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Executive Summary

Malta experienced fast growth in research and innovation performance and has moved up from being a modest innovator to becoming a moderate innovator in the Innovation Union Scoreboard 2011 together with Slovakia, Poland and Hungary. In its group of moderate innovators, it was identified, together with Portugal, as a growth leader.

In the period 2007-2010, Gross Expenditure on research and innovation (GERD), expressed as a % of Gross Domestic Product (GDP), increased from 0.58% to 0.63%. The government funded more R&D in this period and carried out more R&D too, with government-financed R&D increasing from 25.7% of GERD in 2007 to 30.5% in 2010. R&D expenditure in the Higher Education (HE) sector also increased from 31.7% GDP in 2007 to 37.01% of GDP in 2010; whilst the business sector funded less R&D (from 56.5% in 2008 to 51.5% of GERD in 2010).

In December 2011 the Malta Council for Science & Technology (MCST) which is the principal agency overseeing the design and implementation of research and innovation (R&I) and science and technology policy and initiatives, published the draft new multi-annual national R&I Strategic Plan 2011-2020 for public consultation. It maintains a strong business orientation and as with the current strategy, is promoting smart specialization in four areas of economic importance.

One point of emphasis of the new Strategic R&I Plan 2011-2020 is on the importance of considering the whole of the research and innovation cycle from 'blue sky' research to commercialisation of innovations, in line with the EU's Innovation Union Flagship Initiative¹. Another is that of strengthening international cooperation and participation in EU programmes. It bases interventions along six pillars of action aimed at sustaining the concept of an R&I ecosystem; these are policy design to action, human resources, research infrastructures, international cooperation, innovation and funding. Policy design and funding are considered to be issues of horizontal, cross-thematic importance, elements of which feature in all the remaining four thematic pillars.

The process of policy formulation and design is based on a broad participatory approach amongst key stakeholders. This approach was used for the drafting of the new National Strategic Research and Innovation Plan 2011-2020 and for the drafting of the sectoral research strategies for health and manufacturing. MCST maintains strong links with [Malta Enterprise](#), the national business support agency, the state-funded University of Malta and various other sectoral ministries. This has created synergies amongst key public agencies and ministries that has led to a more coordinated approach to policy-making and the dovetailing of policies for R&I across sectoral domains (such as in education and ICT).

The new strategy is expected to define intermediate targets and trajectories to ensure that Malta is well on track to achieve its EU2020 target of investing 0.67% of Gross Domestic Product on R&D by 2020 as defined in the National Reform Programme 2011-2020. The principal system challenges that the R&I system faces up to in drawing Malta closer to achieving this target are summarized as:

¹ Malta's National Reform Programme 2011-2020 p.38

Capacity-Building for smart specialisation of R&I

The strategic choice towards smart specialization in areas of economic importance stems from the limited resources characteristic of a small country context and the need to concentrate these in niche fields. The four priority areas are retained in the new draft National Strategic R&I Plan 2011-2020, namely ICT, energy and environmental technologies, health and value-added manufacturing and services. The challenge to concentrate resources in these areas is being addressed through the drafting of sector-specific research strategies (in health, manufacturing and ICT-related domains) and concomitantly building R&I capacity, both in terms of infrastructures and human resources, in order to strengthen competence in these areas and to be better able to compete and cooperate at an international level.

Sustainability of research and innovation funding

Over the past five years, the R&I system has benefited from an injection of public funds, with a high proportion of these sourced from the second Structural Funds programming period 2007-2013 (ERAWATCH, 2010). In order to move towards a self-sustaining system, alternative sources of funding such as from the private sector and through more effective participation across EU programmes are being sought. Second is the need to shift from annual budgetary cycles to multi-annual funding programmes that aid in the planning of longer term research strategies and programmes.

Creating an enabling environment for research to market, innovation and entrepreneurship, especially amongst SMEs

R&D activity within the business sector is largely attributable to a small cluster of multinational operations whilst the indigenous micro and small and medium sized enterprises that represent the majority of the enterprise sector in Malta are carrying out minimal to no R&D activity (National Statistics Office, 2010). The relatively low R&D activity in the business enterprise sector is not solely contingent on access to finance but other structural factors seem to be compounding on the business sector's capability to capitalize on system factors and incentives promoting innovation and research. One is the gap that may arise between research and commercialisation opportunity and the inability to bring ideas to market (National Reform Programme, 2011); this will be addressed through the setting up of a new Commercialisation Programme (NRP, 2011). Another compounding factor is the management gap present within SMEs and therefore the need to support these entities when preparing successful research proposals.

Although the policy mix tends to favour the provision of direct funding through grant schemes aimed at stimulating R&D and innovative activity, competitive funding is gaining more prominence. The budget for the National R&I Programme which funds on a competitive basis, collaborative projects between industry and academia increased from €700k in 2010 to €1.1m in 2011; and the budget is expected to rise to €1.6m in 2012². There is evidence of a diversity of funding modes being put in place such as collaborative funding provided by the ERDF R&D grant scheme for enterprise and an R&D tax credit scheme. In 2010, the JEREMIE financial

² Ministry of Finance, Economy & Investment (2011) Budget Speech 2012 published 14th November 2011

engineering instrument was launched in Malta with a capital expenditure for the government of €10m in 2010³.

The Structural Funds retain a central role in supporting infrastructural and human capacity building and co-financing the enterprise aid schemes under the umbrella of the '20million for industry' initiative. In terms of the evolution of RDI priorities supported by Structural Funds, a review of the Knowledge & Innovation Priority Axis of OPI⁴ in 2011, proposes to continue channelling Structural Funds in order to strengthen Malta's R&I capacity. There is an evolution in terms of funding sources exemplified by the initiative to source private sector funds for research projects in biotechnology and pharmaceuticals in the BioMalta campus project that will form part of the life sciences centre (2011-2014).

In terms of alignment with the ERA (European Research Area) pillars, some success has been achieved such as through the putting in place of a legal framework for inward mobility of third country researchers and very good participation rates registered in FP6 and FP7. However particular challenges vis-a-vis the ERA arise from Malta being a small state with limited resources and infrastructures. One is that of maintaining a balanced two-way flow of researchers avoiding a brain-drain. Another challenge relates to international collaboration, which though essential for making up for the lack of critical mass, and for pooling knowledge and intelligence-gathering, raises issues related to the sustainability of the funding system and prioritization. Malta's position on the 'European Commission's Green Paper on a Common Strategic Framework for EU Research and Innovation Funding'⁵ published in 2011, stresses that funding mechanisms need to take account of the national requirements and priorities.

³ ibid

⁴ Planning & Priorities Coordination Division Monitoring Committee for Operational Programme I, 17th November 2011

⁵ Malta's Position on the European Commission's Green

Paper on a Common Strategic Framework for EU Research and Innovation Funding

http://ec.europa.eu/research/horizon2020/pdf/contributions/post/malta/national_position_paper.pdf#view=fit&pagemode=none

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1 Introduction

With a gross domestic product (GDP) of €6.4m and a total population of 417,617 inhabitants in 2011⁶, Malta is the smallest EU Member State accounting for a 0.1% share of the EU-27 total population (Eurostat⁷). The GDP per capita at €14,800/inhabitant is well below the EU27 average of €24,400/inhabitant (Eurostat 2011). Real GDP growth decreased from 4.3% in 2008 to 2.1% in 2011 (Eurostat 2011).

In 2010, total R&D expenditure or GERD expressed as a % of GDP stood at 0.63% (Eurostat, provisional value). This would indicate that GERD is increasing following a period of decline in 2007-2009, (where GERD decreased from 0.58% to 0.54%). Nonetheless, Malta's performance remains below the EU-27 average where GERD stood at 2% of GDP in 2010 (Eurostat). The government funded more R&D in this period and carried out more R&D too, with government-financed R&D increasing from 25.7% of GERD in 2007 to 30.5% in 2010 (Eurostat). R&D financed from abroad also increased from €5.2m in 2008 to €6.9m in 2010 (Eurostat); whilst the business sector funded less R&D activity (51.4% of GERD in 2009 compared to 56.5% of GERD in 2008).

The national R&I system is moving towards smart specialisation in a select number of areas of economic importance in which to generate sufficient critical mass and obtain value-added R&I⁸. In 2007, the GERD dedicated to engineering represented 40% of total R&I funding; whilst that for natural sciences averaged 20% and 17% for medical sciences⁹.

Considerable capital investment was made in upgrading and building new research infrastructures at the [University of Malta](#) and the [College for Arts, Science & Technology](#) (MCAST) in the fields of engineering, science and ICT. These projects, estimated at €34m over 2007-2013 are co-financed through the European Regional Development Fund (ERDF). The €15 million that is being invested in a Life Sciences Centre is another step in building capacity investment in biotechnology and pharmaceuticals. Also, participation in European research infrastructure projects such as the [Biobanking and Biomolecular Resources Research Infrastructure](#) (BBMRI) and the [Common Language Resources and Technology Infrastructure](#) (CLARIN) and the signing of bilateral agreements with international organizations (e.g. [CERN](#) and the [European Space Agency](#)) are intended to enhance access to international infrastructures.

Human resources represent a crucial asset for Malta and efforts are being addressed in order to boost the low percentage of Human Resources in Science and Technology (HRST) that stood at 31.7% of the labour force, compared to 40.5% HRST in the EU-27 and the low number of PhD graduates¹⁰ at 0.3% compared to the

⁶ Eurostat provisional value, Main Demographic Indicators accessed 9th December 2011

⁷ Eurostat Main Demographic Indicators accessed 9th December 2011

⁸ Malta Council for Science & Technology (2011) Malta's National Strategic Plan for R&I 2011-2020 Draft Consultation Document published 5th December 2011

⁹ *ibid*, p.27

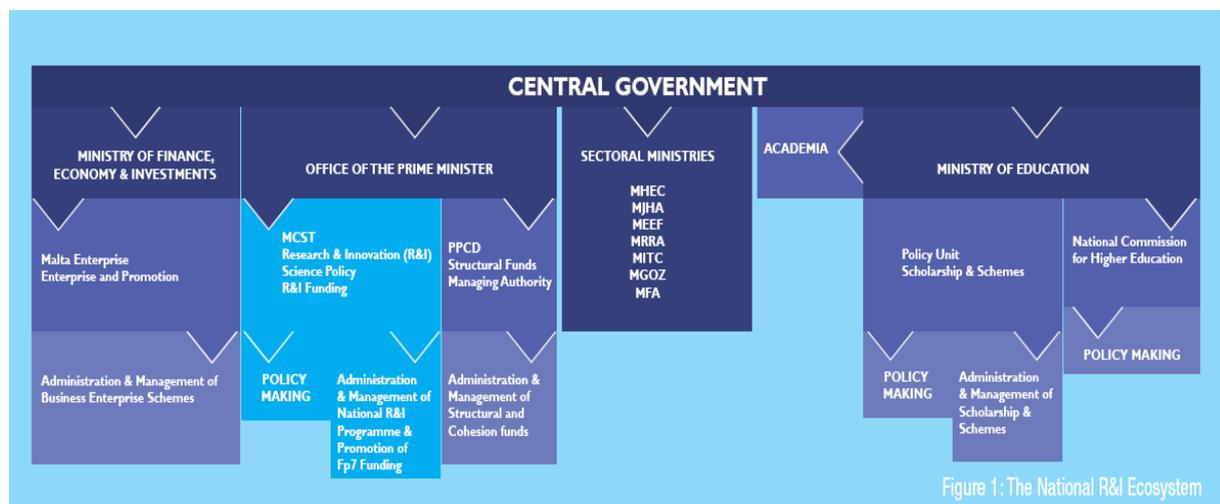
¹⁰ The percentage of doctoral graduates is expressed per 1,000 population aged 25-34

EU-27 average of 1.5% in 2010 (Eurostat data). In 2006-2009 period, the number of PhD graduates increased from four to nineteen individuals; although this is low in absolute terms, the average annual growth rate in the three-year period is actually high compared to other small EU countries such as Cyprus, Luxembourg, Ireland and Latvia (European Innovation Scoreboard, 2011)

Research output indicators for Malta (including publications, citations and patents) are generally low compared to the EU-27 average. The number of publications remained low during the period 2001-2007. Higher education and government are responsible for Maltese R&D publications in an approximate 2:1 ratio; whilst the business sector is not involved in R&D publications¹¹.

The figure below gives a snap shot of the Maltese R&I system that integrates facets of both research and innovation governance.

Figure 1: The Maltese R&I system



Source: [Malta's National Strategic R&I Plan 2011-2020 Draft Consultation Document](#) published 5th December 2011

As with other policy areas, research and innovation policy development and implementation remain a centralized activity within the competence of the Office of the Prime Minister and relevant ministries. The regional dimension is not relevant for R&I governance in Malta's case and there is no split of responsibilities between the national and regional level dimensions.

Within the Office of the Prime Minister (OPM), the [Council for Science & Technology](#) (MCST) is the principal entity responsible for championing the implementation of the National Research & Innovation (RI) Strategy. In December 2011 the Policy, Strategy & FP7 Unit within MCST published the draft new multi-annual national R&I Strategy for public consultation. MCST also manages the [national R&I Programme](#) and promotes Malta's participation in the EU's FP¹² Programme.

Implementation of measures directed at stimulating business sector R&I is the responsibility of the Ministry of Finance, Economy & Investment. Within this ministry,

¹¹ Malta Council for Science & Technology (2011) Malta's National Strategic Plan for R&I 2011-2020 Draft Consultation Document published 5th December 2011

¹² European Framework Programme for Research and Technology Development

Malta Enterprise manages R&D and innovation grant schemes for business enterprise, including small and medium sized enterprises.

The [Planning & Priorities Coordination Department](#) (PPCD) within OPM which is the authority managing the Structural Funds programme oversees the implementation of R&I projects supported by Structural Funds under the Knowledge & Innovation Axis of [Operational Programme I](#).

Education and human capacity building represent a priority area for the government. The scholarship schemes, including national and EU part-funded schemes are coordinated by the Life Long Learning Directorate within the Ministry of Education, Employment & Family. The [National Commission for Higher Education](#) (NCHE) which merged with the Malta Qualification Council in 2011 oversees the reform of the further and higher education sector and the establishment of a quality assurance framework for education.

Research activity in the public sector, including policy research analysis, rests on a number of public research organisations located within a number of ministries. Their contribution to the total R&D is small compared to that of the business and higher education sectors considering that the general government spend on R&D stood at 0.02% of GDP in 2010 (Eurostat). These entities rely on institutional funding for their operational and research costs as they do not receive a dedicated budget to undertake research activity.

Most of the research in the higher education sector (HERD) is undertaken by the state-owned University of Malta. Eurostat data indicate that HERD experienced an increase from 0.17% of GDP in 2009 to 0.23% GDP in 2010 (Eurostat provisional value). According to national statistics, the business sector (local and/or foreign) contributes minimally to funding research in higher education that is principally supported by state funds (National Statistics Office, 2010).

The business sector is the largest R&D performer, performing 51.5% of total R&D (GERD) equivalent to €19.88m in 2010¹³. Out of the €19.88m, approximately 94% represented intramural R&D¹⁴. In 2006-2008, the manufacture of basic pharmaceutical products and preparations sector registered the highest intramural R&D expenditure, accounting for 24.9% of total outlay on R&D activities, followed by computer programming, consultancy and information programming activities ([National Statistics Office](#), 2010). This indicates that R&D activity is clustered around a few sectors, and is not a widespread feature of local economic activity. In fact, the indigenous enterprises that are characterised by small- and medium-sized entities and represent 97% of the private enterprise sector undertake comparatively low research and innovation¹⁵.

¹³ Eurostat accessed December 2011

¹⁴ National Statistics Office (2010) Survey 'Business Research and Innovation 2006-2008, published 14th September 2010

¹⁵ ibid

2 Structural challenges faced by the national system

Malta experienced fast growth in research and innovation performance and has moved up from being a modest innovator to becoming a moderate innovator in the Innovation Union Scoreboard 2011 together with Slovakia, Poland and Hungary (EIS, 2011). Malta, together with Portugal is identified as a growth leader in the group of moderate innovators¹⁶. Expenditure on R&D expressed as a percentage of GDP (GERD) increased from 0.58% in 2007 to 0.63% in 2010; though this remains below the EU-27 average of 2% GDP (Eurostat).

The EIS 2011 identifies relative strengths for Malta in intellectual assets and economic effects; whilst the relative weakness lie in human resources, open, excellent and attractive research systems, finance and support, linkages & entrepreneurship and innovators. Notwithstanding, growth performance in human resources, open, excellent and attractive research systems, intellectual assets and innovators is well above average (ibid).

Many of the structural challenges facing the national R&I system are long-standing (as reported in ERAWATCH and TrendChart Analytical Reports 2008-2010). These reveal a particular dynamic of the national research and innovation system which is largely driven by top-down and centralized processes i.e., initiatives are largely government-led, public funding is targeted towards building research infrastructures and providing incentives to enterprises to stimulate R&D.

A system level analysis seems to point at an apparent misfit between macro-level institutional developments and processes occurring at the micro- or firm-level and the meso-level (interactions and linkages). This may in part be due to the anatomy of the system that is characterized by indigenous micro enterprises exhibiting low R&D activity and in part due to limited interactions and inter-relations amongst the system actors.

In its [National Reform Programme 2011-2020](#), Malta has set a new target for R&D expenditure to reach 0.67% of Gross Domestic Product by 2020. This target was revised compared to the NRP 2008-2010 target of investing 0.75% GDP in R&D by 2020. The principal system challenges that Malta faces in drawing closer to achieving this target are outlined below:

Capacity-Building for smart specialisation of R&I

In a small country context characterized by limited resources, the strategy for R&I adopted by the government is one of resource concentration and specialisation within four sectors identified in the National Strategic R&I Plan 2007-2010, namely ICT, energy and environmental technologies, health and value-added manufacturing and services. This presents two imminent challenges. First is the need to identify niche areas in which to focus resources through drafting sector-specific research strategies. In this regard, work has started on the drafting of a research strategy for the health sector for which focus groups have been set up to address particular areas of importance and a public consultation on a manufacturing research strategy was launched in October 2011. In the field of ICT, digital gaming has been identified as a promising niche field ([Budget Speech, 2012](#)).

¹⁶ European Innovation Scoreboard 2011, published 2 February 2012

Second is a need to build R&I capacity. Whilst there has been good momentum in terms of mobilizing public and Structural Funds for research (including an increase in the funding allocation for the national R&I programme, and capital investments for strengthening infrastructures), one potential bottleneck is the supply of human resources with adequate competences and skills. Eurostat data places Malta below the EU27 average when it comes to new PhD graduates and numbers of researchers and more generally, the percentage of the population with tertiary education is low. However there are indications that Malta has achieved rapid growth rates of new doctoral graduates over the past five years (EIS,¹⁷ 2011). One of Malta's NRP 2011-2020 measures is the attainment of tertiary level education to 33% of 30-40 year olds (the share in 2009 was of 21%, according to Eurostat provisional data).

Another challenge being addressed is the low linkages between industry and academia. Higher education R&D financed by local business enterprise decreased from €40,000 in 2008 to €20,000 in 2009¹⁸. Also, whereas in most EU-27 countries public-private scientific co-publications have been increasing, in Malta like the UK these have experienced a decline (EIS, 2011).

Sustainability of research and innovation funding

Over the past five years, the R&I system has benefited from an injection of public funds, with a high proportion of these sourced from the second Structural Funds programming period 2007-2013 (ERAWATCH, 2010). In order to move towards a self-sustaining system, a number of issues need to be considered. One is the requirement to tap alternative sources of funding from the private sector (through initiatives such as the life sciences industrial park) and through more effective participation across EU programmes including the EU's Framework Programme and the Community Innovation Programme (National Reform Programme, 2011).

Second is the need to shift from annual budgetary cycles to multi-annual funding programmes that would aid in the planning of longer term research strategies and programmes (including the national R&I programme).

Third is the enhanced financial autonomy of the state-owned University of Malta and therefore a shift from the current situation which sees the university largely reliant on a block fund from the Ministry of Education, Employment & Family to one where it is able to tap funds from alternative sources. One step in this direction is the setting up of the university Trust Fund in 2010 with a seed investment of €0.5m made by the government.

Creating an enabling environment for research to market innovation and entrepreneurship, especially amongst SMEs

The business sector is the major R&D funder with a 51.4% share of GERD in 2009 (Eurostat). This R&D activity is largely attributable to a small cluster of firms including large multinational manufacturing operations in the pharmaceuticals and electronics sectors as well as service-oriented sectors such as consultancy and information programming activities (National Statistics Office, 2010). Whilst the indigenous micro and small and medium sized enterprises that represent the majority of the enterprise

¹⁷ EIS: European Innovation Scoreboard

¹⁸ National Statistics Office (2010) Expenditure on Research and Development in the General Government Sector: 2007-2009, published 5th July 2010

sector in Malta are carrying out minimal to no R&D activities (National Statistics Office, 2010). These structural characteristics present particular challenges and raise issues of absorptive capacity.

The relatively low R&D activity in the business enterprise sector is not solely contingent on access to finance but other structural factors seem to be compounding on the business sector's capability to capitalize on system factors and incentives promoting innovation and research.

One is the gap that may arise between research and commercialisation opportunity and the inability to bring ideas to market (National Reform Programme 2011); this will be addressed through the setting up of a new Commercialisation Programme (NRP, 2011). Another compounding factor is the management gap present within SMEs and therefore the lack of expertise when preparing successful research proposals. For example, the SME applicant success rate in FP7 of 14.4% is lower than that for the EU-27 at 19.3% ([IUC Report, 2011](#)).

Bearing in mind the current economic environment that may be detracting from pursuing R&I investments, a persistent challenge remains that of instilling an entrepreneurial and risk-taking culture in enterprise and also inculcating an entrepreneurial culture at an early age. For this purpose the National Curriculum Framework 2011 is proposing the introduction of an innovation and entrepreneurial stream in the obligatory schooling¹⁹.

3 Assessment of the national innovation strategy

3.1 National research and innovation priorities

The [National Strategic Plan for Research & Innovation 2007-2010](#) has inspired and guided research and innovation interventions over the four-year period covered by the strategy. The [new national R&I Strategy](#) that covers a longer time frame of 2011-2020, was drafted following a stock-taking of achievements and impacts of R&I interventions as well as the identification of persistent challenges that need to be addressed by the new strategy.

At a governance level, the National Strategic R&I Plan 2007-2010 has succeeded in fostering a more coordinated approach amongst various public sector entities in the formulation and design of R&I measures and the dovetailing of policies and initiatives reducing the duplication of efforts and resources.

The new R&I Strategic Plan points towards further promoting international cooperation, giving more prominence to participation of Maltese entities in EU research programmes, addressing societal challenges and a heightened importance given to the whole of the research and innovation cycle from 'blue sky' research to commercialisation of innovations, in line with the [EU's Innovation Union Flagship Initiative](#)²⁰.

¹⁹ Ministry of Education, Employment & Family (2011) National Curriculum Framework 2011 Consultation Document III

²⁰ Malta's National Reform Programme 2011-2020 p.38

At the same time, the new strategy aims to build on existing efforts to sustain human resource development and capacity building in research infrastructures in the priority areas. Various interventions aimed at human capacity building have targeted different levels of the education chain ranging from the creative thinking programmes in primary and secondary schools to scholarship schemes ([MGSS](#), STEPS) supporting post-graduate studies in Malta and abroad. A science outreach programme was initiated and plans to set up a new science interactive centre are also underway.

Intermediate targets and trajectories are expected to be defined in order to ensure that Malta is well on track to achieve its EU2020 target of investing 0.67% of Gross Domestic Product on R&D by 2020. This will contribute to establishing a systematic evaluation and monitoring of research and innovation policies and measures that is currently lacking in the system.

The new national Strategic R&I Plan 2011-2020 maintains a strong business orientation in the same four areas of economic importance. It bases interventions along six pillars of action aimed at sustaining the concept of an R&I ecosystem; these are policy design to action, human resources, research infrastructures, international cooperation, innovation and funding. Policy design and funding are considered to be issues of horizontal, cross-thematic importance, elements of which feature in all the remaining four thematic pillars²¹.

Funding aspects are discussed in Section 3.2 below.

3.2 Trends in R&D funding

Table 1: Basic indicators for R&D investments in Malta

	2008	2009	2010	EU average 2010
GDP growth rate	4.3	-2.6	2.9	2,0
GERD as % of GDP	0.57	0.54	0.63p	2.0
GERD per capita	79.7	76.8	92.2	490.2
GBAORD (€ million)	8,896	9,445	11,685p	92,729.05
GBAORD as % of GDP	0.15	0.16	0.19p	0.76
BERD (€ million)	21,438	20,124	22.91p	151,125.56
BERD as % of GDP	0.37	0.35	0.37p	1.23
GERD financed by abroad as % of total GERD	15.9	18.35	18.02	N/A ²²
R&D performed by HEIs (% of GERD)	30.1	31.90	37.01	24.2
R&D performed by PROs (% of GERD)	4.0	4.7	3.7	13.2

²¹ Draft National Strategic R&I Plan 2011-2020, published 5th December 2011

²² 8.4 (2009), 9.04 (2005)

	2008	2009	2010	EU average 2010
R&D performed by Business Enterprise sector (as % of GERD)	65.6	63.4	59.3	61.5

Source of data: Eurostat accessed December 2011; p: provisional value; s: Eurostat estimate

Malta's National Reform Programme (NRP) 2011-2020 has set the target of achieving a total R&D expenditure or GERD of 0.67% of Gross Domestic Product (GDP) by 2020. In the period 2007-2010, total R&D expenditure (GERD) increased from 0.58% to 0.63% of GDP.

The government funded more R&D in the period 2007-2010 and carried out more R&D too, with government-financed R&D increasing from 25.7% of GERD in 2007 to 30.5% in 2010. R&D expenditure in the Higher Education (HE) sector also increased from 31.7% GDP in 2007 to 37.01% of GDP in 2010; whilst the business sector funded less R&D activity (from 56.5% in 2008 to 51.5% of GERD in 2010).

Institutional funding remains the most significant route through which the government disburses block funds to the ministries and various government agencies as well as the state university to support their activities, including for R&D; though there is evidence of the introduction of more diverse types of funding mechanisms. With regard to competitive funding, the budget of the national R&I programme, that provides grants on a competitive basis for collaborative research projects, experienced an increase of over 100% in the period 2010-2012. The funding programme's budget increased from €0.7m in 2010 to €1.1m in 2011 and is estimated to reach €1.6m in 2012²³.

Collaborative funding is made possible through the ERDF R&D grant scheme for enterprise managed by the national business support agency (Malta Enterprise) that also coordinates Malta's participation in the EU's [Eureka](#) and [Eurostars](#) programmes (the latter dedicated to R&D performing SMEs). In 2010, Malta Enterprise committed an annual budget of €0.5m to fund projects approved through the Eurostars evaluation system²⁴. Since Malta's entry in 2010, there have been two calls for project submissions, with one local project in each call. Evaluation of the projects in the first call led to an approval of €114,492 in funds for the local company. Also, by the end of the third quarter of 2011, two Maltese companies were awarded funds for project implementation and received the EUREKA technical status. These projects were approved a total of €208,159 in government funds, which potentially served to leverage a further €138,772 from the private sector²⁵.

With regard to support for enterprise, this is provided mainly in the form of grants through a diversity of aid schemes under the umbrella of the '[20million for industry](#)' initiative co-financed by the European Regional Development Fund (ERDF). Up to September 2011, 96 applications were approved under this scheme with a total

²³ Ministry of Finance, Economy & Investment (2011) Budget Speech 2012 published 14th November 2011

²⁴ Ministry of Finance, Economy & Investment (2011) Malta Economic Survey published 14th November 2011

²⁵ *ibid*

allocated grant of €5.88m²⁶ for projects focussing on international competitiveness, small start-ups, innovation, environment, e-business, energy and R&D. Currently there is only one tax credit scheme providing tax credits on R&D eligible expenditure; however the government has made a new proposal for a tax credit on digital gaming development²⁷.

A larger proportion of Structural Funds were earmarked for research and innovation in the second programming period 2007-2013 under the 'Knowledge & Innovation' axis of Operational Programme I. The Structural Funds interventions focus on infrastructural capacity building at the university and college for Arts, Science & Technology (MCAST) and the setting up of the life science centre (supported by the ERDF), human resources in S&T (STEPS Scholarship) as well as a suite of aid schemes supporting innovative activity in enterprise, including an [ERDF R&D Grant Scheme](#). In 2010, the [JEREMIE financial engineering instrument](#) was launched in Malta with a capital expenditure for the government of €10m in 2010²⁸.

In terms of the evolution of RDI priorities supported by Structural Funds, a review of the Knowledge & Innovation Priority Axis of OPI undertaken in 2011²⁹, proposes to continue channelling structural funds in areas where Malta is building R&I capacity i.e. mainly in strengthening infrastructures and human resources and supporting research in niche areas where Malta is building a critical mass³⁰. Another proposed action for the future is to support R&I activity in horizontal priorities such as in relation to climate change and renewable energy sources.

There is evidence of efforts to diversify the sources of R&I funding and attract private sector funding such as through the setting up of the university trust fund with a seed capital of €0.5m and the initiative to source private sector funds for research projects in biotechnology and pharmaceuticals in the BioMalta campus initiative that will form part of the life sciences centre (2011-2014).

In line with the national priority of smart specialisation, funds are theme and sector-focussed. Four initiatives include government investments in the biobanking and digital gaming initiatives (with a seed investment of €0.25m each in 2010), manufacturing research projects and a capital investment of €11m in the setting up of a life science centre (the latter two being co-financed by Structural Funds).

Foreign funds that include those sourced from the European Commission, international organizations and foreign higher education institutions accounted for 15.7% (or €1.9m) of total expenditure on R&D undertaken within the government sector (GOVERD) in 2009³¹. Looking at the broader context of the R&I system, participation in the [EU's Framework Programme for Research and Technology Development](#) (FP) has served to leverage financing for R&I activity across public and private sector actors. In financial terms, Malta secured €10m in FP6 and by July

²⁶ ibid

²⁷ Ministry of Finance, Economy & Investment (2011) Budget Speech 2012

²⁸ ibid

²⁹ Planning & Priorities Coordination Division Monitoring Committee for Operational Programme I, 17th November 2011

³⁰ ibid

³¹ National Statistics Office (2010) Expenditure on Research and Development in the General Government Sector: 2007-2009 News release No. 123 published 5th July 2010

2011, 108 FP7 projects were approved for funding equivalent to around €11m (representing both the EU and national and private sector funding)³².

3.3 Evolution and analysis of the policy mixes

In this section, the analysis of the policy mix is based on the Innovation Union Self-Assessment Tool.

The new draft Strategic Plan for Research & Innovation 2011-2020 launched for public consultation in December 2011, has reiterated the central role that research and innovation (R&I) play in the Maltese economy to “*spur knowledge-driven and value added growth and sustain improvements in the quality of life*”³³. Over the past four years covered by the national R&I Strategy 2007-2010, Malta has made considerable progress in sustaining a thriving national R&I system through interventions and measures targeted at smart specialisation in four areas of economic importance and that are being retained in the new strategy; it has achieved higher public investments in R&I also by drawing increasingly on Structural Funds for capacity building in infrastructures and human capital. Therefore it has adopted a focused approach to national R&I funding which is expected to have greater impact in the thematic areas of national economic importance (ICT, Energy and Environment Technologies, Health-Biotechnology and high value-added Manufacturing services).

Societal challenges are being addressed through the drafting and development of thematic research strategies for example in the health sector; the new strategy 2011-2020 addresses thematic societal issues such as climate change more strongly in line with the EU Grand Challenges approach.

The governance of the R&I system is based on a top-down centre of government structure, with the Malta Council for Science & Technology within the Office of the Prime Minister being the principal agency overseeing the implementation of the national R&I Strategy; however one strength is the effort towards promoting horizontal and joined up policy approaches and coordination for R&I amongst key players in the public sector. In the past three years we have seen the involvement of broad stakeholder consultation approaches in the drafting of the sectoral research strategies and the new national multi-annual strategic R&I Plan.

The national R&I Strategic Plan 2007-2010 has a strong business focus aimed at promoting applied R&I activity over basic research; this is a trend observed in small country contexts with limited resources³⁴. The Strategy has focussed on innovation as an R&D driven process and also given some attention to other related activities, e.g. business advisory support services. In line with developments at EU level, the new draft R&I Strategy 2011-2020 is adopting a broader concept of innovation and therefore an ‘ideas-to-market’ approach that looks at the whole of the innovation

³² Malta Council for Science & Technology (2011) Malta’s National Strategic Plan for Research & Innovation 2011-2020: A Vision for Knowledge-Driven Growth, draft for consultation published 5th December 2011

³³ Ibid, p.26

³⁴ FP7 OMC-NET ERA-PRISM (2011) Funding Frameworks, Comparative Analysis and Identification of Best Practice, Deliverable D5.4 published 2011.

cycle³⁵. For this purpose a new commercialisation programme is planned that will enable commercialisation of research ideas.

Aid schemes for enterprises are increasingly being tailored towards Malta's particular contextual requirements; hence there is more support for particular target groups (e.g. SMEs, start-ups), areas of focus (e.g. internationalization of markets), and actions (e.g. clustering, technical feasibility projects). Academia-industry research collaboration occurs mainly through competitive funding offered by the national R&I programme and through an ERDF grant scheme for industrial research and experimental development; however this is expected to gain more momentum with the development of an intellectual property framework by the corporate research and technology office at the University of Malta. Also the knowledge transfer office set up at the university in 2009 is facilitating implementation of contracted research projects undertaken between university and industry supporting commercialisation of innovative ideas. As described in Section 3.2 above, Malta's participation in the EU's Eureka and Eurostars programmes is offering more opportunities for collaborative research projects.

In 2011 Malta launched the 'Business First'³⁶, a single point of contact for businesses to obtain information and support when setting up a business in Malta (NRP 2008-2010 measure) and reduce the bureaucracy and red-tape for business accessing the various aid schemes. The [Development, Research & Training Centre](#) (CDRT) within the civil service trains employees to better meet up to the needs of business and nurture a culture of support for business amongst public sector employees³⁷.

The R&I system has experienced an evolution in the policy mix in terms of types of instruments moving from a system dominated by supply-side policies to the inclusion of demand side policies. For example, the government is driving the introduction of innovation through public procurement for ICT-related investments and has institutionalized a green public procurement policy in the public sector³⁸.

The system traditionally favours the provision of grants (direct funding) over competitive funding for research and innovation activity. However, there is evidence of the introduction of new financing mechanisms such as the introduction of an R&D tax credit system.

In 2010, the University Trust Fund for RDI was set up with a seed fund of €0.5m to leverage enhanced private sector investments. Similarly the BioMalta Foundation was set up in 2011 to establish seed capital and share capital that will encourage companies to set up and conduct their research in the new life science park (2010-2014) aim to provide a space for collaborative R&D efforts amongst university, industry and hospital staff and encourage the formation of spin-outs³⁹.

There is some evidence that the knowledge triangle policies (education, research and innovation) are becoming more embedded in strategic policy thinking with some

³⁵ Malta's National Reform Programme 2011-2020

³⁶ Times of Malta (2011) 'One Business Office, 50 different Services, published 12th November 2011

³⁷ Ministry of Finance, Economy & Investment (2010) Budget Speech 2011

³⁸ TrendChart (2011) Mini Country Report Malta

³⁹ Malta's National R&I Strategy 2011-2020 Draft Consultation Document published 5th December 2011

emphasis on education and human resources. The education system is responding to up-coming market demands and the emergence of new economic sectors by investing in particular skills. The national curriculum framework 2011 consultation document makes reference to the need to equip learners with the necessary entrepreneurial skills and encourage innovation in schools in order to enable youth to anticipate and cope with a changing environment⁴⁰.

A perceived weakness in the system is the lack of a systematic evaluation of policy measures and interventions which is only partially being addressed through the review and monitoring of Structural Funds projects by the national managing authority and the targets set for R&I in Operational Programme I and those established in the National Reform Programme 2011-2020.

3.4 Assessment of the policy mix

The draft National Strategic R&I Plan 2011-2020 launched for public consultation in December 2011 gives an overview of policy measures undertaken in 2007-2011 and provides some insight on the impact and outcomes of policies in relation to the structural challenges identified in chapter 2 of this report.

In line with the challenge of building R&I capacity for smart specialization, the National Strategic R&I Plan sought to channel public sector investments in four areas of economic importance for Malta, identified through extensive stakeholder consultation and a SWOT⁴¹ analysis; these areas are ICT, health and biotechnology, energy and environmental technologies, and value-added manufacturing and services.

Furthermore, a participative approach is being adopted in the drafting of sectoral research strategies to identify niche areas within these sectors in which to focus R&I efforts. For the health strategy, a foresight-type exercise was conducted in 2010-2011 to identify drivers and trends in the sector with the participation of key stakeholders in health and related areas including ICT-related applications⁴².

Similarly, a national manufacturing research strategy is being drafted to transform the sector into one offering high value added activities with input from working groups organized around particular themes including human resources and financing R&I investment, research infrastructures, and creating linkages and partnerships⁴³.

In the ICT domain, there is a thrust to promote the creative industry in Malta. A research and development strategy for the digital gaming sector has been formulated and there are a suite of initiatives that promote skills-building and creative businesses (e.g. Malta Arts Fund, [Malta Film Fund](#), the [KREATTIV Programme](#) in schools) and a further planned investment of €7.7m in 2012 to support creative entities⁴⁴.

⁴⁰ Ministry of Education, Employment & Family (2011) National Curriculum Framework 2011 Consultation Document III

⁴¹ National Strategic R&I Plan 2007-2010

⁴² Malta Council for Science & Technology

⁴³ BEAT Consulting (2010) Organization of Workshops in Connection with the Development of a Research Manufacturing Strategy in Malta, 3rd May 2010

⁴⁴ Minister of Finance, Economy & Investment (2011) Budget Speech 2012

A significant step forward in the past four years was the strategic approach adopted at both policy and operational levels to invest in capacity building in research infrastructures and human capital coupled with strategic plans to steer these resources in areas of economic importance.

As outlined in the new draft strategy 2011-2020, the National R&I Programme was re-oriented so as to fund industry-driven collaborative projects with academia in the four priority research areas identified. The priority areas were included in the Operational Programmes for the EU Structural Funds and became a common reference for ESF and ERDF investments. Also, these priority areas were included in the list of study and research areas to be incentivised in the award of scholarships funded through the Malta Government Scholarship Scheme (MGSS) and the ESF-funded Strategic Educational Pathways Scheme (STEPS) with students receiving top-up funding when opting for studies in these areas.

Whilst acknowledging the investments made to boost post-graduates in science, technology, engineering and mathematics (STEM), there has been less momentum in steering efforts to set up a post-doctoral community in order to support the research base at the university; there are plans to address this through the setting up of a post-doctoral research scheme.

The R&I system has witnessed some progress in terms of creating an 'enabling' environment for R&I activity through the implementation of a diversity of aid schemes and the recent launch of 'Business First'⁴⁵, (NRP 2008-2010 measure). However, the absence of a formal evaluation of these schemes makes an assessment of their uptake approximate and the following represents merely a snapshot of absorptive capacity and an extrapolation from published data.

Up to September 2011, 96 applications were approved under the '20 Million for Industry Scheme' with a total allocated grant of €5.88m (or 29% uptake); the projects focused on international competitiveness, small start-ups, innovation, environment, e-business, energy and R&D ([Malta Economic Survey, 2011](#)). With regard to R&I activity in industry, up to November 2011, the ERDF R&D grant scheme for enterprise had committed €1.76m following the first call for proposals out of a total budget of €4.5m over six years (Planning & Priorities Coordination Department, 2011).

There is a perceived gap in the policy mix between applied research and development to commercialization. The national R&I Programme supports collaborative projects in applied research and experimental development whilst there is no specific funding mechanism for commercialisation opportunities. The National Reform Programme under the Europe 2020 Strategy makes a proposal to set up of commercialization programme in order to address this gap (NRP, 2011-2020 measure).

Although funding for R&I is largely reliant on institutional (government) sources and structural funding, recent initiatives aim at diversifying funding sources⁴⁶ and addressing the challenge of rendering the system more self-sustainable. One initiative was the launch of a University Trust Fund in 2010 with an initial seed capital of €0.5m. Another government-led project is a capital investment in a life sciences

⁴⁵ Times of Malta (2011) 'One Business Office, 50 different Services, published 12th November 2011

⁴⁶ Malta's National Reform Programme 2011-2020 p.38

centre for which the recently set-up BioMalta Foundation is seeking to attract private sector investments⁴⁷. An [R&D tax credit scheme](#) was introduced in 2009 and there is a proposal to introduce a new tax credit for companies in the digital gaming industry⁴⁸.

In 2010, the government started carrying out a series of consultative meetings with the university to establish ways by which the University of Malta can achieve greater academic and administrative autonomy and move towards more sustainable financial mechanisms (such as through more effective participation in EU programmes)⁴⁹.

The table below provides an assessment of the effectiveness of the specific policies to address the structural challenges.

⁴⁷ Minister of Finance, Economy & Investment (2011) Budget Speech 2012

⁴⁸ Ibid.

⁴⁹ Ministry of Finance Economy & Investment Budget Speech 2012 delivered on 14th November 2011

Figure 2: Assessment of the policy mix

Challenges	Policy measures/actions ⁵⁰	Assessment in terms of appropriateness, efficiency and effectiveness
Capacity-Building for smart specialisation of R&I	<ul style="list-style-type: none"> • Investments, co-financed by Structural Funds in upgrading and building new research infrastructures in the four strategic areas at the university and college for Arts, Science & Technology; • Development of dedicated research strategies (in health and value-added manufacturing); • Post-graduate scholarship schemes (MGSS, STEPS) focussing on the strategic areas 	<p>The alignment of the strategic principles of national strategic R&I Plan and its priority areas with the objectives of the national strategic reference framework and its operational programmes 2007-2013 has effectively led to the dovetailing of initiatives for the purpose of building R&I capacity in the select areas of economic importance.</p> <p>Moving beyond the identification of these priority areas, the dedicated research strategies should aim to highlight niche areas in which to focus R&I effort.</p>
Sustainability of research and innovation funding	<ul style="list-style-type: none"> • A higher proportion of Structural Funds earmarked for R&I interventions; • Introduction of innovative funding mechanisms for R&I including the RDI university Trust Fund (2010) and an R&D tax incentive; • Initial steps towards more sustainable university funding mechanisms. 	<p>The R&I funding system remains largely reliant on institutional funds and annual budgetary cycles. Although some attempts towards diversification of funding sources and modes of deployment have been made, more efforts are needed to tap alternative sources of funding, including through incentivizing private sector investment and enhanced participation in the CIP, Community Innovation Programme and the FP, Framework Programme (NRP 2011-2020 Measure);</p>
Creating an enabling environment for research to market, innovation and entrepreneurship, especially amongst SMEs	<ul style="list-style-type: none"> • Strengthening the FP7 unit within the Malta Council for Science & Technology; • Setting up of the technology transfer office at the university in 2009; • Incentives to stimulate R&D in industry including: R&D Grant Scheme, R&D Tax Credit, technical feasibility studies and support for Eureka participation, R&D clusters, registration of intellectual property rights, tax credits for SMEs 	<p>The aid schemes launched in 2009 to stimulate R&D activity as well as those targeting innovative activity in the business enterprise sector are contributing to creating an enabling environment for RDI; however more tailoring of measures to fit the particular structural characteristics of the Maltese enterprise sector and policies that effectively help to instil a culture for innovation and risk-taking.</p> <p>One perceived gap in the policy mix is the missing link between research and development and commercialisation opportunity. One of Malta's NRP 2011-2020 measures is</p>

⁵⁰ Changes in the legislation and other initiatives not necessarily related with funding are also included.

	<p>launched in 2009;</p> <ul style="list-style-type: none"> • Aid schemes supporting innovative activity in private sector, with emphasis on SMEs; • Business First Initiative launched in 2011 as a “one-stop-shop” for obtaining information and support when setting up a new business; • Inclusion of innovation and entrepreneurship skills building in the draft national school curriculum 2011 (third round of consultation) in order to instil a culture to anticipate and adapt to changing environments; 	<p>to introduce a commercialisation programme order to bridge this gap.</p>
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4 National policy and the European perspective

Malta’s position of channelling investments and efforts towards smart specialization in areas of economic importance presents a number of risks which are particularly acute in a small country context. Not least is the higher vulnerability to sectoral downturns or shifts in competitive advantage over other locations⁵¹.

The draft national Strategic R&I Plan 2011-2020 re-iterates the importance of building competences in anticipatory intelligence and horizon scanning to identify emerging opportunities and threats relating to R&I to inform policy-making particularly in the areas of national priority, and support foresight and forward-looking exercises to develop sectoral/niche research and innovation strategies⁵².

Despite this focus, attention must still be given to the range of policy measures needed to stimulate innovation since a lacuna in the policy mix or weak link may hamper the innovation process; cooperation at EU level may help in this respect by providing support along a number of dimensions (e.g. access to infrastructures).

The permeation of the ERA dimension in the national research and innovation system is limited in the extent of policies and measures specifically addressing this aspect. Some success has been achieved such as through the putting in place of a legal framework for inward mobility of third country researchers and very good participation rates registered in FP6 and FP7; but the ERA presents a series of challenges from a small country perspective related to sustainability of funding, brain drain, joint programming and research prioritization.

Mobility of researchers is a desirable goal but with limited critical mass and infrastructures, small countries are faced with maintaining a balanced two-way flow of

⁵¹ ERAPRISM (2010) ERAPRISM Policy Dialogue Brief on Policies to Promote Innovation

⁵² Malta’s National R&I Strategy 2011-2020 Draft Consultation Document published 5th December 2011

researchers and avoiding a brain-drain. As with other small countries, Malta depends on international collaboration for making up for the lack of critical mass, for pooling knowledge, intelligence-gathering and securing the range of resources necessary for innovation.

Cooperation and coordination of research programmes raises issues of sustainability of the funding system and prioritization in the sense that whilst seeking to promote such cooperation, Malta must also ensure that its R&I resources are channelled towards areas of national interest for the growth of its economy. In fact, Malta's position on the '[European Commission's Green Paper on a Common Strategic Framework for EU Research and Innovation Funding](#)'⁵³, is that funding mechanisms need to take account of the particular national contextual requirements and namely that funding programmes keep the needs of the industry in particular small and medium-sized enterprises as the central goal and that they provide continued support for both research-driven SMEs and SMEs with no research capabilities. Additional support is needed when it comes to access to finance, Risk Sharing Financial Facility, and Seed Capital funding and support with Intellectual Property registration as key support mechanisms for SMEs and micro-enterprises.

Table 2: Assessment of the national policies/measures supporting the strategic ERA objectives (derived from ERA 2020 Vision)

	ERA dimension	Main challenges at national level	Recent policy changes
1	Labour Market for Researchers	<ul style="list-style-type: none"> • Boosting the numbers of S&T graduates and researchers; • Establishing a post-doctoral researcher community at the university; 	<ul style="list-style-type: none"> • STEPS and MGSS scholarship schemes for the funding of Masters and Doctorate studies undertaken both locally and abroad. • Financial support for researchers to participate in brokerage events in the identified priority areas of research (e.g. COST); • A 2012 Budget proposal to introduce a flat rate of 15% income tax scheme for international professionals in the creative industry sector as well as for academics and researchers in the research and development sectors. • Plans to set up a Post-doctoral scheme around research clusters⁵⁴;

⁵³ Office of the Prime Minister (9 June 2011). Malta's Position on the European Commission's Green Paper on a Common Strategic Framework for EU Research and Innovation Funding http://ec.europa.eu/research/horizon2020/pdf/contributions/post/malta/national_position_paper.pdf#view=fit&pagemode=none

⁵⁴ Malta's National Strategic R&I Plan 2011-2020 draft document published 5th December 2011

	ERA dimension	Main challenges at national level	Recent policy changes
2	Cross-border cooperation	<ul style="list-style-type: none"> • Participation and contribution in European research contingent on availability of adequate research infrastructures and human resources; as well as sustainability of the funding system. 	<ul style="list-style-type: none"> • Channelling R&I efforts towards smart specialisation in key areas of economic importance; • Developing proposals for funding in areas where national and European priorities for R&I coincide.
3	World class research infrastructures	<ul style="list-style-type: none"> • The limited capacity (both financial and in terms of human resources) creates an issue of access to these infrastructures. 	<ul style="list-style-type: none"> • Establishment of a Life Sciences centre with an investment of €11m (2011-2014).
4	Research institutions	<ul style="list-style-type: none"> • The over-reliance on annual institutional funding restricting the state-funded university's financial and academic autonomy. 	<ul style="list-style-type: none"> • The university RDI Trust Fund set up in 2010 (seed fund of €0.5m) and renewed commitment in 2011 (seed fund of €0.3m⁵⁵); • Larger budget allocation to the university for recurrent expenditure from €44.5m in 2011 to €49.6m in 2012; • Consultations underway with the university to explore more sustainable financial mechanisms.
5	Public-private partnerships	<ul style="list-style-type: none"> • Creating enabling framework conditions for public-private cooperation and commercialisation of research. 	<ul style="list-style-type: none"> • Setting up in 2009 of a corporate research and technology transfer office at the university; • Tax exemption from royalties and similar revenue resulting from patents (2011 budgetary measure) • Drafting of an Intellectual Property Policy and support to identify IP opportunities; • NRP 2011-2020 measure to set up a commercialisation programme.

⁵⁵ Ministry of Finance, Economy & Investment (2011) Budgetary Estimates- Ministry of Education, Employment & Family Capital Expenditure

	ERA dimension	Main challenges at national level	Recent policy changes
6	Knowledge circulation across Europe	<ul style="list-style-type: none"> • Shift from the current situation where Malta has more outgoing students than it has incoming towards maintaining a two-way flow or researchers. 	<ul style="list-style-type: none"> • Internationalisation strategy at the state university attracting a growing population of foreign students (at 6.2% of total student population in 2009). • Financial support provided to researchers to participate in brokerage events and enhance participation in FP programme. • Participation in 2010 in the Eurostars programme focussing on R&D collaboration for SMEs.
7	International Cooperation	<ul style="list-style-type: none"> • Aligning national research priorities with developments at EU and international levels, specifically with the Grand Challenges approach adopted by the EU Innovation Union Flagship Initiative. 	<ul style="list-style-type: none"> • Work towards establishing bilateral agreements and collaborative initiatives with international scientific organizations including CERN, ESA and European Molecular Biology Laboratory (EMBL), including possible access to research infrastructures. • Budget 2012 measure to introduce a new fund to assist the internalisation of research and innovation.

Annex: Alignment of national policies with ERA pillars / objectives

1. Ensure an adequate supply of human resources for research and an open, attractive and competitive single European labour market for male and female researchers

1.1 Supply of human resources for research

An upward trend in the total number of new PhD graduates is observed: from four in 2006 to nineteen in 2009 or a four-fold increase (Eurostat). Over two-thirds of doctorate holders were employed as teaching professionals in the higher education sector in 2009⁵⁶ followed by the business sector and then government. With regard to the stock of human resources in science at technology (HRST), this was at 31.7% of the labour force in 2010 compared to the EU-27 average of 40.5% (Eurostat, 2010).

There are no available data on the inward and outward flows of researchers. However, higher education statistics indicate that 9.9% of Maltese students in tertiary education were studying abroad in 2007, mainly in the United Kingdom⁵⁷. A study on the profile of doctoral holders undertaken by the National Statistics Office reveals that over 80% of doctorate holders obtained their degree from abroad, in particular the United Kingdom and Italy⁵⁸. In terms of inward flows, in 2007, 6.2% of the total higher education population were foreign students studying in Malta; over 80% of these came from countries outside the EU⁵⁹.

There are various schemes encouraging participation in international mobility programmes. These range from national-level programmes including various scholarship schemes for post-graduate students (Malta Government Scholarship Scheme and the Strategic Educational Pathways Scheme) and EU-level programmes including the [Erasmus Mundus](#), Erasmus and the [Leonardo Da Vinci programme](#). Overall, Malta has more outgoing students than it has incoming⁶⁰.

In order to incentivize the inward flow of foreign researchers the government announced that it will be offering fiscal incentives to highly qualified and skilled foreign workers who are required for industrial sectors of economic importance and to those persons carrying out research or marketing an invention or technology in Malta (Budgetary measure 2012⁶¹).

⁵⁶ National Statistics Office (2011) A Statistical Profile of Doctoral Holders 2009 News Release 26th October 2011

⁵⁷ National Commission for Higher Education (2011) Further & Higher Education Statistics 2010

⁵⁸ National Statistics Office (2011) A Statistical Profile of Doctoral Holders 2009 News Release 26th October 2011

⁵⁹ National Commission for Higher Education (2011) Further & Higher Education Statistics 2010

⁶⁰ *ibid*

⁶¹ Ministry of Finance, Economy & Investment (2011) Budget Speech 2012

1.2 Ensure that researchers across the EU benefit from open recruitment, adequate training, attractive career prospects and working conditions and barriers to cross-border mobility are removed

As mentioned in 1.1 above, the higher education sector attracts the highest proportion of researchers. The salaries of academic staff in tertiary education, including researchers, are higher than those in the public sector for similar posts though lower than those offered in the private sector. A researcher's salary, at €40,340 in PPS⁶² is higher than the EU25 average of €40,126 and is the second highest after Cyprus, of the ten countries that joined the European Union in 2004. These salaries are governed by fixed scales defined by the agreement for academic staff (2009-2013) and range from €30,000 for early career researchers/lecturers (holding a PhD) to €47,000 for a full professorship⁶³. On the other hand, temporary posts are based on definite contracts and on hourly rates defined by the collective agreement.

Vacancies for academic/researcher posts are advertised on the university website and by the government of Malta's department of information; this offers a transparent recruitment procedure open to both nationals and non-nationals. Each recruitment procedure requires that a recognition statement of qualifications be obtained from the [Malta Qualifications Recognition Information Centre](#) (MQRIC) for any foreign degree obtained by the applicant. A researcher's social security benefits and pension rights are governed by the public service management code⁶⁴ i.e. it is based on thirty years of service and calculated as two thirds of the salary capped at €12,000/year.

Malta has transposed the "scientific Visa" directive (2005/71/EC); this regulates access of third country national researchers. The [Charter for Researchers](#) was endorsed by the Office of the Prime Minister in 2005; information on administrative and legal issues when moving to Malta is available to researchers on the EURAXESS⁶⁵ portal.

1.3 Improve young people's scientific education and increase interest in research careers

In terms of raising interest in research careers, more opportunities have been created for students to undertake post-graduate research and training. In the years 2006 - 2010, the Malta Government Post-Graduate Scholarship scheme provided approximately €2.3m worth of scholarship funding to individuals undertaking post-graduate studies at Masters (138) and Doctorate (103) levels⁶⁶. Likewise, the

⁶² Remuneration values expressed as PPS (Purchasing Power Standard). These take into account differences in salaries due to cost of living, thus reducing differences among countries and highlighting the "attractiveness" in terms of remuneration of each country for the researcher, European Commission Research Directorate General (2007) Remuneration of Researchers in the Public and Private Sectors p20.

⁶³ University of Malta Collective Agreement for Academic Staff 2009-2013

⁶⁴ Public Service Management Code 2007

⁶⁵ EURAXESS <http://ec.europa.eu/euraxess/index.cfm/general/index>

⁶⁶ The figures relating to the number of bursaries awarded refer collectively to the period 2006-2010 as sourced from the Annual Reports of Government Departments 2010

Strategic Educational Pathways Scheme funded 73 PhDs and 321 Masters in 2009-2010, in a range of subjects with a focus on science and technology⁶⁷ and equivalent to an investment of €9.9m⁶⁸.

The government recognized the need to establish a community of post-doctoral researchers which is currently lacking at the university. It is envisaged that this will be addressed in the coming years through the setting up of a post-doctoral scheme at the University of Malta, as detailed in Malta's 2011-2015 NRP⁶⁹.

Policy measures have led to the strengthening of the vocational training system; there has been considerable infrastructural investment in the Malta College for Arts, Science & Technology (MCAST) as well as the setting up of joint training programmes with foreign institutions such as the Fraunhofer Society in areas such as electronics engineering, aviation maintenance and alternative energy sources (for e.g. with the launch of a Masters degree in Sustainable Energy and a diploma in green energy technologies for technicians).

Programmes that tackle aspects of creativity and innovation are offered at undergraduate and post-graduate levels; these include creativity and entrepreneurship study modules offered at the College for Arts Science & Technology and at the University of Malta to students studying Computer Science. Also, the University of Malta offers Masters Degree courses addressing 'Innovation and Creativity' and 'Strategic Innovation & Future Creation'⁷⁰.

In primary state education students are given some exposure to creativity and lateral thinking skills through the 'Thinking Skills Programme'; moreover, in order to stimulate a creative thinking process in schools, in 2011 the government launched the KREATTIV programme with a fund of €80,000, with the aim of bringing creative practitioners into schools and work with educators and students on creative projects and elicit new interactions amongst these actors⁷¹.

In 2011, the [Ministry of Education, Employment & Family](#) launched a consultation document addressing science education in Malta with the aim of improving the quality of science curricula and with it, Malta's performance in science achievement⁷². In order to bring science closer to society and enticing children and young people into a science career the Malta Council for Science & Technology (MCST) has been tasked by the government to set up a national science interactive centre with an investment of €3.5m (Budget Speech, 2012).

1.4 Promote equal treatment for women and men in research

The 'She Figures 2009' report of the European Commission⁷³ provides a snapshot of the gender profile of researchers in Europe. Malta experienced a high compound annual growth rate of female researchers of 14% between 2002 and 2006 and has a

⁶⁷ Ministry of Finance, Economy & Investment (2011) Pre-Budget Document 2012

⁶⁸ *ibid*

⁶⁹ Ministry of Finance, Economy & Investment (2011) Budget Speech 2012

⁷⁰ <http://www.strategicfutures.eu/>

⁷¹ Ministry of Education, Employment & Family website accessed 20th November 2011

⁷² Directorate for Quality & Standards, Ministry of Education, Employment & Family (2011) A vision for Science Education in Malta Consultation Document 2011

⁷³ European Commission (2009) She Figures 2009

gender pay gap which is amongst the lowest in the EU-27 (14%)⁷⁴; however the proportion of female researchers is a minority with less than 30% of the researcher population in the Higher Education Sector being female and less than 50% in the government sector. Just 4% of female researchers were in the natural sciences and in engineering and technology; whilst particularly high shares of female researchers are in medicine (42%). 35% of women in R&D are particularly likely to perform supporting tasks.

Despite public policies and regulations promoting equal gender opportunities at least on paper, trends indicate that women including graduates, still tend to leave employment for a career break or complete abandonment, generally due to family commitments⁷⁵; in addition to existing initiatives more efforts are needed to tackle the lack of necessary support structures such as childcare services that facilitate women to remain in employment⁷⁶.

The public service agreement has introduced greater flexibility for shared parental leave, tele-working opportunities and accreditation of social security contributions of the parents for the first two years of parental leave⁷⁷. A 2012 budgetary measure is expected to extend paid maternity leave from 14 to 16-weeks (Budget 2012 measure). Though the law guarantees that a public servant returns to the same *type* of work or *equivalent* after a career break, it does not guarantee return to the exact responsibilities/duties⁷⁸.

2. Facilitate cross-border cooperation, enhance merit-based competition and increase European coordination and integration of research funding⁷⁹

From a small country perspective, cooperation and coordination of national R&D Programmes, presents particular challenges and raises issues of concentration of resources in particular areas of strength, sustainability of the funding system and

⁷⁴ European Commission (2009) She Figures 2009

⁷⁵ National Commission for the Promotion of Equality NCPE (2006) Career Paths and Conditions of Work of Graduates in the Labour Market

⁷⁶ Malta Department of Information (2010) Workers on the Move: Malta marks its 6th Anniversary in the EU Press Release No. 0778 published 3rd May 2010

⁷⁷ Malta Employment Training Corporation (2007) 'Women at work: Findings from a study on the work aspirations of Maltese Women p39

⁷⁸ The Employment & Industrial Relations Act of 2002 that governs the provisions for private and public sector employment stipulates, in Article 19 (p23 of the Act), that women who take career breaks (for parental leave) be entitled to resume the post occupied upon commencement of maternity leave or an analogous post.

⁷⁹ Promote more critical mass and more strategic, focused, efficient and effective European research via improved cooperation and coordination between public research funding authorities across Europe, including joint programming, jointly funded activities and common foresight.

Ensure the development of research systems and programmes across the Union in a more simple and coherent manner.

Promote increased European-wide competition and access of cross-border projects to national projects funding

prioritization⁸⁰. Although there are no specific studies on the topic, the absorptive capacity of small countries in terms of level of effective participation in European level programmes may be limited by the administrative capacity and technical specialisation and can impact on attention to purely national and local priorities. Thus, Malta's position is to identify potential areas of cooperation based on their strategic economic importance for the country⁸¹. It has joined a Joint Programming Initiative on transport – URBAN Europe that has developed a roadmap of activities and is elaborating a communication strategy to reach out to stakeholders in Europe⁸². Malta is also participating in four ERA-NETS: [SEAS-ERA](#), [BS-ERA.NET](#), [NET-HERITAGE](#) and [ICT-AGRI](#).

The National R&I Programme favours research activity performed 'at home' rather than abroad thus foreign entities (both EU and third country) can only participate as non-beneficiary partners; the rationale is to strengthen national R&I capacity. Research grants remain with the Maltese entity and are typically non-transferable. However it is not excluded that this may change in the future, as far as mobility within the country is concerned⁸³.

3. Develop world-class research infrastructures (including e-infrastructures) and ensure access to them

No recent changes in policy objectives and strategies are observed with respect to accessing intergovernmental European infrastructures. The National Research & Innovation Strategy 2007-2010 serves as a reference to guide the areas of specialisation and the roadmap for building national research infrastructures (RIs) in areas of strategic importance for the economy.

Investments in RIs have increased over the past five years, mainly for the upgrading of existing infrastructures at the university and vocational college for arts, science and technology ([MCAST](#)) and investment in new ones. These have been co-financed through the European Regional Development Fund (period 2007-2013).. The principal areas include ICT, engineering and biotechnology. As noted in the NRP Progress Report 2009, €34m have been allocated for upgrading R&D facilities in engineering, natural sciences, renewable energy, super computing and health biotech and a new ICT faculty at the university and an €11m investment in a Life Sciences Centre. The bulk of these investments are co-financed by Structural Funds

There is evidence of enhanced coordination between the areas of specialisation of national RIs and national participation in ESFRI⁸⁴. One example is the setting up of a national bio-bank through cooperation between the Council for Science & Technology, Malta Enterprise and the university⁸⁵ that has led to Malta's participation

⁸⁰ These issues were analysed in the frame of the [ERAPRISM](#) OMC-NET project, coordinated by the Malta Council for Science & Technology, that brought together small Member States to define policy responses to emerging R&I challenges.

⁸¹ Malta's National Reform Programme 2011

⁸² Malta Hosts 6th JPI Urban Europe Governing Board Meeting 19-20th September 2011 accessed on Urban Europe's website at http://www.jpi-urbaneurope.eu/About_JPI_Urban_EU/ on 21st November 2011

⁸³ Malta Council for Science & Technology 2011

⁸⁴ European Strategy Forum on Research Infrastructures

⁸⁵ Ministry of Finance, Economy & Investment (2009) Budget Speech 2010

as an associated partner in the [Biobanking and Biomolecular Resources Research Infrastructure](#) (BBMRI) initiative⁸⁶. Malta participated in CLARIN - Common Language Resources and Technology Infrastructure) through the Department of Computer Science at the University of Malta and is a partner in [GÉANT](#), the high-bandwidth, academic Internet serving Europe's research and education community. Malta is also participating in [OPENAire](#), the Open Access Infrastructure for Research in Europe though it has no national or institutional electronic repositories⁸⁷.

4. Strengthen research institutions, including notably universities

Since the university is totally dependent on state funds to support its teaching and research activities, its research budget and recruitment processes are tied to the block funds received annually through a vote from the Education Ministry. This has a number of implications on the design of research agendas that are thus linked to annual funding cycles and hiring of personnel for which provisions must be made in the university's budget proposal presented to the Ministry of Education.

Thus an emerging priority is the need for the university to break from annual budgetary cycles and shift towards operating a multi-annual budget that would increase its financial and managerial autonomy⁸⁸; and simultaneously seek more business and EU programme funding to complement state support. This issue is being addressed through consultative meetings with university and the principal stakeholders on ways to diversify funding sources⁸⁹.

With regard to salaries of academic staff, these are governed by a collective agreement for 2009-2013 and fall into a number of streams: resident academic, research and visiting teaching streams each with its own pre-defined salary scales. Appointments for resident and research academic posts must be approved by the Council of the university.

Although the university's principle mission has been that of a teaching university, this is being re-oriented to endorse a third mission which is that of making research more relevant to economic and societal challenges⁹⁰. The university's strategy in this regard is that of setting up research clusters in priority areas identified in the government's Vision 2015 document.

There is only an internal quality assurance mechanism; and the need to establish an external quality assurance framework that assures quality of research and recognition of qualifications has been recognized⁹¹.

5. Facilitate partnerships and productive interactions between research institutions and the private sector

⁸⁶ ESFRI Biological & Medical Sciences Report 2008

⁸⁷ Malta's National Strategic R&I Plan draft document for consultation published 5th December 2011

⁸⁸ Bartolo E – Labour MP for Education 'Creating a Better University' in Times of Malta 28th January 2009

⁸⁹ Ministry of Finance Economy & Investment (2011) Budget Speech 2012

⁹⁰ Times of Malta (2010) University Rector introduces himself in opening speech published 22nd October 2010

⁹¹ Camilleri Juanito (2010) 2020 Vision or Optical Illusion Rector of the University of Malta, 2010

A recent measure to facilitate partnerships and interactions between academia and private sector is the government's capital investment in the setting up of BioCampus Malta, an initiative that is intended to develop as a bio-park bringing together researchers from the university, and companies both indigenous and foreign, to carry out R&I in biotechnology and the pharmaceuticals industry (Budgetary measure 2012).

The intellectual property (IP) framework for publicly funded research drafted by the university's [Corporate Research & Knowledge Transfer Office](#) (CORTO), aims to create incentives for academic staff to commercialize their research. The policy will make provisions for inventions arising from the research undertaken by students and academics as well as third parties and address issues of IP sharing in the case of multiple inventors. CORTO is involved in identifying, evaluating and protecting intellectual property arising from within the university; it offers support services to researchers in the commercialisation process, including on legal aspects of patenting that may arise during contract negotiation and maintains links with the university's legal services office for this purpose.

Specific measures targeting collaborative interactions include the Innovative Clusters & Collaboration Scheme for the setting up of technology clusters and a 'Knowledge Transfer Scheme' for the loan of qualified personnel between industry and research institutions managed by Malta Enterprise.

Although the private sector is represented on the university's governing bodies (principally the University Council), its role in promoting knowledge transfer is currently limited by the lack of enabling structures such as a university incubator and venture capital. This is expected to change once the Biopark is up and running in 2014.

6. Enhance knowledge circulation across Europe and beyond

A knowledge transfer office was set up at the University of Malta in 2009 in order to stimulate contracted research projects between industry and academia and to assist in the negotiation of intellectual property rights. Also, the NRP 2011 under the Europe 2020 strategy recognizes the gap that exists between research and commercialisation of ideas and innovations and the impact that this might be having on the potential for transfer of knowledge and technology; therefore a new commercialisation programme is expected to be launched to address this and promote a research to market concept.

At an international level, Malta is participating in European research infrastructure projects in which it is building its own research competences including the [Biobanking and Biomolecular Resources Research Infrastructure](#) (BBMRI) and the [Common Language Resources and Technology Infrastructure](#) (CLARIN).

In terms of knowledge circulation across Europe, Malta is participating in [OPENAire](#), the Open Access Infrastructure for Research in Europe⁹². OPENAire provides a platform where to search for and deposit FP7 publications and search for projects and programmes including by subject area. The University, via its website, publishes information, also as podcasts⁹³, related to the teaching and research programmes, as

⁹² Malta's National Strategic R&I Plan draft document for consultation published 5th December 2011

⁹³ 'Research Matters' is broadcast by the Malta University Broadcasting and covers a wide range of research projects in which academics are involved. Accessed at: http://www.campusfm.um.edu.mt/pages/webcastspages/research_matters_mainpage.html#series_3

well as on research publications undertaken within the various faculties, institutes and centres.

7. Strengthen international cooperation in science and technology and the role and attractiveness of European research in the world

One of the objectives of the new R&I Strategic Plan 2011-2020 that is currently being drafted is that of strengthening international cooperation with key international players in R&I⁹⁴. For this purpose Malta's research priorities are expected to be more in line with developments at EU and international level, namely the strategic approach adopted in the EU Innovation Union Flagship Initiative of looking at the whole of the innovation chain from research to commercialisation and Malta's strategy is expected to give greater prominence to societal challenges⁹⁵.

The European Framework Programme for Research & Development (FP) has had significant impact in terms of breath and scope of participation of Maltese entities in cross-border collaboration. In FP6, the domains attracting the largest number of participants and funds were Information Communication Technologies (ICTs), sustainable development and ecosystems and health⁹⁶; whilst in FP7 these were so far 'Science in Society' followed by 'Research for the benefit of SMEs'. By July 2011, 108 FP7 projects were approved for funding equivalent to around €11m.

Whereas in FP6, the higher education sector had the highest participation rate, in FP7 the highest success rate (expressed as % of applicants) was observed for research organisations followed by public bodies⁹⁷. More recently Malta has started participating in the Eureka and Eurostars programmes: Since Malta's entry in 2010, there have been 2 calls for project submissions under the Eurostars programme, with one local project in each call. Evaluation of the projects in the first call led to an approval of €114,492 in funds for the local company. Also, by the end of the third quarter of 2011, 2 Maltese companies were awarded funds for project implementation and received the EUREKA technical status. These projects were approved a total of €208,159 in government funds, which potentially served to leverage a further €138,772 from the private sector⁹⁸. A 2012 budgetary measure proposes providing additional financial assistance to researchers in order to enhance their participation in the European Union's FP Programme and by this means increase effective participation in the programme.

Malta's bilateral agreements for cooperation in science and technology do not cover particular thematic areas or domains but generally relate to building cooperation in educational aspects. These agreements are held with both ERA countries - Member States (36%) and Associated States (18%) and non-ERA countries (Ministry of Foreign Affairs, 2010) and typically do not specify the research fields and budgets allocated; they are open-ended and aimed mainly at stimulating educational and cultural activities amongst the countries.

⁹⁴ TrendChart Mini-Country Report 2011

⁹⁵ Malta's National Reform Programme 2011

⁹⁶ European Commission (2010) Major EU achievements in Science & Research 2004-2009: Malta Profile

⁹⁷ Innovation Union Competitiveness Report (2011) Malta Profile

⁹⁸ *ibid*

International cooperation is also supported through formal agreements between the Maltese government and European institutions and organisations such as CERN (European Centre for Nuclear Research), the EC's Joint Research Centre, the Fraunhofer Society and the [European Molecular Biology Laboratory](#) (EMBL); as well as through participation in international initiatives such as [COST](#) promoting European Cooperation in Science & Technology.

The legal framework for the [inward mobility of third country researchers](#), in place since 2008, outlines the procedural and administrative requirements for admittance of PhD researchers from non-EU countries. As such, there are no specific mobility schemes aimed at attracting third country researchers who can only benefit from the provisions laid out in the legislation, namely a residence permit and tax and social security benefits, if they hold a research contract with a Maltese research institution.

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List of Abbreviations

BBMRI	Biobanking and Biomolecular Resources Research Infrastructure
BERD	Business Expenditures for Research and Development
CERN	European Organisation for Nuclear Research
CLARIN	Common Language Resources and Technology Infrastructure
CORTO	Corporate Research & Knowledge Transfer Office
COST	European Cooperation in Science and Technology
EIS	European Innovation Scoreboard
EMBL	European Molecular Biology Laboratory
ERA	European Research Area
ERA-NET	European Research Area Network
ERA-PRISM	Policies for Research and Innovation in Small Member States
ERP Fund	European Recovery Programme Fund
ESA	European Space Agency
ESF	European Social Fund
ESFRI	European Strategy Forum on Research Infrastructures
EPO	European Patent Office
ERDF	European Regional Development Fund
EU	European Union
EU-27	European Union including 27 Member States
EU2020	European Union 2020 Strategy
FDI	Foreign Direct Investments
FP	European Framework Programme for Research and Technology Development
FP7	7th Framework Programme
FTE	Full Time Equivalent
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HRST	Human Resources in Science & Technology

ICT	Information Communication Technology
IP	Intellectual Property
MCAST	Malta College of Arts, Science & Technology
MCST	Malta Council for Science & Technology
ME	Malta Enterprise
MGSS	Malta Government Scholarship Scheme
MNC	Multi-national Company
MQRIC	Malta Qualifications Recognition Information Centre
NCHE	National Commission for Higher Education
NRP	National Reform Programme
NSO	National Statistics Office
OECD	Organisation for Economic Co-operation and Development
OMC-NET	Open Method of Coordination Network
OP	Operational Programme
OPM	Office of Prime Minister
PP	Public Procurement
PPCD	Planning & Priorities Coordination Department
PPS	Purchasing Power Standard
PRO	Public Research Organisations
R&D	Research and development
R&I	Research and Innovation
RTDI	Research Technological Development and Innovation
SME	Small and Medium Sized Enterprise
STEM	Science, Technology, Engineering and Mathematics
STEPS	Strategic Educational Pathways Scholarships
SWOT	Strengths Weaknesses Opportunities & Threats
S&T	Science and technology
VC	Venture Capital

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Abstract

The main objective of the ERAWATCH Annual Country Reports is to characterise and assess the performance of national research systems and related policies in a structured manner that is comparable across countries. EW Country Reports 2011 identify the structural challenges faced by national innovation systems. They further analyse and assess the ability of the policy mix in place to consistently and efficiently tackle these challenges. The annex of the reports gives an overview of the latest national policy efforts towards the enhancement of European Research Area and further assess their efficiency to achieve the targets.

These reports were originally produced in November - December 2011, focusing on policy developments over the previous twelve months. The reports were produced by the ERAWATCH Network under contract to JRC-IPTS. The analytical framework and the structure of the reports have been developed by the Institute for Prospective Technological Studies of the Joint Research Centre (JRC-IPTS) and Directorate General for Research and Innovation with contributions from ERAWATCH Network Asbl.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.