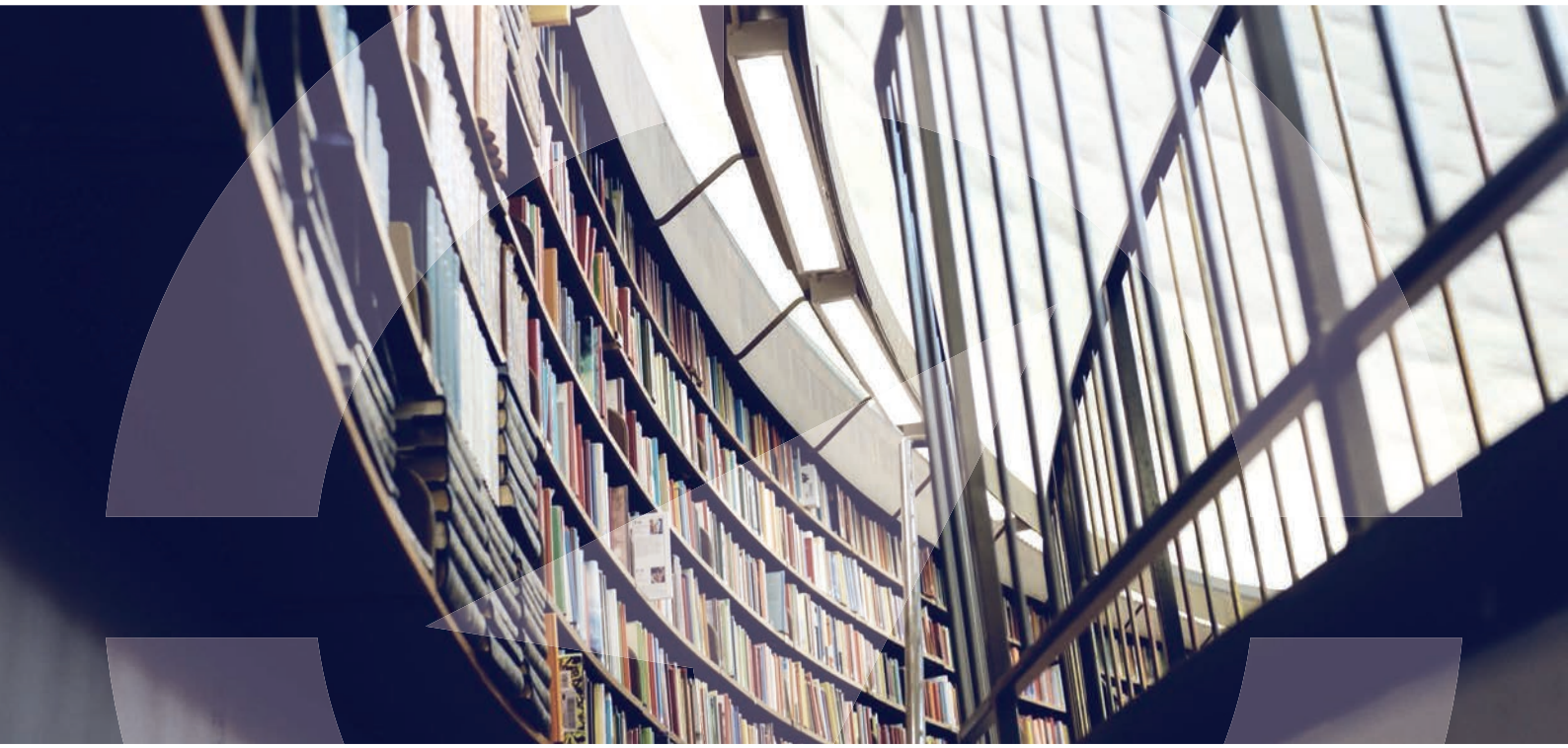

Ex-ante assessment methodology for financial instruments in the 2014-2020 programming period

Strengthening research, technological development and innovation (Thematic objective 1)

Volume II

European Commission

European Investment Bank The EU bank

Strengthening research, technological development and innovation

Please note that this version of the methodology reflects the current state of the Regulations as of April 2014.

The author reserves the right to update this document according to the evolution of the relevant regulatory framework.

Version 1.0 - April 2014

DISCLAIMER

This study was commissioned by the EIB, co-financed by DG REGIO and assigned to the consortium led by PwC."

'Framework Agreement for the provision of technical assistance and advisory services, within the context of the JESSICA initiative
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Glossary and definitions

ABER	Block exemption Regulation for Agriculture
CEB	Council of Europe Development Bank
CEI	Call for Expression of Interest
CIP	Competitiveness and Innovation Framework Programme
CLLD	Community-Led Local Development
Common Strategic Framework (CSF)	According to Article 10 of the CPR: "The CSF establishes strategic guiding principles to facilitate the programming process and the sectoral and territorial coordination of Union intervention under the ESI Funds and with other relevant Union policies and instruments, in line with the targets and objectives of the Union strategy for smart, sustainable and inclusive growth, taking into account the key territorial challenges of the various types of territories."
CP	Cohesion Policy
CPR	Common Provisions Regulation
de minimis	See below under 'State aid'
DG AGRI	Directorate General for Agriculture and Rural Development of the EC
DG REGIO	Directorate General for Regional and Urban Policy of the EC
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission ('the Commission')
EE/RE	Energy Efficiency and Renewable Energy
EEEF	European Energy Efficiency Fund
EIB	European Investment Bank
EIF	European Investment Fund
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ERR	Economic Rate of Return
ESF	European Social Fund
ESI Funds	European Structural and Investment Funds for the programming period 2014-2020. This includes: European Regional Development Fund (ERDF), Cohesion Fund (CF), European Social Fund (ESF), European Agricultural Fund for Rural Development (EAFRD), and European Maritime and Fisheries Fund (EMFF)
ESIF Policies	Policies making use of the ESI Funds
EU	European Union
Ex-ante assessment	As in Article 37 (2) of the CPR. MS/MA are required to conduct ex-ante assessments before supporting financial instruments, including: rationale/additionality against existing market gaps and demand/supply, potential private sector involvement, target final recipients, products and indicators

Ex-ante evaluation	Ex-ante evaluation required for Programmes in line with Article 55 of the CPR
fi-compass	Platform for advisory services on ESIF financial instruments www.fi-compass.eu
Financial Engineering Instruments (FEI)	See below "Financial Instruments". In 2014-2020 reference will be made to 'Financial instruments' rather than Financial Engineering Instruments as referred to in the 2007-2013 legal framework.
Final recipient	Legal or natural person that receives financial support from a financial instrument as described in Article 2 (12) of the CPR
Financial Instruments (FIs)	As in Article 2 (11) of the CPR, the definition of financial instruments as laid down in the Financial Regulation[1] shall apply mutatis mutandis to ESI Funds, except where otherwise provided in the CPR. In this context, financial instruments means Union measures of financial support provided on a complementary basis from the budget to address one or more specific policy objectives of the Union. Such instruments may take the form of equity or quasi-equity investments, loans or guarantees, or other risk-sharing instruments, and may, where appropriate, be combined with grants.
FRR	Fair rate of return for entrepreneurial activities in a certain sector in a certain country
Focus Area	EAFRD proposes 6 priorities with 18 focus areas, between 2 and 5 for each priority
Fund of funds	Means a fund set up with the objective of contributing support from a Programme or Programmes to several financial instruments. Where financial instruments are implemented through a fund of funds, the body implementing the fund of funds shall be considered the only beneficiary in the meaning of Article 2 (27) of the CPR.
Funding agreement	Contract governing the terms and conditions for contribution from Programmes to financial instruments. This shall be established between a MA and the body that implements the FoF or the financial intermediary, between a FoF and the financial intermediary or between the MA and the financial instrument, as described in Article 38 (7) of the CPR.
GAFMA	Guidelines for SME Access to Finance Market Assessments: a methodology developed by the EIF to be used to prepare market assessments to identify market failures, suboptimal investment situations and investment needs related to the access to finance of micro-enterprises and SMEs
GBER	General Block Exemption Regulation
GDP	Gross Domestic Product
GGE	Gross grant equivalent (NPV consideration for State aid purposes)

1 *Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (OJ L 298, 26.10.2012, p. 1).*

GHG	Greenhouse gases
HA	Horizontal Assistance as foreseen in the proposed fi-compass
IFI	International Financial Institution
IRR	Internal Rate of Return
JEREMIE	Joint European Resources for Micro to Medium Enterprises
LEADER	Liaison Entre Actions de Développement de l'Économie Rurale/Links between the rural economy and development actions Programme
Leverage effect	According to Article 140 of the Financial Regulation and Article 223 of its Rules of Application "*Financial instruments shall aim at achieving a leverage effect of the Union contribution by mobilising a global investment exceeding the size of the Union contribution. The leverage effect of Union funds shall be equal to the amount of finance to eligible final recipients divided by the amount of the Union contribution*"
LGD	Loss Given Default (e.g. for a loan)
Managing Authority (MA)	Managing Authority, as defined in the Regulations regarding ESI Funds
MF	Market failure
MFF	Multi-annual Financial Framework of the EU (2007 – 2013, 2014-2020)
MFI	A microfinance institution (MFI) is an organization that provides financial services targeted to a clientele poorer and more vulnerable than traditional bank clients.
MRA	Multi-Region Assistance as foreseen in the proposed fi-compass
MS	Member States
Multiplier ratio	An appropriate multiplier ratio shall be established through a prudent ex-ante risk assessment for the specific guarantee product to be offered, in addition to the ex-ante assessment in accordance with Article 37 (2) of the CPR, taking into account the specific market conditions, the investment strategy of the financial instrument, and the principles of economy and efficiency. Such ex-ante risk assessment may be reviewed where it is justified by subsequent market conditions
NACE	Statistical Classification of Economic Activities in the European Community (in French: *Nomenclature statistique des activités économiques dans la Communauté européenne*)
NPV	Net present value (of a cash flow)
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation of Economic Co-operation and Development
Other Revolving Instruments	Defined in the context of these ToR to refer to funds which are similar to the FEI/FIs, for the eligible sectors, but which are not established under Title IV of the CPR

Pari passu	Situation where a transaction is made under the exact same terms and conditions by public and private investors, with private investor contribution which has economic significance and with simultaneous interventions by both types of investors
PD	Probability of Default (e.g. of a loan)
PPP	Public-private partnership
Programme	Means 'Programme' as described in Article 2 (6) of the CPR
RTDI	Research, technological development and innovation
RDP	Rural Development Programme referred to in the EAFRD Regulation (document approved by the Commission comprising a set of measures which may be supported by EAFRD)
RDR	Regulation EU (No) 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)
Repayable finance	Defined in the context of these ToR to refer to either all, or a subset of, FEIs, FIs and other revolving instruments
RSFF	Risk Sharing Finance Facility
SGEI	Service of General Economic Interest
SI	Suboptimal investment conditions
SME	Small and medium-sized enterprises as per European Commission Recommendation 2003/361/EC
Specific Fund	A term used in the Summary Reports for 2011 and 2012. In the context of 'JESSICA type' of FEIs refers to an urban development fund (UDF); in the context of 'JEREMIE type' refers to loan, guarantee or equity/venture capital funds investing in enterprises.
State aid	'State aid' means aid falling under Article 107 (1) of the Treaty, which shall be deemed for the purposes of this Regulation, to also include *de minimis* aid within the meaning of Commission Regulation (EC) No 1407/213 of 18 December 2013 on the application of Articles 87 and 88 of the Treaty to *de minimis* aid[2], Commission Regulation (EC) No 1408/2013 of 18 December 2013 on the application of Articles 87 and 88 of the EC Treaty to *de minimis* aid in the sector of agricultural production[3] and Commission Regulation (EC) No 875/2007 of 24 July 2007 or its successor Regulation on the application of Articles 87 and 88 of the EC Treaty to *de minimis* aid in the fisheries sector and amending Regulation (EC) No 1860/2004[4].

2 *OJ L 379, 28.12.2006, p. 5.*

3 *OJ L 337, 21.12.2007, p. 35.*

4 *OJ L 193, 25.7.2007, p. 6.*

Summary Report	Report published by DG REGIO in December 2012, on the progress made in financing and implementing financial engineering instruments co-financed by Structural Funds. Situation as at 31 December 2011. The follow-up report on 2012 was published in September 2013.
Technical support	Grants for technical support, which are combined with a financial instrument (FI) in a single operation are provided for the preparation of the prospective investment (please refer to Article 37 (7), (9) of the CPR).
TFEU	Treaty on the Functioning of the European Union
Thematic objectives	Objectives supported by each ESI Fund in accordance with its mission to contribute to the Union strategy for smart, sustainable and inclusive growth (see Article 9 of the CPR)
Union priorities for rural development	For the EU rural development policy (EAFRD) 'Thematic Objectives' are translated into Union priorities for rural development as defined by Article 5 of Regulation EU (No) 1305/2013 (EAFRD). So, the term 'Thematic Objectives' will also cover the Union priorities for rural development.
Urban Regeneration / Development/ Transformation	A range of actions aimed at sustainable renewal, rehabilitation, redevelopment and/or development of city areas, which may include area-based and city-wide initiatives

Introduction

This methodology is intended as a **toolbox encompassing good practices and providing practical guidance to Managing Authorities (MAs)** in the preparation and the realisation of the ex-ante assessment of the financial instrument (FI) envisaged in the Programme(s), as required by Article 37 (2) of the Common Provisions Regulation (CPR).The ex-ante assessment process should also allow MAs to ensure that ESI Funds resources allocations to FIs are fully aligned with the objectives of ESI Funds and Programmes and are used in accordance with the principle of sound financial management (meaning in the most economic, efficient and effective way).[5]

This document constitutes Volume II of the ex-ante assessment methodology dedicated to Thematic objective 1, notably: "Strengthening research, technological development and innovation". It aims to present specificities of this area to be taken into account for the ex-assessment of the FI, at proposing tools adapted to this area and at sharing good practices related to it.

It should be used in conjunction with Volume I – Ex-ante assessment methodology[6], as the common descriptions and tools of the General Methodology are not repeated in this volume. Therefore some paragraphs might be rather limited as long as there are no specificities related to this area.

It is important to note that significant interconnections exist between the research, technological development and innovation themes and entrepreneurship. In particular innovation is a major driver of start-up and SME competitiveness. As a result this specific methodology addresses topics and issues that are also discussed in Volume III: Enhancing the competitiveness of SMEs, including agriculture, micro-credit and fisheries (Thematic objective 3).

In order to facilitate the reading of this Volume the same structure as Volume I has been developed around the seven main groups of elements proposed in the Article 37 (2) of the CPR, namely:

a) Analysis of market failures, suboptimal investment situations and investment needs;

b) Assessment of the value added of the FI;

c) Estimate of additional public and private resources to be potentially raised by the FI;

5 *Regulation of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund covered by the Common Strategic Framework and laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Council Regulation (EC) No 1083/2006.*

6 *Ex-ante assessment methodology for Financial Instruments in the 2014 - 2020 programming period, Volume I.*

d) Assessment of lessons learnt from similar instruments and ex-ante assessment carried out in the past;

e) Proposed investment strategy;

f) Specification of expected results;

g) Provisions allowing the ex-ante assessment to be reviewed and updated.

The different elements of the ex-ante assessment can be performed in stages, as foreseen by Article 37 (3), and MAs are not obliged to strictly follow the order described in Article 37 (2).

As a result, the ex-ante assessment shall be conceived as an iterative process rather than as a strictly linear one. This means that MAs will most likely go back and forth when undertaking the ex-ante assessment and will have to ensure the coherence of the whole assessment before it is finalised.

Finally, please note that this methodological guidance encompasses five Volumes, namely:

- **Volume I** dedicated to the General Methodology covering all Thematic objectives;
- **Volume II** dedicated to Thematic objective 1, namely: "Strengthening research, technological development and innovation";
- **Volume III** dedicated to Thematic objective 3, notably: "Enhancing the competitiveness of SME, including agriculture, micro-credit and fisheries";
- **Volume IV** dedicated to sectors related to Thematic objective 4, notably: "Supporting the shift to low-carbon economy";
- **Volume V** dedicated to "Financial instruments for urban and territorial development".

1. Financial instruments: Overview

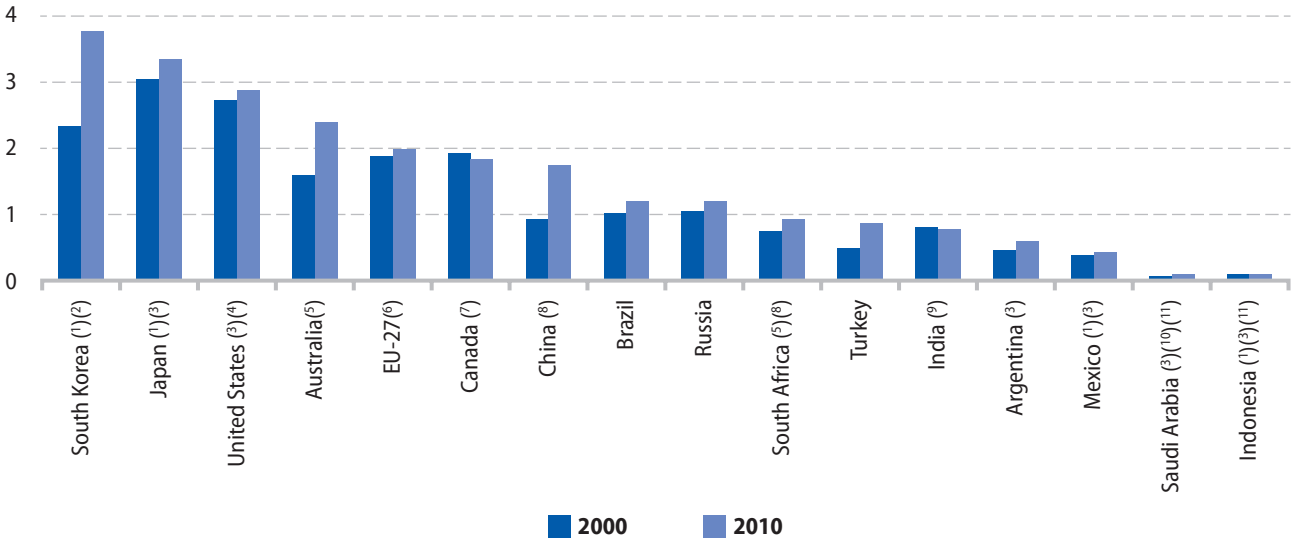
1.1 Rationale for financial instruments for research, technological development and innovation

Innovation is necessary to ensure the competitiveness of countries and regions by increasing companies' productivity, accessing new, higher added-value markets and ultimately leading to sustainable employment creation in a context of fierce global competition. It can also be a cost-efficient way of improving services delivery to meet societal needs. Innovation is therefore central to the Europe 2020 strategy.

The European Council acknowledged this during its assembly of 23 and 24 March 2000, when it set Europe the goal of becoming the most competitive and dynamic knowledge-based economy in the world. To this end, the Council acknowledged the need to prepare Europe's transition to a knowledge-based economy and society by implementing better policies for the information society, and Research and Technological Development and Innovation (RTDI), and stepping up the process of structural reform for competitiveness and innovation.

According to the Eurostat most recent data from October 2012 the Gross domestic expenditure on Research and Development (GERD) to GDP, increased marginally in the EU-27 until 2002 then declined until 2009. Subsequently, it rose again, due to the partial recovery from the financial and economic crisis but remained well below the 3% objective.

Figure 1: Gross domestic expenditure on research and development relative to GDP, 2000 and 2010 (% of GDP)



(1) Break in series. (2) 2000, incomplete (3) Data for 2009 instead of 2010. (4) Excluding most or all capital expenditure. (5) Data for 2008 instead of 2010. (6) Estimates. (7) 2010, provisional. (8) Data for 2001 instead of 2000, underestimate. (9) Data for 2007 instead of 2010, estimate. (10) Data for 2003 instead of 2000. (11) Partial data.

Source: Eurostat (rd_e_gerdtot) and the United Nations Educational, Scientific and Cultural Organisation (UIS: Science & Technology)

An important distinction needs to be made between fundamental research and innovation[7]:

- Research is work undertaken primarily to acquire new knowledge with or without direction towards a specific practical aim. Experimental development is a systematic effort, based on existing knowledge from research or practical experience, directed toward creating novel or improved materials, products, devices, processes, systems, or services;
- Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices.

Most major competitors of the EU, particularly the US, China and other Asian economies have a much higher expenditure in RDI activities as a percentage of GDP. Moreover, these countries tend to use public funds to applied research and development (between 90 and 76%), while EU Member States dedicate around 64% to close-to-market activities. This translates in the so-called "European Paradox", namely the difficulties that European countries have in transforming their success in fundamental research into commercial successes. As a result, action needs to be taken to tighten the links between research centres, such as universities, labs and public and private research institutes, and the market.

Moreover, Europe faces increasing competition from leading and emerging regions outside the EU, e.g. significant parts of the manufacturing activities have been outsourced to regions outside the EU. The choice of the location often takes into account cheap labour, access to emerging new

7 *Source: thematic guidance fiche research and innovation Version 2 – 22/04/2013.*

markets, access to capital, tax breaks, free land access, and access to a growing number of graduates and doctoral candidates with a degree in science and engineering.

While the EU has very good research and development capacities in some key enabling technology (KET) areas, it has not been as successful in translating these results into commercialised manufactured goods and services. As stated in the 2013 report of the High Level Expert Group for Key Enabling Technologies, successful investment in key technologies and their rapid deployment is a prerequisite for the long-term competitiveness, productivity, and sustainability of job creation of any nation's industry, since such technologies are essential in addressing important societal challenges such as energy independence and efficiency, food, transport, health care, security and defence.[8]

As suggested by the High Level Expert Group for Key Enabling Technologies, particular care should be taken by EU and national policy makers in supporting investment in RTDI activities that are close to the market. In this line the Investment Priorities under Thematic Objective 1 stated in the ERDF Regulation are:

a) enhancing research and innovation infrastructure, such as LivingLabs, FabLabs, Science and Technology Parks and demonstration plants, and capacities to develop R&I excellence, and promoting centres of competence, in particular those of European interest;

b) promoting business investment in R&I, developing links and synergies between enterprises, research and development centres and the higher education sector, in particular promoting investment in product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation, and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in key enabling technologies and diffusion of general purpose technologies.

Besides its role in enhancing competitiveness of the overall EU economy, innovation is also a key driver of growth for micro enterprises and SMEs. As noted in Volume III, SMEs often experience significant difficulties in accessing finance. For RTDI-driven entities and innovative companies these challenges may be even greater since they tend to have higher risk profiles, both in terms of the industry in which they operate and their business models, compared to less innovative firms. Furthermore, the value of RTDI-driven entities and innovative companies is often harder for banks to assess due to the fact that they are often more reliant on intangible assets rather than physical

8 *Supporting Key Enabling Technologies (KET) identified by the EC are e.g. nanotechnology; micro- and nanoelectronics; industrial biotechnology; photonics; advanced materials and advanced manufacturing technologies) is important future success. KETs enable process, goods and service innovation throughout the economy, http://ec.europa.eu/enterprise/sectors/ict/key_technologies/.*

property which is rarely accepted as collateral. These difficulties may be heightened in the context of the current economic downturn.

Finding appropriate ways to increase overall spending on R&D and innovation, particularly in applied RDI activities, to foster the competitiveness of EU RTDI-driven entities and innovative companies, to promote close-to-market research activities and reduce the innovation gap between Europe and its competitors are priorities of the EU, which is working towards providing constructive solutions to empower the economy and boost sustainable, inclusive and smart growth.

The 2014-2020 programming period foresees an increased use of FIs for all Thematic objectives and across all sectors, in view of progressively moving from grant financing to revolving funds focused on productive investment.[9] This will be particularly important to bridge the financing gap of RTDI-driven entities and innovative companies and to foster an increase in public and private RTDI expenditure.

1.2 What are the options available to Managing Authorities

Please refer to the General Methodology for guidance on the options available to Managing Authorities.

9 *The 'Growth Capital Instrument Study' conducted by PwC reviewed the state of play of access to finance for innovative mid-cap companies in Europe undertaking risky projects in the field of Research, Development and Innovation (RDI) concludes that majority of innovative mid-caps have been maintaining or trying to increase their investments in RDI despite the widespread perception that the general economic outlook has worsened. On the supply side, the financial and economic crisis of 2008 has led to a credit crunch and these times of transformation present increasing challenges for the financing of innovation. As a consequence of prudential regulations, namely Basel III and Solvency II, and losses occurred during the financial crisis, institutional investors are providing fewer resources to venture capital and private equity funds and similar higher risk asset classes. Demanding capital ratios are urging institutional investors to contract lending activity and be more risk averse. In the current economic situation financial intermediaries are constrained by credit crunch and need to apply strict risk management standards.*

2. Ex-ante assessment: preliminary considerations

2.1 Scope and value of the ex-ante assessment for financial instruments

Please refer to the General Methodology for guidance on the scope of the ex-ante assessment for FIs.

2.2 Preliminary considerations

Please refer to the General Methodology for guidance on the preliminary considerations for ex-ante assessment for FIs.

3. Analysis of market failures, suboptimal investment situations and investment needs

When analysing market failures, suboptimal investment situations and investment needs there are several interconnections between the research, technological development and innovation themes and entrepreneurship. Indeed, there are significant similarities between the approach presented here and the one detailed in Volume III –Enhancing the competitiveness of SME, including micro-credit and agriculture (Thematic objective 3). This implies that market assessments carried out for the same country or region and during a comparable timeframe for Thematic objective 1 and 3 should not provide conflicting results.

3.1 Identifying existing market problems

As presented in the General Methodology[10], the demonstrated presence of market failures, suboptimal investment situations and unmet investment needs is an essential component to justify a public intervention. Following the identification of such events, the assessment of the extent to which additional investment is needed to reduce an identified financing gap is meant to be the trigger for the implementation of FIs.

This methodology is designed to provide a comprehensive toolbox that covers the activities designed to highlight and analyse a wide range of potential market failures that may occur. However MAs should bear in mind that, depending on the circumstances of their specific proposed FI, not all potential issues listed here may need to be covered in order to achieve compliance with Article 37 (2) (a) of the CPR.

As already noted, RTDI activities, both fundamental research and close-to-market innovation, pose significant challenges in terms of risk and funding requirements. However, while access to finance is one of the principal hurdles to the development of RTDI activities, a broader set of issues related to the business conditions may also need to be considered. In other words the market failure in the field of RTDI, is not exclusively related to the capacity of the market to ensure the equilibrium between demand and supply of various types of funding, but can be determined by a complex interaction of market weaknesses related to the general business environment.

10 See: Ex-ante assessment methodology for Financial Instruments in the 2014 - 2020 programming period, Volume I.

It is important to clarify that this type of difficulty cannot be tackled directly by FIs. Nonetheless, they need to be considered when setting up an FI, since they may have an impact on the competitiveness of SMEs and they may also negatively impact the performance of FIs. As such, when such weaknesses are identified, the ex-ante assessment should envisage actions to mitigate their negative effect on the FI investment capacity.

Consequently, when analysing the presence of market failures, sub-optimal investment situations and estimating unmet investment needs, the four methodological steps to be followed should be:

- Analysis of the economic context at the national or regional level;
- Analysis of the structure and characteristics of RTDI-driven projects/entities (sector concentration, segmentation in terms of size of companies, cluster or geographical districts);
- Analysis of market failures/imperfections linked to the business environment in which RTDI-driven projects/entities/clusters are operating;
- Analysis of the gap between supply and demand of financing for RTDI-driven projects/entities/clusters.

The following paragraphs present each of the four methodological steps as well as the tools that could be used to perform these analyses.

3.1.1 Analysis of the national or regional economic context

Key questions to address when completing the analysis of the economic context

1. What aspects of the economic context are favourable and unfavourable to the development of RTDI-driven projects/entities?

Analysing the national and regional economic context is a first necessary step to understand the environment in which RTDI-driven projects/entities operate, before determining the existence of market failures and sub-optimal investment situations. The preliminary analysis carried out during the preparation of the Programme should be the basis of this analysis. This work may leverage the Smart Specialisation Strategies (S3) developed by MAs and the local consultation conducted to structure and implement the agreed-upon S3 policy.

Looking at the broader picture is useful as the financing of RTDI-driven entities and innovative companies is directly linked to, and influenced by, a vast array of economic indicators, such as GDP growth, import and export dynamics, investment flows, taxation policy, level of public investment and performance of the financial market (e.g. situation of equity investment and credit allocation on the territory considered), as well as characteristics and qualification of the labour force, salary

and income levels. Demographics elements are also important in order to understand the evolution of the population living in the country or region considered.

3.1.2 Analysis of market weaknesses impacting the business environment

Key questions to address when analysing market weaknesses:

1. What are the various constraints limiting the development of RTDI-driven projects/entities?
2. In addition to issues linked to limited access to finance, what other factors have a negative impact on the overall business environment?
3. Are these factors due to contingent market conditions or do they imply structural market weaknesses?

In addition to the economic context, the financing of RTDI-driven projects/companies can be influenced by other factors, which exert a negative impact on the business environment in which they operate. They can either be contingent and linked to the economic context at a particular moment in time (e.g. the lack of consumption demand due to the crisis) or constitute structural factors that need to be analysed as they may have an impact on the effectiveness of any FI to be set up. Some of the main structural factors are detailed below.

Political stability influences the business environment and spending on higher education and research institutions. Political stability helps to maintain the confidence of firms, national and foreign investors in the safety of their investments in the country or region.

The **legal and regulatory framework** establishes the rules within which all the financial institutions, FIs, and markets operate in a given country. The procedures and legal requirements for entities operating in the financial services sector, the regulatory provisions for collection of receivables and default payment, the cost of regulation enforcement and the performance of the judicial system in dealing with business litigation are essential to determine sufficient confidence in the proper functioning of the market by the economic actors involved[11].

Taxation policy, both corporate and personal income tax, has an impact on the growth of RTDI-driven entities and innovative companies since it exerts a direct influence on their revenue and it is an important determinant of their investment decisions.

Besides these broad political and economic issues several other structural factors influence the environment in which RTDI-entities and innovative companies operate and limit their ability to invest in innovation.

11 *International Finance Corporation (2011), G-20 Finance Policy Guide, http://www.ifc.org/wps/wcm/connect/f3ef82804a02db-409b88fbd1a5d13d27/G20_Policy_Report.pdf?MOD=AJPERES.*

The weaknesses of the public education system may explain the difficulties of RTDI-driven entities and innovative companies to **access to talent and qualified labour force**, which is a key enabler of their growth and influences their ability to attract capital and investment. In this respect, it is important to analyse the average educational level and possible disparities across the territory.

Many researchers trained in Europe leave to work abroad, particularly in the US, mostly as a result of a lack of openness and competition in European academic systems as well as of adequate economic incentives and reward policies. This phenomenon, commonly referred to as brain drain, further limits the ability of RTDI-driven entities and companies to attract and retain qualified workforce.

Excessive bureaucracy and complex administrative procedures, as well as a lack of capacity of public administration can significantly hinder the activity of RTDI-driven entities and innovative companies. A particularly important consequence of this situation is the complexity and the cost of protecting **intellectual property rights**. A well-functioning framework would remove the risk of rapid imitation, ensure the respect of ownership rights and play a crucial role in the diffusion of new technological advancements. In addition, RTDI-driven entities and innovative companies, particularly SMEs, often **lack sufficient in-house capacity** and expertise to ensure the protection of their intellectual property rights.

Providing money does not always address the most pressing needs of innovative companies if their managers lack **entrepreneurial skills** and experience to grow their business. Smart money, the active involvement of investors in the management of their portfolio companies, provided by VC/PE firms is what helps companies to accelerate their growth under such circumstances. This form of financing, even though sometimes seen as costly, concentrates on sectors and industries that develop innovative products or services with exceptional commercial potential such as biotechnology and healthcare, information and communications technology, and green-tech. In order to leverage on the private sector and create a long standing and efficient VC/PE system, public national support is needed[12]. Research shows that the VC system is fragile, because the different parts of the system need to work effectively over long periods to build trust, managerial and entrepreneurial skill. Once this generates commercial returns for investors, they generate new funding resources that support the next wave of entrepreneurial firms.

Finally, the **lack of infrastructure and capacity** on a specific territory penalises the development of RTDI-driven projects/entities since it limits their possibilities to develop, access and share knowledge as well as their ability to attract new investors and to reach potential clients. This can be compounded by high transaction costs in the sector.

12 *Organisation for Economic Co-operation and Development (1997) Government Venture Capital for Technology-based Firms.*

On the one hand there may be a lack of **research infrastructure** for public and private researchers, e.g. large-scale research installations, libraries, databases, high-capacity/high speed communication networks, highly distributed capacity and capability computing facilities, data infrastructure and observation facilities.

Further weaknesses in the innovation system could arise due to a **lack of coordination between fundamental research and the needs of the productive sector,** insufficient cooperation between public and private research teams, insufficient policy initiatives and incentives for innovation or a lack of interactions and coordination between key stakeholders in the considered country or region. This could be improved through facilities for business- to-business and business-academia/education cooperation, such as technology and science parks, hubs and clusters.

Box 1: Potential studies of the European Commission to be used for market weakness analysis

The exhaustive activities of the European Commission in the field of research and innovation are an extremely valuable source of information for the ex-ante assessment of FIs focusing on RTDI. A list of EU studies useful for the analyses includes[13]:

- European Commission (2013), Innovation Union Scoreboard;
- European Commission (2011), Innovation Union Competitiveness Report;
- European Commission (2011), Innovation Policy TrendChart;
- European Commission (2013), Innovation Union progress at Country level;
- Joint Research Centre (2013), Industrial R&D Investment Scoreboard;
- European Commission (2013), Public Sector Innovation Scoreboard;
- European Commission (2013-2014), Regional Innovation Monitor.

Such weaknesses need to be investigated at the local level, but could also be highlighted by comparing the situation in the local market with other European countries or regions. A word of caution is however necessary since, while these comparisons can provide useful benchmarks, there is a risk of overlooking fundamental differences across the various countries and regions. That is why each country or region has to be considered independently so as to identify and analyse the specific needs of RTDI-driven entities and innovative companies as well as their difficulties to access finance.

13 *The full list of references for the cited documents is provided in Appendix A. Please consider that several of these publications are updated regularly and therefore the ex-ante assessment should take into account the latest version available.*

3.1.3 Analysis of the structure and characteristics of research, technological development and innovation-driven projects/entities

Key questions to address when completing the analysis of the characteristics of RTDI-driven projects/entities

1. What types of RTDI-driven entities and innovative companies operate under the geographical scope considered?
2. How have the RTDI-driven company structures and characteristics evolved during the last years and how is it likely to evolve in the near future?

Following the analysis of the economic context, the structure and characteristics of RTDI-driven entities and innovative companies need to be considered at the relevant geographical scope (national or regional). Such entities and companies can be stratified according to the following variables:

- Size based on their turnover and number of staff;
- Sectors of activity;
- Geographical distribution;
- Age and stage of development;
- Type of innovation activities undertaken.

This analysis should be enriched with the evolution over time of the structure and characteristics of the RTDI-driven entities and companies under consideration (historical analysis) and through the comparison with other regions (or Member States) having similar characteristics.

This analysis consists of leveraging the existing literature, at EU, national and regional levels, to identify key information, including indicators relative to the structure and characteristics of the considered RTDI-driven entities. The results of the Community Innovation Surveys may represent a useful source of information.

3.2 Establishing the evidence of market failure

As presented in the general methodology[14], the presence of market failures, suboptimal investment situations and unmet investment needs is an essential component to justify a public intervention. Following that, the assessment of the extent to which additional investment is needed to reduce an identified financing gap is meant to be the trigger for the implementation of FIs.

14 *See:* Ex-ante assessment methodology for Financial Instruments in the 2014 - 2020 programming period, *Volume I.*

The methodology presented below for analysing financing gaps is based on the logic and tools:

- Proposed by Oxera in its report on innovation market failures and State aid;[15] and
- Applied in the research performed by PwC on the supply and demand of capital by RT-DI-driven mid-caps.

O'Sullivan (2005)[16] explains how, at its simplest, a financial market failure (or financing gap) occurs when projects or entities that merit external financing do not receive it due to market imperfections[17]. Other research studies suggest that projects or entities' (in)ability to raise external financing is often tied to their position in the financing life cycle and so have identified the following two troughs in the supply of capital to Europe's RTDI-driven projects or entities:

- The first Valley of Death - whose existence is attributed to a lack of early stage risk capital for start-ups - occurs during the technical and economic feasibility stage of the innovation sequence, when a transition from the original idea to the development of first prototypes takes place;

  In this context, more emphasis should be placed on the identification of the potential market for innovations, to ensure that available resources are invested in products and services for which the potential demand is high;

- The second Valley of Death, which inhibits innovation's transition from technical and economic feasibility to commercial production. The occurrence of the second Valley of Death at the intersection of these two stages in the innovation sequence is due to the dearth of financing available to innovative projects during the post-creation venture capital stage[18].

  This results in businesses being financially ill-equipped for the creation of new value chains, up scaling, demonstrations, testing and co-developing with end-users. Consequently, the second Valley of Death begins where the welfare-maximising process of government-supported basic research tapers off, and ends where the private profit-maximising process begins.[19]

An illustration of the two Valleys of Death is provided in Figure 2, which indicatively illustrates the relationship between the innovation sequence and access to finance in Europe.

15 *Oxera Consulting Ltd. (2005) Innovation market failures andState aid: developing criteria.*

16 *O'Sullivan, M. (2005), Finance and Innovation, chapter 9 in J. Fagerberg, D.C. Mowery, and R.R. Nelson (eds), The Oxford Handbook of Innovation, Oxford: Oxford University Press.Projects meriting external financing will have a positive net present value.*

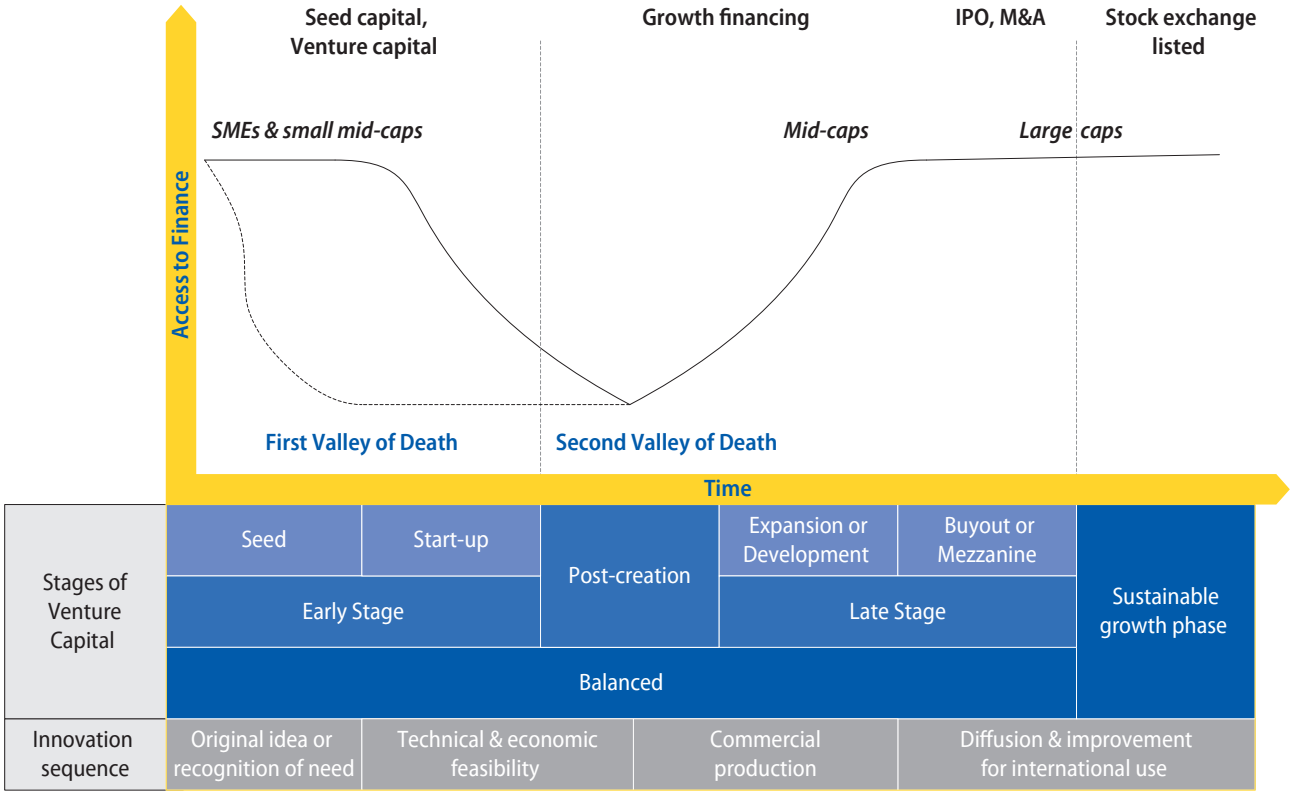
17 *Projects meriting external financing will have a positive net present value.*

18 *During the post-creation stage, businesses have developed their products but lack the capital to begin making and selling it, i.e. commencing commercial production.*

19 *Ford, G.S., Koutsky, T.M. & Spiwak, L.J. (2007) Discussion Paper: A Valley of Death in the Innovation Sequence: An Economic Investigation, Phoenix Center for Advanced Legal & Economic Public Policy Studies.*

Implicitly, the illustration focuses on the supply of capital to RTDI projects and so at a regional or national context is shaped by: institutional factors; historical rates of return by sector; informal financing and the equity gap; and the venture capital industry. Whereas at a company level it will be shaped by the firm's stage of maturity; size; and sector.

Figure 2: The Valleys of Death



Source: PwC (2012)

Further to these supply-side factors, there are also demand-side factors relating to the lack of projects/entities meriting external financing and entrepreneur readiness for external financing.

3.2.1 Analysis of the gap between supply and demand of financing for research, technological development and innovation-driven projects/entities

Key questions to address when performing the financing gap analysis

1. What are the barriers (if any) limiting access to finance for RTDI-driven projects/entities?
2. What is the structure of the financial sector (e.g. presence of commercial banks, microfinance institutions, investment funds, venture capital, business angels) and to what extent does this structure impact the access to finance for RTDI-driven projects/entities?
3. What are the financial products that RTDI-driven projects/entities require but are not developed enough / provided by the financing supply side?
4. What is the size of mismatch between the supply available to RTDI-driven projects/entities and the funding needs?

Once the characteristics of the national or regional economic environment, the structural market weaknesses and the characteristics of RTDI-driven entities and innovative companies have been analysed, financing gaps have to be identified through a comparison of supply and demand. This section presents the main factors that determine a mismatch between supply and demand of financing for RTDI-driven companies. The components of supply and demand analyses are then presented in detail, in order to facilitate the launch of the ex-ante assessment. Finally, section 3.3 provides a description of the suggested operational approach and the different tools that could be used to perform these analyses.

As stated above, limited access to finance is one of the main obstacles faced by RTDI-driven entities or companies in their growth and development. This situation has been worsened by the recent financial and economic crisis.

A public intervention with the use of FIs is one of the key tools to address RTDI-driven projects and entities' difficulties to access finance. The FIs to be developed and implemented have also to be considered within the overall portfolio of financial products that these entities have at their disposal, including grants provided by European, national and local government. It should be emphasised that combinations of these different sources of finance are possible and that existing synergies should be exploited. This aspect is analysed in more detail in section 5.1.

Among the frequently cited reasons behind the difficult access to finance is the **incomplete range of financial products and services** suited to the needs of RTDI-driven projects/entities[20] as well as **regulatory rigidities or gaps in the legal framework**[21]. As a consequence, RTDI-driven projects/entities may not be able to take full advantage of the available financing offer, because they cannot comply with the terms and conditions or because the eligibility rules do not ensure a broad coverage of their needs (i.e. RTDI-driven projects/entities have difficulties meeting the requirements for collateral to obtain a guarantee or do not have a sufficient regular cash flows to repay a loan and secure their financing).

Another reason behind RTDI-driven projects/entities' difficulties in accessing finance is related to **information asymmetries** that lenders (such as private and public banks) have insufficient information on some bankable proposals and may therefore fail in providing sufficient funding to the projects/entities[22]. Such proposals may, for instance, include new and technology-based products and services for which market intelligence may be limited. As a matter of fact, particularly at an early stage of product or service development, innovators may be reluctant to provide full

20 *OECD (2006), Financing SMEs and entrepreneurs, Policy Brief, November 2006.*

21 *Stein, P., Goland, T., Schiff, R. (2010). Two trillion and counting. Assessing the credit gap for micro, small, and medium-size enterprises in the developing world. World Bank Group, International Finance Corporation (IFC) and McKinsey & Company. October 2010. http://mckinseyonsociety.com/downloads/reports/Economic-Development/Two_trillion_and_counting.pdf.*

22 *Stieglitz J.E. and Weiss A. (1981), Credit Rationing in Markets with Imperfect Information,* The American Economic Review, *Vol. 71, No. 3 (Jun., 1981), pp. 393-410.*

information to potential lenders, as maintaining confidentiality reduces the risk of competition[23]. In addition, there may be asymmetries related to location and sector. For example, owners of projects/entities in rural environments may face difficulties with access to bank finance[24].

Knowledge and other externalities created by innovative projects/entities are potentially significant, particularly in terms of spillovers. Knowledge increases its value to society when it circulates, however this may reduce its value to originators who may lose control over their innovations, thus having less incentives to invest in innovation. The failure to account for such externalities penalises innovative potential lenders[25].

The difficulties RTDI-driven projects/entities experience in accessing finance are also linked to their own **weaknesses**. Compared to larger counterparts, small RTDI-driven projects/entities show a more volatile growth and earnings pattern, lower resilience to economic slowdowns and average survival rate, a lack of sufficient collateral, as well as less efficient management methods and governance structure. In addition, they may be more focused on building their customer base and they may lack sufficient scale to hire dedicated finance professionals, leading to a general lack of awareness about alternatives to bank finance[26].

As a result, commercial banks and other lenders may be reluctant to finance these young and small RTDI-driven projects/entities and innovative companies, since the possibilities of high returns are often outweighed by a substantial risk of loss.

Considering these reasons behind the difficulties of RTDI-driven projects/entities, the gap analysis to be performed implies to consider the two sides of the finance market:

- The demand side that is composed of the RTDI-driven projects/entities developing on the territory under scope;
- The supply side that is constituted by the organisations providing all kinds of financing to RTDI-driven projects/entities.

3.2.2 Demand analysis

The second step of the gap analysis consists in assessing the demand of finance provided to RTDI-driven projects/entities.

23 *Shane S. and Cable D. (2002), Network Ties, Reputation, and the Financing of New Ventures, Management Science, Vol. 48, Issue 3, March 2002.*

24 *OECD, 2008; Rural Policy Reviews: Scotland UK – Assessment and Recommendations, OECD, Paris.*

25 *Grünfeld, L.A., Iversen, L.M., Grimsby, G. (2011). The need for government supported capital measures in the market for early stage risk capital in Norway. Menon Business Economics. Publication no. 18/2011. October 2011. http://menon.no/upload/2011/12/08/tidligfasekapital_rapport-nhdv3.pdf.*

26 *Breedon, T. et al. (2012): Boosting finance options for business. Taskforce to boost finance options for business. March 2012. http://www.bis.gov.uk/assets/biscore/enterprise/docs/b/12-668-boosting-finance-options-for-business.pdf.*

Key questions to address when analysing the financing demand side:

1. What types of financial products do RTDI-driven projects/entities currently use in the country or the region?
2. Are there financial products needed by RTDI-driven projects/entities that are not covered by the existing supply in the country or the region?
3. What types of expenditure do RTDI-driven projects/entities seek financing for?
4. How much did the RTDI-driven projects/entities seek and how much did they obtain in the past and nowadays when looking for finance?
5. What difficulties do RTDI-driven projects/entities currently experience when looking for finance?
6. How much financing will be needed for the near future?
7. Can these needs be met by the existing supply of financial products?

Building on the analysis of the economic context and the structure and characteristics of the RTDI-driven projects/entities, as well as on the results of the supply analysis, the **financial structure of the RTDI-driven projects/entities** should be investigated. The information that should be sought includes the level of capitalisation and the level of indebtedness and other forms of financing. The analysis should also include the use of alternative sources of finance such as owners' financial resources and loans from friends and family, in order to get a comprehensive picture. Furthermore, insight into innovators' willingness to cede control of RTDI-driven projects/entities to investors is of interest.

As a matter of fact, in some countries and regions, small RTDI-driven projects/entities tend to rely on the owners' resources and/or loans from family and friends to cover their needs rather than seeking bank loans or other financial products. This may be due to various reasons, such as a lack of suitable financial instruments, in terms of financial product, terms and conditions, but also eligibility rules and timeframe for repayment. The perceived complexity of the funding application process and the (sometimes limited) experience with the banking sector, especially in peripheral areas, as well as the lack of awareness of the available financing supply should also be considered.

The analysis should also focus on the **types of expenditure for which RTDI-driven projects/entities**, for instance material expenditure (such as buildings and machinery), non-material expenditure (like technology, knowledge and human resources) and investment. This will give a detailed indication concerning the adequateness of the available supply to meet the needs of project/entity's needs.

The following step consists of estimating the level of financing needs of RTDI-driven projects/entities. As already described in the General Methodology (Volume I, section 3.2.1.3), this requires the quantification of potential unmet demand, since a part of the demand for the envisaged FI is already met by the existing supply, in particular as far as bankable projects are concerned. To do this, two main pieces of information are needed:

1. The **expected number of projects/entities in need of financing** during the period under consideration;

2. The **expected average amount needed per project/entity**. The product of these two variables enables to obtain an approximation of the potential unmet demand for funding from RTDI-driven projects/entities in the near future. This explains why the ex-ante assessment needs to consider elements on financing amounts sought, obtained and to be sought in the near future by such projects/entities.

However collecting these elements may raise issues and estimating the two key variables is a major challenge. The required information is unlikely to be found directly and both quantitative and qualitative proxies may need to be used.

At this stage both supply and demand for financing for RTDI-driven projects/entities have been analysed and quantified to the extent possible. Their comparison allows drawing conclusions on the presence of unmet demands for financing in terms of types of financial products and, when feasible, required amounts.

The analysis presented above implies the use of several tools and the triangulation of elements resulting from these tools. The tools and their practical use are detailed in the paragraph 3.3.

3.2.3 Supply analysis

The first step of the gap analysis consists of assessing the supply of finance provided to RTDI-driven projects/entities.

Key questions to address when analysing the financing supply side:

1. What is the region or country's financial markets background?
2. What are the region or country's sources of venture capital and informal financing?
3. What are the region or country's exit mechanisms?
4. What is the region or country's regulatory framework?
5. What are the region's or country's and/or sector's historical rates of return?
6. What are the financial and non-financial stakeholders providing finance to RTDI-driven projects/entities?
7. What are the financial products offered to RTDI-driven projects/entities?
8. Are there EU, national or regional grant schemes in place addressing RTDI-driven projects/entities?
9. How have the financial products proposed evolved over time?
10. Has the available supply been fully exploited in the past? If not, why?
11. Do the actors providing finance already use FIs proposed by public stakeholders?
12. Following this, has the available supply supported by FIs been fully used in the past? If not, why?

Venture capital is largely accepted as a key contributor to the financing of RTDI-driven projects/entities. In addition, venture capitalists are well-equipped to evaluate the risk-return potential of RTDI-driven projects/entities and may be actively involved in the operations of their investments. Consequently, during the supply analysis it is important to assess what sectors a region or country's venture capitalists are well-positioned to screen investment opportunities and actively contribute to the running of investments. In addition, it is important to assess the degree to which venture capital firms finance RTDI-driven projects/entities. Possible indicators for a region or country include: overall venture capital investment as a percentage of GDP; investment by stage of maturity (e.g. early stage or late stage); and average venture capital deal size.

Informal financing is another key contributor in the supply of capital to young and small RTDI-intensive projects/companies. Therefore, it is important to review the extent to which business angels provide financing to RTDI-driven projects or companies. This can be analysed on the basis of historical business angel activity. Illustrative indicators for a region or country include: the number of business angel networks; the growth of business angel networks over time; the total funds invested by business angel networks; and the typical upper limit of business angel financing.

It is also important to review the region's or **country's exit mechanisms** (e.g. trade sales, alliances or initial public offerings) that are essential to venture capital firms. More specifically, venture capital firms look to points of inflection whereby the RTDI-driven project/entity undergoes significant progress and provides the firm with the opportunity to realise a return or cut losses on the investment. Indicators that may be used to assess the quality of a region or nation's exit mechanisms include: the number of initial public offerings launched by entities in the region or country annually; and whether there is an abundance of buyers for trade sales, as well as second-tier markets for initial public offerings. If the region or nation's scores are relatively low for any of the aforementioned indicators then there is the potential for financial instruments' intervention.

In the case of RTDI-driven projects/entities, it is also of interest to question whether the region or country's regulations prevent or deter institutions from investing in venture capital funds.

More specifically, it is advisable to assess whether the region or country places restrictions on institutional investment in venture capital funds and whether such funds have a favourable treatment for venture capital funds.

Venture capitalists may also be deterred from providing regions, countries or sectors that have relatively poor historical performance with finance. Therefore, an assessment of historical rates of return on venture capital for the region or country should be appropriate.

The supply analysis should also provide a description of the actors involved in providing finance to RTDI-driven projects/entities with both public and private sources of finance. These actors may include:

- Financial institutions, such as commercial banks, public banks, development banks, leasing companies, micro-credit institutions, consumers lenders, business angels and private investment funds (such as venture capital);
- National and/or regional governments and their agencies;
- International financial institutions, multilateral and bilateral donors, such as the EIB Group.

Each of these actors may provide several financial products to RTDI-driven projects/entities, as well as other forms of interventions, such as grants and technical support. The supply analysis should provide an inventory of the different products available, of the terms and conditions applied to RTDI-driven projects/entities and the past use of these sources of finance.

Institutional support schemes can provide RTDI-driven projects/entities with several financial products, including:

- EU, national and/or regional grant schemes;
- Loans, e.g. short-term, medium-term and long-term loans, bank overdrafts, credit lines, asset-based loans;
- Microcredit;
- Lease financing;
- Trade financing/Factoring;
- Bank guarantees and letters of credit;
- Equity and quasi-equity, e.g. private equity, venture capital, mezzanine capital and growth capital;
- Technology transfer funds;
- Replacement, rescue, turnaround and buyout capital.

These financial products are meant to address various RTDI-driven projects/entities' needs in terms of development and time horizon. These needs often depend on the size of the RTDI-driven project/entity and its current stage in the financing life-cycle. Following this, it is important to identify and analyse the public support schemes developed at the European, national and regional levels and providing the financial products listed above.

Despite the availability of financial products for RTDI-driven projects/entities, their terms and conditions as well as their eligibility rules may not be suitable for their country or region. This analysis is meant to assess whether the available supply of finance ensures adequate coverage of the RTDI-driven project/entity's needs.

In order to determine the financing gap, the analysis of the supply side has to be completed with the analysis of their demand for finance.

3.2.4 Suboptimal investment situations

As highlighted in the General Methodology, the analysis of market failure encompasses the **identification of suboptimal investment situations**, which are investment gaps between a quantitative EU (or national) objective and the current trend of the selected indicator. Indeed, despite an existing investment activity (which might represent an efficient allocation from a pure market perspective) this might be insufficient to achieve the politically set target. The missing investment amount to achieve the quantitative objective quantifies the suboptimal investment situation. One of the key quantitative targets to achieve the priorities set out in the Europe 2020 Strategy is to increase the overall spending on R&D in the Union to approach 3% of GDP. Therefore, a very pragmatic approach to roughly identify and quantify the suboptimal investment situation in RTDI is to measure the spending volume missing at national or regional level to achieve the target of 3% of national or regional GDP.

3.3 Operational tools

The main objective of the analysis of market failures and sub-optimal investment situations is to substantiate the rationale behind a public intervention and the introduction of Financial Instruments supported by ESI Funds.

As a consequence, the analyses detailed in the previous paragraphs have to focus on:

- The economic context, the structure and the characteristics of RTDI-driven projects/entities, including the regulatory framework and an analysis of the barriers reducing the development and growth of such projects/entities;
- The demand for finance and the identification of the specific needs of RTDI-driven projects/entities on the territory, including an analysis of the existing financial instruments and products currently used by such projects/entities;
- The supply of funding targeting RTDI-driven projects/entities.

This includes a focus on the performance of the different forms of public support, including existing financial instruments as well as grant schemes and subsidies provided to RTDI-driven projects/entities in the considered territory.

In operational terms, different data sources both from the supply and demand sides have to be collected. A comprehensive research strategy needs to be adopted in order to gather all necessary

data sources. These include secondary data resulting from desk research and literature review as well as primary data from interviews and online surveys.

The research strategy has three dimensions:

- Elements to be addressed: i.e. RTDI-driven projects/entities from different sizes and working in different sectors in the territory under scope as well as all kinds of financial instruments;
- Time period to be considered: i.e. present time as the main focus with an interest in previous years - including the pre-crisis period and the years following the financial crisis – as well as the near future in the context of the programming period 2014-2020;
- Views and opinions of relevant stakeholders to obtain a comprehensive image of RTDI-driven projects/entities' needs for access to finance on the considered territory: i.e. opinions from the demand side, the supply side and policy-makers.

These elements then need to be triangulated and used in a mutually reinforcing way, since all of them can contribute to the estimation of financing gaps. This approach is consistent with previous methodologies and implemented for various studies[27] in the view of identifying and, to the extent possible quantifying financing gaps for RTDI-driven projects/entities.

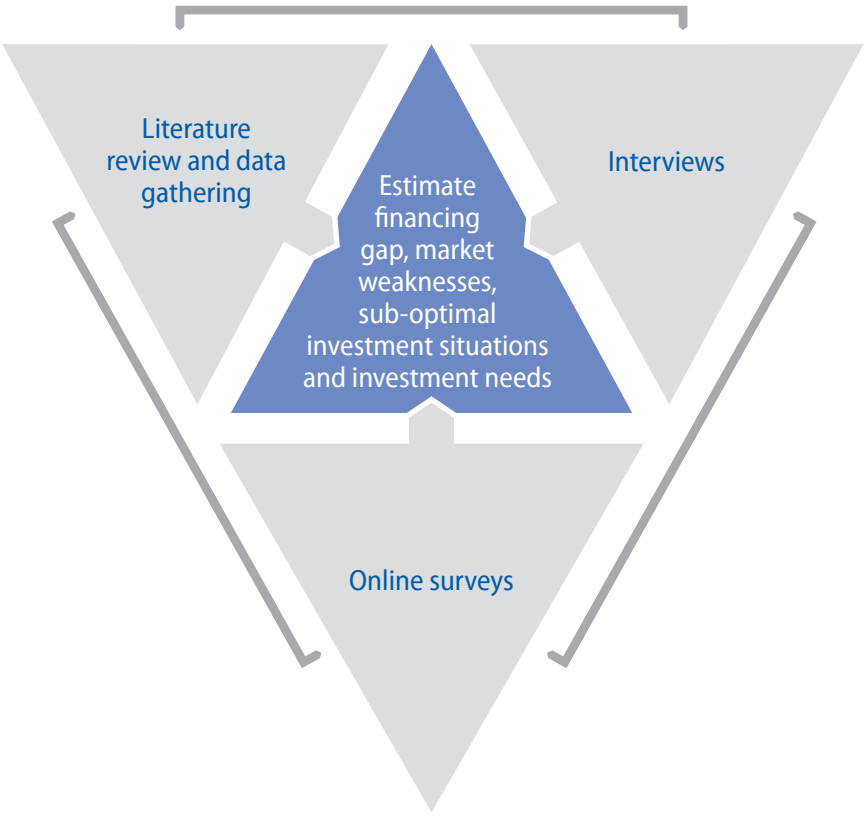
The main tools to be used to collect this information include:

- Literature review with a focus on specific indicators and statistical data. This literature review also include the identification of lessons learnt from the implementation of public instruments (financial and non-financial) as well as elements on their performance, success and/or limits;
- Face-to-face interviews with relevant stakeholders from the demand and supply sides, as well as with policy-makers;
- Online surveys addressed to RTDI-driven projects/entities.

They constitute a triangulation process in the sense that the results of each tool feed the other tools. This triangulation process is illustrated in Figure 3 below.

27 *EIF (2013) SME Access to Finance Market Assessment for Bulgaria and EIF (2014) SME Access to Finance Market Assessment for Rhône-Alpes.*

Figure 3: Main tools to analyse financing gaps and market weaknesses



This multi-tool approach allows to:

- Substantiate the demand and supply analyses with qualitative as well as quantitative information;
- Better understand potential regional disparities on the territory in terms of access to finance for RTDI-driven projects/entities, not necessary visible through one tool only;
- Identify key success factors or blocking factors related to the implementation of existing Financial Instruments dedicated to RTDI-driven projects/entities on the territory.

Each tool is detailed in the following paragraphs.

The **literature review** and the desk research are conducted to gather all the existing secondary information on the topic of financing RTDI-driven projects/entities on the considered territory. More specifically this information helps identifying:

- The quality and quantity of existing indicators and statistical data;
- The overall economic and political environment in the country or region;
- The regulatory environment affecting RTDI-driven projects/entities;
- The successes and limits of the existing Financial Instruments;
- The policy priorities of the Managing Authorities;

- The description of the financial products provided by the supply side and critical needs emerging from the demand side.

The literature review permits the sourcing of qualitative and quantitative indicators that are used to analyse the context and situation of the financing of RTDI-driven projects/entities in the country or region.

Indicators and statistical data are identified, reviewed and analysed so as to provide a quantitative analysis of both supply and demand and can be used to benchmark and compare the territory under scope with other countries and regions being in a similar situation.[28]

Quantitative indicators can be retrieved from official statistics and reports from EU institutions, EC publications like the Innovation Union Scoreboard, the Industrial R&D Investment Scoreboard, the Innovation Policy TrendChart, Eurostat (e.g. Science, technology and innovation in Europe) and national statistical offices, OECD, Global Innovation Index, European Central Bank and private sector organisations, and the European Venture Capital Association (EVCA) as well as the websites of financial institutions.

The literature review and identification of relevant indicators also permits the **comparison of indicators between countries and/or regions** having similar situations. The comparison of the structure and characteristics of RTDI-driven projects/entities in the considered territory with other regions (including the evolution of the use of financial products) helps to define good practices in terms of use of financial product and development of Financial Instruments. Such comparisons may also support the identification of financial intermediaries having previous experience with Financial Instruments in the same country and/or other regions of the same country. The main available sources that could be consulted in order to retrieve indicators and statistical data to be used during the assessment of financing supply and demand are provided in Appendix A.

The selection of indicators should take into account country- and market-specific considerations. In parallel, Managing Authorities are encouraged to use, as much as possible, indicators developed by the EU Commission[29], national and/or regional banking associations, as well as European, national and regional professional and business organisations, statistical offices and central banks.

Studies carried out by these stakeholders may provide precise indicators and enable **time series analysis** focused on the local environment. The analysis of the evolution of the structure and characteristics of RTDI-driven projects/entities as well as the historical use of various sources of finance

28 *This benchmarking exercise is similar to the Peer-Group-Analysis (PGA) approach mentioned in the GAFMA.*

29 *As an example, DG Enterprise and Industry provides links to EU policy documents, data and additional statistics from other sources than the European Commission related to the issue of access to finance of SMEs. This can be accessed on the website: http://ec.europa.eu/enterprise/policies/finance/index_en.htm.*

enables to identify the local weaknesses of the market and substantiate the development and implementation of Financial Instruments using ESI Funds.

In addition to comparisons with other countries/regions, the literature review enables to identify **lessons to be learned from the past**. This step aims at answering the following questions:

- Is there any past experience in using Financial Instruments to bridge the financing gap for RTDI-driven projects/entities in the country or region?
- What are the main successes of the past Financial Instruments (in terms of coverage of RTDI-driven projects/entities' needs and disbursement)?
- Has the absorption capacity proved sufficient with respect to the available resources?
- Is there margin for improvement (in terms of financial products to propose and/or support and amounts to devote for each specific Financial Instrument)?
- Have specific structural market weaknesses been identified in the past and addressed successfully or not?

The past use of available products is also to be included in the analysis and compared with the results of the demand analysis, as described in the previous section. If the available resources have not been fully used in the past despite evidence of unmet demand, this may signal potential shortcomings in the design or in the implementation of existing schemes.

The literature review is completed with stakeholder interviews and online surveys addressed to local RTDI-driven projects/entities.

Face to face interviews are conducted to develop the qualitative assessment of market failures and other market weaknesses. Relevant stakeholders need to be identified and grouped so as to cover the whole scope of the RTDI-driven projects/entities' access to finance topic in the country or region. Three groups of stakeholders are to be addressed:

a) Supply side stakeholders:

- Commercial and specialised banks;
- Development banks;
- Microfinance institutions;
- Venture capital institutions;
- Business angels;
- Business incubators and accelerators;
- Leasing and factoring companies;
- Insurance and public funds;
- RTDI-focused grant schemes managers;

- Responsible persons for the development of the relevant smart specialisation strategies
- Guarantee providers (e.g. members of the European Association of Mutual Guarantee Societies)

Trends and expected shifts in sources of supply (including intended changes in public support schemes) should be reviewed during the interviews to assess expected future supply. An example of an interview guide for supply-side stakeholders is presented in Appendix B.

b) Demand side stakeholders:

- Chambers of commerce;
- Leading professional associations;
- Individual entrepreneurs (including, if possible potential entrepreneurs);
- Cluster representatives (if existing);
- Specific district organisations;
- Key personnel of business/RTDI incubators, technology transfer centres; etc.
- Any other relevant organisation and public or private entities present on the territory, including if applicable civil society actors, e.g. from environmental groups or patients associations, consumer groups etc.

c) Policy makers whose decisions may have an impact on competitiveness at the national and/or regional level. These interviews are meant to discuss the key focus points of future policies affecting RTDI-driven projects/entities and the sectors and/or areas of specific interest for the national and/or regional government; including initiatives to foster innovative trends (as developed in the Smart Specialisation Strategies).

In addition to the literature review and stakeholder interviews, **online surveys** addressed to RTDI driven projects/entities are an essential tool to be implemented. These online surveys are meant to provide qualitative and quantitative insights on the RTDI driven projects/entities environment and RTDI driven projects/entities' needs for finance in the future. They also support the quantification of financing needs by type of financial product and consequently help defining the future investment strategy for the Financial Instrument.

In operational terms the surveys have to be developed so as to:

- Have a sample that is aligned with the overall RTDI-driven projects/entities population considered (in terms of size, sector and location);
- Propose a questionnaire that RTDI-driven projects/entities may easily answer and that include questions to be used both for qualitative and quantitative analyses;
- Ensure a number of answers enabling an analysis that has appropriate statistical relevance.

A proposed approach to define a representative sample of RTDI-driven projects/entities in the country or region under consideration could take into account three dimensions:

- Sectors, using the NACE rev.2 classification;
- Location, using the NUTS2 regions;
- Size of companies (micro, small, medium-sized) either based on the number of employees or turnover volume, using the most recent figures published by National Statistic Institutes.

To achieve a good representation level the size of the sample should cover a relevant percentage of the population of RTDI-driven projects/entities in the country or region (e.g. 5%). The online survey should aim to achieve a minimum response rate (e.g. 1‰ of the total population of RTDI-driven projects/entities).

The application of these tools allow constructing a comprehensive picture of the characteristics of the environment in which RTDI-driven projects/entities operate in the considered country or region, of the constraints and hurdles that limit RTDI-driven projects/entities and of the gap existing between supply and demand for the different types of financing.

Based on this MAs can demonstrate the existence of a market failure and/or a suboptimal investment situation that justifies public intervention using ESIF resources. The following step of the ex-ante assessment involves the verification of the value added of the envisaged financial instrument.

4. Assessment of the value added of the financial instrument

4.1 Analysing the dimensions of the value added for the envisaged financial instrument targeting RTDI

In the previous chapter we have presented the main methodological steps that need to be undertaken in order to demonstrate the presence of market failures, suboptimal investment situations, market weaknesses and financing gaps for RTDI-driven entities and innovative companies operating in the concerned territory. The results of this analysis are the necessary starting point in order to justify a public intervention using ESIF resources, by means of an FI aiming to strengthen investments in RTDI.

The General Methodology introduces the idea that, in most cases, the identified market failures and suboptimal investment situations can be addressed through several instruments, for instance through a grant scheme and through a revolving instrument. Based on the assumption that both of these options would achieve the primary objective of the FI (i.e. improving access to finance for RTDI-driven entities and companies), the ex-ante assessment needs to demonstrate that the chosen solution delivers the highest value added. It is therefore necessary to compare the value added of the alternative options according to both quantitative and qualitative criteria. The elements of the quantitative dimension of the value added of an FI are described in the General Methodology. These considerations are independent of the Thematic Objective specificities; therefore they will not be treated in this specific methodology.

On the other hand, a few specificities need to be highlighted as regards qualitative dimension, particularly as regards the direct and indirect economic benefits resulting from the implementation of an instrument targeting RTDI.

To begin with, an FI or a grant scheme using ESIF resources can promote **cross-border collaboration and coordination**, allowing capturing the full capacity within the EU and building upon the

European research area and the Europe 2020 Flagship Initiative Innovation Union[30]. Furthermore, while a wide range of sectors could be targeted by RTDI focused FI, it is important to verify that the size of the regional RTDI ecosystem is sufficient to support the creation of a regional FI. In many cases national FIs will have more opportunities to reach the critical mass necessary to the effective and efficient functioning of a financial instrument.

Basic and frontier research often have no immediate commercial value and their results, as well as their potential application, are uncertain. There is a clear need for **bridge financing to bring discoveries with potential commercial viability to the market**. Ensuring this link between research and market is essential to maintain Europe's research, technological and industrial leadership.

FIs focusing on RTDI can have a significant added value in allowing the **financing of research infrastructures**. These are facilities, resources or services of a unique nature that have been identified by European research communities to conduct top-level activities in all fields. This includes the associated human resources, major equipment or sets of instruments and knowledge-containing resources such as collections, archives and data banks. Research infrastructures play a paramount role in enabling excellent research activities that would not be realised otherwise due to a lack of capacities or excessive costs to be borne at the national level.

Research infrastructures present other advantages, since they are characterised by an open access policy, meaning that they must be open to all interested researchers, based on open competition and selection of the proposals evaluated on the sole scientific excellence by international peer review. As a result, they provide the opportunity to train scientists and, at the same time, facilitating knowledge sharing, technology transfer and innovation[31].

Beyond its impacts on the realisation of basic and frontier research, an FI aiming at strengthening RTDI will most certainly exert **positive effects on other EU policy objectives**. Strengthening the links between research activities and the commercial exploitation of the results will encourage the development of the whole supply chain, for instance through the creation of research-driven clusters associating universities, research centres, enterprises and regional authorities and supporting their cooperation.

Clusters provide a fertile environment for SMEs to innovate and develop linkages with large companies and international partners. Moreover, cluster organisations offer a wide range of customised business support services which are a precious resource for businesses, in particular for

30 *COM(2010) 546 final, Brussels, 2010(d).*

31 *European Strategy Forum on Research Infrastructures (2011), Strategy Report on Research Infrastructures. Roadmap 2010, http://ec.europa.eu/research/infrastructures/pdf/esfri-strategy_report_and_roadmap.pdf.*

SMEs[32]. The aspects of added value linked to the increased competitiveness of SMEs are discussed in more details in Volume III.

There are evident synergies between investment in RTDI and EU objectives for the development of low-carbon technologies and in particular energy transformation[33]. In particular, an FI targeting RTDI will be crucial in order to achieve the goals of the European Strategic Energy Technology Plan (SET Plan)[34]. Added value can also be created along the entire value chain of Climate Related Technologies, since small scale projects and low-cost technologies can be a field of interest for SMEs and local development. In addition, attention should be given to the generation of intellectual property and its transfer to the market via licensing or spin-off creation.

In line with the general methodology, the ex-ante assessment should compare the ability of grants (or subsidy) schemes and of FIs in achieving such benefits. It should be noted a combination of grants and FIs appears to be particularly relevant for RTDI. A more detailed of complementarity of FIs with grants and other forms of public intervention are described in chapter 5 of this document.

When the added value of an FI focusing on RTDI and other forms of public interventions such as grants, the ex-ante assessment should take into account the considerations displayed in Table 1 below.

Table 1: Key considerations to compare different forms of public intervention

Type of intervention	Key considerations
Grants and vouchers	• There is evidence of significant increase in the profitability of firms supported to carry out joint projects; • The size of grant seems weakly correlated with the size of impact. A small grant is often more effective and less distortive than a large one; • Grants provided to large firms may result in less significant changes in their innovative behaviours than expected.
Financial Instruments (e.g. soft loans, loan guarantees, seed capital, early stage venture funds, business angels networks)	• Less adapted for research activities than grants, more adapted for innovation (closer to the market); • Hints of positive impact on investment and on fundraising activities, particularly of private firms.

32 *Communication from the Commission to the Council,t European Parliament, the European Economic and Social Committee and the Committee of the Regions "Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy" (2008), COM(2008) 652 final/2.*

33 *Centre for European Policy Studies (2012), Investing where it matters. An EU budget for long term growth, CEPS Task Force Report.*

34 *Communication from fhe Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions (2007), "A European Strategic Energy Technology Plan (Set-Plan). Towards a low carbon future", COM(2007) 723 final.*

Type of intervention	Key considerations
Non-financial support (e.g. advisory services and coaching in finance, law, marketing, audit, networking)	• Hints that combined financial and non-financial support is more cost effective that financial support alone; • Consider the cost and time involved in setting up and running schemes.

4.2 Assess the consistency with other forms of public intervention addressing the same market

The approach to the assessment of the consistency with other forms of public intervention is presented in the General Methodology and there are no specific methodological issues related to Thematic objective 1.

4.3 Identify possible State aid implications

The approach to the assessment of State aid implications of the envisaged FI is presented in detail the General Methodology (chapter 4.3). This section focuses exclusively on the specificities for FIs targeting RTDI.

State aid implications related to RTDI are usually addressed through compatibility with one State aid Scheme under Art 19 of General Block Exemption Regulation (GBER). Section 7 of GBER focuses on aids for research, development and innovation and details provisions of seven measures to foster the competitiveness of European industry via more money spent in RTDI without need to notify to the Commission:[35]

- Aid for research and development projects;
- Aid for technical feasibility studies;
- Aid for industrial property rights costs for SMEs;
- Aid for research and development in the agricultural and fisheries sectors;
- Aid to young innovative enterprises;
- Aid for innovation advisory services and for innovation support services;
- Aid for the loan of highly qualified personnel.

35 *Commission Regulation (EC) No 800/2008 of 6 August 2008 declaring certain categories of aid compatible with the common market in application of Articles 87 and 88of the Treaty Please note that the new GBER is due to be published in July 2014. As a result this section of the ex-ante assessment methodology may need to be updated following the publication of the new Regulation.*

The Community Framework for State aid for Research and Development and Innovation in force since 2007 are currently being revised and the Draft Framework for State aid for research and development and innovation has been under public consultation from 20 December 2013 to 17 February 2014.[36]

With respect to the proportionality to investment needs identified in the analysis of market failure and suboptimal investment situations as well as measures to minimise the market distortions the approach described in the General Methodology fully applies to RTDI. The approach to the assessment of the consistency with other forms of public intervention presented in the General Methodology is considered to be sufficient and there are no specific methodological issues related to FIs targeting RTDI.

36 *The information contained in this section may need to be updated once the new guidelines will have been adopted. More information can be found in the Paper of the services of DG Competition containing a draft Framework for State aid for research and development and innovation, Brussels, 19.12.2013, http://ec.europa.eu/competition/consultations/2013_state_aid_rdi/rdi_draft_framework_en.pdf.*

5. Additional public and private resources to be potentially raised by the FI

After analysing market failures, sub-optimal investment situations and financing gaps for RTDI driven entities and assessing the added value of the envisaged FI aiming at addressing these issues, the ex-ante assessment shall concentrate on identifying the additional resources which could be raised by the FI. Moreover, the analysis should estimate the amount of their potential contribution and the level at which they intervene (i.e. at the level of the FI or the final recipient).

This will allow assessing to what extent the FI will be able to attract private and other public resources, thereby increasing the leverage effect and broadening the results achieved by ESI Fund resources.

5.1 Estimating additional public and private resources

The General Methodology provides a detailed analysis of the methodological steps required to obtain such an estimate. As a general rule these additional resources can come from public sources at the European, national, regional and local level, as well as from private investors and financial institutions.

While the principles presented in the General Methodology still hold, it seems useful to discuss more in detail which resources can be associated to the creation of an FI focusing on strengthening research, technological development and innovation.

To begin with, it is necessary to **identify the main actors providing finance to RTDI driven entities, both public and private**, as well as the types of intervention they finance. These elements have already been dealt with during the supply analysis performed as part of the market assessment (see Chapter 3, Section 3.4.1). In addition, the extent to which fund targeting RTDI have been set-up and used in the past in the country or region under consideration has also been investigated.

Against this background, it will be possible to have a fairly clear picture of where additional resources for the FI may come from. This will have an influence on the decision concerning the type

of financial product and target beneficiaries to be selected. In this respect a key issue is avoiding duplication of existing sources and foster complementarity of the new FI with the instruments already in place.

Secondly, as regards public resources it is necessary to **check which other ESI Funds can finance RTDI** within the scope of the envisages FI, since FIs can receive support from more than one ESI Fund, more than one Programme and more than one priority axis or measure under the same Programme. As a matter of fact, besides Thematic objective 1, other Thematic objectives have a close link to research, technological development and innovation and this is reflected in the investment priorities of different ESI Funds, as shown in Table 2 below.

Table 2: Investment priorities linked to RTDI in the different ESI Funds

ESI Fund	Thematic objectives	Investment priorities linked to RTDI
ERDF[37]	**T.O. 1**	• Promoting business investment in innovation and research; • Developing links and synergies between enterprises, R&D centres and higher education; • Enhancing research and innovation (R&I) infrastructure and capacities to develop R&I excellence and promoting centres of competence.
	T.O. 3	• Promoting entrepreneurship in particular by facilitating the economic exploitation of new ideas and fostering the creation of new firms, including through business incubators; • Developing and implementing new business models for SMEs, in particular for internationalization; • Supporting the creation of advanced capacities for product and service development; • Supporting the capacity of SMEs to engage in growth and innovation processes.
EAFRD[38]		• Fostering innovation, cooperation, and the development of the knowledge base in rural areas; • Strengthening the links between agriculture, food production and forestry and research and innovation, including for the purpose of improved environmental management and performance.

37 *Investment priorities as reported in the Proposal for a Regulation of the European Parliament and of the Council on specific provisions concerning the European Regional Development Fund and the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006, COM(2011) 614 final.*

38 *Investment priorities as reported in the Proposal for a Regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), COM(2011) 627 final/2.*

39 *Investment priorities as reported in the Proposal for a Regulation of the European Parliament and of the Council on the European Maritime and Fisheries Fund [repealing Council Regulation (EC) No 1198/2006 and Council Regulation(EC) No 861/2006 and Council Regulation No XXX/2011 on integrated maritime policy, COM(2013) 245 final.*

ESI Fund	Thematic objectives	Investment priorities linked to RTDI
EMFF[39]		• Fostering innovative, competitive and knowledge based fisheries and aquaculture including related processing; • Support to strengthening technological development, innovation and knowledge transfer.

Bearing in mind that additional public and private contributions can be made at all levels (FI and final recipient) and that they can be both monetary and non-monetary, it is necessary to take into account in kind contributions. These types of contributions, for instance in the form of land, or real estate assets can be relevant for RTDI-driven entities, since they are necessary to the implementation of their economic activities and, if not available, would need to be financed otherwise. These can be provided by the RTDI-driven entities themselves.

5.2 Estimating the leverage of the envisaged FI

There are no sector specificities in terms of the concept of leverage therefore please refer to the General Methodology.

5.3 Attracting additional private resources

There are no sector specificities therefore please refer to the General Methodology.

6. Lessons learnt

The purpose of this section is to capture the knowledge learnt during the course of activities as part of a continuous improvement principle. Article 37 (2) (d) states that the ex-ante assessment shall include an assessment of lessons learnt from similar instruments and ex-ante assessments carried out in the past.

6.1 Gathering relevant information

Please refer to the General Methodology for guidance on gathering relevant information.

6.2 Identifying success factors and pitfalls of past experience

Building upon the approach detailed in the General Methodology, it is important to gather information on the public and private support schemes available to RTDI initiatives in the country or region in question. Additional lessons learnt can be gathered from other territories and EU-level instruments focusing on RTDI.

The experience of the following EU level Financial Instrument could provide a first source of information on good practices and difficulties.

Table 3: Example of past experience with revolving finance in RTDI

Financial Instrument	Description
Risk Sharing Instrument for Innovative Research oriented SMEs & Small Mid-Caps (RSI)	RSI is a joint pilot guarantee scheme launched to improve access to debt finance of innovative SMEs and Small Mid-Caps in support of their RTDI projects. With this scheme, the European Investment Fund (EIF) is providing guarantees to banks and leasing companies.
Risk Sharing Finance Facility (RSFF)	RSFF is joint collaboration between the European Commission and the European Investment Bank (EIB) since 2007. The RSFF aims to improve access to the EIB debt finance for participants of European R&D projects.

Financial Instrument	Description
National Capital Fund	The National Capital Fund (NCF) was launched in 2007 in order to fill the equity gap in the market by investing in polish innovative businesses. The NCF is funded by the Polish and Swiss government together with the European Union.
ERP Innovationsprogramm	The ERP Innovation Programme of KfW provides long-term financing for market-oriented research and development of new products, processes and services as well as for their introduction on the market.
ERP-Startfonds	KfW mobilises equity capital for young innovative companies. KfW enters into participations but in most cases does not assume management tasks inside the companies.
High-Tech Gründerfonds (HTGF)	The main objective of High-Tech Gründerfonds (HTGF) is to significantly reduce the financing gap for high-tech enterprises in their seed phase and ultimately to contribute to the creation of highly-skilled jobs. The fund also intends to act as an icebreaker for private Venture Capital.
JEREMIE Innovation fund in Andalusia	The objective of the JEREMIE Innovation fund is to foster the development of companies with high growth potential, the creation of sustainable and qualified jobs and the facilitation of access to finance through the provision of equity and mezzanine finance

It must be noted that during the programming period 2007-2013 Financial Instruments could not be used to explicitly target research and innovation. However, in practice a number of Financial Instruments were established to serve innovative "Enterprises, primarily SMEs" (as defined in article 44a of Council Regulation No 1083/2006). This means that some experience in providing revolving finance under Thematic objective 1 exists.

While the review carried out for Chapter 3 focused on elements necessary for the assessment of the financing gap, the focus should move now to information and/or data necessary to assess the key success factors and the main pitfalls of FIs.

The first topics to be investigated are the **governance rules and FIs structure** used including the legal vehicles adopted and the role of implementing bodies, the final recipients and other stakeholders.

Lessons learnt from the effectiveness of **investment strategies** are particular relevant. The review should focus on the size of the target market, the adequacy with the country/region specificities and the selected financial products.

While the investment strategies of private investment funds are usually not available for confidentiality issues, a preliminary data source of experience in shaping strategies to address identified

market gaps are the outcome of previous ex-ante assessments. [40] Indeed these can provide a set of general recommendations concerning the setting up of new, or strengthening of existing financial instruments.

It emerged from industry practice that RTDI investment funds tend to have a sectorial rather than geographical coverage. Fund managers often specialise on specific field of research/innovation and look for projects globally. Unless a very mature cluster can provide sufficient demand, a RTDI driven FI active in a single region could have difficulties in achieving critical mass.

The analysis of the FIs **operations** is also very important. The investigation should seek for relevant applicable processes, procedures and tools as well as indications on the past level of fees and lifecycle costs.Such information could be gathered from the experience of local main actors in the operations and in particular fund managers.

To draw conclusion on the **financial performance** of existing financing instruments the ex-ante assessment should gather information to assess the cost-effectiveness (e.g. management fees per disbursement) and the leverage effect achieved. Additional information to be gathered are the verification of the sound financial management and the capacity to achieve objectives.

Lessons learnt can come also on the effectiveness of the **monitoring and control** system and suitability of key performance indicators. These elements will feed the specification of expected results (section 8 of this methodology).

Once the investigation has highlighted what have been the key factors that allowed or impeded the full deployment of the potential value added of the instruments in the past, the ex-ante assessment should leverage on these learning and move to the preparation of a proposed investment strategy.

6.3 Applying lessons learnt to enhance the performance of the FI

Please refer to the General Methodology for guidance on applying lessons learnt to enhance the performance of the FI.

40 *The summary findings and conclusions of ex-ante assessments in relation to financial instruments shall be published within three months from their date of finalisation (Article 37 (2)).*

7. Proposed investment strategy

At this stage of the ex-ante assessment, market failures, suboptimal investment situations and financing gaps for RTDI to be addressed by the envisaged financial instrument have been identified and quantified to the extent possible. In addition, the value added of the different solutions to address them has been assessed. Subsequently, the additional potential public and private resources to be raised by the FI have been considered as well as the lessons learnt from the implementation of similar instruments in the past.

This process will have screen out some of the ways of fostering research, technological development and innovation. The objective of the proposed investment strategy (PIS) is to start defining the operational framework of the FI, bearing in mind that the proper investment strategy will need to be defined in the set up phase, when the funding agreements are finalised.

7.1 Process to develop the proposed investment strategy

The General Methodology provides an explanation of the steps to be followed in order to elaborate a proposed investment strategy. This block of analysis is applicable to any FI regardless of the Thematic objective and includes the description of the process to define scale and focus of the envisaged FI as well as its foreseen governance structure.

7.2 Defining the scale and focus of the financial instrument

When the ex-ante assessment reaches the stage of development of the proposed investment strategy, the characteristics of the financial products to be offered and final recipients to be targeted will appear as fairly straightforward. Indeed, since the analysis of market failures and suboptimal investment situations for RTDI venture focuses on access to finance, the identification of gaps in serving specific segments of the market will have a direct implication in terms of financial products to be provided by the FI. For example, acknowledging the shortage of venture capital in

one region and assessing the size of such a shortage already gives an approximation of the size, scale and focus of the FI.

Developing the proposed investment strategy, therefore, means drawing conclusions from all the previous analyses and using their results to structure an FI that will be effectively able to address the market needs.

As such, the proposed investment strategy should include the following elements:

- **Summary of the conclusions** of the market failure, value added, potential co financing and lessons learnt analyses carried out so far. This will allow structuring the reasoning and demonstrating the rationale for the envisaged FI;
- **Target market**, i.e. the geographical scale at which the FI will be set up (EU level, multi-country, national or regional, cross-border);
- **Target final recipients**, i.e. the types of innovation targeted in terms of stage of maturity, size and sector;
- **Financial products** to be provided in order to respond to the identified needs of the final recipients;
- **Implementation option** chosen within the meaning of Article 38 CPR and the consequent governance implications for the setting up of the FI.

As already highlighted in Chapter 2 a key milestone (and an ex-ante conditionality) in the national or regional RTDI policy is to develop a strategy for smart specialisation (S3).

Such specialisation implies fostering local strengths in research and innovation, identifying unique characteristics and assets of a territory and matching these with business needs so as to effectively seize emerging opportunities and market developments in a coherent manner. An important goal of S3s is also to avoid duplication and fragmentation of efforts at EU level by looking beyond territorial boundaries.

It goes without saying that any Financial Instrument in this sector should serve the deployment of strategies for smart specialisation. The proposed investment strategy should therefore target the market and the recipients in the object of such strategy.

This relationship with S3 is crucial for achieving a coherent strategy and it ensures linking the FI with an already identified potential project pipeline. Indeed it is often difficult to link RTDI instruments with a homogenous and consistent group of recipients in a given territory.

Nevertheless, the investment strategy should not try to stretch too much the spectrum of different eligible recipients and sectors or it will lose quality of their strategic investing. In order

to achieve critical mass the proposed Financial Instrument could pursue possible territorial synergies. Indeed it is recommended to consider establishing national RTDI Financial Instruments instead of several undersized regional FIs. This will also reflect industry practice as RTDI investors tend to have a sectorial approach (as in the Information Commination Technologies) rather than a geographical driver.

Regional FIs are effective only when the regional RTDI ecosystem can support them with a significant volume of potential operations. This is often the case when a healthy cluster is present in the region.

As already highlighted in this methodology, RTDI infrastructures may require different approaches to effectively serve them in the supply of financing and likely require ad hoc Financial Instruments. The challenge of achieving sufficient volumes to establish a specific fund might suggest the need to consider higher levels of governance, including EU level FIs.

7.3 Defining the governance structure of the financial instrument

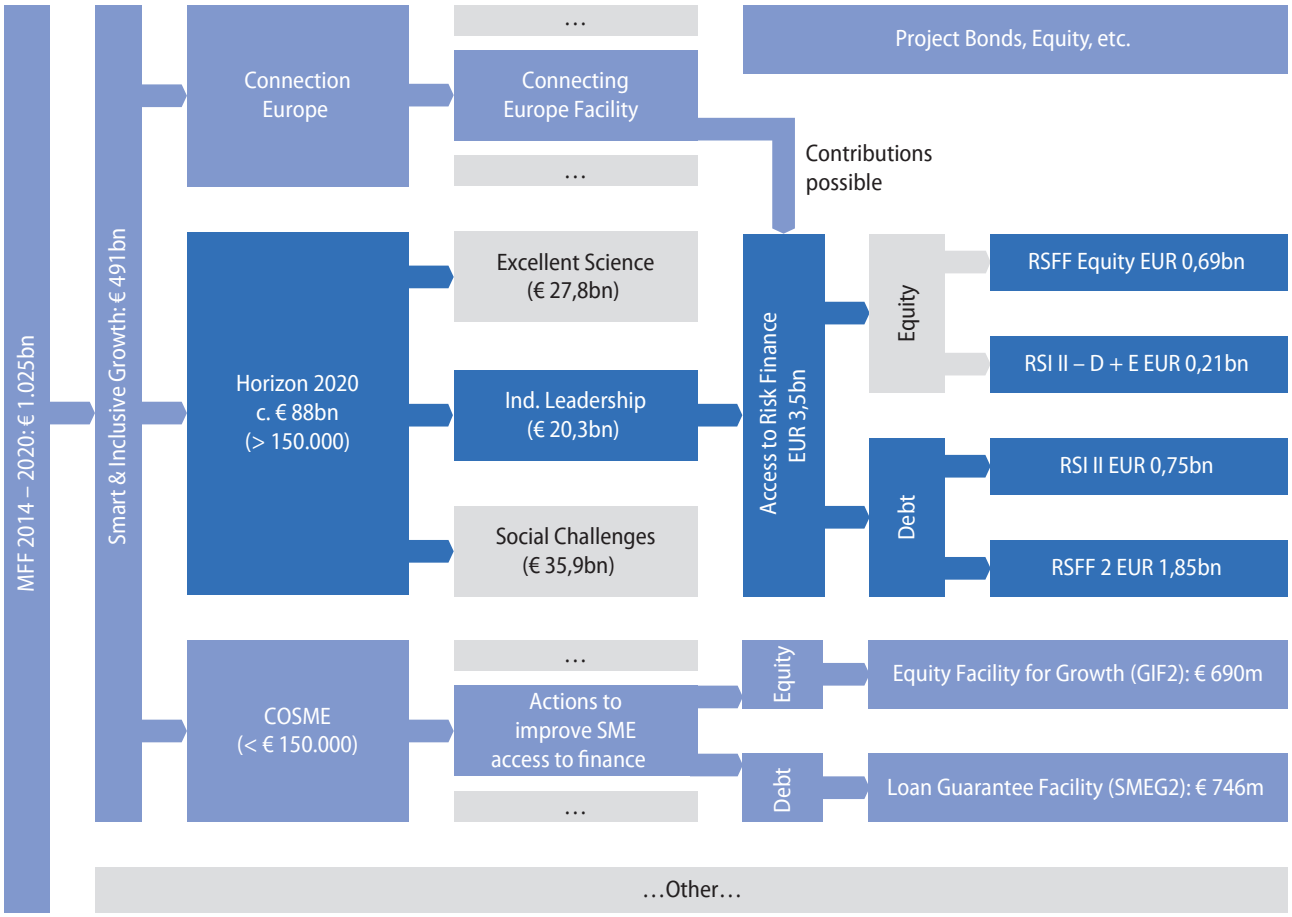
7.3.1 Analyse different options for implementation arrangements

The General Methodology (Volume I) provides a thorough analysis of the different options available to MAs when setting up FIs. As complementary information a brief overview of the RTDI relevant options are provided in this paragraph.

Art 38 (1) (a) allows the contribution from ESI Funds to EU-level Financial Instruments. **Horizon 2020** is an EU-level FI aimed at securing Europe's global competitiveness[41]. Horizon 2020 has an integrated approach toward SMEs but support also larger midcaps, large corporates, research bodies, etc.

41 *http://ec.europa.eu/research/horizon2020.*

Figure 4: EU Budget Structure - Main Logic of the EU MFF Budget Resources (2013 presentation by EIB)



As figure 6 shows the main logic of Horizon 2020 the EU MFF budget resources and the Financial Instruments projected for 2014-2020. For the next programming period the already existing facilities, namely Risk Sharing Financial Facility (RSFF) and Risk Sharing Instrument (RSI) will continue and refine by providing both equity and debt financing. RSFF targets low- to sub-investment grade risk including large corporations, mid-caps, SMEs (RSI) as well as research infrastructures, universities and public research institutions. The RSI Facility has been designed to support access to debt finance of one of the RSFF target groups, i.e. innovative SMEs and Small Mid-caps investing in research, development and/or innovation (RDI) projects.

In 2014-2020 the form of risk-taking and risk capital (Financial Instruments) will be:

- **Loan finance**, i.e. risk-sharing loans to companies and for innovative projects introducing new technologies;
- **Guarantees** to financial intermediaries (commercial and development banks) that provide loans to research-and innovation-driven SMEs and small mid-caps;
- **Equity**, i.e. venture capital for newly created companies exploiting R&D results.

Two financial instruments (Figure 6)[42]:

1. **Debt:**
- Loans and guarantees for investments in Research & Innovation; demand-driven; targeted at midcaps and larger companies, research bodies and Research Infrastructures; ("RSFF II");
- Guarantee facility for research-intensive and innovative SMEs & small midcaps ("RSI II").

2. **Equity (early-stage finance):**
- Early stage finance for innovative enterprises (notably seed and start-up companies);
- Growth-stage finance also possible.

At least one-third of the budget shall support RDI-driven SMEs and small caps. MAs could support research and innovation in the area and for other actions foreseen by their Programme by allocating ESI-Fund contributions to one of the FIs managed by Horizon 2020 investing in RTDI for SMEs: the Equity Facility for Research and Innovation and the SMEs & Small Midcaps Guarantee Facility.

The **Equity Facility for Research and Innovation** provides risk capital to innovative SMEs and small mid-caps in the early stages and (for a maximum of 20% of its total investment) growth stage investments.

SMEs & Small Midcaps Guarantee Facility (also known as RSI II)[43] is meant to provide guarantees for loans (over €150,000) for research and innovation activities to both RTDI-driven SMEs and small mid-caps.

In addition to EU-level FIs, MAs can entrust entities for the implementation of FIs (art 38(4) b) or invest in the capital of legal entities dedicated to implement FIs in line with the objectives of the ESI Funds. A further option is to directly implement the FI, in case this consists exclusively in loans and guarantees. However, no specificities for RTDI are foreseen for these implementation options.

The investment strategy should also clarify whether the Financial Instrument intend to adopt the structure of an Off-the-shelf instrument or in the specific market a tailor made instruments is required to fully deliver the potential value added.

Despite not being explicitly designed for financial instruments focusing on research, development and innovation the three options below can be used. These are meant to satisfy the needs of SME

42 *Presentation on Horizon 2020 Financial Instruments: Access to Risk Finance under the EU Framework Programme for Research and Innovation 2014-2020, Philippe Froissard, Policy Officer, representing RTD-C.3 Financial Engineering Unit, DG Research and Innovation (October 2013).*

43 *This Financial Instruments builds on the positive experience of the SMEs & Small Mid-caps Guarantee Facility (RIS) started in 2012 under the Seventh Framework Programme (FP7).*

structures but with the addition of a constraint on the innovativeness of the target beneficiaries such templates can be applied to FIs focusing on RTDI:

- Loan fund for SME's based on a portfolio risk sharing loan model (RS Loan);
- Guarantee fund for SMEs (partial first loss portfolio) (Capped guarantee);
- Equity Investment fund for SMEs and starter companies based on a co-investment model (Co-investments Facility).
- Further detail on these predefined structures are available in the Standard terms and conditions for financial instruments pursuant to Article 38(3)(a) of the CPR (Implementing Act).

7.3.2 Envisaged combination with grants

In some cases, when it comes at financing research and innovation a mix of grant and repayable FIs, can be necessary in order to ensure the financial viability of the projects and ultimately of the Financial Instrument.

The ex-ante assessment should consider whether the combination of the financial instrument with a grant element is appropriate or not. The grant element can take several forms:

- Direct investment grants;
- Technical support;
- Interest rate subsidies;
- Risk sharing instruments.

The combination of grant with Financial Instruments under Thematic objective 1 is particularly relevant as the uncertainty of RTDI project outcomes is not always sufficient to generate a sound stream of cash flows. Indeed, in some cases the issue of financial viability is still the main problem.

Good examples of this are research infrastructures which tend to have large viability gaps that can be bridged only by covering part of the capital investment with a public grant. Nevertheless, as soon as projects can generate net revenues it should always be considered to combine the grant support with a Financial Instrument. While the largest part of the research infrastructure will still be covered by grants a part of the investments for the equipment can be reimbursed charging users for their usage or the commercialisation of future licences and patents.

When the financial viability is ensured but the project still faces difficulties in accessing commercial finance, the grant can be useful again. To overcome the premium rates required by specialised suppliers to reward the uncertainty about outcomes, a solution can be to engineer a grant into other financial products to supply RTDI driven entities with soft loans (interest rate subsidy) and cheaper guarantee fees (guarantee fee subsidy).

In the case of innovative start-ups and spin offs, the use of grants be extremely usefully for the medium term success and sustainability of the venture when it is used to **provide technical support**. For examples grants can cover expenses necessary to address property rights issues or used to pay the preparation of a sound business plan.

With respect to academic spin-offs, another relevant option is to use grants for **providing capacity building** and professionalise the commercial activities of researches. This could help them overcome their weaknesses in terms of inefficient management and governance structure, which as discussed in Chapter 3, can have a negative impact on the risk perception by potential lenders, thus limiting their access to finance possibilities. Training and coaching can also help **raise awareness of existing financing opportunities**.

While the combination of different sources can be useful to address specific needs it can bring some complexity as eligibility criteria can be different and no central management is foreseen.

The proposed investment strategy should reflect the findings on ways the mix of grants and repayable FIs can serve the objective of strengthening research, technological development and innovation.

In some cases a subsidy can be useful to **fill a viability gap** and promote a capital investment that will deliver future research capacity, technological developments and innovations. This can be done for instance through a grant engineered to deliver soft loans (interest rate subsidy) and cheaper guarantee fees (guarantee fee subsidy). Another option, particularly relevant for research infrastructures, is to directly replace part of the private financial contribution necessary for the investment by a public grant.

The proposed investment strategy will then detail the governance implications in term of combining grants support with the Financial Instrument. Indeed it is possible to embed the grant component in the Financial Instrument or create a separate scheme.

8. Specification of expected results consistent with the relevant Programme

8.1 Establishing and quantifying the expected results of the financial instrument

Please refer to the General Methodology for a general approach to establishing and quantifying the expected results of the FI.

After the development of the proposed investment strategy, the ex-ante assessment has to specify the expected results of the Financial Instrument and define its contribution to the achievement of the specific objectives and results of the priority or measure under which it has been established.

Chapter 8 of the General Methodology describes the standard steps for the definition of the expected results of Financial Instruments. This specific methodology focuses on the peculiarities of Financial Instruments focusing on Thematic objective 1.

The overall objective for achieving smart growth in the European Union is mirrored in the specific funds Regulations of ESI Funds. As such, there can be several **result indicators** focusing on different investment priorities/focus areas related to RTDI. Examples of possible result indicators specific to Thematic objective 1 include:

- Number of new high tech firms/of spin-off companies;
- Share of turnover based on innovation;
- Productivity (e.g. measured by Gross Value Added (total or by sector) per worker);
- Share of knowledge-intensive personnel (see: new Europe 2020 headline indicator for innovation);
- R&D personnel as percentage of total employment;
- Community innovation survey indicators (available for Member States and some regions);
- Innovation Union Scoreboard or regional innovation scoreboard indicators;
- Number of business/enterprise partnerships;
- Number of cooperation between businesses and universities/research centres;
- Number of patents/prototypes/registered trademarks or designs;

- Number of companies reporting difficulties in accessing equipped laboratories or innovation support platforms (e.g. LivingLabs, Creative Factories);
- Measurable skills/technical competence levels in specific sectors;
- KET investments.

Financial Instruments should not multiply result indicators and should ideally pick up from those defined for each specific objective. For each of these it is important to know how the Programmes plan to collect data for result indicators in order to structure the activities of the FI in a consistent manner.

The **output indicators** measure activities carried out by the FI in order to deliver the above outcomes/results. Some output indicators for FIs focusing on RTDI are listed below:

- Number of new researchers in supported entities;
- Number of researchers working in improved research infrastructure facilities;
- Number of enterprises cooperating with research institutions;
- Private investment matching public support in innovation or R&D projects;
- Number of enterprises supported to introduce new to the market products;
- Number of enterprises supported to introduce new to the firm products;
- New products and their overall export share (inside/outside EU).

Additional indicators will try to assess the operational efficiency of the Financial Instruments: the performance of the FI. Some examples of these indicators, which are not RTDI specific, are credit losses (i.e. supplied financing that has become unrecoverable), management costs and leverage.

8.2 Specification of how the financial instrument will contribute to the strategic objective

Please refer to the General Methodology for guidance on the specification of how the FI will contribute to the strategic objective.

8.3 Monitoring and reporting

Please refer to the General Methodology for guidance on monitoring and reporting.

9. Provisions for the update and review of the ex-ante assessment methodology

The ex-ante assessment should be updated and reviewed every time it no longer represents the initial market conditions. This may happen throughout any phase of the FI life cycle.

No specificities to the general approach are foreseen under Thematic objective 1 and the process described in chapter 11 of the General Methodology should be applied to Financial Instruments focusing on strengthening research, technological development and innovation.

9.1 Result oriented approach

Please refer to the General Methodology for guidance on the result oriented approach.

10. Ex-ante assessment completeness checklist

No specificities to the general approach are foreseen under Thematic objective 1 to the completeness checklist described in chapter 12 of the General Methodology. This checklist should be applied to Financial Instruments focusing on SMEs including microcredit and agriculture.

Appendices

Appendix A
List of useful documents

1. Breedon, T. et al. (2012): Boosting finance options for business. Taskforce to boost finance options for business. March 2012. http://www.bis.gov.uk/assets/biscore/enterprise/docs/b/12-668-boosting-finance-options-for-business.pdf
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7. European Commission (2013), Paper of the services of DG Competition containing a draft Framework for State aid for research and development and innovation, Brussels, 19.12.2013, http://ec.europa.eu/competition/consultations/2013_state_aid_rdi/rdi_draft_framework_en.pdf
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Appendix B
Sources for indicators and statistics for RTDI financing supply and demand

Table 4: Sources for indicators and statistical data

	Data source	Description	Responsible
Indicators and statistical data	**Innovation Union Scoreboard**		European Commission http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/
	Industrial R&D Investment Scoreboard	information on the top 1000 EU companies and 1000 non-EU companies investing the largest sums in R&D	Joint Research Center http://iri.jrc.ec.europa.eu/home
	Innovation Union progress at country level 2013	Research and Innovation performance in EU Member States and Associated countries - Innovation Union progress at country level 2013	European Commission http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2012/innovation_union_progress_at_country_level_2013.pdf
	Innovation Union Competitiveness Report 2011	The report provides country-specific analysis on selected indicators	European Commission http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitiveness-report&year=2011
	Global Innovation Index 2012	Innovation-related data for more than 140 countries including country comparisons.	http://www.wipo.int/export/sites/www/freepublications/en/economics/gii_2012.pdf
	FP7 country profile	Provide a set of key data on the involvement of each MS in FP7 (participation and success rates, level of involvement of SMEs, key collaborative links, most active thematic areas, type of participant, geographical concentration and most active participating organisations).	European Commission

	Data source	Description	Responsible
	Innovation Policy TrendChart	Innovation policy analysis, trends, key challenges and country comparisons	European Commission http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/trendchart/index_en.htm European Commission http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/country-reports_en.htm
	Public Sector Innovation Scoreboard	Benchmarking of public sector innovation performances	European Commission http://ec.europa.eu/enterprise/policies/innovation/policy/public-sector-innovation/index_en.htm
	Regional Innovation Monitor	Sub-national innovation policy analysis, profiles, benchmarking tool, good practice dissemination	European Commission http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/
	Community Innovation Survey	The harmonised survey is designed to provide information on the innovativeness of sectors by type of enterprises, on the different types of innovation and on various aspects of the development of an innovation	Eurostat http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/cis
	Structural business indicators	Indicators concerning access to finance	Eurostat http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/introduction
	Science, technology and innovation in Europe - 2013		Eurostat http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GN-13-001/EN/KS-GN-13-001-EN.PDF
	Data on Access to Finance	Links to data and additional statistics from other sources related to the access to finance of SMEs	European Commission http://ec.europa.eu/enterprise/policies/finance/data/index_en.htm

	Data source	Description	Responsible
	Better access to Finance	Available instruments and additional information regarding access to finance	European Commission http://ec.europa.eu/enterprise/policies/finance/index_en.htm
	Global Venture Capital and Private Equity Country Attractiveness Index	Broad range of indicators useful to assess the market maturity and possible market weaknesses. Indicators concerning the loan market, the environment for entrepreneurs in general and for start-ups in particular. Data for 80 countries, including 18 in Eastern Europe and 17 in Western Europe (including comparisons within peer groups).	Groh, A. et al., 2011 http://blog.iese.edu/vcpeindex/
	Funding Research and Innovation in the EU and Beyond: Trends during 2010-2012		European Commission http://ec.europa.eu/enterprise/policies/innovation/files/inno-funding-2012_en.pdf
	Industrial performance scoreboard 2012		European Commission http://ec.europa.eu/enterprise/policies/industrial-competitiveness/monitoring-member-states/files/ms_comp_report_2012_en.pdf
	Regional innovation systems		OECD http://www.oecd.org/governance/regionaldevelopment/regionalinnovation.htm
Surveys	**Eurobarometer surveys**	Insights into the intended use of different financial instruments by final beneficiaries.	European Commission http://ec.europa.eu/public_opinion/index_en.htm
	Eurobarometer surveys	Survey on Business perception of public sector innovation	European Commission http://ec.europa.eu/public_opinion/whatsnew2012_en.htm

Appendix C
Example of interview guide for supply-side stakeholders

Part 1: Interviewee's investments in innovation-driven projects/entities

1. Could you briefly describe the three key **solutions** that you are currently offering to RTDI-driven projects/entities?

   a) What is the volume invested for each solution and your capacity for the next three years?

   b) What are the eligibility criteria for each solution?

   c) Are you adopting a single or multi-player approach?

Description	Equity, debt, hybrid, guarantee, other
Volume	Amount of present and future supply
Eligibility criteria	e.g. size of investment and company, sector, location, type of investment (target activities / objectives)
Key challenges and obstacles	e.g. cost, market acceptance, legal complexity, expectations for guarantees, risk profile
Approach	Single or multi-player

2. What are some of the reasons why you declined to make investments from your side (e.g. related to management, product, commercial, general)?

3. What specific **obstacles** do you face as a VC / bank / promotional bank/agency investing in your region or country (e.g. cost, market acceptance, legal complexity, expectations for guarantees, risk profile)?

Part 2: Market trends and challenges

4. How would you assess the **market demand** for financing RTDI-driven projects/entities in your region or country? How many projects/entities in your territory fit into your potential pipeline?

5. Which **sectors** would you say are most likely to experience a growth in demand for this type of funding in Europe? What would be the most likely objectives or target areas for investment?

6. In which **countries or regions** do you foresee the most significant growth in the future?

7. What are the key **challenges** for funding RTDI-driven projects/entities?

8. Is market demand higher than the current supply? Is there a **funding gap** in Europe?

Part 3: Prospective solutions

9. Which are the most effective **models to fund growth** for RTDI-driven projects/entities?

10. How do you see the **role of public sector funding** for supporting RTDI-driven projects/entities?

11. Is there a **market need** in Europe for a potential financial instrument? If you were to define an ideal vehicle to put in place for RTDI-driven projects/entities tomorrow what would its characteristics be?

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