countries**, in Poland from 261 to 422, and in Latvia from 236 to 413. There are still huge differences within the EU-12 region. In Lithuania (499 cars/1000 inh.) one can expect stability in this indicator while in Romania (187 cars/1000 inh.) there is still a perspective for sudden growth (EC, Pocketbook, 2010). The escalating traffic congestion problem in Bucharest is proof of this. In the years of 2000-2008, the growth of motorization rate in the EU-15 was much smaller. France even reported some decline. The exception is Greece where a rapid growth of car ownership from 292 to 446 has been observed.

Evaluation of the EU funds in Poland shows a significant effect of reducing journey times to major cities as a result of the investment in **roads leading out of towns**. These roads are usually heavily congested. Therefore, **this type of investment improves access not only to the core areas, but also the peripheral ones**. A good example is the S8 Radzymin-Wyszaków express road situated in the north-east of Warsaw in the road corridor in the direction of Lithuania. The upgrading of the road resulted in an increased accessibility of peripheral regions, including the Podlasie (PL EVAL., 2010, [1]).

Fig. 1.4. Shortening the travel times to Warsaw by road resulting from the improvement of transport infrastructure (programming period 2004-2006)



Source : PL EVAL, 2010, [1].

However, taking sustainable development into account (see Chapter 2), **railway solutions are the preferable ones to commute to work in the metropolitan areas**. A good example is Lisbon and the high speed rail of the Third Tagus Crossing (TTC), vital to link the high-speed rail axis between Lisbon and Madrid. The TTC is located between Lisbon and Moita, linking the northern and southern banks of the Tagus river. The 17 km long works include a 7.3 km bridge over the Tagus and 9.7 km of north and south access routes. According to the implementation schedule, the project is estimated to finish in 2014 (EU EVAL, 2010, [4]). Sometimes drilling a railway tunnel underneath the city centre is a good solution, as it was in Cadiz in Spain. The railway track on the surface was replaced and the urban bus network reorganized. Shifting of the railway line into the tunnel led to removal of the main barrier separating the historical centre of the city from the suburbs. The investment also relieved congestion along the main arterial routes into the city (EU EVAL, 2010, [3]). Excluding congestion from the city is the objective of a new project of a railway tunnel under Malmö. It includes a 17-kilometre long rail link running between the Malmö Central Station and the Öresund Line (Öresund Bridge). The line, with the European Union's contribution of 700 million SEK, was inaugurated by the King of Sweden in 2010 (EU EVAL, 2010, [4]). Local congestion benefits (removing of congestion caused by traffic disruption at level crossings) are offered also by building out-of-town stations (bypasses for rail). A good example is the Thriassio-Pedio-Eleusina-Korinthos railway line in Greece financed by the Cohesion Fund (EU EVAL, 2010, [2]). There are also examples of improving the relatively weak railway access to the EU-12 metropolises, capitals in particular. Providing better job accessibility in major economic centres in Slovakia (Bratislava and Trnava) is a result of upgrading the Bratislava Rača-Trnava Railway in Slovakia (EU EVAL, 2010, [2]). Linking growth poles in the metropolitan areas can lead to increase of the area of socio-economic influence of the town. A good example of this process is Messoghia, the region in the south-east of Athens. The metropolitan region of Athens is an area capable of attracting investment in innovative sectors and being able to trigger development in the rest of the country. Within this framework, Messoghia is approached as the regional 'growth pole'. The prospective investment in transport infrastructure in this area is expected to strengthen regional development prospects. These goals are incorporated in the Operational Programme (2007–2013) of the Attica region (Chorianopoulos et al., 2010).

From the above mentioned considerations one can draw the following conclusions: providing an easy, effective and comfortable access to metropolitan areas from their hinterland is crucial for smart growth. Also construction of bypasses is needed while taking into account the increase of car ownership, in particular in the EU-12 states. And introduction of congestion charging zones in the centres of towns helps to relieve bottlenecks. Investments on roads leading out of towns and improving railway connections lead to better access for people commuting daily within the metropolitan areas. Public urban transport is indispensable to make the transport system smarter and more sustainable (see chapter 2).

Access to the interagglomeration network and polycentricity

In a global world, one can assume that transport investments linking the growth poles also have an impact on smart growth. Wealth distribution and diffusion of knowledge are possible with modern and reliable transport systems that enable passengers to travel in comfort between metropolitan areas. It is obvious that **spatial differences of 'real weight' cities should be taken into account**. Therefore, **strengthening a balanced polycentric urban system is a goal** of national spatial planning (TRACC, 2011). Polycentricity is opposed to monocentricity, in which territorial management competence and service provision are concentrated in a single centre. Polycentricity is therefore associated with two complementary aspects. The first aspect concerns the number of cities, hierarchy and distribution of urban areas in a territory. The second aspect relates to the relations between urban areas (flows and cooperation) (ESPON 1.1.1, 2005).

Taking Functional Urban Areas (FUAs) as building blocks, national urban systems can be analysed on the basis of the three dimensions of polycentricity: size, location and connectivity. A flat rank-size population and GDP distribution is more polycentric than a steep one (size index). A polycentric urban system is not dominated by one large city. The most polycentric EU-27 states from this perspective are: Italy, Belgium, Germany and Netherlands, and the least – Latvia dominated by Riga. Moreover, a uniform distribution of cities across a territory is a feature of a polycentric urban system. On the other hand, a system is polarized when all major cities are clustered in one part of the territory (location index). However, 'connectivity' is the most important criterion for cohesion policy and the role of transport investments which means that the more accessible secondary centres are compared to the major city, the less monocentric the urban system is (connectivity index). The most polycentric EU-27 states from this perspective are: Cyprus, Austria and Germany, and the least polycentric are: Lithuania, Slovakia, Romania, Finland, Bulgaria, Latvia and Poland (ESPON 1.1.1, 2005). **Bulgaria, Lithuania, Poland, Romania and Slovakia are characterized by high values of size and location index and low value of connectivity index. The objective of the Cohesion Policy in these EU-12 states should be to improve the currently underdeveloped and underinvested transport networks. The priority should be given to major milestones which means completion of the motorway and railway network.**

Bottlenecks within corridors is the weakness of the Polish and Bulgarian transport systems (PL EVAL., 2010, [1], PL EVAL., 2006, [3]; BG EVAL., 2006, [2]). Insufficient motorway infrastructure and low quality of road and rail network features also in Romania (RO EVAL., 2006, [1]). One example of significant connectivity improvement, with the help of the Cohesion Fund in 2004-2006, is the new A2 motorway section between the towns of Konin and Stryków (near Łódź) in central Poland. This section is part of a wider package of projects to construct a high standard road transport link between Berlin and Warsaw. Among the positive effects of this section (which is continued at the eastern end of the project in the direction towards Warsaw) are 30% time savings between Poznań and Łódź. The other effects, in addition to connectivity improvement and reducing journey times, are relief to traffic congestion and improvement of safety (EU EVAL., 2010, [2]).

Box 1.3: Increase of haulage and heavy load traffic

Construction of modern interagglomeration transport networks is particularly important in the states with a relatively high increase of national haulage. Between the years 2000 and 2008 the highest increase of national haulage was observed in Spain (from 107 thous mio tkm to 175 thous mio tkm) and Poland (from 48 to 72). During the same period, Italy and Greece recorded a decline in the national haulage. It is worth mentioning that Poland also has the highest share of international haulage and in 2008 accounted for more than 15% of the total EU-27 international haulage (EC, Pocketbook, 2010). Moreover, despite the global economic downturn, **traffic volume on national roads** in 2005-2010 increased in Poland by 22% (comparing with 18% between 2000 and 2005) and the increase of trucks with trailers traffic volume exceeded 43% in the same period (Synteza wyników GPR 2010, 2011). From this perspective, the lack of high capacity strategic roads still remains an obstacle to development for Poland (PL EVAL., 2006, [3]).

Polycentricity is also a goal in Spain, a country that is developing its high-speed railway network. Spain is characterized by a very low location index which means that only Madrid and Zaragoza constitute areas of real weight away from the Mediterranean, Atlantic and Cantabrian coasts (ES EVAL., 2006, [1]; ESPON 1.1.1, 2005). The expansion of the high speed railway network in Spain tries to avoid the concentration and centralization of the economic activity in a number of big centres weakening the areas of minor potential in benefit of the dominant ones (Blanco et al., 2011). A good example is the high speed railway line linking two largest cities in Spain - Madrid

and Barcelona via Zaragoza with the Cohesion Fund contribution in the period 2000-2006 of more than 1 million euro (EU EVAL., 2010, [2]). The situation is different in Greece. This country is characterized by a very low size index and a very high location index (only two big agglomerations of Athens and Thessaloniki located far away from each other) (ESPON 1.1.1, 2005). One of the most important motorway projects in Greece is called PATHE (Patras-Athens-Thessaloniki-Evzoni) corridor linking Athens and Thessaloniki is co-financed from the ERDF and Cohesion Fund (EU EVAL., 2010, [2]).

Within Europe 23% of cities have the potential to build cross-border metropolitan regions. These regions are not only concentrated in the European core, but also along the borders situated between Slovenia, Hungary, Slovakia and Poland. The cross-border polycentric urban structure should be underlined by the modern public transport networks in these regions (ESPON 2013, 2010).

Summing up, a balanced polycentric urban system cannot work without modern interagglomeration transport network. The huge increase of haulage and trucks and trailers traffic in the EU-12 states is the best explanation for the need for hard infrastructure. The EU-12 states still suffer from lack of basic modern road and railway networks linking metropolitan areas.

Access to airports

Smart growth means a fast and convenient way to travel between regional, national, European and global growth poles. Travelling between growth poles goes hand in hand with one of the Europe 2020 flagship initiatives – **Youth on the move. At the European scale, the easiest way to travel on long distances is by air.** Domestic / intra-EU-27 passenger air transport in 2008 exceeded 560 billion passenger-kilometres, while in the same year, railway passenger transport volume was only 409 billion passenger-kilometres. Moreover, in comparison with the USA, with its 978 billion air passenger-kilometres, the European air market has still a good perspective for growth. The number of passengers travelling by air in Europe is increasing year by year, with the exception of 2008, due to the global economic downturn. The share of aviation in the total passenger transport volume in Europe increased from 7.7% in 2000 to 8.6% in 2008 (EC, Pocketbook, 2010).

Airport infrastructure projects can be divided into airside and landside. Airside facilities include all buildings and equipment beyond security check points. Airside projects aim to increase the capacity of the airport to handle aircraft movements and involve construction or modernization of runways or improvements in air traffic control in the airport (Jorge and de Rus, 2004). Landside projects include both construction of the terminals and new or upgraded airport access routes by all modes. The benefits deriving from both airside and landside projects are: reductions in travel, access and waiting time, improvements in service reliability and predictability, reduction in operating costs and, finally, increases in air traffic (Jorge and de Rus, 2004).

The massive expansion of low-cost airlines is one of the major causes of the increasing role of air transport. The success of the low-cost model has a strong impact on the benefits of supporting airport development with the ERDF resources. If low cost carriers are not willing to serve an airport due to the operational constraints, the use of the EU funds can be justified. The above conclusion refers in particular to the improvements in the access to an airport (EU EVAL., 2010, [3]).

Box 1.4: Airports in the Mezzogiorno

The Bari Karol Wojtyła airport was first designed for freight transport and the passenger terminal was not prepared to handle more than one million passengers per year. The ERDF funded a project aimed at improving both airside and landside infrastructure at the airport. The major project benefit was the increased total capacity to 2.8 million passengers per year. The actual volumes proved to be significantly higher than the forecasts and the difference was 70% in 2008. The airport now attracts more tourists to this area of Mezzogiorno also because of low-cost carriers (EU EVAL., 2010, [3], Appendix C). Public policies can promote attractiveness of the peripheral areas of Southern Italy to tourists by providing incentives to regional airports to support low-cost network improvements. Italian regional airports specialized in low-cost services showed rapid growth rates between 2000 and 2006, in international traffic in particular. The airports with limited experience in low-cost services, in contrast, reported slow growth in international tourism (Donzelli, 2010).

Among the landside infrastructure projects, access by rail is the most crucial of all issues. **There are still many European airports, in eastern Europe in particular, which have no direct railway connection to the city centre.** For example, the lack of a railway link to the city is one of the causes of road traffic congestion between the

Slovenian capital - Ljubljana and its airport at rush hours. It was regarded as a weakness within the transport SWOT analysis in Slovenia (SLO EVAL., 2006, [1]). In Poland, the first airport to have a direct rail link to the city centre was Balice in Kraków (the link opened in 2005). The railway connection linking Modlin airport (passenger airport under construction designed to handle low-cost carriers, located 35 km north of Warsaw) and Warsaw Frederic Chopin Airport with the Warsaw Central Station is planned to open before 2012 when Poland is to host the European Football Championship. In Hungarian capital - Budapest, the Ferihegy Airport's terminal 1 and Nyugati Train Station in Budapest are connected by railway line since 2007. The investment was implemented with the help of funding granted by the ISPA/Cohesion Fund. There is still no direct railway connection to the major airport in the Czech Republic - in its capital Prague, and in Sofia in Bulgaria. The railway connections of Prague-Ruzyně and Mošnov airport in Ostrava are the priorities for air transport infrastructure in the Czech Republic. The evaluation study recommends the railway connection to these two airports as the priority for air transport infrastructure (CZ EVAL., 2010, [1]). In the case of Bulgaria, an extension of the Sofia Metro Line 1 is planned to reach the airport in 2014. In central Europe, there are works and studies for upgrading the Wien-Bratislava railway line which aims to link the new Vienna central railway station to the Vienna and Bratislava airports. The new railway investment linking Erfurt and Halle in Germany with an EU contribution of 57 mil euro will allow passengers to move at a maximum speed of 300 km/h. The project aims to improve access to the airport with a planned stop at Leipzig/Halle airport (EU EVAL., 2010, [4]). Another example of improving accessibility by rail to the airport is the Liverpool John Lennon airport situated in Merseyside in the North West England. In the 2000-2006 programming period, the ERDF supported the further phase of the development aiming to increase capacity from 3 million to 6 million passengers per year. The airport has improved its accessibility to railway passengers after the completion of the Liverpool South Parkway rail station in 2006 (EU EVAL., 2010, [3], Appendix C).

Generally, there is no smart growth without opportunities to travel quickly and safely by air. Cohesion Policy should aim to improve access to airports, by railway in particular. Young people from all around Europe should have a chance to be 'on the move'.

1.5. Conclusions

Europe 2020 recognizes innovation driven, smart growth as a solution to European macroeconomic performance and structural weaknesses. The strategy identifies a number of areas where public intervention is needed and provides a broad picture of desired actions at European, national and regional level. This chapter describes **a number of traditional cohesion policy measures** that have been used successfully in the past and **put them in the perspective of the Europe 2020 goals**. **Innovation support** is discussed (especially direct and indirect measures of enterprises support and research performance support) as well as **the role of transport** in building smart growth with the use of cohesion policy measures.

Innovation support measures under cohesion policy are targeted mostly at firms and to a smaller extent to research institutions. Significant support is also devoted to improve the innovation system to address not only firm-level specific market failures, but also the functioning of the whole institutional network crucial for innovation processes. It is important to remember that although **Europe is likely to experience a policy shift** to a wider use of financial engineering measures and indirect measures, the policy choice must correspond to the problem. Therefore also in the future enterprise support **will need a broad range of both direct and indirect cohesion policy measures**.

Although there is no evidence of general superiority of direct repayable support (e.g. financial engineering) versus non-repayable support (grants and loans) – or vice versa – it seems that **non-repayable support is more effective for innovative, R&D intensive projects far from the market**, while **financial engineering is more appropriate when lack of private financing is due to financial market failure** and not to the asymmetry of information. The main factor is the risk involved in innovative activities, and particularly in R&D activities, sometimes cannot be resolved by repayable support alone. Such barriers should be addressed by non-repayable forms of support also in the future.

On the other hand much support from structural funds at the moment in the form of non-repayable grants could and should be given in the form of loans and other repayable support measures. This includes especially **support for investment projects**, when not the risk, but financial market failure alone is the most important barrier for an entrepreneur. **Financial engineering measures proved to be effective** in supporting SMEs (in both innovative and non-innovative activities), but **underestimation of legal and organisational complexity** of venture capital and loan

funds is a common problem. Especially venture capital funds have to be designed in a very sophisticated manner to both ensure an effective use of resources and a real impact on the economy.

The “innovation system” approach proves that to enhance innovativeness and competitiveness of the economy also **indirect support, influencing the business environment, is important**. This is particularly in the case of services for SMEs, but the evidence shows that in **indirect support a bottom-up approach is crucial** – that is support should be designed and granted in line with the specific needs and potentials of the beneficiaries.

An important part of the indirect support is for science parks and clusters. These measures **have to be based on the existing potential and aimed at the existing, potentially successful initiatives**. Clusters and parks can facilitate the effective use of the existing potential, but usually fails when such potential is missing or insufficient. Support for business-science cooperation may take many forms and should not be limited to cooperation within science parks or clusters. Favourable conditions for such cooperation can also be created by **grant support and support for cooperation networks, vouchers etc**. Evidence suggests that **the demand for such measures is high** and that they are potentially effective – especially in case of cooperation of firms from lower-developed regions with entities from better-developed areas.

Public research organisations (universities and various institutes) are crucial counterparts for companies in the innovation system; at the same time **their effectiveness in generating relevant innovations differs across countries and sectors**. Cohesion policy at national and regional level should play an important but supplementary role (to EU and national policies) by enhancing cooperation as well as stimulating research activities.

Human capital is a crucial factor for productivity growth and the innovativeness of the economy. Most cohesion policy measures affect the business environment indirectly in this regard (i.e. increase of human capital is achieved mostly thanks to the policies within educational and training system), but enterprises play an important role in lifelong learning programmes and increasing the adaptability of workers. **Smart growth therefore needs a strong focus on human capital issues**.

The role of metropolitan areas is crucial in understanding the relationship between transport and smart growth which is one of the three priorities of the Europe 2020 strategy. Agglomerations are considered “motors of growth” particularly in innovation and R&D investments. Agglomeration effects can be strengthened by decreasing travel times and relieving bottlenecks. Particular attention should be paid to the construction or upgrading of transport infrastructure in the growth poles, linking the city centre with its suburbs and the surrounding region and integration of different transport modes. Imposing congestion pricing schemes, preference for urban transport or constructing tunnels and bypasses are possible solutions. When the urban flows are considered, it is clear that **railway is a mode of transport that should be the most supported for people who commute to work in the metropolitan areas**.

The easiest way of travelling between growth poles on long distances is not only by rail but also by air. In this context it is important to improve access to airports by all modes of transport so that people have a chance to be “on the move”. There are still many European airports, in eastern European in particular, which have no direct railway connection to the city centre.

At national level, the largest increases of car ownership and heavy traffic load between 2000 and 2010 were reported in Eastern European countries. Bulgaria, Lithuania, Poland, Romania and Slovakia are characterized by high values of size and location polycentricity index and a low value of connectivity index which means that in relation to their polycentric urban system they suffer from insufficient modern transport networks. Linking growth poles by modern and reliable transport systems contributes to wealth distribution and diffusion of knowledge and innovation. **The objective of Cohesion Policy should be to improve the currently underdeveloped and underinvested transport networks linking agglomerations in the EU-12 states so that their economic growth is smarter**.

2. Cohesion Policy and „Sustainable growth” within the EU2020 strategy – remarks and conclusions

2.1 “Sustainable growth” within the EU 2020 strategy

One of the three priorities of the EU 2020 strategy is **sustainable growth**¹⁰. In the current decade, the efforts of EU Member States should focus on building a more environmentally friendly and more competitive economy in which resources are used in an effective manner. The EU’s response to the challenges posed by environmental degradation, biodiversity loss, rapid economic development and the inefficient use of resources is a balanced approach to growth.

The EU 2020 strategy points to three key areas:

- **Competitiveness:** The EU should remain a market leader in environmentally friendly technologies – thus ensuring the efficient use of resources throughout its economy – and remove barriers hindering the operation of key network infrastructures, thereby increasing the competitiveness of industry.
- **Combating climate change:** To achieve climate objectives it is necessary to further reduce emissions of greenhouse gases. More efficient use of resources can greatly contribute to reducing emissions, generating more savings and boosting economic growth. The strategy also highlights the role of strengthening the resilience of economic systems to climate risks and places strong emphasis on preventing and coping with disasters.
- **Clean and efficient energy:** Reducing energy consumption and increasing the share of renewables in the coming decades will generate cost savings and increase energy security.

The full implementation of the EU 2020 strategy’s sustainable growth objectives requires action in many areas and sectors. This chapter focuses only on selected issues, in particular on meeting the objective of sustainable growth in the environment, energy and transport sectors.

The objectives of a lasting separation between economic growth and environmental pollution and a more efficient use of resources are contained in several documents published by the EC over the last decade, including the EU Thematic Strategy on the sustainable use of natural resources (COM (2005) 670). The proposed approach is a continuation of trends that have crystallized over the last decade. However, the EU 2020 strategy introduces a new perspective on issues of environmental conservation and competitiveness. It moves away from a sectoral perspective and emphasizes the close interdependence between the rational use of resources, reduction in environmental pressures and an increase in economic competitiveness.

The EU 2020 strategy sets out general lines of action. More detailed assumptions are contained in the Communications: *Regional policy’s contribution to sustainable growth in EU 2020* (COM (2011) 17) and *A resource-efficient Europe – Flagship initiative under the EU 2020 strategy* (COM (2011) 21). The key point is the **efficient use of resources**, with **resources** defined quite broadly, to include not only raw materials, such as fuels, minerals and metals, but also food, soil, water, air, biomass and ecosystems. In light of this definition, the majority of environmental protection and power engineering measures, supported through Cohesion Policy, contribute directly or indirectly to a more efficient use of resources.

Europe 2020 emphasizes that the EU can boost sustainable growth both via a resource-efficient Europe and an industrial policy for the globalisation era. Transport combines both of these aspects. We discuss how renewable and alternative transport energy sources and modal shift may contribute to resource efficiency and how TEN-T transnational sections, better access to ports and intermodal solutions may have an impact on European industry and competitiveness not only at the global, but also at regional level.

In the environment and energy sectors, the effect of many projects on the interim targets as of the EU 2020 strategy (e.g. the impact of renewable energy projects on reducing CO₂ emissions) is indisputable and requires no

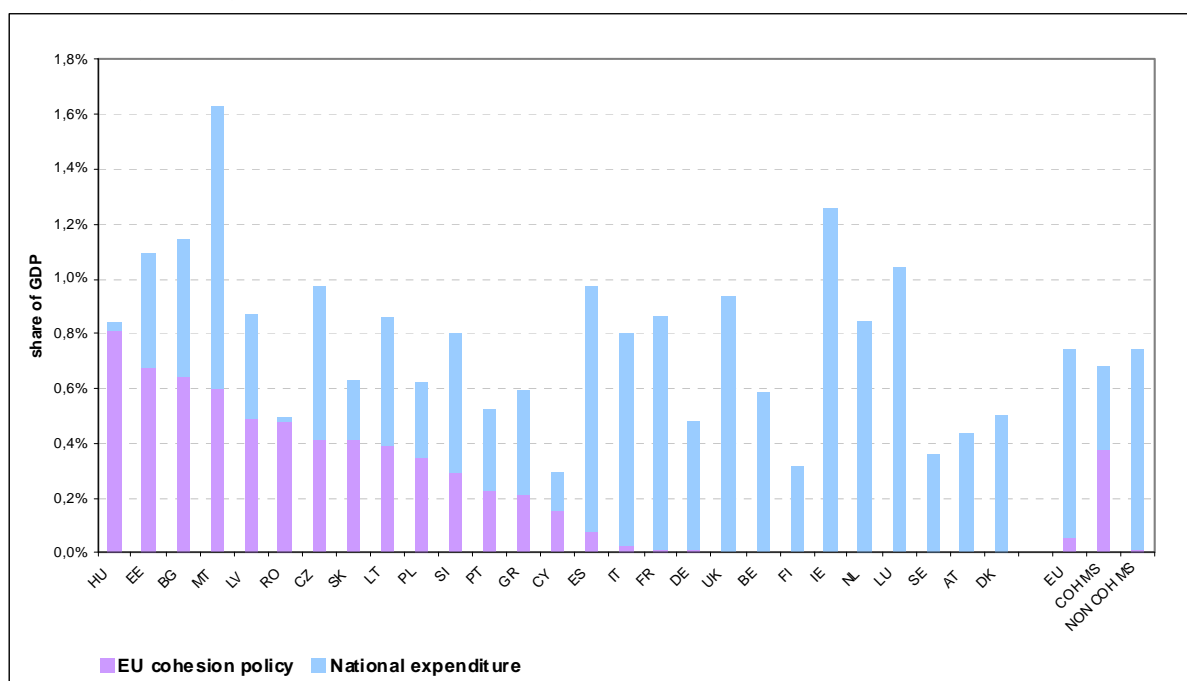
¹⁰ There are many definitions of **sustainable growth** offered in the literature. In this chapter the concept is defined through the lens of the Europe 2020 objectives, which refer to a permanent separation between economic growth and environmental pollution, the maintaining of the competitiveness of economy and, consequently, to economic growth. In the areas of environment, energy and transport these issues are often very closely interrelated.

additional evidence. In view of this, this section gives more attention to the assessment of implementation mechanisms and the identification of measures which maximize both ecological and socio-economic results and stimulate projects critical to achieving EU 2020 objectives. Due to the innovative nature of many activities and the lack of experience in Cohesion Policy, findings from the implementation of other instruments – such as LIFE and several national programmes – have been drawn upon.

2.2 The development of environment and energy infrastructure

Projects in the environment and energy sectors play a key role in achieving the EU 2020 objectives defined within the **sustainable development** priority area. Cohesion Policy has been an important instrument for stimulating the implementation of those projects in the periods 2000-2006 and 2007-2013 and therefore its contribution to the objectives of the EU 2020 strategy seems indisputable. The importance of Cohesion Policy for meeting the EU 2020 objectives is also explicitly emphasized in the Communication: *Regional Policy contributing to sustainable growth in EU 2020* (COM (2011) 17), which states that regional policy plays a crucial role in stimulating the scaling up of projects that promote smart and sustainable growth by supporting activities for climate, energy and environment protection. In 2000-2006, environmental infrastructure across the EU was largely financed from the budgets of Member States (about 51%) and by industry (about 28%). The remaining 21% came from the EU budget, including about 8% from the Cohesion Fund and about 6% from the ERDF. In 2000-2006, the ERDF invested 21% – €25.5 billion – from its total allocation in environmental protection and the Cohesion Fund allocated a further €15.8 billion. Given this, the contribution of European funds in the construction of environmental infrastructure should be regarded as substantial (EU EVAL, 2010 [1]). In cohesion countries (Greece, Ireland, Portugal, Spain and EU-12), the ERDF, CF and ISPA resources played an even greater role because they represented a very significant part of the resources devoted to environmental protection.

Figure 2.1: Total public expenditure on environmental protection in relation to GDP (2008)



Source: COM (2011) 17, Eurostat, DG REGI COH MS: Cohesion Member State – NON COH MS: Non Cohesion Member States

The evaluation reports summarizing the 2000-2006 financial perspective show quite clearly that Cohesion Policy had a significant impact on spending trends and contributed to the intensification of activities in environmental protection.

So far, ERDF and CF environment and energy projects by Member States have focused primarily on meeting the obligations under various EU directives and on improving the quality of the environment. Therefore, the vast majority of ERDF and CF resources have been allocated to environmental infrastructure, primarily water supply, sanitation and waste-management systems. Other projects aimed at the efficient use of resources, including air-quality, flood-protection and nature-conservation projects, have been funded to a lesser extent – mainly under the ERDF (EU EVAL, 2010 [3]; EU EVAL, 2010 [4]). The financial support has helped intensify action taken by local

governments, state governments, entrepreneurs and farmers and fill the gaps in basic infrastructures at a much faster pace. Even though local and regional needs have been met only to a limited extent, most investments would not have been possible without subsidies (LT EVAL., 2010 [1]; PL EVAL., 2010 [10]; PL EVAL., 2008 [20]; PL EVAL., 2009 [2]).

Evidence of the environmental effect of projects promoting socio-economic growth can be found in many studies. The studies also draw attention to difficulties associated with a comprehensive assessment of socio-economic effects on the basis of the indicators monitored (LT EVAL., 2010 [1]; PL EVAL., 2008 [19]; PL EVAL., 2008 [20]).

Efficient use of resources

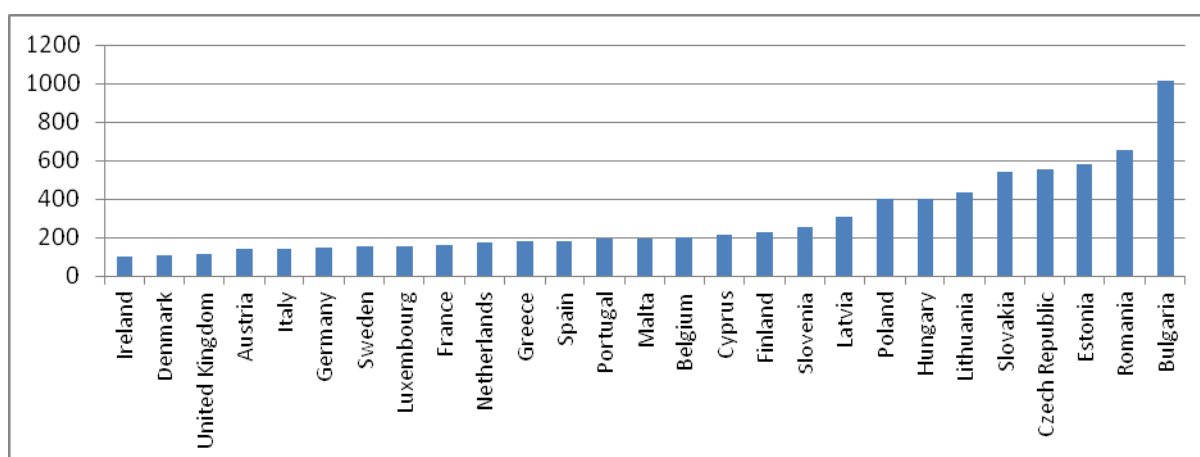
As envisaged in the EU 2020 strategy, by 2020 the EU should have reduced greenhouse gas emissions to levels at least 20% lower than those of 1990 (or, if conditions permit, to levels up to 30% lower); the share of renewables in total EU energy consumption should grow to 20% and energy efficiency – by 20%. The long-term goal is to decouple economic growth from energy and resource consumption, which should reduce the EU's dependence on external supply sources of basic raw materials and goods, enhance the security of supply of resources in Europe and make the EU economy more resistant to the increasing prices of energy and resources in the future.

The goal is ambitious. In recent decades a steady increase in the consumption of natural resources in Europe has been observed. Their extraction in Member States has been stable throughout the last decade, but dependence on imported resources is growing (EEA, 2010). Given the dynamics of processes in this area, achieving tangible progress in terms of the effective use of resources and energy, as well as a reduction in CO₂ emissions in a relatively short period of time requires action across all sectors of the economy, not just those characterized by the high consumption of resources and energy.

The EU 2020 strategy emphasizes that action in this area is of great importance to the future of the Union. Given the current changes in world energy and resource markets, an increase in resource-use efficiency will be crucial when it comes to securing economic growth and employment in Europe. It is assumed that the increase will provide extensive economic opportunities, improve productivity, reduce costs and contribute to a rise in competitiveness.

Countries which use the Cohesion Fund's instruments are facing special challenges. For most, their economy's energy intensity is far above the European average.

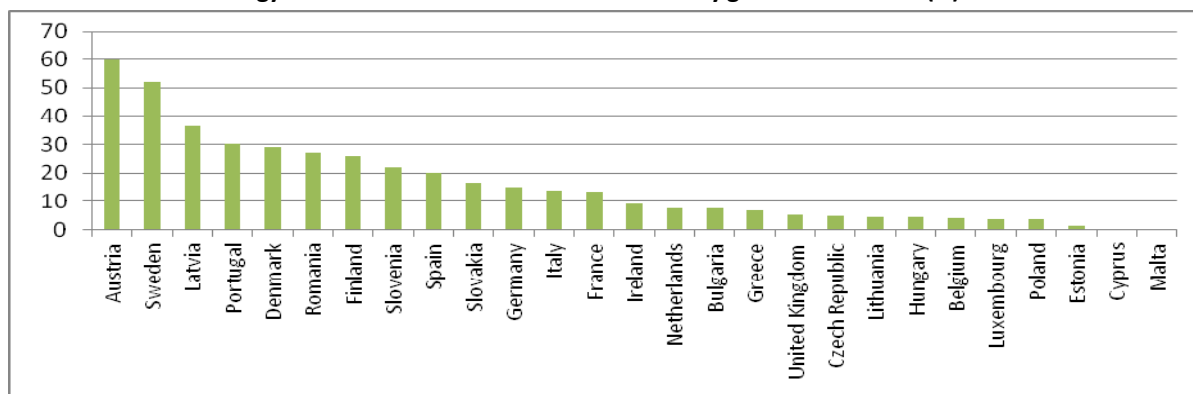
Figure 2.2. The energy intensity of EU Member States' economies in 2007 expressed as ratio of energy use to GDP (kg oe/1000 euro)



(Source: EUROSTAT)

A similar gap exists in the case of the share of energy from renewable sources.

Figure 2.3. The share of energy from renewable resources in EU electricity generation in 2007 (%)



(Source: EUROSTAT)

• The implementation of low-carbon technologies

Meeting EU objectives of reducing CO₂ emissions and those from the area of energy production and consumption, constitute a significant challenge to Member States and will require action in many areas. The Communication: *Regional Policy contributing to sustainable growth in EU 2020* (COM (2011) 17) focuses chiefly on renewable energy and thermomodernisation. An analysis of concentrated solar power (CSP) plants on climate protection and the development of renewable energy suggests that other activities to support the development of renewable energy, improve energy efficiency and reduce energy losses, will also play a role. Because of the different conditions in individual Member States and regions, the objectives can be pursued in various ways.

At the preparation stage of programmes in the financial perspective for 2000-2006, climate change and energy management issues were not a priority and were usually part of a broader agenda to prevent airborne pollution (EU EVAL., 2010 [3]). Investments in renewable resources or energy efficiency and energy-loss reductions have only become an important component of programmes implemented during the current financial perspective. Therefore, experience in financing activities in this area is rather limited.

The development of renewable energy

Owing to the technological progress of recent years, Member States have a broad spectrum of technological solutions at their disposal to facilitate the efficient acquisition of renewable energy. As far as the amount of energy produced from renewable sources and the effect on reducing CO₂ emissions are concerned, in 2000-2006 projects dealing with wind energy and the co-incineration of biomass were the most effective (EU EVAL., 2010 [3]).

Box 2.1. A wind farm in Tymień (West Pomerania, Poland)

One of the largest renewable energy projects pursued with the support of Cohesion Policy is a wind farm in the town of Tymień (West Pomerania, Poland). The farm's annual production of electricity is 125 GWh, which is sufficient for 100 thousand households. In addition to the ecological impact, the investment has brought about an economic revival of the area. It is also a source of additional revenue from property tax, which currently plays a significant role in the budget of the agricultural community (IETU, 2008).

Most wind-energy projects funded in the previous financial perspective were small-scale. The main barriers to financing large-scale projects were long project-preparation periods and technical limitations (PL EVAL., 2009 [13]).

ERDF resources were also used to support investments in biomass combustion.

Box 2.2. Biomass for producing heat and hot water in Kechnec, Slovakia

An example of successful intervention is the use of biomass for producing heat and hot water in the village of Kechnec in Slovakia. The project's objective was to reduce CO₂ emissions and decrease dependency on coal imports. The upgrading of the heating system has also led to an increase in energy efficiency from 80 to 85%. Interesting results were also obtained in the Midi Pyrenees in France, where the ERDF funded 21 local projects using wood waste to produce energy. The projects have enabled the effective management of waste from the wood-processing sector. The project resulted in the installation of 1,919 collective heating systems (EU EVAL., 2010 [3]).

An additional effect of projects promoting the use of biomass for energy purposes was the boost to the development of enterprises involved in the processing of biomass and the creation of new jobs (EU EVAL, 2010 [3]; PL EVAL, 2010 [10]). However, the effect on local labour markets is not guaranteed and depends on the scale of project. In the case of biomass firing projects or co-firing in large plants (power plants and CHP plants) there is a risk of depleting resources in local markets. Such a situation inhibits growth opportunities for small and medium biomass-processing enterprises which generate valuable jobs, often in rural areas (PL EVAL, 2010 [10]). **Biomass co-firing in large plants is an effective and relatively inexpensive way to increase the share of renewable energy, but it can adversely affect local labour markets. In some regions, increasing the share of renewable energy will not be possible without the participation of biomasses, but it seems sensible to allocate public funds to smaller-scale projects, such as local power and CHP plants. What is also needed is a more integrated approach which takes into account – alongside various sectoral effects – the projects' impact on the development of local biomass markets.**

Biogas, hydropower, geothermal and solar energy projects implemented under Cohesion Policy were very rare.

Research based on life-cycle assessment (LCA) indicates that the environmental and economic effectiveness of different solutions for the use of renewable energies are quite diverse and highly dependent on regional conditions. With time, they also undergo dynamic changes due to technological progress, changing prices of resources and renewable energy production costs (LCA MET., 2008). This is confirmed by the results of research on Cohesion Policy which included a comparison of the cost-effectiveness of different renewable energy solutions (EU EVAL, 2010 [3]; EE EVAL, 2009 [1]; PL EVAL, 2010 [10]). It is, therefore, not possible to draw general conclusions about the most effective solutions and about the forms of renewable sources which should be preferred by the implementing institutions. **Decisions regarding the selection of directions and forms of support are strictly dependent on regional conditions and should therefore be taken at the level of Member States taking into account the most recent empirical data and forecasts on the effectiveness of different solutions.**

The most desirable from the perspective of maximizing the effects seems to be a comprehensive approach that takes into account various ways of acquiring energy from renewable sources based on the optimal use of local capacities.

Box 2.3. A comprehensive approach to renewable energy in the Portuguese Autonomous Region of the Azores

A good example of a comprehensive approach to the introduction of renewable energy is provided by the Portuguese Autonomous Region of the Azores, where, in the years 2000-2006, with the support of the ERDF, nearly €42 million were invested in climate protection activities. Financial support was given to a group of interrelated activities that had been selected according to their local energy potential (e.g. the development of geothermal and wind energy, the upgrading of small hydro-power plants). As a result of the projects, at present the Azores are among the most effective regions in Europe with respect to renewable energy (EU EVAL, 2010 [3]).

A key factor cited as a barrier to the development of renewable energy projects, especially wind power projects, is the lack of adequate infrastructure to deliver the energy produced. The existing systems are not well suited for the efficient distribution of energy from renewable sources (DK EVAL, 2010 [2]; PL EVAL, 2009 [2] [13] [14]). Some studies postulate that financial support should be primarily oriented to the rapid transformation of existing energy grids into smart grids. Such grids enable energy to be received from diffuse sources (e.g. wind turbines), its storage during periods of energy deficit and controlling the collection and use of energy in a way to optimise energy use in the entire system. For the countries which invest in wind power it is also the balancing of energy systems – including the development of international energy connections that can supplement future energy deficits in periods of lower production from renewable sources – which has vital strategic importance in terms of energy security and the efficiency of the energy system (DK EVAL, 2010 [2]). **A rapid development of renewable energy requires balancing the planning and construction of renewable energy production facilities with the development of energy grids.** In the case of renewable energy, the role of financial and legal instruments implemented by the state can be seen very clearly (PL EVAL, 2010 [10]).

Cohesion Policy also supported renewable energy projects developed by government, local governments, businesses and households. Most often they covered the installation of solar collectors and heat pumps, often complementing efforts to increase energy efficiency.

A significant barrier to planning and the extensive use of financial resources has been the lack of knowledge about the benefits from investing in renewables. A good example is provided by the Italian region of Lazio, where – because of poor interest among entrepreneurs – financial resources originally intended for the private sector were used to install photovoltaic cells in schools (EU EVAL, 2010 [3]).

Increasing energy efficiency and energy savings in buildings

The Communication: *Regional policy's contribution to sustainable growth in EU 2020* lists the reduction of energy losses and improvement of energy efficiency in buildings – which account for 41% of energy consumption in the European Union – among the key areas of interest (COM (2011) 17).

Analyses carried out using the LCA methodology show that the operating stage is crucial in terms of overall energy consumption. Therefore, modernization efforts should focus primarily on reducing demand for energy in buildings. A more efficient use of thermal energy in buildings, e.g. by thermomodernisation, can lead to significant reductions in energy consumption and heating costs (LCA MET., 2008; DK EVAL., 2010 [2]). Research results from Slovenia show that allocating €110 million to modernization measures can result in savings of 150 to 175 GWh per year (SLO EVAL., 2010 [2]).

Since thermomodernisation measures are characterized by a relatively quick return on investment, many operators choose to finance such activities from private sources or through credit. A barrier to the widespread use of such activities is the lack of knowledge about the benefits from the energy efficiency of buildings. **Given the extent of needs, support in the form of grants should be directed to demonstration projects of the most effective and comprehensive solutions**, which – in addition to the thermomodernisation of buildings – cover the upgrading of heating systems and development of renewable energy (thus enabling partial or full independence from fossil fuels for heating purposes in buildings). Such projects are generally aimed at the construction of furnaces for burning biomass, recuperative systems, heat pumps, solar panels, or small wind turbines. Depending on conditions, it seems optimal to use a combination of different solutions (EF, 2007; SLO EVAL., 2010 [2]). **Other important activities are information campaigns that focus on the economic benefits of reducing energy losses and action which motivates local governments by encouraging them to create programmes aimed at improving energy efficiency in partnership with businesses and residents** (EU EVAL., 2010 [5]; IETU, 2008). Good results have also been achieved through the use of payback mechanisms. However, at the design stage of such programmes, it should be considered what forms of support are available in the national or regional markets. Payback mechanisms should not be a competitor but a complement to the existing forms of support (PL EVAL., 2009 [14]).

Thermomodernisation of existing buildings has – in addition to reducing energy consumption – an impact on improving climate and acoustic conditions in buildings, which in turn has a positive effect on health (DK EVAL., 2010 [2]). It also contributes to an increase in demand for construction services, fosters the creation of new jobs and stimulates the building-materials market, thereby increasing domestic consumption and reducing energy consumption (EE EVAL., 2009 [1]).

From an energy-consumption point of view and CO₂ emissions, the production of building materials is also of great importance. Depending on the technology used the energy accumulated in building materials is noteworthy – ranging from 5.5 to 6.5 GJ/Mg. Concrete and steel are materials which radically increase the energy accumulated in buildings. The least energy-intensive material is wood. Wooden structures found in buildings contribute to the accumulation of carbon (LCA MET., 2008). Also in this case structural funds can play an important role through information campaigns and the demonstration of solutions beneficial from a climate-protection point of view. A model example is a demonstration project in Luxembourg.

Box 2.4. A three-story wooden school building in Luxembourg

Public funds were invested in the construction of a three-story wooden school. Innovative technologies and architectural solutions were used to enable very low energy consumption. The heating system was based on wood chips and a photovoltaic system. The demonstration effect was intensified by the fact that the project was set in a public facility frequently visited by residents (LU EVAL., 2007 [3]).

Increasing energy efficiency and energy savings in energy systems

Energy systems in Convergence regions mostly date back to the 60s and 70s, when the issue of energy efficiency was not a priority. Increasing energy efficiency and reducing energy losses in production and distribution systems is a complementary addition to activities aimed at the upgrading of buildings.

Cohesion Policy in the period 2000-2006 supported only a few projects in this field (mainly under the ERDF). An example of successful intervention is a comprehensive modernization of heating systems and a reduction in energy losses with the financial support of ERDF in Latvia.

Box 2.5. Heating systems in Latvia

33 heating systems were modernized and about 50km of district heat pipes replaced with the support of the ERDF. Among the beneficiaries was Olaine – a town in which energy losses were reduced by 920 MWh per year after the restoration of its heating system. The added value of the project was that it enhanced the overall attractiveness of the area covered by the project for the residents and business. Reducing heat losses also contributed to a reduction in heating costs (EU EVAL., 2010 [3]).

Evaluations from the countries where such projects were financed suggest that **support should be given to comprehensive energy system optimization measures (measures aimed at increasing energy efficiency should be taken at all stages of production, distribution and final consumption)**. Replacing or modernising the sources of heat is not very effective if there are significant heat losses at the transmission stage or if the buildings to which heat is supplied have not been subject to thermal upgrading (where necessary). A comprehensive approach requires an accurate diagnosis and cooperation of stakeholders from different sectors (LV EVAL., 2010 [1]; EE EVAL., 2009 [1]). A model approach has been developed by the EcoFund Foundation, a precursor to the financing of environmental protection in Poland.

Box 2.6. Support for comprehensive programmes in Poland

The EcoFund Foundation's strategy has been to support comprehensive programmes addressing the key environmental problems in particular areas. One area of activity has been the improvement of energy generation and distribution efficiency. Programmes covering many sub-activities, often implemented by several partners, have been characterized by spatial concentration on problem areas. One of the programmes was implemented in the Opole region, where air pollution presented a significant threat. The focus was on large cities where adverse impacts of industrial plants were amplified by small coal-fired boilers. The scope of activities was adapted to local conditions and included: the elimination of local boilers, the connection of buildings and housing estates to heating systems, the modernization and expansion of district heating systems and the installation of an automatic control system for the receiving, transmission and production of heat. The ecological effect was reducing CO₂ emissions by about 200 thousand Mg/year. At present, the heating system in Opole is one of the most progressive in Europe. The operator monitors all devices in distant heat exchanger stations with an intelligent remote control system. Any disruption to the operations of the stations is immediately signalled and can be removed even before the heat consumers notice. Moreover, the system signals and locates a leak in the heat pipes to within a few metres. Heat recipients can request the provision of heat to a given apartment, house or unit within a specified period of time (days, hours). This is important in the case of large spaces heated periodically (e.g. meeting facilities, sports halls). The project had the effect of a dramatic improvement of air quality in Opole as well as in all the other major cities in the region. Beneficial economic effects were also achieved since heat production costs decreased significantly (EF, 2007).

In a few cases, ERDF resources have contributed to the development of cogeneration systems, which have strong potential to improve the efficiency of the process of generating electricity and heat (EF, 2002). The Norte Region in Portugal serves as an example – its cogeneration systems contributed to a reduction of CO₂ emissions by more than 660 Mt/year. Projects on reducing energy losses and increasing the efficiency of energy and lighting networks can also help protect our climate. An example is a lighting replacement project consisting in replacing mercury lamps with sodium lamps in an urban agglomeration. The project led to the reduction of CO₂ emissions by almost 50 Mt/year (EU EVAL., 2010 [3]).

Energy consumption patterns are relatively varied at different times of day. High energy consumption during the daytime, resulting from the cumulative needs of industries and households, means it is necessary to maintain high power-generation efficiency. **Important measures for optimizing energy consumption are, among others, to develop systems capable of intelligent management of the distribution system, create conditions for intelligent energy consumption (for example by information campaigns) and provide economic incentives**, e.g. by introducing organizational and technical solutions to enable the variation of tariffs for energy consumption depending on time of day (DK EVAL., 2010 [3]).

A review of evaluation reports also reveals that the implementation of renewable energy and energy efficiency projects benefits both the environment and the economy. The most important gains are: reduced fossil fuel consumption and CO₂ emissions, less pollution, reduced costs associated with the production and purchasing of power, higher employment and enhanced energy security (due to lower dependence on imported energy), more cooperation and the balancing of energy distribution systems (e.g. through the development of TEN-E) (EU EVAL., 2010 [3]; EE EVAL., 2009 [1]; DK EVAL., 2010 [2]).

Analysis of the most efficient projects suggests that their efficiency was reinforced by: spatial concentration, spatial planning tailored to local conditions and needs, a comprehensive approach to solving the problems identified, a focus on both ecological and economic effects and the adaptation of local policies (e.g. to support the production and distribution of thermal energy).

- **Saving resources, waste prevention and recycling**

The rational management of resources is now one of the most important environmental and economic challenges that the Union has to face. An integral part of sustainable resource management is waste management, which should focus on reducing waste at its source and promoting the efficient use of materials through re-use, in particular recycling.

In the period 2000-2006, Cohesion Policy resources played an important role in the development of waste-management systems. Among the activities funded were the development of separate collection systems, waste management plants, sorting and composting facilities to enable waste recycling and the decommissioning and reclamation of landfills. The implementation of waste management projects was closely connected to the adaptation to EU requirements. In most countries EU resources – although they did not solve the waste management problems – helped approach EU standards at an increased pace (EU EVAL., 2010 [3]); EU EVAL., 2010 [4]; LV EVAL., 2010 [1]; PL EVAL., 2010 [10]).

Optimization measures of resource and waste management entail a tight control of production processes and costs. This reduces emissions, generates savings and substantially increases the competitiveness of the economy. This observation is confirmed by the results of research and analyses conducted at the level of Member States.

Research based on the LCA method provides ample evidence that the management and reuse of waste, compared to its storage, leads to significant energy savings and a reduction in pollutant emissions, including CO₂. Although the process of waste treatment involves resource and energy consumption, benefits outweigh environmental costs. An analysis of the waste management system used in the region of Asti (Northern Italy), based primarily on composting, suggests that this method of waste management offers significant environmental benefits, compared to the alternative storage system. This is the case in particular with reducing greenhouse gas emissions (BLENGINI, 2008). The results of studies conducted in the area of Bremen (northern Germany) indicate that thermal treatment of waste in incineration plants can contribute to reducing greenhouse gas emissions by up to half compared to the storage of the same amount of waste in a landfill site. It was also found that the optimization of power production in waste incineration plants leads to further reductions in greenhouse gas emissions (WITTMAYER, 2009). Research findings for the region of Kaunas, Lithuania, show that the most advantageous solution in terms of environmental impact is recycling (plastics, metals and glass), then energy recovery and, finally, the disposal of residual waste through storage (LUORANEN, 2009).

The results also demonstrate quite clearly that the environmental and economic effectiveness of different waste management methods is highly dependent on regional conditions (LCA, 2008). **As in the case of renewable resources, so with waste selection, the choice of optimal directions and methods of support can be quite varied in different regions.**

Developing a waste management system involves the creation of new jobs. An excellent example of the positive effects that introducing a waste-management system has on job creation is provided by Brandenburg, Germany. A comprehensive approach to waste management adopted there contributed to the creation of 147 new jobs and securing of a further 259 jobs in the SME sector (EU EVAL., 2010 [3]). Similar conclusions emerge from a Polish research project. The labour market is influenced to the greatest extent by the construction of waste management plants. The emergence of such facilities usually results in the creation of dozens of jobs, potentially – and very importantly – for people with lower qualifications. Moreover, the implementation of projects financed by the ERDF and the CF involved the development of additional transport and sometimes social infrastructure. Waste management plants are a source of substantial revenues for the budgets of communes. **The magnitude of the effects depends on the location of projects – stronger effects were observed in less-developed areas, where the jobs created were of greater importance to the local labour market (HU EVAL., 2010 [1]; PL EVAL. 2008 [19]).**

EU support had a significant effect on costs incurred by residents. Research conducted in Lithuania shows that the costs of waste management services to end-users were lower by about 66% than if the investments had been made without the support. An important role is also played by outflows from the sale of recycled materials, biogas and electricity, generated in the process of combustion (LV EVAL., 2010 [1]).

An important issue in terms of waste management is the sustainability of systems funded with public support, understood as the ability to function independently under market conditions. Several studies suggest that some installations experienced intermittent problems with self-financing. This was primarily the effect of a market downturn accompanied by a decline in the prices of raw materials, which led to a temporary reduction in demand and lower prices for recyclable materials. **Institutions that had implemented comprehensive solutions fared best during the crisis.** Owing to the diversification of income they had a greater ability to maintain positive financial results (PL EVAL., 2010 [10]).

Another problem from the perspective of project sustainability was the lack of effective mechanisms to ensure greater citizen participation in the separate-waste collection system (LV EVAL., 2010 [1]). The unsatisfactory level of participation was partially due to inadequate public information campaigns. It can be postulated that information campaigns should form an integral part of waste management projects. Environmental education carried out within projects should build a sense of individual responsibility for the generation of waste. Another important factor in increasing public participation is the development of national and regional waste management policies. Measures such as varying fees for the collection of mixed and sorted waste should be introduced. In Poland, an increase in the profitability of waste-management plants constructed with the support from the ERDF and the CF was due to raising fees for the management of waste at landfills (PL EVAL., 2009 [15]). This aspect is also highlighted in a Bulgarian study which states that a key factor in the implementation of an effective waste management system which is able to function independently is the adjustment of the administrative and legal framework governing the sector. The adaptations should facilitate cooperation between communes and companies active in municipal services (BG EVAL., 2010 [1]).

Several studies draw attention to the risks that result from the projects' low comprehensiveness. Funding landfill reclamation alone, in isolation from other activities, can lead to the lowering of fees by operators (LV EVAL., 2010 [1]). Investing in incinerators while disregarding the processing and recycling of waste, in turn, can lead to the adverse phenomenon of competing for waste (PL EVAL., 2009 [15]).

The implementation of comprehensive waste-management programmes is a major organizational challenge. The preparation and implementation of such projects requires a long-term perspective. The European experience shows that the time needed to implement an effective selective waste collection system is about 10 years (den Bear, 2006). Convergence countries have experienced big problems generating comprehensive waste-management projects (Fideler & Artim, 2006). In the period 2000-2006, some of the countries had problems using the funds allocated for this purpose (PL EVAL., 2009 [15]; GR EVAL., 2004 [1]). **Meeting Community requirements in the field of waste management involves active support in the preparation of projects and the close coordination of all action taken at regional levels. It is important to precisely define the priorities at central level and implement complementary financial, legal and organizational instruments to assist with the preparation of complex projects** (BG EVAL., 2010 [1]; LV EVAL., 2010 [10]).

From a perspective of the maximization of effects and sustainability of activities, financial support should be directed to complex programmes aimed at a comprehensive solution to the problems of waste management in a given area. Such programmes should include – depending on the needs identified – the construction or modernization of essential infrastructure, the development of selective waste-collection systems, the development of the recycling market, the promotion of the use of recycled materials, public information campaigns and an appropriate shaping of waste policy.

Box 2.7. A Scottish waste management programme

A good example of effective and comprehensive action was the implementation of a waste management programme in Scotland. The point of the programme was to create an effective system of integrated waste management, defined as the development and implementation of high-efficiency waste management systems and services, with an acceptable balance of costs and benefits, able to minimize the level of risk and maximize the efficient use of recycled resources for the sake of environmental protection and human health. Education was very important for meeting the goals of the programme which included several activities, varying according to the target group – young people, residents of apartments or detached houses, or representatives of the service industry. The strategy also addressed the planning system, which has a key role in waste management. Economic instruments were also introduced, with the intention of avoiding transferring waste management costs to other entities and charging those responsible for their production with them. At the same time, the Scottish Government created the Strategic Waste Fund for the implementation of the strategy. Its budget was pre-set at more than 240 million GBP. The implementation of the programme in the years 2001-2006 contributed to increased recycling rates from 4% to 18%, increased composting from 3% to 10% and a reduced share of landfill storage from 91% to 70%. In mid 2009, the share of recycling and waste composting in Scotland amounted to 38%, with 60% of the total waste collected disposed of in landfills.

The ERDF and the CF supported very few resource saving or waste-prevention-at-source initiatives, which are among the Community's priorities. Such activities were carried out primarily by enterprises (EU EVAL., 2010 [3]; SLO EVAL., 2007 [1]; PL EVAL., 2010 [10]).

To eliminate the correlation between economic growth and waste generation, it is necessary to develop and progressively execute complex waste prevention strategies, which should be the foundation for all other activities. Financial sources directed to Member States under Cohesion Policy should play a key role here and resource saving

and waste prevention should be a priority. A coherent analysis of the causes of the inefficient use of resources across regions should constitute the starting point for formulating guidelines for intervention.

It seems to be particularly important to support the development and deployment of cleaner and more efficient technologies as well as a wider use of eco-design. Information campaigns are also vital and are described later in this chapter (Section 2.3).

- **Protection of water resources**

Climate change and economic growth have an adverse impact on the quality and quantity of water resources. Water-saving measures and the promotion of more rational water management, leading to water being available in sufficient quantity and quality and used in a sustainable manner with the minimum use of other resources, should be the priority of water policy.

Water and sewage management were the main areas of environmental funding under Cohesion Policy which greatly contributed to increasing the number of people covered by an organized sewage-collection system. The number of people newly connected to sewerage networks and sewage treatment plants in 2000-2006 in the EU amounted to approximately 40 million (12% of the total population). It is estimated that Cohesion Policy has contributed to the achievement of half that number. In addition, owing to projects financed by the ERDF and the CF, about 14 million people are supplied with better quality water (EU EVAL., 2010 [3]). An ex post evaluation paper by the EC stresses that in some areas the projects' effect on meeting EU requirements on environmental protection is significant. At the same time, the study points out that most activities in the field of environmental protection did not bring immediate economic effects, particularly desirable in light of the EU 2020 strategy objectives.

In the case of water and wastewater projects the analysis of indicators collected by the project monitoring system seems to confirm this thesis. However, research carried out by Member States, with the objective of evaluating individual projects, point to numerous examples of a favourable impact of water supply and sanitation projects on socio-economic development:

- Some of the comprehensive projects completed consisted in the construction of water supply and sanitation systems in areas earmarked for investment, thereby creating conditions for the sustainable economic growth of communes and the creation of new jobs (PL EVAL., 2010 [10]).
- Some of the projects were implemented in areas of great natural beauty and thus of great tourist potential. The improvement of conditions for the performance of ecosystem services enhanced the development of tourism in these areas (PL EVAL., 2008 [19]).
- Separating sanitary sewage and stormwater led to a reduction in the demand for energy and resources for wastewater treatment, thus diminishing the costs of the process (PL EVAL., 2008 [20]).
- Upgrading water-supply networks resulted in the reduction of water losses during transmission and thus also the costs associated with the treatment and distribution of water (PL EVAL., 2008 [20]; SLO EVAL., 2010 [2]).
- Some of the comprehensive projects included the construction of water supply and sanitation systems in both built-up areas and areas earmarked for development. Such activities brought about the development of metropolitan areas and prevented the spread of buildings to previously non-urbanized areas (the concentration of buildings is beneficial from an environment and landscape protection point of view), as well as greatly reducing the costs of servicing the existing urban areas (PL EVAL., 2010 [10]).

These examples show that **water supply and sanitation projects have strong potential to generate socio-economic benefits**. A common feature of projects characterized by an extensive impact was a comprehensive approach which took into account the ecological and socio-economic needs equally (PL EVAL., 2010 [10]; LV EVAL., 2010 [1]; SLO EVAL., 2010 [2]).

The analysis of unit costs is particularly interesting in terms of the efficiency of projects supported. In the case of sewerage-network construction works, unit costs varied across the projects, resulting from varying field conditions. For some sewerage-network construction projects, unit costs per household connected were significantly higher than the maximum cost of building a household treatment plant. **Some reports indicate the need to use alternative sewage collection and treatment systems in areas with dispersed settlements** (e.g. household sewage treatment plants or local sewage treatment systems). They also suggest that activities carried out outside built-up

areas will have a significant impact on improving water quality (LV EVAL., 2010 [1]; SLO EVAL., 2010 [2]; PL EVAL., 2010 [10]).

One of the studies questioned the advisability of water-supply and sewage-treatment projects in communes that can afford the inclusion of investment costs in tariffs, i.e., in which an increase in water provision and wastewater treatment fees does not jeopardize the purchasing power of residents. These kinds of metropolitan areas could greatly benefit from loans, while grants could be redirected to areas in which individual investments result in an increase in costs above a level deemed acceptable (LV EVAL., 2010 [1]).

One component of the wastewater-treatment process – important from an environmental-protection standpoint, the efficient use of resources and the reduction of greenhouse gas emissions – is the management of sewage sludge. Analysis of reports prepared by the EC and Member States shows that – despite significant needs – sewage-sludge management activities were rarely included in water supply and sanitation projects. One of the limiting factors was low profitability (LV EVAL., 2010 [1]; PL EVAL., 2010 [10]; SLO EVAL., 2010 [2]). The ecological and economic effects of sewage-sludge management largely depend on the choice of technology and the organization of the process. Studies conducted in Germany with the LCA method demonstrate that innovative methods of waste disposal such as solar sewage-sludge drying, which can contribute significantly to reducing greenhouse gas emissions and conserving natural resources, have high ecological and economic potential. Moreover, they greatly reduce the costs of sewage treatment (Wittmaier, Langer and Sawilla, 2009).

The acquisition and use of biogas generated in the wastewater treatment process is also of major importance in terms of climate protection. The extracted heat can be used in the process of sewage treatment and sludge drying, which reduces the costs of operating sewage treatment plants (PL EVAL., 2010 [17]).

In terms of maximizing environmental and economic effects, financial support should be primarily directed towards the development of complex software systems for wastewater treatment and water supply. Such programmes should cover diverse activities tailored to local conditions and be equally beneficial for the environment and local economies.

- **Enterprise projects**

Enterprises can contribute significantly to sustainable development. Particularly important are small and medium-sized enterprises that produce a significant share of regional income and provide many jobs. At the same time, SMEs enjoy a dominant position in some segments of the environmental-protection sector (e.g. recycling) and have a great deal of potential for the growth of eco-innovation (Eco-industry, 2007).

One field of support for environmental protection, directed at companies in the 2000-2006 period, mostly by the ERDF, was an adjustment to legal requirements. Other activities focused on the implementation of technological and organisational solutions for limiting energy losses, reducing the demand for natural resources or cutting down on waste generated during the production processes. Many activities for the effective use of resources and energy contribute directly to an increase in company competitiveness (Wuppertal Institute, 2008). Reductions in energy losses, a more rational use of natural resources and the use of cheaper recycled materials can all generate substantial financial savings. The positive influence green-technology projects have on the financial well-being of companies has been confirmed in a survey carried out on a group of over 200 enterprises in Upper Silesia (Poland) based on the propensity score matching (PSM) method. The companies that had implemented green technologies recorded higher income growth in the period after completing the project. On the one hand, the positive impact may have been the result of savings, on the other, of the marketing effect (more clients and potential partners attracted to the company's activities) (PL EVAL., 2009 [4]). This seems to be confirmed by the results of other studies, e.g. one conducted among representatives of companies that had been implementing green technologies with the support of the ERDF. The study demonstrates that some of the companies, encouraged by their positive experiences, launched more projects for the rational management of resources and energy with their own funds (PL EVAL., 2010 [10]). Given the rise in the prices of raw materials and energy, a continuous shortening of the return-on-investment period is to be expected (Eco-industry, 2007).

The amount of public funds directed to enterprises is not relevant to the needs and potential of the sector. The most effective and desired forms of stimulating the introduction of green technologies to enterprises seem to be:

- a) Support for demonstration projects (the promotion and incentive effect). A vital element of this kind of project is an extensive evaluation of their ecological and economic effects and information about the results – particularly about the beneficial ones (EU EVAL., 2010 [5]; PL EVAL. 2009 [4]; PL EVAL., 2010 [17]).
- b) Information campaigns and active support offered directly to companies. Insufficient knowledge about the economic benefits of green technologies is a barrier to broader implementation of such solutions (4 PL EVAL.,

2009 [4]; ISL, 2003). An analysis of projects financed by the ERDF and LIFE shows that a vital task in the popularisation of the widespread use of green technologies is that of developing a consultancy system for companies operating outside the clean-technology business. It involves direct support in the form of training courses or consultancy services, the creation of partnerships and clusters, as well as the production of good practice manuals and other information materials (DK EVAL., 2011 [1]; LU EVAL., 2007 [3]; Best LIFE projects).

- c) Dissemination of knowledge about the most effective solutions in groups cooperating with entrepreneurs at the project preparation stage, especially designers and architects (PL EVAL. 2009, [4]; PL EVAL., 2010, [10]).
- d) Supporting mechanisms for crediting green technology investments (Eco-industry, 2007).
- e) Stimulating demand for green technologies, among others by promoting green public procurement in government and local administration institutions, as well as among other institutions subsidised by public funds. The sustainability of the green technology projects depends on the rise in demand for ecological goods and services (Eco-industry, 2007; EU EVAL., 2010 [5]; EE EVAL., 2009 [1]).
- f) Investing in R&D in green technologies (Eco-industry, 2007).

It should be noted that supporting the development of modern technologies involves a rise in the demand for qualified labour, with a consequent worsening of unqualified employees' circumstances (HU EVAL., 2010 [1]). This makes it very important to simultaneously invest in green-technology projects and the training of present and future employees.

Coping with environmental change and policies aimed at mitigating it will require appropriate employment policy strategies and Cohesion Policy (in particular the ESF) can contribute to these policy approaches (EMCO, 2010).

Most of the studies on the labour market implications of climate change deal with the question of whether green jobs will be created and/ or analyse what will be the necessary skill adjustment for jobs and occupational profiles in the transition to a low carbon economy (Pearce and Stilwel, 2008; European Commission, 2009; OECD, 2010a; EMCO, 2010). To no one's surprise hardly any evidence exists on the effectiveness of various labour market policies in coping with the changes. Therefore, below we focus on the most important assessment results and conclusions drawing on the policy documents.

The labour market challenges resulting from climate change will not be dissimilar to the other major structural changes the labour markets have faced, such as globalisation or skill biased technological change, hence the **labour market policies that worked well before** (and which have been presented in this chapter) **will address the green transition** as well (EMCO 2010). This will involve, in particular, **flexicurity type policies helping to secure transitions between old and new, greener jobs**. Skill improvement and adjustment will be an important challenge: more young people, especially young women, need to be attracted to study science, technology, engineering and mathematics subjects, which will provide the basis for high-level low-carbon skills. In addition, teachers will have to be trained to teach new skills (cf. Box 2.8). Furthermore, there is a need to address stereotypes affecting these occupations and educational paths (EMCO, 2010).

Box 2.8 Green skills

The Europe 2020 strategy sets ambitious goals of a significant reduction in carbon dioxide emissions, an increase in the share of renewables in total energy consumption and an increase in energy efficiency. Attaining these goals will require many changes in the approach to production and consumption. Increasing importance will be attached to knowledge about modern technological and organizational solutions, which enable reduction in the consumption of energy and raw materials, about new methods of design (the so called eco-design) and about the relationship between ecological and economic factors in the ordinary course of business.

Danish clean technology market research has pointed to four areas in which demand for workers with specialized skills and expertise in environmental technologies will be significant in the coming years. These are: wind energy technologies, technologies associated with the use of biomass, smart grids and intelligent buildings. Research shows that some companies specializing in the development and implementation of clean technologies have had problems finding suitably qualified staff on the labour market. Lack of adequately trained personnel is an important factor that may impede the development of clean technology industry – it can cause the industry's development to be less dynamic than it could potentially be. Effective stimulation of the development of clean technology industry requires information campaigns directed to different target groups. Results of the Danish market research indicate that the main target group should be students in higher education and of technical schools, who will feed the labour market in the coming years. It seems most effective to include issues related to clean technologies in existing education programmes in technical institutes, rather than creating separate faculties (DK EVAL., 2011, [1]).

Labour market measures and Cohesion Policy interventions, in order to be efficient, will have to **be tailored to both regional and sectoral differences**, as job creation and destruction will be unevenly distributed (European Commission, 2009; CEDEFOP). The low skilled are likely to be most affected by the ongoing environmental changes (in particular by the potential *carbon leakage* in the economy), hence the need to set up particular measures for them (OECD, 2010a). Again, cooperation between local governments and local stakeholders will be crucial for the adaptation of local economies to the environmental change (European Commission, 2009).

- **The ability of beneficiaries to generate complex and innovative projects**

A report summarizing the first years of the implementation of the Cohesion Fund in new Member States finds that good projects, offering comprehensive solutions to identified environmental problems, constituted a small proportion of all proposals (Fideler & Artim, 2006). A similar situation was observed in the case of the ERDF. Funds that were used most frequently were those allocated to water supply and sanitation – Member States had rich experiences in the preparation and implementation of such projects. Innovative projects, however, or those requiring a more comprehensive approach, such as the involvement of many partners, attracted less interest. This group included renewable energy projects and other complex waste-management and flood-protection projects. Despite the availability of resources, there were problems with the full realisation of the projects' stated goals (EU EVAL., 2010 [5]; PL EVAL., 2010 [10]; GR EVAL., 2004 [1]; SLO EVAL., 2007 [1]). The low level of contracting observed was caused by the lack of experience in implementing such projects on the part of both the beneficiaries and the implementing institutions (Fideler & Artim, 2006). In the present perspective, however, considerable progress can be observed as a result of a growing body of experience and the adaptation of the administrative and legal systems to implement complex projects (PL EVAL., 2011 [3]).

Similar conclusions can be drawn from studies which provide an overview on the implementation of the LIFE projects in Poland and Estonia. They show that the absorption of funds was initially very low – potential applicants had difficulties adjusting to an entirely new approach to project implementation (new areas, funds for innovative and demonstration projects). Another barrier was the lack of co-financing mechanisms (EU EVAL., 2010 [5]).

The EU 2020 strategy and its related documents highlight a number of potential areas for support in which the preparation of projects requires a comprehensive approach. A strong focus is also put on activities for which there is currently little or no experience (such as adaptation to climate change).

Research conducted in Member States suggests that the financing and implementation system should be more effective in addressing the specific character of environmental and energy projects and take into account the long preparation period of complex projects. The experiences of old Member States in preparing and implementing projects indicate that a good strategy for supporting the preparation and implementation of projects is essential (Fideler & Artim, 2006). **Preparations for the implementation of complex and large projects (such as waste management, power grids and renewable energy) or new types of projects should be carried out by the implementing authorities well in advance.** The programming arrangements should always include: the development of an implementation strategy covering a comprehensive risk assessment, an information campaign, developing a framework for an effective crediting system tailored to the needs and capabilities of the beneficiaries and a programme of active support for the beneficiaries (SLO EVAL., 2010 [2]; PL EVAL., 2009 [1]; PL EVAL., 2010 [10]; BG EVAL., 2010 [1]). **An inadequate preparation and implementation strategy may cause the ambitious plans of the EU 2020 strategy to collide with the realities of the beneficiaries' inability to generate complex and innovative projects.**

Preserving ecosystem services

The Communication: *Regional policy contributing to sustainable growth in EU 2020* (COM (2011) 17) points to the important role of regional policy for enhancing ecosystem services. The goal is to preserve and maximize the potential of the environment and the benefits of properly functioning ecosystems. The preservation of ecosystems has become a subject of interest in the EU 2020 strategy as it fosters the creation of sustainable jobs and promotes economic and social growth (TEEB PM., 2009).

Various activities, directly or indirectly relating to the protection of natural resources, development of green infrastructure and prevention of natural hazards, may contribute towards achieving this goal.

- **The adaptation to climate change and prevention of natural hazards**

In the last decade the EU has seen significant growth in the number and intensity of the negative effects of natural disasters, such as floods, forest fires or storms. The damage consisted mainly in the destruction of economic and social infrastructure and the degradation of ecosystems. According to reports presented by the European Environment Agency, flood losses in Europe are increasing with each decade. The reasons are the increasing share of developed land in the total river catchment areas and the progressive growth of the value of property. Record losses were reported in August 2002 during the so-called millennium floods, which simultaneously affected the river basins of Austria, Croatia, the Czech Republic, Germany, Poland, Romania, Slovakia, northern Italy and Hungary. According to the EEA they amounted to approximately €12 billion (EEA, 2007).

The Communication: *A Community approach to the prevention of natural and man-made disasters* (COM (2009) 82) states that natural disasters can have a negative impact on economic growth and competitiveness. According to calculations made by the EEA (EEA, 2007), inertia in adapting to climate change will generate significant costs. In the short term it is essential to seek effective ways of adapting to climate change because in the decades to come adaptation to climate change may cost a great deal more than is apparent from the current plans (Parry 2009; TEEB, 2009). **Disaster prevention should be seen as a very rational and efficient activity because the cost of preventive measures can be many times lower than the cost of repairing potential damage.**

It should be noted, however, that the problem of adjusting the economy, society and nature to climate change is a new issue, so there is little experience regarding the effectiveness of measures taken in this area. Pilot climate-change adaptation projects are executed under the LIFE+ programme. However, the evaluation of their effects will have to wait several years (LIFE best projects database).

The best-known field of action is flood control and prevention. It should be noted at this point that the Water Framework Directive 2000/60/EC (WFD) and the Directive 2007/60/EC on the assessment and management of flood risks introduced a whole new perspective on issues of water protection and flood protection. This approach requires a comprehensive attitude to flood protection and catchment-based action planning, as well as the inclusion of the needs of river valleys' ecosystems. In the next decade, flood-hazard maps and risk maps for entire river basins will constitute the basis for planning.

Analyses of the 2000-2006 financial perspective address the issues of flood protection only to a limited extent. Such projects were rather rare. Some reports point to problems with the preparation of complex projects which involved the watershed approach to flood protection (SLO EVAL., 2010 [2]; PL EVAL., 2010 [6]; PL EVAL., 2010 [10]).

Box 2.9. A flood risk management project (Tisza river, Hungary)

A flood risk management project located in the catchment of the Tisza river in Hungary, co-financed by the ERDF and the CF, can be considered a model example. Action taken within the project includes the rebuilding of flood control infrastructure to recreate natural floodplains which can serve as natural flood control reservoirs during violent rain storms. Moreover, the project made the interim storage of water (good for irrigation purposes) possible. Also the restoration of natural wetlands has a beneficial impact on biodiversity. Additional advantages result from new opportunities for the development of organic farming, nature tourism and recreation. Attention should also be paid to small water retention projects implemented in Polish lowland and mountain forests. Projects of this kind have been successfully implemented in the last decade with the support of public funds managed by the EcoFund Foundation. Small water retention systems help increase the natural retention capacity of catchments and have a positive impact on biodiversity (EF, 2007). In the current financial perspective, comprehensive projects to improve small retention are being implemented on a much larger scale with the support of the CF.

The above examples show that well-designed risk prevention projects can help to preserve ecosystem services, including water quality and quantity and have a positive impact on biodiversity. Strengthening the buffer functions of nature can lead to better adaptation to climate change. **The effectiveness of flood protection projects is the result of good planning, close cooperation of key entities and the comprehensive nature of actions addressing both environmental and economic needs** (IPCC, 2008).

In the face of climate change, one should also pay special attention to urban public spaces – the majority of Europeans' natural environment. Large areas of nonporous surfaces limit the infiltration of rainwater and increase the risk of local flooding resulting from extreme rainfall. Another threat is the widespread use of materials that accumulate heat and thus contribute to an increase of temperature in urban areas during intense heat. Climate-change mitigation measures

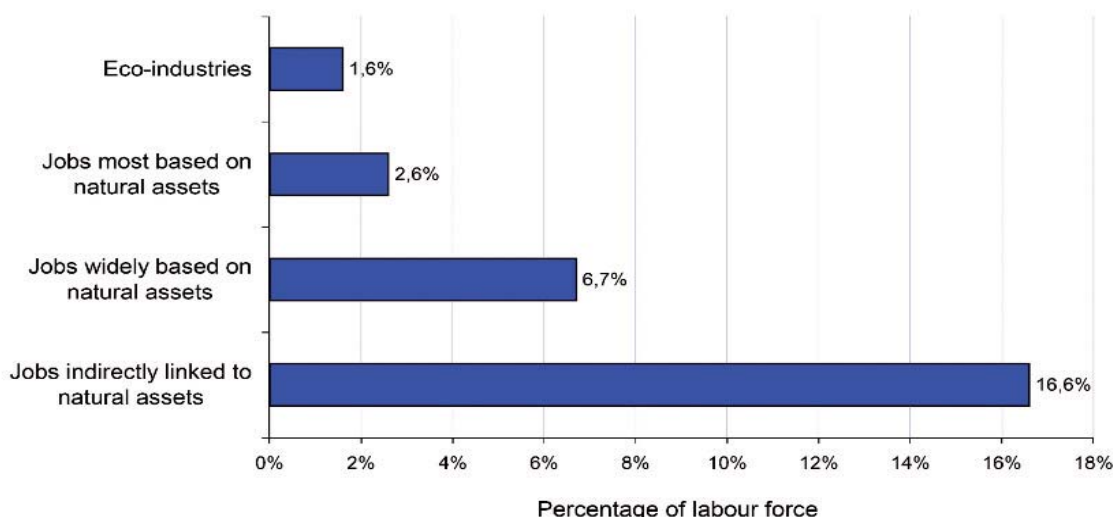
include proper development of urban green spaces, the planting of trees and rainwater retention systems. LIFE projects can serve as good examples of the effective execution of such tasks (EU EVAL., 2010 [5]; LIFE projects database).

It must be taken into account, however, that **the successful implementation of climate change adaptation projects – flood-control projects for increasing catchment storage capacity in particular – requires the involvement of many stakeholders**, including infrastructure managers, water and forest managers, local governments, land owners and NGOs. It is often necessary to adopt a completely new approach to the planning, implementation and funding of projects. **Success in this area will depend on a careful and sufficiently early preparation of detailed adaptation strategies, programme guidelines and accompanying measures aimed at removing potential barriers that may pose a threat to the completion of key projects.**

- **The protection of natural resources and development of green infrastructure**

The term "green infrastructure" refers to spatially or functionally related elements: forests, rivers, coastal zones, natural areas and landscapes, ecological corridors and other natural or semi-natural elements that are crucial in providing ecosystem services. Developing green infrastructure is essential for maintaining a balanced environment in which the economy and society can develop harmoniously. The development of green infrastructure facilitates adaptation to climate change, favours the creation and proper management of ecological networks, fulfils social functions and serves as the foundation of economic growth, particularly on greenfield sites (TEEB PM., 2009). The conservation of natural resources is of value in itself, while it has also significant implications for maintaining the potential for the sustainable provision of ecosystem services. It is estimated that about 16.6% of jobs in Europe are indirectly linked to natural assets.

Figure 2.4. European jobs linked to the environment



Source: GHK et al. 2007

On a global scale, every year 8 to 10 billion USD are invested in the protection of biodiversity (James et al., 2001; Pearce, 2007). The LIFE programme is a rich source of experience in using effective methods to protect natural resources. According to the ex post evaluation of the programme, LIFE projects have undoubtedly contributed to the better management of the Natura 2000 network and the better preservation of endangered species and habitats (EU EVAL., 2010 [5]).

LIFE experiences should be widely acknowledged in the preparation of Cohesion Policy projects. Still, the objectives of the EU 2020 strategy should not be disregarded, as they encourage a broader cross-sectoral perspective – integrated solutions, which influence the ecosystems but also create conditions for socio-economic growth.

Ecotourism, the fastest growing segment of the tourism industry, is very likely to generate economic benefits and jobs in areas of high natural beauty (Mastny, 2001). In 2006 in the United States the overall level of private-sector expenditure on recreation in natural areas reached 122 billion USD (U.S. Fish and Wildlife Service, 2007).

The development of ecotourism has been advanced by some of ERDF projects. Some Lithuanian projects had a positive effect on the development of tourism and the improvement of recreational conditions in areas of high natural beauty. A favourable economic impact is best illustrated by the growing influx of tourists to these regions (LT EVAL., 2010 [1]). However, it seems that **beneficial economic effects are driven by the concentration of budget allocations in regions with the greatest potential for tourism, through supporting programmes covering several related and complementary projects.** A noticeable effect on employment in the tourism sector can be expected when the programme uses the available resources in a comprehensive manner. Scattered small-scale activities for the

strengthening of selected aspects of the tourism industry have only limited potential to change the situation in the local labour market (HU EVAL., 2010 [1]).

It should also be observed that the attractiveness of areas of natural beauty is accompanied by high environmental vulnerability – such areas are particularly susceptible to the growing pressure of tourism, especially in the case of an uncontrolled growth of tourism. The improper development of tourism infrastructure may pose a threat to the existing species, habitats and the natural beauty of such areas. Tourism infrastructure projects can have beneficial ecological and socio-economic effects, provided that the location of sensitive species and habitats and the tourism capacity of natural areas are taken into consideration at the project planning stage (EF, 2007).

An example of an integrated approach which equally affects the protection of natural areas and their socio-economic growth is a support model developed in Spain (OTOP, 2009).

Box 2.10. Protection of natural areas and their socio-economic growth (Castilla y Leon region, Spain)

In order to prevent the social and economic degradation of regions some governments develop programmes aimed at promoting economic growth in Natura 2000 sites. As a result of these programmes, areas within the Natura 2000 network have begun to grow faster than other areas. This is mainly due to investments in the potential of natural areas, with respect to their unique environmental values. Alongside measures for improving the environment (flora and fauna protection), the programmes offer various forms of socio-economic development stimulation activities, including:

- a. Strengthening tourism potential while maintaining natural assets, for example by developing the necessary infrastructure;
- b. Support for socio-economic development, e.g. by creating conditions for economic growth, manufacturing and services, creating the foundations for economic activity, creating opportunities for self-employment, promoting local products and through quality labels;
- c. Direct improvement of the quality of life, e.g. through the development of environmental infrastructure, roads, etc.;
- d. Strengthening institutional capacity, e.g. through various activities for the professionalisation of the local administration staff.

A good example of an efficiently run programme is that of the Castilla y Leon region.

It is estimated that the existence of natural areas have directly contributed to the creation of 1,759 jobs (e.g. at hotels, hostels, campsites, entertainment and leisure organizations, restaurants, museums, manufacturing and the marketing of regional products). It is estimated that every 100 jobs directly created leads to the creation of a further 50.2 jobs to service the ones created directly. Greater control and emphasis on minimizing the environmental impact have also led to the maximization of efficiency and cost savings in local companies (BP Castilla., 2006).

Intensive support for natural areas, in particular those under different forms of protection, is additionally justified by the fact that very often they are peripheral areas, facing the risk of exclusion.

Particular attention should be paid to areas with conflicts of interest between socio-economic and environmental needs and concerns. There were a number of LIFE + projects conducted on Natura 2000 sites, whose aim was to find solutions for the harmonious achievement of both environmental and socio-economic objectives.

Box 2.11. Reduction of the impact of power lines on birds protected within the Natura 2000 network

One of many examples of the actions described is a LIFE project carried out in Spain (Murcia Region), whose objective was to reduce the effects of power lines on birds protected within the Natura 2000 network. The government of the region worked for many years analysing the impact of power lines on birds, particularly birds of prey, on some of the Natura 2000 sites, in order to estimate the risks they faced. The research led to the development of a strategy for the adjustment of overhead power lines on five Natura 2000 sites. The corrective measures applied to power lines deemed the most threatening to birds resulted in meeting the conservation requirements for the threatened species. In addition, the comprehensive approach adopted in the project deserves special attention. Efforts have been made in a legislative and training sense aimed at integrating preventive measures into new overhead power-line construction and renovation projects. The LIFE programme provides numerous additional examples of effective projects run on economically viable Natura 2000 sites (agriculture, forestry or fishing), seeking resolutions to conflicts between economic and nature protection needs (LIFE projects database).

Both ecological and socio-economic benefits can be generated through focusing public resources on selected key functional and spatial areas. A comprehensive approach should be adopted and the measures taken should acknowledge the key factors that affect the preservation or restoration of a given site's natural assets and help maintain or increase the potential for socio-economic development. The following are examples of such activities (EF, 2002, 2007; PL EVAL., 2010 [17]):

- Comprehensive water-conservation measures in areas with natural water dependent ecosystems through the elimination of point and surface sources of water pollution. Such activities can be: the development of collective sewage systems or – where this is not economically justified – the construction of household sewage treatment plants in functionally related areas, or the restriction of agricultural-waste discharge to water.
- The reduction of emissions in spa areas, where the preservation of the bio-climate, in particular air quality, is of essential significance.
- Comprehensive protection of endangered species (such as bats or owls), through the restoration of historic buildings, with an eye on the preservation of natural services and the adaptation of technical parameters to the needs of particular species.

Eco-innovation

In the 21st century, innovation has become one of the main ways to achieve the EU's environmental objectives. It is seen as a means to effectively implement the principles of sustainable development. Many publications emphasize that supporting and stimulating innovative activities should be focused in particular on developing ecologically sound solutions.

The Communication: *Regional policy's contribution to sustainable growth in Europe 2020* (COM (2011) 17) encourages Member States to provide greater support to the development of eco-innovation. Eco-innovation is considered an essential tool in the pursuit of resource efficiency, competitiveness and job creation in all sectors of the economy (Eco-industry, 2007). The Communication highlights the need of the development and broad implementation of new technologies.

In the financial perspective 2000-2006, eco-innovation was not commonly supported under Cohesion Policy and therefore experience in this area is rather poor. However, a number of interesting initiatives, that can serve as an inspiration for activities in the future programming periods, can be identified (EU EVAL., 2010 [3]). Experience can be drawn from the LIFE programme, which in the years 2000-2006 supported, among others, the demonstration of innovative technological solutions for environmental protection. In many countries the introduction of innovative environmental technologies has contributed to significant progress in the implementation of the EU Environmental Action Plan (EAP) (EVAL EU., 2010 [5]).

The Communication: *Stimulating technologies for sustainable development: an environmental technologies action plan for the European Union* (ETAP) (COM (2004) 38) defines environmental technologies and points to the need for their broad implementation. An analysis of renewable energy strategies prepared in different Member States shows that significant progress in this field involves the development of new technological solutions that will help produce, store and distribute energy in a more efficient way. Documents point to the significant role of research on new environmental technologies (DK EVAL., 2010 [2]; national plans for renewable energy).

The ETAP also highlights the role of eco-design, which should be widely applied to the creation of new products and services. Eco-design is an example of an integrated approach that involves many aspects including: expense reduction measures, the minimization of resource, waste and energy use in production, the improvement of resource-inventory management, the optimization of production processes, the introduction of new management and business methods, logistics-improvement methods and changes in consumption patterns.

Analyses of all manufacturing industries suggest that the main determinant of products' energy intensity at the production stage is the choice of materials, especially metals. Their share in energy consumption is 60-80%, sometimes reaching up to 90%. Innovative processes of material and product manufacturing help decrease the use of natural resources. Rational organization of labour and distribution leads to a further reduction in energy and material consumption, as well as a better use of facilities' working time (LCA MET., 2008).

Structural measures can play an important role in the development of eco-innovations, their direct introduction to various sectors (this aspect is described in section 2.1) and support for the implementation and promotion of environmental solutions.

Projects funded under LIFE demonstrate that the activation of local governments, businesses or residents, which includes professional advice or the provision of access to reliable information on the economic benefits of environmental measures, is often a sufficient incentive for the implementation of projects financed from their own resources. For high profitability projects the overall cost-benefit ratio of information campaigns is disproportionately better than for projects with direct public support (EU EVAL., 2010 [5]).

Similar conclusions can be drawn from reports summarizing the implementation of the ERDF. **Although financial resources allocated to environmental information and public awareness activities were lower than those assigned directly to the realization of projects, such activities often had significant beneficial effects on the environment** (LT EVAL., 2010 [1]). In some countries information campaigns offered noticeable support for the introduction of renewable resources.

Box 2.12. Support for renewable energy projects (Malta)

A good example is Malta, where public funds were insufficient for the direct support of renewable energy projects and therefore strong emphasis was placed on "soft" measures aimed at stimulating projects launched by private entities and public-private partnerships (MT EVAL., 2008 [1]). In Luxembourg, the focus of support was on a programme aimed at providing up-to-date information in the field of photovoltaics. The activities were targeted at consumers, manufacturers and installers (LU EVAL., 2007 [3]).

More examples of effective action in this area are cited in a European Commission report summarizing the implementation of the ERDF. Strengthening the social capital in the regions of Calabria (Italy) and Nord Pas de Calais (France) had a positive effect on the development of natural capital, through raising awareness, the modification of individual consumer behaviour and reduced demand for natural resources (EU EVAL., 2010 [3]).

Successful eco-innovations depend on the involvement of different actors (SMEs, universities, public authorities, etc.). The existence of environmental innovation clusters in a given area can be a stimulating factor for regional development. The allocation of resources for the strategy of the "Science and Business Park" in Lahti, Finland, is an example of effective support for an environmental technology cluster.

Box 2.13. Support for regional clean technology clusters (Finland)

The project, aimed at strengthening the knowledge base and business opportunities in the field of environmental technology, as well as supporting regional clean technology clusters, brought together industry and science. On account of the project, Lahti became a place of dialogue between different fields of knowledge and experience, which boosted innovation. The project brought together the experience and expertise of four Finnish universities. The universities were engaged in technology and innovation from an environmental perspective. The role of EU funds was twofold. Firstly, some projects focused on the development of environmental technologies and innovative systems were financed by the ERDF in the period 2005-2008. The implementation of these projects helped to create a common vision for the development of environmental technologies and innovations in the Lahti region, bringing together universities, companies, development organizations, funding organizations and communes, while preserving coherence between the different funding instruments. Secondly, the EU funds were used to create an economic waste management centre at the Helsinki University of Technology, mainly in Lahti, in 2006-2007. The establishment of the centre was a vital element in the creation of a regional research base. The effects of the activities are significant. Lahti has become a model clean-technology cluster. The ERDF helped to transform Lahti into an eco-innovation leader and an attractive hub for innovative, green businesses (EU EVAL., 2010 [3]).

A wide promotion of ICTs, which can play a significant role in the development of a low carbon economy, is another important method of intervention. Network information and communication infrastructure, along with innovative services and applications, is the main factor enabling the use of environmental technologies and eco-innovation. Increased investment in ICT contributes to improving communication and a reduced need to commute, thus providing environmental and social benefits. Investment plans in this area should include not only changes in transport infrastructure, but also address the possibility of a deterioration of social ties, which was highlighted in the case of the West Midlands region in the UK and Vaestra Géstaland in Sweden. However, it is considered that investments in ICT proposed in the Vaestra Géstaland region, which go along with the development of transport

infrastructure, can have a positive impact on the development of human capital by creating and strengthening networking as well as improving skills and qualifications (EU EVAL., 2010 [3]).

The conclusions of the reports summarizing the implementation of the ERDF and LIFE indicate that in the case of information campaigns, a modest amount of public resources can be the catalyst for the widespread use of desirable environmental solutions, characterized by high ecological and economic efficiency. The examples suggest that support for green technologies and eco-innovation can have a positive impact on both the economic growth of regions and their labour markets. The inclusion of similar activities seems necessary in future financing periods.

Box 2.14. The evaluation: “The Contribution of the Lithuanian Strategy for the Use of European Union Structural Assistance for 2007–2013 and its Operational Programmes in Achieving the Objectives of EU 2020 strategy”

The internal evaluation initiated by the Ministry of Finance of the Republic of Lithuania aimed at defining the contribution of the European Union (EU) structural assistance for 2007–2013 in implementation of the EU 2020 strategy. Analysis focused on direct contributions of the Operational Programmes (OP) for the Development of Human Resources, Economic Growth, Promotion of Cohesion for the period 2007–2013 to the EU 2020 strategy. The evaluators used the criterion of compatibility and evaluated to what extent the activities of OP measures are directly compatible with the activities foreseen in the Europe 2020 strategy and its flagship initiatives.

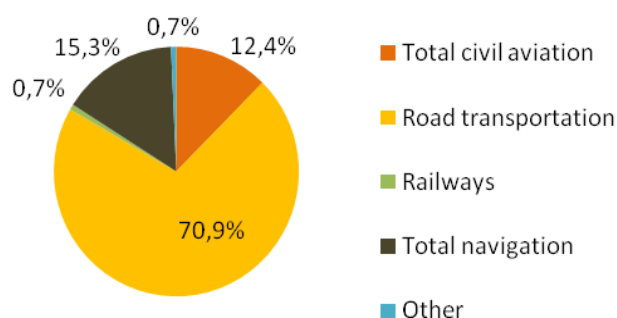
The analysis showed that 143 OP measures (out of 176 analysed measures) **directly contribute to the EU 2020 strategy that makes about 80 per cent of total EU structural assistance for 2007–2013**. 3 OPs contribute significantly in the implementation of priorities and targets of EU 2020 strategy, but to different extents. **The largest financial contribution of the OPs (more than a half) is attributed to the second priority of the strategy – sustainable growth**. In this case, structural investments, which are mainly “hard”, are directed to the measures implemented in such areas as energy efficiency, efficient use of natural resources, waste management, recycling, improvement of infrastructure (energy, transport etc.), promotion of the entrepreneurship and etc. As EU Cohesion Policy is broader than the EU 2020 strategy, according to evaluators, about 20% of EU structural assistance is allocated to activities that are not directly in line with the EU 2020 strategy, but which contribute to the fundamental goal of EU Cohesion Policy, enshrined in the Lisbon Treaty, i.e. economic, social and territorial cohesion among EU regions. Thus, some of EU Cohesion Policy resources are used to finance regional development priorities that are not necessarily in line with EU 2020 strategy. It is noteworthy that the implementation of the OPs contributes only to some activities mentioned in the Strategy and flagship initiatives. This refers to the circumstance that the same target and/or priority of the EU 2020 strategy could be achieved by implementing different actions/measures which are the most relevant in addressing the problems of a particular region, i.e. the regional context and particularities are crucial in selecting the directions of structural investments in the context of the EU 2020 strategy.

2.3 Environmentally friendly transport

The relationship between transport and the environment is associated with decoupling transport growth from economic growth and reducing greenhouse-gas and pollutant emissions from transport (EU EVAL., 2009 [8]). Decoupling freight and passenger transport growth from GDP growth was one of the strongest objective of the 2001 White Paper (COM(2001) 370; COM(2006) 314). In the case of freight transport, this aim was not achieved. The strategy concerning passenger transport has been more successful. However, growth in demand had been slower than GDP growth also before 2001 so *there is no clear evidence that the relationship between transport growth and GDP growth has changed* (EU EVAL., 2009 [8]). According to the new White Paper (COM(2011) 144) there are new key sustainable goals which include, inter alia, a 50% shift of medium-distance intercity passenger and freight journeys from road to rail and waterborne transport by 2050.

The concept of **sustainable transport refers particularly to these modes which have a possible low impact on environment (rail, inland water, public transport in cities, such as metro or tram)** (fig. 2.5). However, successful transport and cohesion policy in this area can be traced not only to railway or metro infrastructure but also to other ways to encourage a shift towards more sustainable modes (modal shift). **Although modal shift is one of the main goals of transport policy, the overall target in this area should be reformulated and modal shift is needed only where appropriate, over long distances, on congested corridors and in urban areas (COM(2006) 314; EU EVAL., 2009 [1]).** Following this conclusion, sustainable transport works only together with smarter geographical targeting and fund allocation.

Figure 2.5. GHG emissions from transport – EU-27 by mode (shares %)



Source: EC, Pocketbook (2010)

In 2005 transport was a significant source of the 1.3 million tonnes of CO₂ equivalents of greenhouse gas (GHG) emissions which accounted for a quarter of total EU-27 GHG emissions in 2005. Between 1990 and 2006, the share of transport in producing GHG has increased whilst emissions from other sectors have decreased (EU EVAL, 2009 [1]). A country that was successful in reducing GHG growth was Germany (only a 4% increase between 1990 and 2006). This was a result of the improvement of regulatory framework of passenger and freight rail transport, the increase in fuel taxation and introduction of road tariffs for HGV vehicles on motorways. In the same period transport emissions of air pollutants (particulates, acidifying substances and ozone precursors) were successfully reduced in EEA Member States. For example, emissions of acidifying substances decreased by 36% (EU EVAL, 2009 [1]).

This subchapter, related to the role of transport in sustainable development, is divided into five parts : 1. Railways; 2. Urban public transport; 3. Transport, energy and Intelligent Transport Systems; 4. Inland waterway transport; 5. Access to ports.

Railways

Railways are the most environmentally-friendly mode of land transport. The share of rail in the EU-27 overall passenger traffic increased between 2003 and 2008 from 5.9% to 6.3%. However, within countries there are some significant differences. For example, in 2007 the share of rail passenger traffic was nearly 12% in Hungary, while in Greece and Lithuania shares were close to 1%. Despite significant transport investments (especially in Greece), the performance of railway passengers expressed in passenger-kilometres in both Greece and Lithuania decreased in 2000-2008. Nevertheless, the highest reduction of rail passenger traffic occurred in Romania (EC, Pocketbook, 2010). The decline of rail usage in the EU-12 states was caused by the poor state of rail infrastructure. These countries suffer from severe railway-speed restrictions reducing efficiency levels (EU EVAL, 2010 [10]).

The ERDF evaluation (EU EVAL, 2010 [10]) highlights a strong focus on investments in roads during the 2000-2006 programming period. In many countries it was often easier to invest in roads than implement rail projects. The reason was a longer process for railway design, planning and approvals. The engineering constraints and technological complexity were also important. Railway investments often require a greater scale, along an entire route rather than over a short section. **The “spend” culture, in particular in the time of financial crisis and budget constraints, directs funds to the easiest projects which may not have been optimal.**

On the other hand, it should be noted that **smaller scale investments such as the remodelling of junctions can also lead to substantial capacity increases.** However, the transport strategy in most EU states (particularly Spain, Greece and Portugal) was focused on upgrading and building new railway lines rather than maintaining existing infrastructure (EU EVAL, 2010 [10]). In Spain the objective is to transform the railway system into the central element of intercity transport services for both passengers and goods which will help to concentrate action in corridors with the greatest demand (García-Montero et al., 2010).

Particular attention in many European states is being paid to High Speed Railways (HSR) which are regarded as one of the most significant technological breakthroughs in passenger transportation developed in the second half of the 20th century. The construction cost of HSR lines per kilometre (excluding planning and land costs) is in the region of €6–45 million (of 2005) and the average cost of HSR infrastructure maintenance of a 500km line accounts of about €30 million per year (Campos and de Rus, 2009). Despite the high cost, the game is worth the candle in polycentric and populous countries. **The introduction of high speed railway lines has generally been successful.** In 2008 the share of trains able to run 200km/h in total passenger-kilometres in rail transport exceeded 20% in

Germany, Spain, Sweden and was over 60% in France (EC, Pocketbook, 2010). France boasts the longest high speed rail network (1,961 km in 2009), followed by Spain (1,614 km) and Germany (1,285 km). Italy is also developing its new HSR network which is more than 800km in length. ERDF resources tended to be used for larger projects in Italian Objective 1 regions, for example the high speed railway line between Rome and Naples (EU EVAL., 2010 [10]). However, the most HSR lines under construction are in Spain (EC, Pocketbook, 2010). Spain invests so much in HSR that there is even a threat of overinvesting and some HSR will be offered on routes with relatively low demand (ES EVAL., 2006 [1]).

Box 2.15. High speed railways and modal split

High speed railways compete with roads for short distances and with aviation for long distances (over 500km) (Martín and Nombela, 2007). An ex post evaluation of the Madrid-Barcelona high speed railway line shows that one of HSR's main benefits lies in its role in shifting passengers from other transport modes, mainly car (44%) and to a lesser extent, traditional rail (23%) and air (16%) (EU EVAL., 2010 [9]). However, HSRs are not only a substitute but also, if concerning multimodal choices, a potential complement to air networks. If the charges are relatively high, it may reduce the social benefits of the new HSR line by reducing traffic and leading to rail having a smaller market share when competing with air (Adler et al., 2010; Sánchez-Borràs et al., 2010). This is confirmed in an ERDF evaluation (EU EVAL., 2010 [10]) where the authors suggest that in the case of HSR both demand patterns and existing services should be taken into account. There are even some published papers showing a lack of modal split after the implementation of high speed trains. For example, in France the share of car journeys between Paris and Lille has remained high even after the introduction of the TGV Nord line (Kaufmann et al., 2008). The conclusion is that **implementing high speed railways should be preceded by the careful evaluation of future demand.**

The role of rail freight in the EU is insufficient, only 443 billion tkm which accounts for an 11% share in overall freight transportation, compared with the USA (2,657 billion tkm, 43%), China (2,380 billion tkm, 33%) or Russia (2,116 billion tkm, 43%). However, the EU has managed to stop the negative trend of decreasing share of rail freight (1995-12.6%; 2000-11.5%, 2005-10.5%, 2008-10.8%) (EC, Pocketbook, 2010). There are significant differences between EU states. Germany has been successful, while Estonia reported a huge setback. Spain, a country that has succeeded in passenger rail, has failed in the case of rail freight (a decrease in the years of 2005-2008) (EC, Pocketbook, 2010). For that reason, some rail projects in Spain are being re-scheduled in the 2005-2020 (PEIT) and a number will be prepared for freight passenger services at 220 km/h. One example is a TEN-T Priority Project 16 which is a freight railway axis Sines-Madrid-Paris linking Spain and France through the Pyrenees and aiming to overcome the problem of Spanish unimodal culture (ES EVAL., 2006 [1]; EU EVAL., 2010 [11]). The same unimodal (road) dependency characterizes Greece (GR EVAL., 2006 [2]). In general, **for long-distance freight the performance of multimodal logistic chains should be optimized through the greater use of inherently more resource-efficient modes such railways** (COM (2011) 144).

There are some studies on the **trans-border railway sections** which should improve the situation concerning international railway discontinuity and a lack of interoperability in the peripheral EU-states enhancing smart, sustainable and inclusive growth. TEN-T PP 27 Rail Baltica corridor (Warsaw-Kaunas-Riga-Tallinn-Helsinki) aims to boost both passenger and freight demand. There is cross-border planning in ensuring that an integrated approach is adopted along an entire corridor, to facilitate the enhancements along this important axis (EU EVAL., 2010 [10]). It is worth mentioning that Finland and the Baltic countries have kept the Russian gauge until today.

The low level of **interoperability** within the EU railway system is also regarded as a weakness in Spain and Portugal (ES EVAL., 2006 [1]; PT EVAL., 2006 [1]). On the Iberian Peninsula trans-border sections there are the high speed railway lines between Spain and France (parts of TEN-T PP 3): Vitoria-Dax on the north of the Pyrenees and Perpignan-Figueras on the south, and between Spain and Portugal: part of PP 19 cross-border section Ponte de Lima-Vigo on the Porto-Vigo axis and part of PP 3 between Évora and Mérida linking Lisbon and Madrid. The second one will be 130km of double track designed for a maximum speed of 350 km/h (passenger services) and compatible with freight transport. This project also includes the international station of Caia (Elvas/Badajoz) (EU EVAL., 2010 [11]).

Modern railway solutions in mountainous areas of natural beauty with poor access are needed for both inclusive and sustainable European development. The Brenner Base Tunnel under the Alps between Austria and Italy (TEN-T PP 1) aims to increase the capacity on this line up to 45-50 million tonnes per year. A considerable shift from road

to a high quality rail service in this environmentally sensitive area is envisaged. The Trieste (Italy) – Divača (Slovenia) connection (TEN-T PP 6), complementary to the existing line is also very significant, as this new line will help to relieve road freight traffic congestion through the Alpine region (EU EVAL., 2010 [11]).

ERDF evaluations (EU EVAL., 2010 [10]) suggest that rail investments have not always contributed effectively to the improvement of **rail services**. For example, there are some doubts concerning customer satisfaction in Greece and Poland (Nathanail, 2008; PL EVAL., 2009 [24]). There is still very little information regarding train arrivals, delays and/or other changes to a journey in many EU states. For example, the communications policy of the Hellenic operator is rather poor. However, a step towards improvement has been taken and new telephone line, which provides easily accessible ticket purchasing has been introduced (Nathanail, 2008). **Priority should be given to new railway rolling stock** which enables the achievement of a synergy effect on upgraded lines, in particular in Poland where the train services on many lines and railway stations, despite the significant investment effort, are still outdated (PL EVAL., 2009 [2]). This recommendation is supported by an example from Spain where the services in trains passing through the railway tunnel under Cadiz were not sufficient and the improvement of infrastructure was not accompanied by increased service levels. For that reason, the expected gains in terms of modal shift have not materialized (EU EVAL., 2010 [10]).

It is a truism that railways are environmentally-friendly and must be developed. The share of rail in intra- and inter-metropolitan passenger traffic and long distance freight should be increased. However, a railway renaissance will not be successful without the careful evaluation of demand and the provision of high level services capable of meeting not only the needs of sustainable growth but also that which is smart and inclusive.

Urban public transport

Many regions lack appropriate public transport to meet the growing demand of communities relying on congested roads (EU EVAL., 2010, [10]). The modes which are the most environmentally friendly are tram, light rail and metro. In spite of the fact that during the last two decades public transport services in most European cities have significantly improved, the share of tram and metro in the EU-27 overall passenger transport has not changed and still remains between 1.3% and 1.4% (EC, Pocketbook, 2010). Investments in public transport are being cancelled out by the increase in car ownership. Countries located in central Europe, which have relatively monocentric urban systems – the Czech Republic, Austria and Hungary are characterized by the highest share of tram and metro (EC, Pocketbook, 2010). The same situation refers to relatively polycentric Romania which can be explained by its low rate of motorization.

Box 2.16. Buses and sustainable transport

It is worth noting that a modern fleet of buses equipped with new technologies can also contribute to the improvement of the urban environment and reduction in emissions of air pollutants. For example Linha Eco (Eco Line) in Funchal (Portugal) financed by the ERDF fund relies on innovative battery systems developed for public services, which have been used since 2006. The batteries demonstrate high levels of performance, both in terms of their reliability and rapid recharge times leading to low energy consumption and low operating costs (EU EVAL., 2010 [10]). An ageing fleet of buses is a costly problem in many countries. In Cyprus and Malta for example it is regarded as the main weakness of its public transport system (CY EVAL., 2006 [1]; MT EVAL., 2006 [2]). In Malta in the late nineties, 79 registered, timetabled buses were produced before 1940 and most of the buses in operation were from the seventies, sixties or even fifties (Attard, 2005).

An ERDF evaluation (EU EVAL., 2010 [10]) concludes that **public transport received relatively little support in the programming period of 2000-2006**. Only Ireland, Lithuania, Latvia, the Netherlands and the UK allocated at least 20% of their ERDF transport resources to urban transport. The aforementioned states were followed by Portugal and Poland which spent 16-17% of their ERDF transport expenditure on public-transport development. However, so far new investments have not contributed to a modal split in Poland and the passenger volume of public transport traffic in this country has not changed since 2005, while during the same period in Portugal it has increased twice (EC, Pocketbook, 2010). Therefore, in Poland and other EU states more Park and Ride Systems should be introduced on the outskirts of towns to attract more people to public transport (PL EVAL., 2010 [23]).

The construction of the Athens Metro extensions as a response to the increase in the rate of motorization in the city is a widely recognised example of good practice. The project was completed in time for the Athens 2004 Olympic Games and resulted in a significant shift in demand from private cars to public transport, especially in the

years 2000-2006 and in the densely populated areas of Athens where the Metro extensions are located. This project also led to reducing the number of car journeys in Athens by an estimated 120,000 per day (EU EVAL., 2010 [10]). The Athens Metro has had a considerable impact both in terms of traffic volumes as well as of time required for trips (GR EVAL., 2005 [3]). Thessaloniki, the second largest city in Greece wants to use the experience Athens gained while building its own rapid underground transit system, which should be completed by late 2014 (EU EVAL., 2010 [10]).

Urban public transport is essential for a city to function properly on a daily basis. Tram, light rail, the metro and ecobuses are environmentally friendly and should receive more attention during the process of fund allocation. Moreover, low cost public transportation has a positive influence on inclusive growth. The introduction of intelligent transport systems like traffic-management systems makes urban life run in a smart way.

Transport, energy and Intelligent Transport Systems

A major focus of sustainable growth is to reduce the level of noise and traffic concentration. Road transport is by far the largest source of noise (55% of the EU-27 population live in towns with more than 250,000 inhabitants exposed to daily road noise levels exceeding 55 dB Lden (day-evening-night) (EU EVAL., 2009, [1]). **Some states (Germany, Italy) have been successful in introducing restrictions to more pollution-prone vehicles in the centres of urban areas by creating Low Emission Zones** (geographically defined areas deterring access by vehicles). Promoting cleaner vehicles in urban transport has been supported by the EU within projects like CUTE (Clean Urban Transport for Europe) and CIVITAS (City-VITALity-Sustainability). However, the initiatives mentioned previously were limited to a number of cities participating in the initiatives (EU EVAL., 2009 [8]).

After the revision of the Eurovignette Directive, variations of charges based on local air and noise pollution and congestion are allowed. Introducing a **distance-based tolling system for heavy trucks** in Germany or **congestion charges** in London, Stockholm or Milan are examples of good practices (EU EVAL., 2009 [8]). The long-term European goal is to apply user charges to all vehicles and on the whole network to reflect at least the maintenance cost of infrastructure, congestion, air and noise pollution (COM (2011) 144). However, charging for both the network of motorways and national roads can have negative consequences in terms of both accessibility and territorial cohesion (negative spillover effects) because the pricing implemented in a region penalizes the accessibility of neighbouring regions (Condeço-Melhorado et al., 2011).

The **promotion of renewable and alternative transport energy sources**, such as electricity, biofuels or natural gas, should be taken into account. The environmental impact of the transport sector can be decreased by using cleaner fuels, such as unleaded petrol and low-sulphur diesel, LPG, methane and non-fossil energy sources (Koroneos and Nanaki, 2007). The integration of the transport with the energy system is crucial as is a multi-pronged strategy (Mathiesen et al., 2008). The use of biofuels represents one option to reduce the end-of-pipe emissions of the existing car fleet (Silvestrini et al., 2010). However, it is important to avoid affecting the production of food (Mathiesen et al., 2008).

In the context of sustainable development in Europe, the European Commission aims to increase the share of renewable sources, including biofuels and green electricity to 10% of EU transport fuel by 2020 (in 2010 the use of biofuels accounted for about 5%). It is worth mentioning that **private vehicle design improvements** have caused an average improvement in energy efficiency of about 1.5% yearly since 1995 (EU EVAL., 2009 [8]). A new White Paper assumes that there will be no conventionally-fuelled cars in cities by 2050. Improving truck efficiency via the uptake of modern engines and cleaner fuels and the use of intelligent transport systems is an objective in transport policy (COM (2011) 144). The conclusion is that the **integration of transport into energy planning should be proposed, using multiple means promoting sustainable transport.**

Box 2.17. Smarter choices for sustainable growth

‘Smarter choices’ include workplace and school travel plans, teleworking, teleconferencing and home shopping as well as other technologies like Intelligent Transport Systems. A UK government review of international experience of smarter-choice measures points out that it is possible to reduce peak hour traffic in this way by as much as 21% (EU EVAL., 2009 [8]).

Intelligent Transport Systems (ITS) include: the European rail traffic management system (ERTMS) aiming to standardize the different rail signalling and speed control systems, Single European Sky ATM research (SESAR) programme aiming to create a new generation of Air Traffic Management systems, maritime surveillance systems

(SafeSeaNet), River Information Services (RIS) for inland waterways, the EU Intelligent Car Initiative aiming to reduce road accidents, congestion, fuel consumption and CO₂ emissions and the Galileo programme aimed at developing a European-controlled global-satellite navigation system (EU EVAL., 2009 [8]). The **environmental impact of intelligent transport systems is very significant**. For example, the SESAR programme will lead to a substantial reduction of energy consumption by 2020 (estimated at between 300 to 500kg of fuel on average per flight) and environmental pollution (estimated at between 945 and 1575kg of CO₂ on average per flight) (EU EVAL., 2009 [8]).

Box 2.18. ITS in Helsinki-Tallinn Euroregion

An example of the use of ITS at the metropolitan and international level is the project TICKET which was operated by Helsinki-Tallinn Euroregion in 2005-2006 with the help of the ERDF. The initiative aimed to provide an integrated public transport ticketing system that can be commonly used throughout participating regions. According to the authors of this project, the system is to be further promoted throughout Europe with the goal of developing a common European public transport ticketing system (FI EVAL., 2008 [1]).

The evaluation of ITS projects is complicated by the presence of unique variables affecting the outcomes of projects, which include driver behavioural response and market penetration issues (Newman-Askings et al., 2003). The relationship between cause and effect in ITS projects is more complex than in conventional road projects. The main impacts of ITS projects that are not usually taken into account in the evaluation of traditional infrastructure projects include: travel time reliability improvements, improved control over travel choices, environmental benefits due to smoother traffic flow (less stops) and the higher risk of implementation due to high technological content. Underwood and Gehring (1994) found that in addition some ITS projects achieve a very small improvement in capacity compared to conventional road projects. Consequently, the **ITS evaluation methodology must be more sensitive and detailed than existing evaluation models** (Newman-Askings et al., 2003).

Conclusions concerning the relationship between transport and energy are that policy measures should aim to decrease overall reductions in emissions rather than specifically mode shift. Particular attention should be paid to the promotion of renewable and alternative transport energy sources like biofuels and private vehicle design improvements. Intelligent transport systems (ITS) are crucial for many modes. However, in metropolitan areas, where noise and traffic concentration is at its highest, ITS are of special importance for a “resource-efficient Europe”.

Inland waterway transport

Inland waterway transport decreased its share in freight transport for inland modes between 1995 and 2003 from 6.5% to 5.4%. However, since 2003 its share in tonne-kilometres has risen to 5.6% (EC, Pocketbook, 2010). Inland waterway transport is important, in particular, for European core regions. There are two priority TEN-T projects to remove bottlenecks: PP 18, the Rhine-Meuse-Main-Danube axis and PP 30, the construction of the Seine-Scheldt canal (EU EVAL., 2010 [11]).

The River Danube is the backbone of water transport in Europe because it connects, via the Rhine-Main Canal, Western Europe and Rotterdam’s harbour with the Black Sea. The European Union supported, through the ISPA funds, the upgrading of key stretches along the Danube river in countries such as Hungary and Romania (EU EVAL., 2009 [8]). The part of TEN-T Priority Project 18 in Hungary aims to improve navigation on the Danube river and reduce bottlenecks hindering navigation along the Hungarian stretch between the town of Szob and Hungary’s southern border (EU EVAL., 2010 [11]). The Danube is used insufficiently in Slovakia where navigation is limited by its depth and width (SK EVAL., 2006 [1]). Navigation between Vienna and Bratislava should improve after the completion of the Austrian and Slovakian part of the TEN-T PP 18. The Danube river east of Vienna is currently characterized by constant riverbed erosion, which has a negative impact on the water-resource management and the ecological viability of the Donau-Auen National Park ecosystem. The construction of new groynes, granulometric riverbed improvement, river-bank restoration and side-arm reconnection aim to reduce erosion and increase water levels in the Danube in this area (EU EVAL., 2010 [11]). Inland waterway transport also faces many difficulties in Poland, in particular on the Oder Waterway which is the main inland waterway in this country (PL EVAL., 2006 [25]).

Summing up, inland waterway transport, being a safe, efficient and environmentally friendly transport mode, can be a driver for sustainable growth, in particular along the Rhine-Danube axis.

Access to ports

Seaports have a major role as logistics centres. European competitiveness in a global world strongly depends on modern port facilities and efficient hinterland connections avoiding unnecessary traffic crossings (COM (2011) 144). The share of sea transport in EU-27 external trade amounts to about 48% of the overall export value and 53% of the import value. Concerning the weight, sea transport's share is even higher – 75% of export and 72% of import (EC, Pocketbook, 2010).

Various measures have been introduced to tackle maritime pollution: the gradual elimination of the fleet of single-hull tankers, replacing these with double hull tankers, the introduction of the use of shore-side electricity and imposing sanctions for those responsible for causing oil spills or other ship-source type pollution (EU EVAL., 2009 [8]). The EU CO₂ emissions from maritime transport should be cut by 40% by 2050 compared to 2005 levels (COM (2011) 144).

Seaports operate in a commercial environment and are typically subject to strong commercial pressures. ERDF evaluation (EU EVAL., 2010 [10]) suggests that EU resources in **support of port facilities should be considered with caution, in particular, at major ports operating in competitive markets. The focus should be on improved access to a port if there is a perspective for economic development within one or more regions.**

Improving access to a given port may increase the potential for economic development across the region or at specific locations, depending on the scope of exporting regionally produced goods by sea. The railway axis of the Ioanian/Adriatic intermodal corridor in Greece (TEN-T PP 29) is a good example of improving access to ports by railway. The axis will lead to the increase of the capacity for intermodal links between sea and rail transport. The new routes aim to connect the major ports in Greece with each other and with the main rail routes to the rest of Europe. There are also additional benefits in interoperability (change gauge from 1.0m to 1.435m) (EU EVAL., 2010 [11]). Other examples of projects are: improving access to the Trieste (Italy) and Koper (Slovenia) ports by railway (TEN-T PP 6), improving access to the ports in the south of Portugal (Porto de Sines) after the completion of the Algarve railway with the use of Cohesion Fund and improving access to the port in Dublin after the completion of the M1 northern motorway in Ireland (EU EVAL., 2010 [9]).

Some states (France, Estonia and Lithuania) and regions (Haute-Normandie) focus on supporting regional development through improving their ports' connections with the hinterland and with locations overseas (EU EVAL., 2010 [10]). Among the major EU ports investments include those improving access to Le Havre (France) and Klaipeda (Lithuania). Le Havre is in fifth position in the ranking of freight traffic at EU seaports (in tonnes loaded and unloaded). The traffic value in Le Havre increased between 2005 and 2008 by about 7%. The ERDF resources were used to co-finance the building of a new road that connected the main port of Le Havre to the main regional and national road network (EU EVAL., 2010 [10]). The Lithuanian port of Klaipeda reported a 36% increase of freight traffic between 2005 and 2008 (EC, Pocketbook, 2010). European funds helped implement the railway-reorganization project in the southern part of the Klaipeda State Seaport (LT EVAL., 2010 [4]).

In general, all three Baltic States depend on maritime transport, therefore, much transport investment is directed to port development (Kovács and Spens, 2006). **A greater number and more efficient entry points into European and global markets are needed, ports on the Baltic Sea in particular,** avoiding unnecessary traffic crossing Europe (COM (2011) 144). A good example is the DCT deepwater terminal in Gdansk, Poland, suited to accommodate the largest vessels that can enter the Baltic Sea – the Post-Panamax ships which handle the direct weekly Far East container service from China.

In summary, inland barges and railways should have better access to the seaports. The intermodal ship-to-rail transfer of containerised cargos is not possible without modern railway infrastructure linkages. Improving the access to the seaports by railway should be treated as a priority for both Cohesion Policy and 'industrial policy for the globalisation era'.

2.4 Conclusions

Projects in the field of environment, energy and sustainable transport can have a significant contribution to the development of a sustainable European economy which uses its resources in an effective way. Cohesion Policy has been and still is an important instrument to stimulate the implementation of projects in these sectors. Many of the hitherto supported projects have had a significant direct or indirect impact on the more rational use of resources, energy conservation, energy efficiency, the reduction of CO₂ emissions and the enhancement of ecosystem services.

Due to recent technological progress, Member States have a wide range of activities at their disposal – technological and organizational solutions that can be implemented in the field of environment and energy. **Eco-efficiency, cost-effectiveness and often also the feasibility of particular solutions are highly dependent on regional conditions.** Therefore, the path leading to meeting the overall goals and specific objectives of the EU 2020 strategy can be quite varied across Member States. **Decisions regarding the selection of directions and forms of support are dependent on regional conditions and should be taken at the level of individual Member States.**

Part of the activities implemented in the 2004-2006 period were characterized by equally high ecological and economic efficiency. Given the current changes in the global energy and resource markets, as well as rapid advances in technology providing new and increasingly efficient solutions, the profitability of green technology can be expected to grow. There was, however, a **significant barrier to the widespread implementation of green technologies – the limited spread of knowledge about the economic benefits.** Decisions regarding the selection of directions and forms of support should be based on the most recent empirical data and forecasts of the effectiveness of available options. It is advisable to use different support mechanisms depending on the degree of relevance and viability of individual activities. An example is combining financial support in the form of grants for key activities characterized by low profitability with feedback financing for those which have a higher rate of return.

The most effective and desirable forms of stimulating the broad implementation of green technologies in the case of high-yield activities seem to be: financial support for demonstration projects (the effect of promotion and incentives), wide dissemination of knowledge about the most effective solutions, proactive advisory support, stimulating various forms of cooperation in the field of environmental technology, support mechanisms for investment lending and stimulating demand for green technologies.

For the Europe 2020 strategy sustainable growth objectives to be successfully achieved, it is important to introduce non-investment activities for the transmission of information, stimulating cooperation and enhancing human capital. **The European Social Fund should also play an important role in reaching the objective of sustainable growth, alongside the European Regional Development Fund and the Cohesion Fund.**

In the 2000-2006 period a strong sectoral approach can be observed. Projects contributed to the objectives of environmental policy but had a limited effect on the generation of beneficial effects in other fields. The sectoral approach was only moderately helpful in the identification of conflicts between the environmental and climate policy objectives and economic growth. **Projects with a comprehensive and integrated approach to solving the problems identified had a greater impact on maximizing effects in different areas of activity.**

After analysing the Cohesion projects implemented in the years 2000-2006 it can be concluded that the **beneficiaries showed limited ability to generate large and comprehensive projects.** Large and complex projects often required the involvement of many partners and were characterized by long periods of preparation and implementation. However, some beneficial effects of the funded projects on the environment and socio-economic development can be identified.

The hitherto adopted methods to stimulate the comprehensiveness and complementarity of the supported projects proved to be ineffective. In some areas, moving away from funding independent projects should be considered. More support should be given to the implementation of comprehensive, spatially concentrated programmes, which include both infrastructure development investments and non-investment activities in the field of information, promotion, strategic planning and legislation. A comprehensive approach is particularly desirable in the following areas:

- Municipal solid-waste management – comprehensive programmes implemented at the level of metropolitan areas, groups of communes, or entire regions, including such activities as: the construction of infrastructure for recycling and waste management, the development of selective waste collection systems, landfill remediation, preventing the generation of waste and awareness-raising activities aimed at increasing the level of social participation in new waste-management systems.
- Water supply and wastewater management – comprehensive programmes covering, among others: the development of sewage systems, the improvement of the efficiency of municipal and industrial wastewater treatment, storm-water drainage, sewage-sludge management, enhancing the energy efficiency of the system and preventing pollution.
- Renewable energy development – comprehensive programmes covering: the development of local or regional action plans which take into account local energy potential, the development of the most appropriate renewable energy alternatives, the development of smart grids facilitating receiving renewable energy, the development of local-market stakeholders engaged in the production and processing of biomass.
- Energy-loss reduction and energy-efficiency improvement – comprehensive programmes such as: the modernization of heat production and distribution facilities, the thermomodernisation of buildings, the use of renewable energy sources, the implementation of intelligent power management systems and information campaigns on efficient energy use.

- Flood protection – catchment-based flood risk reduction programmes, including: ecosystem protection measures, spatial planning, management in crucial areas in terms of flood risk control and the development of flood risk management support systems.
- Enhancing valuable natural areas – comprehensive support for activities aimed at both the protection of natural beauty and the socio-economic growth of areas of high wildlife potential, including the development of green infrastructure, the stimulation of green jobs and the promotion of the areas.

Sustainable growth means building a more competitive low-carbon economy that makes efficient, sustainable use of resources and reduces emissions. It is based, inter alia, on the proper relation between transport growth and environment. Sustainable transport refers particularly to these **modes which have a possible low impact on the environment (rail, inland water, public transport in cities, such as metro or tram).**

Although modal shift is one of the main goals of transport policy, the overall target in this area should be reformulated and modal shift is needed only where appropriate, over long distances, on congested corridors and in urban areas. For example, the share of rail in the intra- and inter-metropolitan passenger traffic and long distance freight should be increased, while in peripheral regions the potential for modal shift is much more limited. **Policy measures should aim at decreasing overall reductions in emissions rather than specifically mode shift.** Priority should be given to the development of modern technology. Nevertheless, the realization of investments related to modern technology solutions should not be implemented at the expense of investment in hard infrastructure (motorways, railway lines and stations) and rolling stock.

Sustainable development should targeted the environmental, economic and social aspects equally. The need to reduce the negative impact of transport on the environment should not lead to an excessive increase in the cost of infrastructure investment.

The “spend” culture, in particular in times of financial crisis and budget constraints, directs funds to the **easiest transport projects which may not have been optimal.** The realization of big projects, such as the introduction of high speed railway lines has generally been successful. The **role of rail freight in logistic chains is insufficient**, taking into account the achievement of the 60% GHG emission reduction target.

Urban public transport, which is a key element in the strategy for transport contributing to sustainable growth, has so far received relatively little support. Therefore, integration of transport into energy planning is needed, using multiple means promoting sustainable transport: alternative transport energy sources like biofuels, private vehicle design improvements, pricing schemes, traffic calming in the city centres, introducing restrictions on pollution-prone vehicles by creating Low Emission Zones. The environmental impact of intelligent transport systems (ITS) responsible for managing transport flows and therefore increasing the level of transport safety and reliability, reducing congestion, fuel consumption and CO₂ emission, is very significant.

The support of seaport facilities should be considered with caution, in particular at major ports operating in competitive markets. **The focus should be on improved access to a port by road and rail** if there is a perspective for economic development within one or more regions and the chance for intermodal ship-to-rail transfer of containerised cargos.

A substantial part of the discussion on the contribution of Cohesion Policy to the environment, energy and transport objectives of the Europe 2020 strategy should include the development of effective support mechanisms for the preparation and execution of comprehensive projects. **Member States should place greater emphasis on the development of dynamic institutions** able to successfully perform comprehensive analyses of conditions (potential, risks and obstacles) and adapt to new and changing circumstances. Innovative programmes should be prepared well in advance.

It should also be borne in mind that, **for certain types of projects, implementing institutions faced a basic problem – a low level of interest in the implementation of projects crucial from the point of view of the strategy objectives.**

The EU 2020 strategy and related documents highlight a number of areas in which the achievement of objectives requires a comprehensive approach. A particular focus is also placed on activities in cases where there is currently not much experience (including adaptation to climate change). **The lack of an adequate preparation and implementation strategy may cause the ambitious goals of the EU 2020 strategy to collide with the realities of beneficiaries' limited capacity to generate comprehensive and innovative projects.**

3. Cohesion Policy and "Inclusive growth" within the EU2020 strategy –remarks and conclusions

3.1 "Inclusive growth" within the Europe 2020 strategy

Inclusive growth, fostering a high-employment economy delivering economic, social and territorial cohesion is the third priority of the Europe 2020 strategy. As emphasized by the strategy, Europe needs to make full use of its labour potential to face the challenges of an ageing population and rising global competition. It must also assure that the benefits of economic growth spread to all parts of the EU. Meeting the targets set out in the strategy, such as higher employment rates, reduced early school drop out and a substantial reduction in the number of people living in poverty will only be possible if adequate actions are taken. The Europe 2020 strategy calls for three major actions:

- Increasing employment rates, in particular amongst the young people, women and older workers
- Improving skills and lifelong learning participation
- Fighting poverty: the unemployed and children are particularly at risk, with the working poor also being a challenge

These three areas are to be addressed by two Flagship Initiatives "An Agenda for new skills and jobs" and the "European Platform against Poverty". The first aims to create conditions for modernising labour markets with a view to raising employment levels and ensuring the sustainability of EU social models, while the objective of the second is to ensure economic, social and territorial cohesion. The main actions that will contribute to increasing employment will include further implementation of the flexicurity agenda, adapting the legislative framework to evolving work patterns, facilitating and promoting intra-EU mobility and improving matches between labour supply and demand. Achieving the employment goal will also require modernization and evaluation of the tax-benefit systems to ensure they do not provide work disincentives and promoting new forms of work-life balance and active ageing policies. Skill improvement will require implementation of life-long learning principles, developing a system of recognizing qualifications (including implementing the European Qualifications Framework), all within partnerships between the worlds of education/training and work and with the involvement of social partners. The fight against poverty will require modernization of social protection, promotion of social innovation and the development of new tools to support those in particular need. It will also need a review of the pension systems and tackling health inequalities.

Support of the above aims with Cohesion Policy requires the adoption of well designed, efficient interventions. The aim of this section is to summarize the evidence on the effectiveness of policies and interventions that focus on four major areas: (i) improving skills (ii) providing better matches on the labour market, (iii) labour market integration of some groups at risk of exclusion and (iv) assuring territorial cohesion, in particular via the support of transport infrastructure. The presented studies and evaluations do not exhaust the entire scope of potential policy measures that may be supported by the ESF, neither do they address many important issues relating to social inclusion (such as fighting poverty among some groups at risk, e.g. minorities or those not able to work, migration policies, health policies, homelessness, pension systems, antidiscrimination, gender equality or measures lifting children out of poverty).

The Europe 2020 flagship initiative, the "European Platform against Poverty", emphasizes the need to deliver territorial cohesion. Therefore, in this chapter, particular attention is paid to regions with specific geographical features: mountainous regions, island regions and sparsely populated regions (rural and border regions). When, where and how to strengthen the positive impact of transport infrastructure on territorial cohesion is discussed as well as economic activity within less developed regions and areas, so that place-based policy is more effective and inclusive.

3.2 Skills

Human capital is one of the most important factors contributing to growth and productivity, and improving skills and educational outcomes at all levels will be crucial for all three major dimensions of the Europe 2020 strategy. Investment in human capital starts early and, as discussed below, those in the early stages of life appear to be the most important. Primary, secondary and tertiary education needs to provide individuals with the right skills and competences to face labour market challenges, while adult learning, formal and informal, is crucial in keeping those

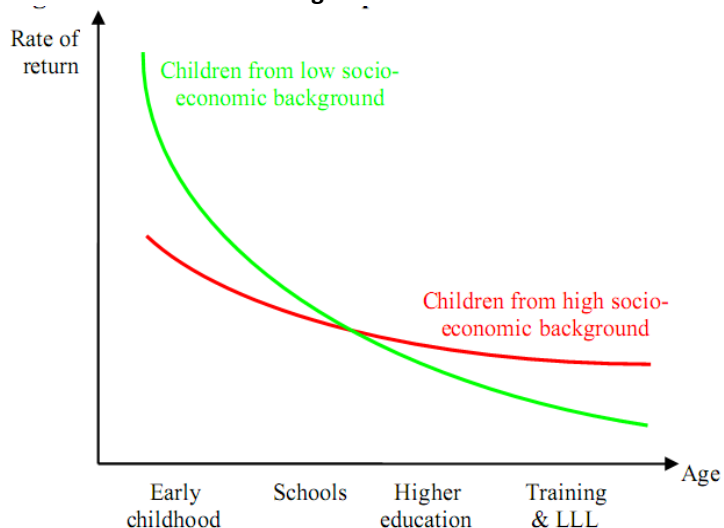
skills up-to-date and increasing the chances of those who failed at the earlier stages of education. Public policies, regulations and institutions play a major role here, yet they are largely supported with Cohesion Policy.

Early childhood education and care (ECEC)

There is a consensus, strengthened by several studies and policy evaluations, that **early education is of crucial importance** from an economic and social point of view as it is a foundation for further education, skills development, labour market outcomes, life long learning and social inclusion (European Commission, 2006 and OECD, 2006 provide an excellent review of evidence). Interventions concentrated in early childhood (rather than later in the life course) can enhance social efficiency and social equity (OECD, 2009). They are also more cost-effective than later interventions (Barnett, 2010) (see Figure 3.1).

For example, the direct net effects of the US *HighScope Perry Pre-school project* for the society as a whole include better human capital, better health, higher employment rates, higher earnings, lower criminality (Schweinhart, 2004). **Reaping the benefits of early childhood education and care interventions within Cohesion Policy framework will directly translate into obtaining some of the Europe 2020 objectives**, such as better skills, lower school drop-out rates, lower poverty rates and their intergenerational transmission, social inclusion of disadvantaged groups – all contributing to higher growth.

Figure 3.1: Rate of return on investment at different stages in life



Source: Cunha et al. (2006), after: European Commission (2006)

The gains of investing in early education policies are particularly high for disadvantaged groups (e.g. migrants, minorities, children from dysfunctional families). These gains are reflected not only in better educational outcomes of the affected children, but also in reduced crime and delinquency later in their lives (Barnett, 2005). Those long term studies that followed participants into adult life also provide evidence of positive results for their labour market outcomes. Participation in high-quality early childhood education and care programmes is associated with better cognitive, social and emotional development of children, their school readiness and educational performance, again in particular for children from disadvantaged backgrounds (a survey of studies of UK, France, Sweden by Kamerman et al. , 2003).

The role of pre-school education in equality of opportunity was also confirmed by a cross country study by Schütz et al. (2008), who found that **more intensive and widespread childhood education programmes lower the dependency of students' test scores on family background**. They also improve social, educational and economic equality (Barnett, 2010). The evaluation of Polish ESF actions (PL EVAL [2]) has highlighted the role of supporting pre-school education for disadvantaged children from rural areas. There is also evidence on the positive association of early education of migrants with better labour market performance and social outcomes (Nusche, 2009). Finally, there is a clear need to invest in disadvantaged children, which again is crucial to lowering intergenerational inequality and lifting people out of poverty (OECD (2009), evaluation of child support policies).

Support to early education infrastructure is important in helping to reconcile work and family life (cf. Box 3.1), which is crucial to boost the employment of young parents, helping to prevent many households with dependants from falling into poverty (these are particularly relevant for single parents and low earners). Cohesion Policy

appreciates the importance of ECEC, supporting the development of child care facilities. For instance, pilot projects in Greece introduced full-time primary schools and day care which, apart from supporting education seriously enhanced female employment (GR EVAL [2]). Improving access to childcare facilities is underlined as an important measure in the *Inclusive growth* dimension of the Europe 2020 strategy. As evidenced by several evaluations, the lack of childcare institutions is an obstacle to participation in Cohesion Policy interventions (e.g. active labour market policies). Hence **improvement in access to childcare will also enhance the effectiveness of other measures**, enabling development opportunities not only for children but also for adults (new jobs created, higher women employability etc.) (BE EVAL [1], 2009, CZ EVAL [1], 2010, HU EVAL [2], 2010, WALES EVAL [1], 2005, WALES EVAL [3], 2005).

Box 3.1 : Reconciling work and family life

Cohesion Policy instruments have served many actions helping parents to combine professional careers with child rearing. The 'Pagitsch Kinderland' is one of several examples: a childcare facility set up in a private medium-size company co-financed through the ERDF, opened in 2006 offering professional day care for children between 2 and 14 years. The project received several awards for promoting equal opportunity and corporate social responsibility from the Land of Salzburg and the Austrian Federal Ministry of Economy. Its success and good match to local needs was also confirmed by further growth in the infrastructure in 2008.

Source: Panorama info regio, no 33/2010; <http://www.pagitsch.at/>

Successful educational actions directed at children need to be coordinated and coherent with health and welfare policies, in particular those at the local level (OECD, 2009). Well-funded, integrated, socio-educational programmes improve the cognitive and social functioning of children at-risk and can be expected to deliver additional outcomes, such as enhanced maternal employment, less family poverty, better parenting skills and greater family and community cohesion (Lynch, 2004).

Integrated actions are of particular importance for disadvantaged children. The measures that may work best for them include **a mixture of parenting programmes, early childhood education and child visits**. Repeated evaluations of home visiting initiatives in several OECD countries (aimed at raising parents' awareness of their possibilities and capacities as home educators) indicated significant performance advantages in the cognitive abilities of the participating children (Nusche 2009). Synergies have also been highlighted in the US experience, where home visiting combined with early childhood education and care programmes produced more long-lasting results than home visiting only. Strong collaboration between different policy sectors (education, labour market, health, welfare) is necessary to add value to the early childhood interventions.

It is also important to **encourage family and community involvement in early childhood services** (OECD, 2006). The positive effects of early childhood education and care are reinforced when parents and teachers share information and adopt consistent approaches to e.g. socialisation, daily routines, child development and learning. As highlighted by some ESF evaluations, high efficiency of support for different forms of pre-school education was enhanced by their integrated approach, with a focus both on educational infrastructure as well as skilled teachers and the impact it had on parents and local governments' awareness of the role of early education (GR EVAL [2], PL EVAL [2], 2008). Similar conclusions can be drawn from evaluations of projects aimed at the Roma communities (CZ EVAL [3], 2008).

OECD and EU countries' experience provides more insight into the effectiveness of childcare policies, offering suggestions and references for Cohesion Policy in this respect. Firstly, the evidence suggests that **direct public funding of childhood services brings better results** (in terms of quality, equity, more effective training for educators) **compared with parent subsidy models** (OECD, 2006). Secondly, **interventions in early childhood should combine transfers both in cash and in kind**. In particular, for higher-risk families, delivery of services in kind may be more effective. However, some parents may not be willing to use services, and in such cases experiments with conditional cash transfers (e.g. benefit payments conditioned upon school attendance) may be more appropriate. Thirdly, the duration of childcare is important and an earlier start results in better intellectual development and improved independence, concentration and sociability (OECD, 2006). However, full time attendance does not have to offer better gains for children than part-time provision. It is the quality of the pre-school centres and their staff that are of major importance (Currie, 2000). **The effects of education-based programmes are longer lasting compared to the effects of attending nursery or playground programmes**, which suggests that investments made in programmes that teach children basic skills (reading, writing, calculating) may

be much more effective for skills development (Goodman and Sianesi, 2005). **Supporting measures that aim at adjusting pre-school curricula to help children make a better start may be seen as a potential for interventions funded within Cohesion Policy.**

Finally, there is a need to constantly review and improve the early education and care programmes, experiment with the number of teachers, school hours, group sizes etc. so as to obtain better progress in a particular setting (Barnett, 2004).

General education, preventing early school drop-out & improving school-to-work transitions

While the role of early education is crucial for socioeconomic outcomes, there is also evidence that **the effects of formal education are more solid than investment in training or informal learning** (European Commission, 2007). There are several aspects in the design of public education that affect its efficiency. For example, those education systems that include early *tracking* of students appear to lead to more unequal outcomes in terms of educational attainment and have negative effects for disadvantaged children in particular. The **combination of school autonomy and accountability (e.g. central exams) appears to be an institutional setting offering substantial gains** in European educational systems; competition, free choice and market forces also have a strong potential for increasing efficiency (European Commission, 2006a). As highlighted by the “Agenda for New Skills and Jobs” Flagship Initiative, improving skills will require new educational strategies, designed with the involvement of all stakeholders. Experimentation with the educational system designs that proved to work best may be a great opportunity for Cohesion Policy measures to respond to the new needs set out in the EU2020 strategy.

One of the major challenges for educational measures is limiting early drop-out rates, as this has the potential for huge savings in future public spending, e.g. on health care or delinquency (research summarized by the European Commission, 2006). No clear cut solutions exist, although there is evidence that e.g. integrated approaches based on **partnerships between business, public sector, social partners** may offer an alternative learning environment and, as such, **lower early school drop-out** for those at risk. Evaluations of ESF interventions also reveal that instruments aimed at preventing school drop-out should be complemented by actions such as **pathways to employment and individual learning plans** (European Commission, 2010, PT EVAL [7], 2005). For instance, scholarships for pupils and students, often offered within the ESF framework (GR EVAL [2], PL EVAL [1], 2010), if continued, should be accompanied by such additional measures.

Many studies have emphasized that **quality and motivation of teachers are crucial for the pupils’ educational outcomes** (Jrges et al. 2004, Koedel 2007, de Paola 2008), hence the ESF supported measures which aimed at increasing teachers’ and trainers’ qualifications (PL EVAL [3], 2008, HU EVAL [2], 2010, CZ EVAL [3], 2008) had been targeted in the right direction. Several studies indicate that **financial incentives for teachers (e.g. performance related pay) have a positive impact on pupils’ educational achievements** (Lavy 2002). However, there is no clear cut evidence on the most appropriate measures for encouraging the best teachers to work in the most challenging schools.

Increasing equity in the educational system is not an easy task. The available studies and evaluations provide evidence on negative or no-impact policies for the children at risk: for example, **additional resources channelled to disadvantaged groups or schools** (spent on e.g. reducing class sizes, additional infrastructure or extra resources for the personnel) show no or limited positive outcomes (Hanushek 2005, Bénabou et al. 2005). On the other hand, home visiting programmes appear to work well for vulnerable children at school age. Indeed, it is agreed that **complementing educational policies aimed at high risk children with interventions like out-of-school programmes and mentoring work well**, especially if **combined with labour, social and health policies**. Place-based policies work best: it is the collaboration between teachers, parents and local welfare institutions that secures the most effective results for the disadvantaged groups (OECD, 2006; European Commission, 2006a).

On the level of vocational education, the available evidence suggests that **combining specific education in vocational schools with apprenticeships offering on-the-job training yields positive outcomes** and facilitates school to work transitions (Acemoglu 2001, OECD, 2010, Bonnal et al. 2002, PT EVAL [1], 2009, PT EVAL [7], 2005). The proper design of the scheme’s curricula is important, as well as its quality, reflected by certification and state monitoring (Acemoglu and Pischke, 1999). **Vocational education schemes need also to correspond directly to the labour market needs**, as emphasized by the EU2020 strategy. This calls for the policy makers to come up with regular updates on the skill demand projections, which is a challenge given the pace of the skill-biased

technological change. Moreover, there is no consensus on what approach to take to match the supply and demand of skills in the educational market, as there is a large diversity across EU countries and a lack of evaluative evidence in this respect (European Commission, 2007), posing a challenge for Cohesion Policy.

The Europe 2020 strategy, in its Flagship Initiative “Youth on the move” sets out a clear goal of **facilitating young people’s entry into the labour market**. However, as evidenced in the school-to-work transition review of the OECD (2010), recent years have highlighted the need to consider another target group facing problems on the labour market (apart from the typically disadvantaged, such as migrants, youth with minority backgrounds, living in rural/remote areas), i.e. the “poorly integrated new entrants”. They often have the right qualifications, but not adequate skills to find a stable job, experiencing a circle of unemployment/ temporary employment job spells. Below we summarize the evidence on the potentially effective instruments for this target group.

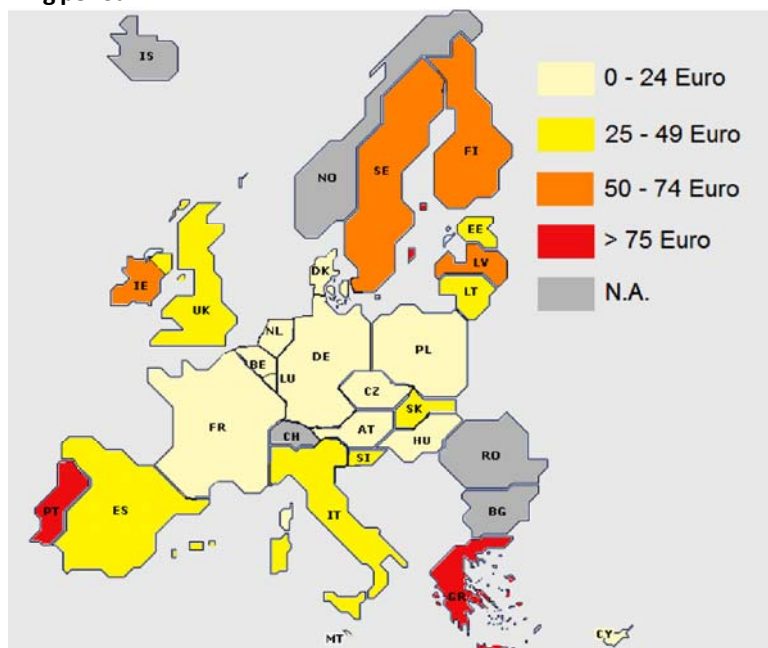
Lifelong learning

Support to early childhood education appears to be the most cost effective investment in education, yet it is a long term one; while skill improvement is also needed by those who have already finished general education. Hence the emphasis on the importance of lifelong learning and improvement in training policies, clearly set out in the Europe 2020 strategy and supported by Cohesion Policy via the ESF (cf. Figure 3.2).

Conclusive evidence on the effects of returns to training is somehow more limited compared to education, which reflects also the diversity and complexity of potential training approaches and schemes. One of the aspects of training policies that is underlined in all studies and evaluations is the necessity to adjust them to the employers’ needs. For example, **programmes that offer on the job training have been proven to be more effective than those without** (Wößmann 2008; European Commission, 2010a; European Commission, 2010b). Furthermore, **training schemes related to the labour market** appear to be especially **effective in increasing employment opportunities for the disadvantaged when they focus on the skill needs of the regional and local economy** (European Commission, 2006; HU EVAL [4], 2010, PT EVAL [1], 2009). **Training focussing on specific skills** has proven to be **more effective**, while focussing on soft skills appears to be somewhat less efficient [CZ EVAL [1], 2010, HU EVAL [2], PL EVAL [2], 2008, European Commission, 2007, Kubisz, 2010]. Some studies suggest that the development of general competences has had strong positive effects (LT EVAL [1], 2010, PT EVAL [1], 2009). Certain evaluations emphasize that e.g. training in ICT skills needs to be combined with soft skills to enhance participation in the information society (European Commission, 2010b).

Opinions on what should be the most appropriate targeting approaches of training schemes vary considerably. On the one hand, it is emphasized that due to rapid technological change, qualifications become out-of-date irrespective of their holders’ education level and need constant updating. On the other hand, however, those with low qualifications expose higher skill gaps and some claim that training policies should be targeted at them (European Commission, 2010b). The data clearly shows that those with higher educational attainments are most likely to improve their skills further (Bukowski, 2010, European Commission, 2010b), and the available evidence suggests that the rates of return to training seem in fact to be highest for them, while they might be particularly low for the disadvantaged (European Commission, 2006a). Also, employers are more likely to provide training for their highly skilled employees, as this offers a high return on investment for both sides; while they have proven to be more reluctant to offer training to the low skilled and the disadvantaged groups (European Commission, 2006, Bassanini et al. 2005, PT EVAL [1], 2009, PT EVAL [2], 2009). The difficulties lie also in the lack of HR strategies among firms (in particular SMEs), as they are unable to assess the skill needs of their workforce, notably the low skilled (Kubisz, 2010), which lowers their market and innovative potential (cf. Chapter 1). The **question of whom to provide support to within the lifelong learning policy** is not an easy one and **demands a good diagnosis of the situation (including the local level) and needs** before setting the targets, so as to increase participation and minimise deadweight loss. At the same time, it is commonly agreed that the **training itself should be well adjusted to a particular target group** (e.g. older people, inactive women etc.), as tailor-made measures have proven to be more effective (Bukowski, 2010).

Figure 3.2. ESF expenditure per capita (PPP) on measures targeting lifelong learning over the 2000-2006 programming period



Source: European Commission Ex Post Evaluation Of The European Social Fund (2000 – 2006)

Motivation to learn is an essential foundation of lifelong learning and is often lacking among those who need skills improvement the most. Learning in order to acquire skills that can give a return in the future is perceived as abstract and not immediately attractive; especially for people who do not have a learning attitude (as highlighted by the [European Commission, 2010b](#) or [Bukowski, 2010](#)). Support in setting educational goals and in achieving them is crucial, and should be taught from the early stages of life. Increasing motivation among those at risk of non-participation in lifelong learning measures also demands a clear message showing the link between skills improvement and earnings and other positive labour market outcomes.

Motivation to undertake training can be strengthened by various instruments aimed at encouraging individuals to improve their skills. A question arises as to whether these should be targeted at the supply side of the labour market (i.e. support schools and training institutions) or the demand side (direct support to individuals). Some evaluations of the ESF lifelong learning interventions suggest that **support targeted at the supply side somewhat lowered the potential efficiency of the training system** ([PL EVAL \[2\], 2011](#), [EE EVAL \[2\], 2007](#)). Direct support to participants may be offered through various forms of training subsidies or cost reimbursement (e.g. education vouchers, individual learning accounts, loans, direct refinancing). The evidence on their effectiveness in EU countries remains rather inconclusive ([Bukowski, 2010](#)) provides a review of evaluation studies. A positive evaluation comes from the Bulgarian “I CAN” project, where educational vouchers contributed to increased lifelong learning ([BG EVAL \[1\], 2010](#)). Excluding employees from the decisions on the training curricula may lower their motivation towards skill improvement ([SI EVAL \[1\], 2006](#)).

The [OECD \(2007\)](#) emphasizes the link between systems of qualifications and lifelong learning. Qualification systems help individuals to make the right decision on their learning activities and facilitate their navigation through the system. Evaluations of training measures supported by Cohesion Policy suggest that the **results of lifelong learning are best made marketable and valuable through certification** ([European Commission, 2010b](#), [PT EVAL \[1\], 2009](#), [PT EVAL \[5\], 2010](#)). Other mechanisms, such as those linked to credit transfer, recognition of prior learning, qualification frameworks and stakeholder involvement, are also powerful in promoting lifelong learning ([OECD, 2007](#)). Furthering the efficiency of training systems may be made possible by **improving information about training opportunities, setting appropriate legal frameworks and ensuring portability of skills** ([Bassanini et al., 2005](#)). Implementation of the European Qualification Framework, set out as one of the actions within the Europe 2020 strategy and supported by Cohesion Policy will enable the fulfilment of some of the efficiency conditions presented above.

A question arises as to whether or not training provided by the public sector may be efficient compared to that of private providers. Evaluation studies of **public training programmes** in European countries (France, Germany, Ireland, Norway, Poland, the Slovak Republic, Sweden and the United Kingdom) tend to **report very low or even negative returns**, i.e. the costs of the programmes are significantly higher than the benefits in terms of increased earnings or employment

probabilities (Wößmann, 2008). Public sector sponsored training may even have significant negative effects on earnings and employability of participants (Fitzenberger and Prey 2000, Lechner et al. 2005), at least in the short run. Moreover, public sector training programmes have been found to be **more effective for adult women than for adult men and the youth** (Kluve and Schmidt 2002, Parent, 2003). There may also be some positive effects for the disadvantaged (Jenkins et al. 2002). At the same time, firms often emphasize that they would not be able to train their staff without public support, notably within Cohesion Policy framework (SI EVAL [1], 2006, PT EVAL [2], 2009).

Upgrading skills at all levels requires a comprehensive and well planned approach, fit into a strategic framework for cooperation for education and training, involving all stakeholders, as clearly set out in the Flagship Initiative “An Agenda for new skills and jobs”. Indeed, **the role of social partners in the development and implementation of lifelong learning strategies** has been highlighted by several studies and evaluations (Bukowski 2008; European Commission, 2007, PT EVAL [1], 2009). Successful training schemes are often based on partnerships between business, the public sector, social partners and local third sector organisations (European Commission, 2006a). Finally, the training schemes should be constantly and properly evaluated in order to maximize their efficiency.

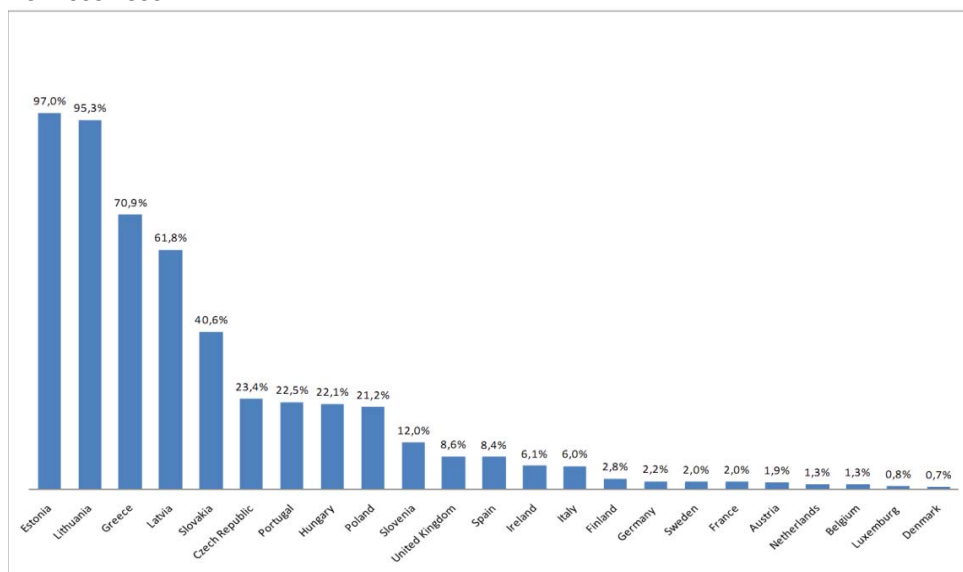
3.3 New jobs and better matches

Mismatches between labour supply and demand hinder job creation and economic growth; hence the need to tackle the problem of better matching, as emphasized in the Flagship Initiative “An agenda for new skills and jobs” of the EU2020 strategy. There are three major reasons behind the labour market mismatches: (i) asymmetry and the cost of information, which makes it difficult and expensive for employers to find the unemployed and for the unemployed to get the information about available job offers (ii) skill dimension, whereby the unemployed do not possess the qualifications required by the employers (iii) regional dimension, whereby the demand and supply do not match spatially. Active labour market policies (ALMP, supported to a significant extent by Cohesion Policy in many EU Member States, cf. Figure 3.3.), such as job search assistance, job brokering and training, may be an effective way of improving matches on the labour market, as discussed below.

Supporting direct job creation: employment subsidies

Measures aimed at encouraging and supporting direct job creation encompass various incentives, such as subsidies to employers, who hire new employees (e.g. reimbursement of social security contributions), financial support to business start up and, finally, public work programmes fully or largely financed from public funds (usually within the ALMP framework). They are usually supported by the ESF, contributing to employment growth (IT EVAL [1], 2009).

Figure 3.3. Yearly ESF Community expenditure as a percentage of public money spent on Labour Market policies, %, ESF 2000-2006



Source: Ex Post Evaluation of the European Social Fund (2000 – 2006)

The cost effectiveness of job subsidies in the private sector is usually largely undermined by the substitution¹¹ and crowding-out¹² effects they entail (Martin and Grubb, 2001; HU EVAL [2]). Subsidizing jobs may result in higher wage growth, rather than employment growth (Cahuc and Zylberberg, 2004). Another negative impact of subsidized jobs may be reflected in the so-called *lock-in effect*, when, during participation in a given programme, the unemployed may put less effort into their job search and therefore have lower exit rates to employment (compared to those unemployed who do not participate in the programme). Several empirical evaluations of ALMPs have confirmed that this effect indeed exists; for instance van Ours (2004) for Slovakia. Overall, **the empirical studies of jobs subsidy schemes tend to show their positive impact on labour market outcomes** (e.g. Forslund et al., 2004, Kluve, 2006; Zhang, 2003; Bernhard et al., 2008). The measures may **be particularly effective if well targeted at people at the margins of the labour market**: e.g. older people, the disabled, welfare recipients (Katz, 1996) or the young people (European Commission, 2010c). Apprenticeship- type subsidized job schemes may be much more effective for those with lower educational levels (Bukowski 2008). **Short term subsidized jobs are more effective than longer running ones**, as the latter may even have a negative effect for the job finding rate (van Ours, 2000). However, there are also negative results from a macroeconomic perspective: Boone and van Ours (2004) in their empirical analysis of data on 20 OECD countries in the time period 1985-1999 found that subsidised jobs were not effective at all in bringing down the overall unemployment rate. Hence, **it is likely that subsidizing jobs in the private sector increases individual employment probabilities of targeted groups, changing the structure of employment but not the overall level (suggesting a large substitution effect).**

Job creation in the public sector is usually found to be ineffective, as it displaces jobs from the private sector, and the jobs that are created are temporary and low productive (Kluve et al., 2005; Zhang, 2003, Fredriksson and Johansson, 2003). **There may even be a significant adverse impact on the employability of those who take up jobs under public sector works**, in particular in the longer run, due to the potentially negative signal it gives to the employers, resulting in the so-called “stigmatisation effect” (Vodopivec, 1999; Kluve and Schmidt, 2002; Rodriguez- Planas and Jacobs, 2007). For instance, the estimates of net effects of public work schemes in Poland showed they were overall slightly negative, although the adverse effect was quite large for the youngest unemployed (cf. Bukowski, 2008). The negative effect of public works is stronger for those lasting longer (Wunsch and Lechner, 2007). There are **also examples of some public work schemes which, when well tailored and designed can be effective** (e.g. positive and weakly significant employment effects for participants in *1-Euro-jobs* in Germany for men, who are not lone parents and who do not have a migration background, Huber et al., 2009). Furthermore, **jobs offered under the public work scheme may have a positive socialising component**, helping to maintain certain groups (those most vulnerable and most likely to withdraw to inactivity, e.g. the long term unemployed) on the labour market. Once they become inactive, bringing them back to the labour market is much harder and costly, if not impossible. For instance, Wunsch and Lechner (2007) in their evaluation of public subsidised jobs (targeted at the unemployed with the worst job prospects: older and long term unemployed ones), stated that although they had no positive long term impact on participants’ employment, their only effect seemed to be to prevent participants from being inactive by keeping them busy and requiring effort, thus, also providing social contact and daily routines. This “prerequisite for employment” effect has also been emphasized in Cohesion Policy evaluations (DK EVAL [2], 2006).

Support to job creation via subsidies to employment appears to be more effective if provided in an integrated package of instruments, in particular for certain target groups, such as the youth (Martin and Grubb, 2001; Lechner and Wiehler, 2007). For example, a rigorous evaluation of the UK programme “New Deal for young people”, which included extensive job assistance and wage subsidies to employers has shown that the programme has significantly raised young people’s transitions to employment, though the effect may be weaker in the long run (Blundell et al., 2004).

¹¹ If those who undertake employment as a result of a certain public intervention (job subsidy in this case) do so at the expense of those not participating in the program. If the substitution effect is strong, job subsidies may not have any effect on the overall level of employment. They may however change its structure, increasing the participation of the targeted groups (e.g. women, older workers) which itself may be a desirable effect.

¹² If the jobs created as a result of a certain public intervention (job subsidy in this case) destroy the existing ones, e.g. if a subsidized firm, due to lower costs, overtakes part of a market and forces another firm to close.

Supporting direct job creation: business start-up incentives

Supporting the starting up of self-employment is a popular intervention targeted mostly at the unemployed, and largely co-financed by Cohesion Policy in several EU Member States. The “Agenda for New Skills and Jobs” stresses the importance of removing barriers to self employment as a measure contributing to the achievement of Europe 2020 objectives. It is important to emphasize that many policies that are crucial for new firms to enter the market concern macro-level aspects, such as a business friendly environment or keeping non wage labour costs low (in particular for the low skilled) and directly impact the chances of financial support for business start up and other accompanying initiatives, such as encouraging innovation (discussed in chapter 1).

The existing empirical evidence based on microeconomic studies suggests that **grants to start self-employment may be an effective way of helping the unemployed to exit unemployment** (Carling and Gustafson, 1999; Bukowski, 2008; Caliendo and Künn, 2011). It is also positively assessed by several evaluations of Cohesion Policy interventions (BG EVAL [2], PL EVAL [1], 2010, PL EVAL [4], 2011, SI EVAL [1], 2006). The evidence of the impact on firm survival is somewhat mixed, though many studies show that firms set up by the unemployed (compared to other founders) may exhibit slightly lower survival rates (Pfeiffer and Reize, 2000) or quite similar ones (PL EVAL [1], 2010). Some studies suggest that small-business assistance programmes may be more effective for low qualified workers and those living in rural areas (Rodriguez Planas, 2007) and for disadvantaged groups overall (Caliendo and Künn, 2011), particularly in the long term. **Targeting business start up incentives at disadvantaged groups (such as women, the youth, the unemployed) enables them to enter the labour market and gain the necessary work experience;** their firms will most likely on average survive shorter than those of prime aged, experienced men, but the deadweight loss¹³ will also be minimized (PL EVAL [1], 2010). Start up support programmes should also be well **tailored to local market needs** (Blanchflower and Oswald, 1998) and possibly be integrated with other measures helping the targeted groups to lower the obstacles that force their firms to exit the market (e.g. support to childcare facilities, PL [1], 2010).

Raising employment through improved matching: the role of PES & job search assistance

Job search assistance involves all sorts of measures aimed at lowering the cost of job search to the unemployed (e.g. job counselling, job broking, etc.) and the cost of filling vacancies for the employers, thus easing transitions into new jobs for workers and helping firms to better adapt to rapid economic changes. Job search assistance programmes are usually provided by a network of public employment services, though they may be partly outsourced to private service providers. They are very often supported by Cohesion Policy.

There is a large strand of studies and evaluations which show that **job search assistance can be a cost effective way of increasing participants' employment** (Kluve et al., 2006; Martin and Grubb, 2001; Crepon et al., 2005). People who find employment with the support of intensive jobs counseling usually have longer job durations, as their skills provide a better match to the workplace requirements (Boone and van Ours, 2004). **If well organized, job search assistance can raise the overall employment levels and the individual probabilities of getting a job** (Boone and van Ours, 2004; Calmfors et al., 2002; Martin and Grubb, 2001). For instance, in a rigorous evaluation of a mandatory activation programme in Denmark, based on an experimental study, Graversen and van Ours (2007) found that it was very effective, as it lowered the median unemployment duration by more than 2 weeks and increased the job finding rate by 30%. Intensive contacts between the unemployed and the public employment services were the main reason behind the programme's success and improved matching. Some evaluations show that **the greatest impact of job search assistance services comes from the provision of information and guidance to job vacancies, career development advice also appears to work well** (Kotzeva and Zvetkov, 2010). Compiling an internet-based, field-specific labour demand database may also be an effective way of matching supply and demand (EE EVAL [1], 2007).

Job search assistance services work best if targeted at those with shorter unemployment spells, in particular below one year (Weber and Hofer, 2005). It may be less effective for the long term unemployed (Centeno et al. 2005), where it needs to be combined with other measures that provide guidance and training (Bukowski, 2008). **More significant effects may be seen among women and young people aged below 30.** The results also show that

¹³ A deadweight loss appears if the support is targeted at those, who would be able to start their own business without a financial incentive.

using mediation services has the greatest net effect on employment among persons having a primary school educational level or lower (Kotzeva and Zvetkov, 2010). As shown for Romania, they are also more effective for those with little access to informal search channels (Rodriguez – Planaz, 2007). Overall, job search assistance appears to be more important for those with the highest cost of job search, in particular low educated, unemployed and low skilled women (Fougère et al., 2009), though the specific target groups may differ across countries (and/or) regions.

Some specific approaches to job search support may increase its efficiency: **an individual approach and personalised actions that direct the unemployed on pathways to employment have been shown to work well** (Martin and Grubb, 2001; Kotzeva and Zvetkov, 2010, PT EVAL [1], 2009). This was also the direction of the activities supported by Cohesion Policy, which put an emphasis on the individualization of services offered, so as to provide a better match between the unemployed and vacancies (European Commission, 2010d). As emphasized, job search assistance is likely to be more cost effective if well targeted, and the evidence suggests there is room for improvement in this area. Often, measures proved to be “skim-creaming” i.e. focusing assistance on those least in need among the unemployed, implying a large deadweight loss (Rodriguez –Planaz and Jacobs, 2007). Bukowski (2008) found no effect of job counseling and brokerage on employment in Poland, possibly due to the fact that these measures were targeted not at those mostly in need of assistance, but rather at those unemployed with better labour market prospects.

Measures such as **job counselling and other forms of job search assistance may work better if accompanied by monitoring and sanctioning components** (Kluve et al., 2006), although some studies suggest that stricter monitoring only increases the re-employment of those groups that devote the least effort to their job search (e.g. women in their 30s) (Micklewright and Nagy, 2005).

The effectiveness of job search assistance measures depends not only on the type of interventions themselves, but also on their providers’ competences and skills. ESF supported actions aimed at the modernization of the public employment services, at **upgrading the skills of PES staff via training, and promoting co-operation with other stakeholders**, in particular place –based employers and local governments, other welfare, education and health institutions (HU EVAL [3], 2010). Some evaluations suggest that the ESF support was limited in this respect (European Commission, 2010b), although a clear vision and longer-term strategy of PES upgrading improves the results (European Commission, 2010a). Strengthening public employment services (in terms of staff, skills and work organisations) is highlighted as an important step on the pathways to flexicurity, which itself is crucial in achieving the Europe 2020 goals, as emphasized in the “Agenda for new skills and jobs” Flagship Initiative.

Raising employment through improved matching: training the unemployed

Training the unemployed aims to improve their skills and match them to those required by employers, so as to enhance the individual’s chances to access employment. This is one of the most commonly used active labour market policies and is supported to a significant extent by Cohesion Policy (BG EVAL [2], IT EVAL [1], 2009, HU EVAL [1], GR EVAL [1], 2005, PL EVAL [4], 2011, Wales EVAL [4], 2010). There is a wide range of training courses that are offered to the unemployed, which are varied in their length, curricula, on-the-job components, financing arrangements or integration with other measures. As each of these dimensions is relevant for the training efficiency (which, moreover, may be different for different groups), **unambiguous assessment of the overall effectiveness of training measures is impossible**.

Training is usually found to have positive effects on the labour market from a macroeconomic perspective. Contrary to subsidized employment, which usually entails large substitution and displacement effects, training decreases unemployment and boosts employment, in particular among women (Boone and van Ours, 2004; Bassanini and Duval, 2006).

From a microeconomic perspective, many analyses find that public-sector sponsored training does not show positive results (Weber and Hofer 2003, Puhani 1998), although positive employment effects appear once they include a strong on-the-job component (Martin and Grubb 2001, Kluve and Schmidt (2002), OECD 2005 EO, HU EVAL [2], 2010). The evaluations of training programmes supported by Cohesion Policy also show mixed results: while they were sometimes positive in the Czech Republic, there was on average no net effect for the Polish unemployed¹⁴ (PL EVAL [4], 2011). In Greece, many of those who got jobs after training soon lost them and were

¹⁴ Although the effect varied with time: from negative for training completed before 2006, to positive for that completed in 2007 and later.

again unemployed, thus one may conclude that the jobs had a temporary character (GR EVAL [1], 2005, WALES EVAL [4], 2010). Some studies draw a more positive picture of public sector sponsored training: although they often lead to an initial lock-in effect, negative for employment probabilities, **impact becomes positive in the medium- and long-term** (Cockx, 2003; Lechner et al., 2007; Fitzenberger et al., 2006). Longer public sponsored training spells can cause longer unemployment spells, but also longer employment spells, suggesting that **training improves the matching process between jobseekers and firms** (Crépon et al., 2007). The impact of training on wages is also ambiguous: some studies find a positive effect (Raum et al., 2002; Lechner et al., 2004) while others find there is none (Mato, 2002; Letmaa and Vork, 2004).

The effectiveness of training varies across different groups, though again, the evidence is mixed, reflecting country and regional heterogeneity in the labour market problems and needs. Some studies claim that the benefits from training are larger for the highly qualified (Cavaco et al., 2005), while others find a positive employment impact for those without any vocational education (Wunsch and Lechner, 2007). Unemployed people with medium level qualifications may benefit both from training and competitiveness increasing schemes (HU EVAL [2], 2010). **Training may be less effective** (Bukowski, 2008) or even have a negative effect (BG EVAL [2]) **for the youngest unemployed**, while gender results are contradictory (Arellano, 2005; Albrecht et al., 2005; Zhang, 2003).

Short term training programmes may be more effective if compared to the traditional, long term and costly ones (Hujer and Wellner, 2000; Biewen et al., 2007). Longer training programmes may even make their participants worse off compared to nonparticipation (Wunsch and Lechner, 2007). There is also evidence that training is in the long run more effective if started during a period of high unemployment, hence one might want to reduce the number of training programmes available once the economy picks up and unemployment starts falling (Lechner and Wunsch, 2009). General training programmes may also work better if properly timed (e.g. the planned duration is not longer than 6 months and if started not earlier than 5 months after entering unemployment for the German data) (Wunsch and Lechner, 2007).

Some studies find a **positive impact of the threat effect**, that is the obligation to participate in training after a certain time in unemployment, which acts as an incentive for the unemployed to put more effort into the job search and/ or lower their reservation wage so as to find a job before the training programme starts (Geerdsen, 2006).

Training programmes work better if they are designed in cooperation with employers and other stakeholders and include on-the-job training, providing participants with skills that match local employers' needs (Bukowski, 2008; EE EVAL [1], 2007, PT EVAL [1], 2009, PT EVAL [3], 2008). Their efficiency increases if they **provide a certificate that can be recognized on the labour market** (Kluve et al., 2007). Some evaluations suggest that integrating training with intensive job search assistance, in particular with individual action plans may significantly improve their effect (PL EVAL [1], 2010).

There are several interactions of training with other labour market policies and institutions, which may enhance or decrease their overall effectiveness (Boeri and van Ours, 2008). For instance, if participation in training allows the beneficiary to qualify again for unemployment benefits after the programme, a so-called *carrousel effect* is likely to appear, incentivizing unemployment – training – unemployment cycles (Forslund et al., 2004). Again, even if there is no employment effect of the training measures for certain groups, mostly those with the greatest risk of social exclusion, **participation in a training programme may have a socializing effect**, preventing them from withdrawing from the labour market and leaving some room for other activating measures (WALES EVAL [3], 2005, [4], 2010, IT EVAL [1], 2009).

What remains a **challenge for the proper design of training programmes is the identification of future labour market needs**, in particular at the regional or local level (PT EVAL [1], 2009, PT EVAL [6], 2010). Misjudging these depresses long term individual employment outcomes of the unemployed under public sponsored training (Lechner et al., 2007). Cooperation with other place-based institutions is necessary: bringing together working councils, business representatives, and other relevant social partners improves the planning of the educational and vocational training process and the forecasting of future skill needs, as highlighted by the Europe 2020 Strategy in its “Agenda for New Skills and Jobs” Flagship Initiative. The Initiative also puts a lot of emphasis on the need to strengthen the capacity for forecasting labour supply and demand developments, necessary to be able to provide new training schemes or curricula that will fit into a changing economy, in particular its green dimension (cf. Box 3.3. and chapter 2).

Increasing geographical labour market mobility

Apart from the skill dimension, labour market mismatches are often strengthened by another aspect - a spatial one. Large regional labour market disparities exist in all countries and across them. Job creation is often higher in regions with relatively low numbers of unemployed, who tend to live in more depressed labour markets. There is a large strand of literature that shows how **migration is a key component of labour market flexibility** and how it contributes to alleviating mismatches and reducing labour market differences (Borjas, 1994, 2001; Pissarides and McMaster, 1990), though its impact in some of the EU countries is lower (Puhani, 2001). Facilitating and promoting intra-EU labour mobility stands as an important point on the Europe 2020 agenda (emphasized in its “An Agenda for New Skills and jobs” and “Youth on the move” Flagship Initiatives). There are several measures that may improve internal EU mobility: (i) modernising employment services, so that they are able to match unemployed and vacancies regardless of their location, (ii) adapting education training systems, (iii) adapting skills certification, so that those acquired in one region/ country become recognised elsewhere, (iv) improving mobility of students and researchers, and, finally, (v) providing direct support to those willing to undertake a job in a different region and, finally, (vi) further opening of the EU labour markets to the EU citizens. The first four of these issues have been discussed above. Below we focus on the last but one, in particular its two aspects: facilitating increased work commuting and encouraging/ helping those who may move to a different region (internal migrations). Commuting is also influenced by transport infrastructure, discussed below (cf. Section 3.4).

Several studies indicate that interregional commuting appears to be a more important dimension of labour mobility than internal migrations (Bukowski, 2007, Lindgren and Westerlund, 2003), hence it may be more effective to focus support on the former. There is also some evidence suggesting that subsidising internal migration does not necessarily enhance it (Westerlund, 1998.). There is a strong relationship between the costs of commuting and the local unemployment rates (HU EVAL [2]), and the **economic cost of commuting is itself higher for women** (Swärdh and Algers, 2009), who may therefore be a **better target for commuting support policies**.

Instruments that are directly aimed at mobility encompass subsidising transport costs, mobility allowances for travel to work and/ or relocation and accommodation costs. These have been set up in several EU Member States (EMCO, 2010; BE EVAL [1], 2009). However, as emphasised by some evaluations, only some of the European countries allocate enough priority to mobility, making use of the opportunities offered by Cohesion Policy via the European Social Fund (European Commission, 2010d).

Promoting job quality

There is evidence of a **positive link between job quality, labour productivity and employment growth** (CEPS, 2010, European Commission, 2008; Bukowski, 2010). **Improvements in job quality increase workers’ well being and their work efficiency, translating into higher productivity**. Enhanced job quality may also be a means to prevent work absence and/ or early retirement, as job satisfaction is negatively correlated with turnover and absenteeism rates (Hackman and Oldham, 1980; Appelbaum and Berg, 1997), although the link between job satisfaction and job quality is not straightforward (Llorente and Macías, 2005).

Job quality is a multidimensional phenomenon, and its several aspects¹⁵ can be grouped into 4 main areas: (i) career and employment stability, (ii) participation in education and training, (iii) work-life balance and (iv) health and well being (cf. Eurofond approach). Many of these dimensions are emphasized clearly as the pathways to achieving the goals set out by the Europe 2020 strategy (e.g. skills, III, inclusion, flexibility and security, the role of social dialogue).

Box 3.2.: Germany: “INQA - Initiative Neue Qualität der Arbeit, New quality of Work initiative”

INQA is a joint initiative introduced by the German Federal Government, the federal states (*Länder*), trade unions, employers’ and business associations, social security organisations, foundations and individual companies. Its aim is to foster the building of a healthy, highly-skilled and motivated workforce to ensure a competitive advantage for enterprises and the economy as a whole. Supported by the ESF, INQA promotes projects and models of good practice. It has itself also been indicated as a good practice.

Source: www.inqa.de, European Working Conditions Observatory ID: DE0612039Q

¹⁵ The European Commission approach sets out 10 dimensions: 1. Intrinsic job quality; 2. Skills, lifelong learning and career development; 3. Gender equality; 4. Health and safety at work; 5. Flexibility and security; 6. Inclusion and access to the labour market; 7. Work organisation and work-life balance; 8. Social dialogue and worker involvement; 9. Diversity and non-discrimination; 10. Overall work performance (see European Commission, 2008 for details).

Several dimensions of the job quality concept can be tackled via the various policy measures we have presented above (skills improvement, work-life balance, gender equality , flexicurity) and further (social inclusion) in this chapter. Although education and childcare policies are highlighted as crucial to improving job quality in the European Union (CEPS, 2010), the issue of working conditions should not be forgotten. For instance, evaluations show that **studying and improving working conditions**, in particular in male dominated jobs/ occupations, **is a good way of encouraging female employment and thus gender equality** (European Commission, 2010b; European Foundation 2007). Enhancing health and safety at work requires, above all, proper legislation, although it can be vastly improved by introducing advisory services for employers, promoting health and safety among employees, improving working conditions and engaging social partners into these actions. Cohesion Policy supports, via the European Social Fund, measures aimed both at increasing health and safety awareness, adapting working conditions in enterprises as well as introducing flexible working time arrangements (European Commission, 2010b) (see for example Box 3.2).

3.4 Social cohesion: fighting poverty

As emphasized by the “European platform against poverty and social exclusion” Flagship Initiative, the fight against poverty is placed well at the heart of the Europe 2020 strategy, with the aim of lifting at least 20 million people out of poverty and social exclusion in this decade. Poverty is a multidimensional phenomenon and is usually determined by several complex reasons (OECD, 2007a). Certain groups are more exposed to the risk of poverty, mostly the unemployed, children, households with no market income, single parents, the youth, the disabled, certain minorities and people with migrant background. Each of the identified target groups requires a different approach in tackling the risk of poverty, and summarising the evidence in this field is beyond the scope of this report. We will pay particular attention to the link between poverty and employment and policies that “make work pay”, focussing on a few major groups: the youth, the elderly, and the disabled. The measures aimed at them usually encompass a combination of training, counselling and employment support (cf. Figure 3.4), as an appropriate policy mix of income support with activation and inclusion measures and access to quality services is the most effective (OECD 2005, OECD 2009a).

Employment as a way of lifting people out of poverty

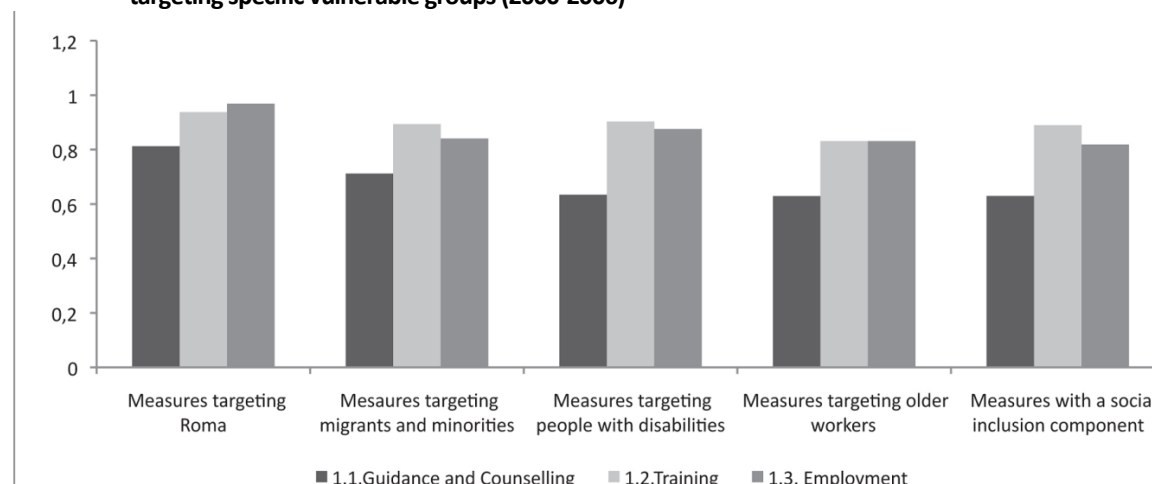
Joblessness is one of the most important factors contributions to poverty and **getting those who are able to work to take up a job is the most effective way of lifting them out of poverty, while helping those at risk of poverty to remain on the labour market is crucial for them to avoid that risk** (OECD 2007, 2009a). Supporting employment is of particular importance for the single and/or low-earner parents, as it helps to lift their children out of poverty. For instance, evaluations of North American randomised experiments (focussed primarily on single parent families, e.g. Florida’s Family Transition Programme, the Minnesota Family Investment Programme, the National Evaluation of Welfare-to-Work Strategies, New Hope and the Canadian Self-Sufficiency Project) have shown **positive effects of parent’s transition to work not only on child poverty rates, but also schooling, health and behaviours** (OECD, 2009). The measures and public interventions that appear to work well in bringing people (back) to work have already been largely discussed in the previous sections. Below we focus on additional aspects of the employment and poverty overlap.

The issue of *in-work poverty* has been lively debated, and although the poverty risk among the working population is much lower than among non-working individuals¹⁶, the working poor represent almost 8% of the working population in the EU, as emphasized by the Europe 2020 strategy. This calls for adequate actions to *make work pay*, in order not only to keep employees out of poverty, but to also encourage those without jobs to take them up and search for them, which will only be possible if these jobs offer sufficient financial incentives to exit the unemployment and inactivity traps (Carone et al., 2004; Immervoll and O’donoghue, 2003).

Employment-conditional cash transfers to individuals facing particular labour-market challenges have been a **core element of “make-work-pay” policies** in most of the EU/ OECD countries (Immervoll and Pearson, 2009). These cash transfers usually take the form of “in-work benefits” or employment-conditional tax credits and their role is to provide financial support to those with low incomes while also creating additional work incentives (OECD, 2007b).

¹⁶ The link between (low) pay and poverty is relatively weak (Nolan 1998, Bazen (1988), Burkhauser and Sabia(2007)), as many of the low paid live in non-poor households, whereas most of the poor households have no market income.

Figure 3.4: Breakdown of ESF Pathways to Integration activities in measures with a social inclusion component targeting specific vulnerable groups (2000-2006)



Source : European Social Fund and Social Inclusion, European Commission (2010)

In-work benefits and tax credits can be an effective way of raising the employment rates among the target groups, usually the low skilled, low income, often single parents and other welfare recipients (Michalopoulos et al., 2005), though their effect on the overall employment levels is not substantial (Immervol and Pearson, 2009). Their design and entitlement rules are important: for instance, **in-work benefits based on individual income may promote part-time employment**, while those **based on low household incomes may in fact act as a disincentive to work for second-earners** (Holger et al., 2002). There is evidence in favour of those policies which distinguish between low effort and low productivity, by **targeting those with low wages rather than low overall earnings** (Bargain et al., 2006). Cross country institutional differences also matter for the outcomes of in-work financial support. For example, estimates show that importing the UK-style in-work tax credits into Germany would lead to a raise in the employment of single individuals, but would also result in a reduction of labour supply among individuals living in couples, among both women and men (Haan and Myck, 2007). This stand is in contrast to the UK experience, where the labour market impact has been positive not only for lone parents, but also for men in couples (Brewer et al., 2006). Moreover, **in-work benefits targeted at lone parents appear to work well if accompanied by measures helping to provide (or finance) childcare** (Francesconi and van der Klaauw, 2004; OECD, 2007b).

In-work benefits can be a cost-effective redistribution instrument, although their redistribution role is more limited if they take the form of short-term or one-off transitional payments (e.g. for those taking up a new job); they also appear to **work well if there are significant income or earnings disparities at the bottom of the distribution** (Immervol and Pearson, 2009). Haan and Steiner (2006) evaluate the in work tax credits targeted at older unemployed people and compare them to wage subsidies and a subsidy of social security contributions on low wages, finding that the simulated labour supply effects of the three policy reforms would be rather similar and of moderate size.

To sum up, **in work benefits or employment, conditional tax credits can be an effective way of lowering in-work poverty and encouraging transitions to employment for some of those at the margins of the labour market**. However, they need to be **well designed and tailored** to a particular economic and institutional setting and the target groups. Although these are largely determined by the central-level policies, **designing the system, experimenting with pilot projects and evaluating them could be an important area supported by Cohesion Policy**.

Labour market integration of certain special groups: youth, older workers, disabled

The disabled face particular challenges in terms of their integration on the labour market; so too do people at the beginning and end of their working careers. Measures helping them to enter and/or stay within employment need to be tailored to their needs, as the effectiveness of various policy measures varies depending on the needs addressed (cf. Section 1 and 2). Moreover, within the quickly changing economy, the interventions undertaken also need to be constantly evaluated and improved. **Social innovation offers a novel way of integrating those at risk into the labour markets and preventing their social exclusion** (cf. Box 3.3).

Box 3.3. Social innovations and social experimentation

Social innovation has become an important strategy to tackle social problems. It describes new, innovative tools and solutions to public and social services, which are usually designed as small scale projects and then thoroughly tested and evaluated, before they are adopted on a larger scale. The testing is done with the use of experimental methods, assuring methodologically rigorous assessment of the innovation's efficiency. The assessment will most often be based on the so-called experimental methods, comparing the outcomes of two groups, one being subject to the assessed intervention (controlling for the individuals socio-economic characteristics). Promoting evidence based social innovation has been identified as one of the areas for action in the Europe 2020 strategy.

Cohesion Policy may provide financial means both for testing and mainstreaming the positively assessed actions, and many of the initiatives supported by the ESF (e.g. within the EQUAL CI, cf. CZ [2], DK [1], NL [2]) have reflected the idea of experimenting with social innovation.

Source: European Union/The Young Foundation (2010), "Study on Social Innovation", Europe 2020 strategy

Youth transitions from education to the labour market have become longer, more complex and often unsuccessful. The **poorly integrated new entrants**, working in low quality, temporary jobs and unable to find stable employment, **may need intensive job search assistance**, which is found to be the most cost-effective for young people who are assessed as ready to work (OECD, 2010). Those who have difficulties in finding a job should be targeted with training and apprenticeships, keeping in mind that **ALMP are a much less effective tool in countering unemployment and social exclusion of the youth than measures in the area of education**, including above all securing equal education opportunities for children from disadvantaged families, developing pre-school education, adjusting education syllabuses to labour market needs and preventing early drop-out from the education system (Grubb, 1999; Heckman, 2006). **Dual vocational education and training (VET)** programmes, such as those in Austria and Germany, appear to be **efficient school-to-work pathways**, particularly for secondary students. School drop-outs need remedial help: the focus should be on acquiring skills required by the job markets, such as ICT and basic technical qualifications. While getting them back to school might prove counterproductive, training and educational programmes taught outside traditional schools, combined with some work experience and adult mentoring, are more likely to be a better strategy (OECD, 2010; PT [2], 2009). Several evaluations indicate that **business start up support may be an effective way of integrating youth into the labour market** (PL EVAL [4], 2011), while setting up **career offices offering guidance and placement services may be a way of smoothing transitions from university to employment** (GR EVAL [2]). Again, integrated measures and place – based policies are the most effective in achieving positive outcomes (PT EVAL [1], 2009, AT EVAL [1], 2005).

Older workers and the unemployed constitute a largely heterogeneous group, therefore the policies targeted at them vary a lot in their approach, design and objectives. Due to the ageing of the workforce there is a need to prolong working lives, which poses a challenge to firms, employees and public policy, including the EU's Cohesion Policy framework. Firstly, it is often emphasized that **retirement should be seen as a process**, rather than a one-time event, whereby older employees gradually withdraw from the labour market. Measures that help to achieve this include **flexible working time arrangements and increased part time work** (Loretto et al., 2005; Graf et al., 2009; DwP, 2011), though some employers may be unwilling to offer phased retirement (Hutchens and Grace-Martin, 2006). **Flexibility in adjusting wages** to the falling productivity may also be important to keep up the demand for older workers (Casey et al., 2003). Secondly, there is a need for **training employers and managers on how to manage an ageing workforce** (Loretto and White, 2006). Thirdly, some policies aim at increasing employment opportunities for this group. For instance, several EU and OECD countries introduced **wage subsidies for older workers**, usually targeted at employers who hire the unemployed approaching retirement age. The **evidence on their effectiveness is mixed**. Ammermüller et al. (2007), analyzing the impact of hiring subsidies for older unemployed workers in Germany on their transitions to employment found a positive effect only for women in East Germany. Some evaluations show however that earning subsidies have proven effective (Haan and Steiner, 2005; BG EVAL [2]). The fourth set of policies aims at **improving participation in training among older workers**, in particular with an on-the-job component, as these prove effective as a tool for retaining them in work (Picchio and van Ours, 2011). However, some evidence on the **tax incentives for firms training older workers is rather discouraging** (Leuven and Oosterbeek, 2004). Finally, innovative initiatives at firm level (e.g. integrative ones, or special training for the entire crew), which aim at reconciling age, work and training, tend to work well (Gendron, 2006).

Several measures discussed in this chapter highlighted **gender aspects** of Cohesion Policy interventions. In particular, measures aimed at helping to reconcile work and family are supportive in increasing female employment (BE EVAL [1], 2009, CZ EVAL [1], 2010, HU EVAL [2], 2010, WALES EVAL [1], 2005, WALES EVAL [3], 2005). These include in particular providing childcare facilities, but also social infrastructure targeted at old-age care. Some of the interventions (e.g. trainings, job search assistance) prove particularly effective in boosting female employment and thus lowering the gender employment gap. Finally, gender aspects should be taken into account when designing and assessing interventions, as their success and failure risks may vary for men and women.

Working-age **disability policies** are targeted at a large and heterogeneous group, with varying degrees of disability and very different labour market skills. Labour market integration of those who are able to work is the best way of securing them an adequate income (OECD, 2003). The commonly used policies aimed at increasing employment include vocational rehabilitation and training, sheltered and supported-type employment programmes. **Vocational rehabilitation and training appear to work better if employers are involved in the process.** Being relatively inexpensive, they can be seen as a cost effective intervention if they secure permanent employment within a relatively short time period. However, they are usually used too little and initiated too late (OECD, 2003). **Sheltered employment** has been more and more often seen as an **inappropriate policy measure and replaced with supported-type employment**, e.g. on the job coaching in the open labour market (NL EVAL [1]). **Financial incentives to promote employment of the disabled may only have temporary effects and no long-term ones** (Verick, 2004). **Legislative approaches to employment promotion among the disabled appear to benefit those already in jobs**, while those out of work are much less likely to benefit (Acemoglu and Angrist, 2001; Humer et al., 2008; Beegle and Stock, 2003; Bell and Heitmueller, 2009). **Integrated approaches** tend again to be the **most effective**, e.g. a design of individual work/benefit packages (rehabilitation, job training, job search assistance, some work elements e.g. a part time or subsidised job), adapted to individual and local needs and capacities (OECD, 2003, NL EVAL [1], 2008, HU EVAL [2], 2010). This is confirmed by an evaluation of the Want2Work pilot programme (WALES EVAL [2], 2006), focussed primarily on those with incapacity benefits, where a combination of advice, guidance, health support, funding for training, in-work support during the first year of employment and potential additional funding was positively associated with the probability of the disabled moving to a job.

3.5 Territorial cohesion. Role of transport infrastructure

Transport infrastructure may influence industry productivity in different ways, in particular through a reduction of time and transport costs, which leads to, inter alia, higher productivity of other inputs, lower production costs, growth of trade, more intensive competition, changes in location decisions, better coordination of decisions among suppliers and consumers and more efficient allocation of resources between firms and sectors (Bottasso and Conti, 2010).

There is a broad consensus that more accessible regions are more competitive. However, one should notice that on the other hand there are relatively more accessible regions at the heart of Europe which suffer from industrial decline and high unemployment. There are also prosperous peripheral regions, such as the Nordic countries (TRACC, 2011). The theoretical (new economic geography) and empirical evidence is also not unequivocal. There is even disagreement on the direction of the impact and thus whether transport infrastructure investments lead to regional income convergence or polarization. Moreover, there is no clear methodology to evaluate the wider impact effects of transport infrastructure investments on employment, GDP, population and social inclusion.

This subchapter is divided into two parts: 1. Transport infrastructure and regional development ; 2. Accessibility at the European, national and regional level.

Transport infrastructure and regional development

The choice of the evaluation method of assessment of the impact of transport infrastructure on regional development and **inclusive growth** in the peripheral regions is crucial for policy recommendations. There is a long history of **evaluation of transport infrastructure projects**. However, the scope, the method and the impact of evaluation on actual decision-making differ between countries (Nakamura, 2000). A range of possible analytical approaches has been reported in the literature: conventional cost-benefit analysis (CBA), multi-criteria analysis (MCA), production function models, accessibility approach, input-output approach and spatial computable general

equilibrium models (SCGE). The conventional cost-benefit analysis, in which the benefits of a given project are weighted against the costs of the project, remains the most popular approach.

The wider impact of transport infrastructure, which is crucial for inclusive growth, are difficult to measure. There are two main methodological approaches to evaluate the wider impact of transport infrastructure: econometric estimates of infrastructure measured as public capital stock and accessibility indicators. Both public capital stock and accessibility indicators (potential accessibility in particular) are employed as an additional input in a production function.

The econometric estimates of the impact of infrastructure, measured as public capital stock, on productivity are the most used research method to evaluate the socio-economic effects of infrastructure. At the European level, the impact of European funds on regional development is being measured by two macro models used by DG Regional Policy – HERMIN and QUEST (EC, Fifth report, 2010). At the national level, national macroeconomic models are constructed. For example Lithuanian, macroeconomic calculations show that within 2004-2008 every Litas invested into the transport infrastructure within these five years has brought a return of LTL 1.5 (LT EVAL., 2010, [1]). There are also many econometric studies on the impact of infrastructure on productivity and regional growth in Spain (Mas et al., 1996; Pereira and Roca-Sagalés, 2003), Greece (Dalamagas, 1995), Portugal (Pereira and Andraz, 2007) and other countries developing their transport networks.

However, due to many reasons, the results of econometric studies are questionable. For example, it is difficult to define the quantity of public capital stock (transport infrastructure) because the infrastructure assets are unique goods and there is always a problem with the impact of technological changes on prices and average service lives of assets. Gramlich (1994) indicates that econometric problems like spurious regression, missing variables such as human or social capital and the direction of the causality may raise doubts about the high correlation coefficients observed. Kovács and Spens (2006) indicate that the relationship between economic growth and transport infrastructure can be described in a circular manner. There are traffic models in which exogenous economic factors influence the demand for transport on one side, and, on the other side, production function, location and general equilibrium models, in which transport influences the economy. Cohen (2010) points out that, although there is still a lack of consensus on the direction of infrastructure's impacts, spatial econometrics has significantly contributed to understanding the causality problem.

Difficulties arise when regional estimates on the impact of infrastructure are taken into consideration. The appropriate regional model should include specific characteristics of an area (region) and so called spatial spillovers (externalities). **Spillovers refer to the fact that the impact of a new motorway on output and productivity growth is expected to be seen not only in the region where the motorway runs, but also in neighbouring regions.** Bröcker et al. (2010) check whether benefit spillovers from TEN-T projects to countries not involved in financing might prevent the realization of projects. The authors evaluate the contribution of each project to the spatial cohesion objective. Their results confirm sceptical views on EU involvement in infrastructure policy and suggest that out of 22 projects only 12 have a yearly rate of return above 5% for the EU.

The existence of spillovers has been evaluated by several authors in Spain. Pereira and Roca-Sagalés (2003) point out the importance of the infrastructure situated outside the peripheral Spanish regions for the development of these regions in the period of 1970 to 1995. Gutiérrez et. al. (2010) took the Spanish transport master plan PEIT in the years 2005-2020 as a case study for calculating and mapping regional spillovers. Their conclusion is that the magnitude of the spillover effects varies significantly according to region, from 26.3% in Valencia to 84.1% in Madrid, and overall, 58.9% of the total investment in motorways in PEIT is exported to other regions. Holl (2004) analyzes the impact of road infrastructure on the location of new manufacturing establishments in Spanish municipalities from 1980 to 1994. Her results show that new motorways affect the spatial distribution of manufacturing establishments at the municipal level. Most benefits are concentrated near the new infrastructure because firms prefer locations closer to new motorways at the cost of more distant municipalities, which is consistent with negative spillover effects.

The effects of an increase in transport infrastructure may evolve over time and differ between the short and the medium- and the long-term. The evaluation of transport infrastructure projects needs to consist of all the temporal phases of implementing an investment project: construction phase, short term phase (right after the implementation of the transport project), medium term phase (when industries and households have enough time to respond to the initiative) and long term phase (when industries adapt further through changes in productivity and business competitiveness and households through changes in consumption propensities) (J. van Excel et al., 2002). The wider socio-economic impacts directly attributable to the project are difficult to establish (EU EVAL., 2010, [2]). The problem

arises in particular when one is assessing long term wider socio-economic effects during an economic boom or recession, such as during the financial crisis of 2008-2009. For example, [Mamatzakis \(2007\)](#) shows that public infrastructure in Greece exhibits a significant productive effect, but that it varies over time. **Indirect effects need effective measurement and monitoring which needs to be carried out over a much longer timeframe than the limited time in the programming period.**

The conclusion is that **the return on transport infrastructure investments is a nonlinear one.** First sections of the network are not exceptionally productive but connecting additional locations increases the usefulness of the entire network. The most effective is the final section that completes the basic intermetropolitan network. However, expanding the network further does not lead to additional benefits. For the above mentioned reasons, **retrospective studies are not the best way to justify future expenditures on the transport infrastructure.** In countries with an already highly developed transport infrastructure, further transport network improvements bring only marginal benefits ([TRACC, 2011](#)). **In the states where the network overall is limited and fragmented (Poland, Romania) connecting additional agglomerations gives huge benefits both for the firms and the consumers.**

The main wider impact of high speed railway (HSR) lines is the impact on mobility, accessibility, socio-economic structures, urban image and spatial effects. The HSR line linking Madrid and Barcelona with the cities of Zaragoza and Lleida confirms this thesis. However, this line may support wider economic changes that are already underway rather than induce or generate new changes ([EU EVAL, 2010, \[2\]](#)). The problem of development of regions located between junctions (nodes) of motorways or high speed railway lines refers to the **corridor effect** which means that the infrastructure passes through the region without having much impact. If accessibility is represented as a continuous three-dimensional surface, the nodes of the (high-speed) networks are 'mountains' representing, for instance, high-speed rail stations in the city centers, whereas the areas away from the network nodes are 'valleys' representing the 'grey zones' with low accessibility between the network nodes ([TRACC, 2011](#)). However, additional traffic and the increased accessibility gives a node a good start to attract new companies, logistics firms in particular.

Ex post evaluation of cohesion policy interventions during 2000-2006, financed by the Cohesion Fund, gives much evidence of the positive impact of transport investments on new industries located along the transport corridors ([EU EVAL, 2010, \[2\]](#)). IX B corridor in Lithuania helped set up Free Economic Zones and open new logistic centers. It also contributed to the regeneration of brownfields along the motorway with the set up of new shopping and residential centers. A23 motorway in Spain has also attracted several developments to the region, both in the Tereul and Huesca provinces including new industrial and technological parks. Along the M0 corridor near Budapest in Hungary, new retail and logistics centers will contribute to the development of the metropolitan area. However, a question arises as to whether these firms are relocated or generated. In the case of relocation from peripheral areas to the infrastructure nodes, the process can have a negative impact and even lead to further regional divergence. From the theoretical point of view, new economic geography gives some answers (but also raises some questions) to the problem of improving access of peripheral regions and its consequences.

The **new economic geography** explains regional development as the result of the process where two forces exist: agglomeration effects (economies of scale) and spatial interaction costs. In the historical process of decreasing transport costs and increasing agglomeration effects, the spatial structure changed from isolated dispersed settlements into more a polarized one with a small number of agglomerations ([TRACC, 2011](#)). According to the NEG theory, a reduction of transportation costs might be harmful for the constant returns to scale economies of less-developed peripheral regions, while in the meantime it can stimulate the increasing returns to scale industries in more developed "core" regions ([Krugman, 1991; Mohl and Hagen, 2010](#)). A new infrastructure connection makes it easier for producers in the peripheral region to sell their products in the central one, but may also expose the peripheral region to the competition of more advanced products from the core ([Vickerman et al., 1999](#)). Therefore, economic integration may lead to a spatial "core-periphery" pattern. However, if a poor region is located between two rich regions and the transport costs decrease after the implementation of a new motorway or high-speed railway line, firms are likely to relocate to the less-developed region, due to the relatively lower wages and opportunity of operating in two markets in richer regions ([Baldwin et al., 2003](#)). This may be a reason why improving access is still one of the main objectives of European, national and regional transport strategies.

From the above mentioned theoretical and empirical considerations one can draw the following conclusions. Due to the fact that the evidence is ambiguous, it is very difficult to conclude unequivocally that transport infrastructure always and everywhere has the same positive impact on regional development. However, one can be sure that transport infrastructure investments have important implications for territorial cohesion and accessibility in countries where the transport network is limited and fragmented.

Accessibility at the European, national and regional level

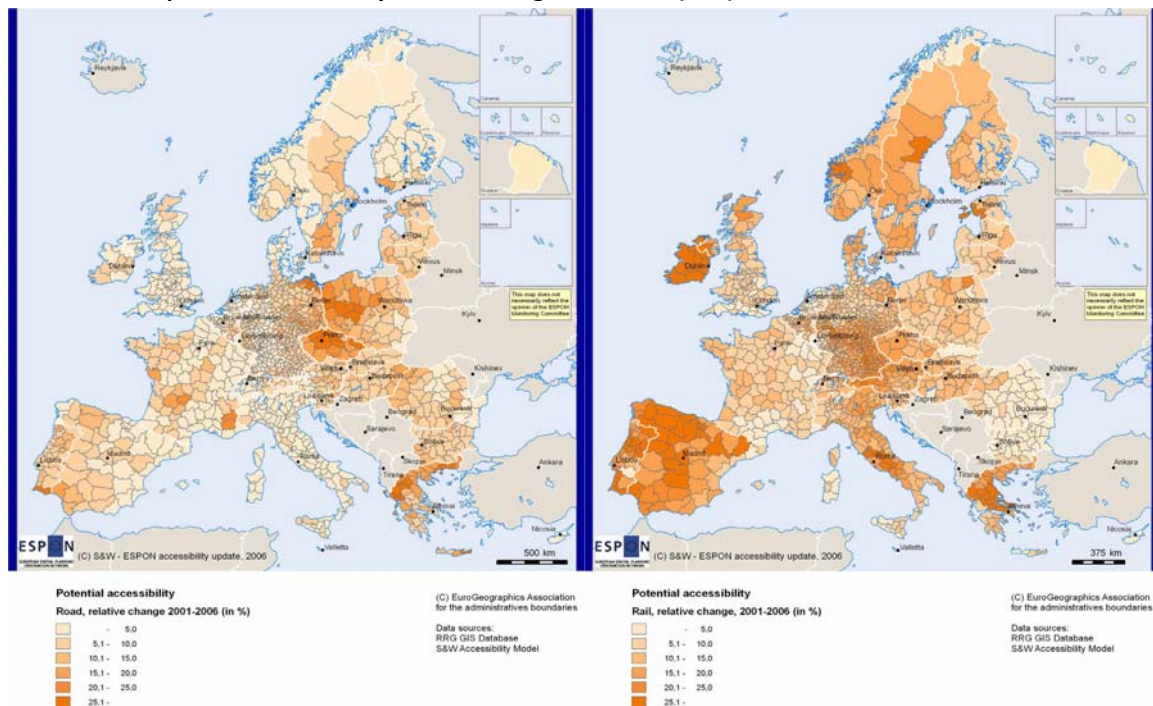
The maximization of accessibility is an objective of Cohesion Policy as far as it helps to improve the quality of life by facilitating access to opportunities, goods and services (TRACC, 2011). The process of finding comparable evidence of successful cohesion policy concerning accessibility changes is complicated. The problem refers to a lack of coherence between indicators at the European, national and regional level. Definitions of the indicators to be monitored are relatively poor (EU EVAL, 2010, [3]). The basic indicators (for example, the length of the motorways and their regional density) are the most popular ones. More advanced accessibility indicators (see the box), potential accessibility in particular, are seldom used for evaluation of transport investments financed by European funds. The studies at the European scale (Keeble et al. (1982), Spiekermann and Wegener (1996), Spiekermann and Schürmann (2007)) refer to the changes in accessibility in the period of time irrespective of the source of infrastructure financing.

At the European scale the most frequently used indicator is potential accessibility which is based on the assumption that the attraction of a destination decreases with the distance, travel time or cost (TRACC, 2011). There is no common method to evaluate the accessibility effects of transport projects (see in the box).

Box 3.4. Accessibility – methodological issues

There are different methodological approaches to accessibility. One can identify several groups of methods (Komornicki et al., 2010): **infrastructure-based** accessibility measure – the regional infrastructure equipment is evaluated by its quantity and quality; this approach is widely used in national transport policy plans; however, it fails to recognize the destinations located far away from the region; **cumulative-based** accessibility measure (daily accessibility) – assessment of set of destinations available in particular travel distance, time or cost from the origin; the use of isochrones (lines of equal travel distance, time or cost) for measurement of accessibility to activities in a 15,30,45,60 minutes time from the place of origin; **potential-based** accessibility measure – the number of activities (opportunities) which can be reached in a certain distance, time or effort weighted by the travel distance, time or effort to do so; **person-based** accessibility measure – analyzing accessibility at the individual level; the models take into account the individual behavior of the transport network user and focus on the person's ability to contribute in activities through space and time. Among the above-mentioned methods the **potential accessibility indicator is recommended for measurement of the effect of particular infrastructure project or set of projects on changes in accessibility both at the regional, national, European and even global level.**

Fig. 3.5. Road and rail potential accessibility, relative change 2001-2006 (in %)



Source: Spiekermann and Schürmann (2007)

According to Spiekermann and Schürmann (2007) between 2001 and 2006 the relative winners of road accessibility improvements are regions in western Poland, the Czech Republic and the New German Länder. They improved

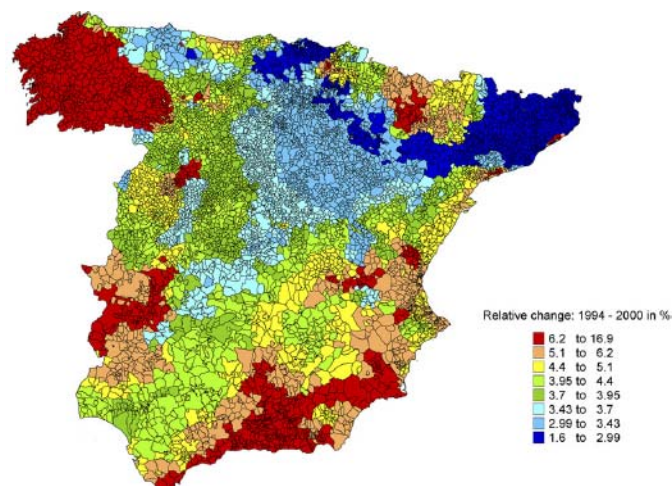
their relative position by more than six index points. Relative winners of rail investments are mainly located in southern Germany, Italy and Spain in which high-speed rail projects led to an improvement of their locational position compared to other European regions. An accessibility study shows that the least accessible regions are distributed mainly in the northern parts of Scandinavia, in the Baltic States, Romania, Bulgaria, Greece and in the western and southern part of the Iberian Peninsula. Among the above mentioned regions, those located at the southern fringe (Romania and Bulgaria) and the northern fringe (Baltic states) of the European Union should improve their access to the European core by 2020.

The example of improving accessibility by transport infrastructure is a TEN-T project of expanding Project 7 (Motorway Axis Igoumenitsa/Patra-Athina-Sofia-Budapest) which will provide significant improvements to the road network of southeastern Europe. Initially, it involved the construction of two new motorways in Greece. In 2004, the project was extended to connect in the future the neighbouring countries and Central Europe: one branch to Sofia and Budapest and another towards the port of Constanta (EU EVAL., 2010, [4]).

In the case of the Baltic States, one of the important obstacles is the Polish bottleneck. There is no dual carriageway from central Poland to the Lithuanian border over a distance of more than 300 km. Baltic-EU interconnectivity suffers from the current state of rail and road connections in Poland (Kovacs and Spens, 2006). **Improving the accessibility of Romania, Bulgaria, the Baltic States and north-eastern Poland should be treated as a priority for the expansion of both the European road and railway network.**

At the national level, access to the interagglomeration network and metropolitan areas is of the highest importance (see chapter 1). There are some interesting studies concerning changes in accessibility during the last decades. For example, according to Holl (2007) in Spain in 1980-2000 accessibility levels have improved all over the country, but the distribution of accessibility gains has been uneven and in relative terms has become more polarized. However, between 1994 and 2000, in the years of massive road building financed by the structural funds, Galicia, a peripheral region of north-western Spain, gained the most in terms of accessibility (fig 3.6).

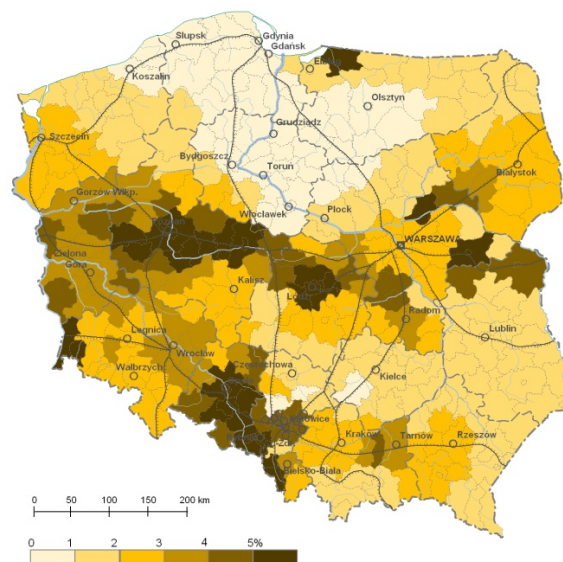
Fig. 3.6. Road potential accessibility, relative change 1994-2000 (in %)



Source: Holl (2007).

Transportation evaluation in Poland shows changes in accessibility after the implementation of transport infrastructure projects financed by the structural funds during the programming period of 2004-2006 (PL EVAL., 2010, [1]). This evaluation is based on the multimodal potential accessibility indicator calculated at the national level (fig. 3.7).

Fig. 3.7. Multimodal potential accessibility, relative change due to EU funded transport projects 2004-2006 (in %)



Source: PL EVAL., 2010, [1].

One of the main problems concerning regional and local infrastructure is whether to invest in new sections or just maintain the old ones. Ex post evaluation of ERDF (EU EVAL., 2010, [3]) points out that **funds should be more focused on new construction and major enhancements** that will support regional development over the medium and long term. The recommendation is that **investment in local roads requires careful consideration independent of local political pressure** in particular when the benefits are difficult to demonstrate. However, **upgrading/rehabilitation is very important in eastern European states (EU12)**. These countries suffer from very poor road conditions which is regarded as one of the main weaknesses of their transport systems (PL EVAL., 2006, [3]; SK EVAL., 2006, [1]). The importance of this fact is given even greater strength when we acknowledge a sudden increase of traffic, heavy load traffic in particular (see chapter 1).

Improving access to the regions by connecting the main networks to local small-scale transport systems was one of the main ERDF objectives for the programming period 2000-2006. The term 'overinvesting' seems to be exaggerated, in particular from the perspective of eastern Europe which lags behind and has many needs in this area. However, in Spain there is a real '**risk of overinvesting**'. This problem relates to the goal to link all the capitals of the 47 provinces and a number of other important cities by four-lane motorways. Ecorys experts (ES EVAL., 2006, [1]) indicate that the daily intensity of traffic on many of these connections is below the usual standards for the construction of four-lane motorways.

The provision of minimum standards of services of general interest in rural and peripheral areas is becoming a problem of high political importance. This makes the analysis of accessibility of public facilities such as schools, doctors and public transport, important because of its strong impact on social inclusion or exclusion and participation in social and cultural life (TRACC, 2011). The low quality of public transport in rural and peripheral areas can be seen as a weakness of the transport system in many European states (GR EVAL., 2006, [2]; SK EVAL., 2006, [1]). **Generally, more attention should be paid to better management, flexible pricing and intelligent transportation systems.**

Box 3.5. Taxi-style public transport

The introduction of new bus lines aimed at facilitating access to every village costs a lot of money. For this reason, the lack of public transport (buses) in the peripheral (from the national point of view) area of Flevoland in the Netherlands has been effectively solved by introducing a new formula that combines a taxi-style service with traditional public transport. The traveler can expect to be taken to when he or she requires after just one phone call. The prices are only slightly higher or equal to those charged on the usual public transport lines. This solution is cost-effective because a bus driver is not obliged to go to a remote village if he or she has not received a call from this area (EC, Promoting sustainable development, 2009).

Summing up, the accessibility indicators, with potential accessibility in particular, are very useful for ex-ante and ex post evaluations of transport infrastructure projects, sets of projects or national programmes. The accessibility analysis shows the effects of transport investments on territorial cohesion in peripheral and rural areas and gives some important recommendations for transport policy. At the European level it has been proven that improving the accessibility of Romania, Bulgaria, the Baltic States and north-eastern Poland is the highest priority. For measurement of inclusive growth, the provision of minimum standards of services of general interest, including availability of public transport should also be taken into account.

3.6 Conclusions

Inclusive growth is the third top priority set out in the Europe 2020 strategy, which in this respect calls for higher employment rates, improved skills and lower poverty. Drawing on the research studies and evaluations of Cohesion Policy, this chapter summarizes the existing evidence on the efficiency and results of public interventions that aim at achieving the above stated objectives. It also discusses the role of transport in strengthening territorial and economic cohesion.

Interventions concentrated on early childhood are the most cost effective and the most needed, as they provide a basis for further education and professional advancement. **Investing in childcare and early education (ECEC) will translate into higher employment, lower school drop-out rates, lower poverty** and its intergenerational transmission. The gains of investing in early education policies are particularly high for the disadvantaged groups. ECEC also offers return on investment in the short run, as it removes an important obstacle preventing young parents (or their relatives) from participating in the labour market. It may therefore strongly reinforce other measures aimed at increasing employment. Successful educational actions directed at children need to be coordinated and coherent with health and welfare policies, and should possibly include a mixture of parenting programmes, early childhood education and child visits. The effects of education – based programmes are longer lasting than attending nursery or playground programmes.

The effects of formal education are more solid than investment in training or informal learning. **Institutional design of the general educational system matters for its efficiency**: a combination of school autonomy and accountability appears to offer substantial gains. **Reducing early drop-out rates** is crucial, and **may be helped by designing pathways to employment and individual learning plans**. Quality and motivation of teachers are crucial to the pupils' educational outcomes and these may be enhanced with financial incentives for teachers (e.g. performance related pay). In vocational education **combining specific education with apprenticeships offering on-the-job training facilitates school to work transitions**. Children at risk gain most if offered out-of-school programmes, monitoring, combined with labour, social and health policies. Finally, it is important to emphasize the crucial role of central-level educational policy and the institutional setting it creates, yet (as shown by several evaluations) these may be significantly reinforced by Cohesion Policy interventions.

Lifelong learning requires investing in training, however, conclusive evidence on the effects and returns to training is limited. **Training schemes appear to work well if they address local and regional labour market needs**. They have also proven more effective if **well tailored to the particular group needs and abilities**. Improving motivation to learn is essential to boost lifelong learning participation. Targeting the training support policies is important as well: some evaluations suggest that funding targeted at the supply side somewhat lowers the potential efficiency of the training system. This **is improved if the training measures offer certification** and if they assure portability of skills. Public sector sponsored training appears to be mostly ineffective, especially for men and young people, at least in the short run. Finally, there is a **need to include social partners and stakeholders in the development and implementation of lifelong learning strategies**.

Direct job creation through employment subsidies appears to bring positive results and may be particularly effective if well **targeted at people on the margins of the labour market**. **Short term subsidized jobs are more effective than long run ones**. It is likely however that subsidizing jobs in the private sector increases individual employment probabilities of targeted groups, changing the structure of employment but not the overall level, due to a large substitution effect. Job creation in the public sector is usually found to be ineffective, though it may have a positive socialising component. Finally, support for job creation via **subsidies to employment appears to be more effective if provided in an integrated package of instruments**, such as intensified job assistance.

Grants to start self-employment may be an effective way of helping the jobless to exit unemployment, in particular for disadvantaged groups who manage to exit unemployment and gain work experience, without a large deadweight effect. **Start up support programmes should also be a place-based policy, well tailored to the local market needs**. **Job search assistance is one of the most cost effective ways of increasing employment**. It should be targeted at those with shorter unemployment spells. It may also prove more effective for women and the youth. Individual approach and personalised actions improve the programme's efficiency. Finally, job search assistance may work better if accompanied by

monitoring and sanctioning components. The skills of the service providers are also important, as is cooperation with other stakeholders.

One of the most popular Cohesion Policy interventions, i.e. trainings provided to the unemployed appear to boost the overall employment, in particular among women. However, from a microeconomic perspective, many analyses state that **public-sector sponsored training does not show positive results in the short run, though it increases in the medium and long-run**. Positive employment effects also appear once they include **a strong on-the-job component**. Those targeted towards the youth are likely to be less effective, while short training programmes prevail in their positive effects over long ones. Again, better results are achieved if the training provided to the unemployed is designed in cooperation with employers and provides a certificate that can be recognized on the labour market.

Subsidising transport costs, mobility allowances for travel to work and/ or relocation and accommodation costs may promote job mobility, in particular an increase in commuting, hence lowering the spatial dimension of labour market mismatches. **Improvements in job quality**, including working conditions, **translate into higher productivity**.

Taking up a job is the most effective way of leaving poverty, and helping those at risk of poverty to remain on the labour market is crucial for them to avoid that risk. **In-work benefits and tax credits can be an effective way of raising employment**, in particular among those at the margins of the labour market. Labour market integration of the vulnerable groups requires individual and well tailored approaches, and social innovation initiatives appear to be a novel way of experimenting and designing the appropriate measures. **Both youth and older workers are largely heterogeneous groups and no single policy design will work**. However, ALMP appear to be a much less effective tool in countering unemployment and social exclusion of the youth than measures in the area of education, such as well designed apprenticeship schemes, intensive job assistance with career offices or business start up support. Older workers will need, above all, flexible working hours and improved training participation. **Approaches integrating rehabilitation, education, job search assistance and some work elements tend to be the most effective way of helping disabled people into work**.

Inclusive growth implies that the benefits of economic growth should be spread evenly across the EU, including the outermost regions, thereby increasing economic, social and territorial cohesion. Transport infrastructure has important implications for territorial cohesion due to its effect on the location of economic activity through improving connections to and within less developed regions. The effects of an increase of transport infrastructure evolve over time. **Indirect effects need effective measurement and monitoring which needs to be carried out over a much longer timeframe than the programming period**. The return on transport infrastructure investments is a nonlinear one. In countries with a highly developed transport infrastructure further network improvements bring only marginal benefits. In states where the network is limited and fragmented (Poland, Romania), connecting additional agglomerations gives huge benefits for firms and consumers making the growth more inclusive.

There is a broad consensus that more accessible regions are more competitive. The accessibility indicators, potential accessibility in particular, should be employed more frequently in the ex-ante and ex post evaluations of transport infrastructure projects and programming periods. The maximization of accessibility is an objective of Cohesion Policy as far as it helps to improve the quality of life by facilitating access to opportunities, goods and services. **Effective place-based policy at the European level means that improving accessibility of the least accessible regions of Romania and Bulgaria, the Baltic States and north-eastern Poland should be treated as a priority for the expansion of both the European road and railway network**.

Investment in local roads requires careful consideration independent of local political pressure, in particular when the benefits are difficult to demonstrate. However, **upgrading and rehabilitation is very important in the EU-12 states**. These countries suffer from a very poor road and rail condition which is regarded as one of the main weaknesses of their transport systems. Hence, because of the increasing degradation of infrastructure, in addition to modernization, the reconstruction (revitalization) of existing connections (including removing bottlenecks) should be supported. The provision of minimum standards of services of general interest, including availability of public transport, education and health in rural and peripheral areas is becoming a problem of high political importance.

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