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## Executive Summary

Cyprus is a very small country and its research system is not well developed as it still ranks very low in terms of GERD/GDP (0.49% in 2009, which equals to 1/4 of the EU average) and BERD/GDP amongst the lowest in the EU (0.1% in 2009). Enterprises perform 19.8% of total GERD and the share is further decreasing. The higher education sector was and remains the major R&D performer. Its share increased from 43.7% to 49.6%<sup>(P)</sup> of GERD over the last three years. The Government sector contributes 20.4%. These figures reflect the late creation of a national innovation system with the first systematic steps adopted in the '90s. Since then progress is very rapid in the adoption and funding of national R&D policies.

In terms of research output, Cyprus is underperforming. Total scientific publications are less than 1000 in absolute amounts. The country is third from the bottom (above Luxembourg and Malta, which are member states with similar total populations) but with the third fastest growth rate in terms of publications in the last decade. Although no detailed data are available on citations, its impact is probably close to average as in terms of scientific publications within the 10% most cited scientific publications worldwide its performance is similar to that of its overall publications. Patenting under the PCT is very low and rates Cyprus only at about 13% of the European average. The situation with PCT patent applications in societal challenges is even worse (8.5% of the EU average). This performance does not seem to be improving over time. The country is only strong in trademarks (about 250% of the EU average).

Public research and public funding have improved significantly. Each new DESMI (the bundle of research incentives under the same name launched and executed by the Research Promotion Foundation, which is the national agency for research policy implementation) outperforms the previous in terms of budget and number of measures.

Higher education has grown and is gaining momentum, while public support for R&D, which started in the last decade, has grown rapidly. However, internal reorganisation problems, an explosion affecting the overall economy<sup>1</sup> and the international credit crunch have negatively affected R&D funding in 2010. It has started resuming momentum in 2011.

In terms of structural challenges the problems are those typical for all small economies specialising in the service sector with a very small share of manufacturing activities, mainly performed by SMEs in traditional sectors.

1. *Too broad research orientation lacking prioritisation* is the result of the late development of the educational system, where all disciplines request a share of research funding to be able to follow state of the art. This is fully acknowledged by the national government, which has restructured national governance giving

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<sup>1</sup> A massive explosion at the navy base next to the largest power station of the Republic of Cyprus has knocked out, the station resulting in widespread power cuts. The damages' cost is estimated around €300m. Its economic impact is not yet officially reported but there is no doubt it will significantly affect the national economy (e.g. increase cost for power generation and reduced liquidity).

two new Councils the mandate to scientifically introduce and politically endorse a narrow focus of research priorities. This process takes time and delays are manifested. At this stage focus has improved at the implementation level, but the new politically endorsed agenda is still not adopted.

2. *Limited involvement of SMEs in R&I activities* is mainly a result of the structure of the economy. At the level of implementation the orientation of incentives is gradually shifting emphasis towards awareness raising and company participation. Despite new incentives tailored to the service sector and company needs the business sector responds only partially. Two new platforms have raised the expectations in this particular challenge.
3. *Low exploitation capacity of innovative ideas in the market* is related to the limited participation of SMEs but touches also the problem of unexploited university research results. The Research Promotion Foundation has adopted incentives for facilitating patenting and new business creation as well as university-industry cooperation, but the size of the market, the prevailing culture and the lack of venture capital are still inhibiting innovation.
4. *Limited human resources for research* are a challenge despite the overall very satisfactory level of tertiary education. The problems are associated with a comparatively low number of S&E graduates, limited opportunities to undertake research in the country and the openness of the system, which facilitates scientific brain drain. New faculties and increasing enrolments are adopted to face this challenge combined with attractive salary conditions, but the limited research infrastructure continues to be a major barrier for highly qualified personnel.

The decision to delegate priority setting to the two newly established councils has raised expectations for more focus. However, the Cyprus Scientific Council has not completed this prioritisation yet.

The last three years can be characterised with strong efforts to improve policies and increase funding. However, delays in the implementation of the new governance structure and financial constraints have not allowed for rapid and continuous progress. The main elements of progress include:

- Redesign of governance to ensure high level policy advice and political legitimacy of the scientific advice
- Increased focus of the DESMI calls and increase in resources (although with a drawback in 2010).
- Shift of emphasis towards participation of the business sector and university industry cooperation with new schemes dedicated to this purpose.
- Activation of the Ministry of Commerce, Industry and Tourism in the area of innovation
- The creation of technology platforms, starting with the Cyprus Construction and Technology Platform as a pilot of priority setting. It was initiated by the Cyprus Scientific and Technical Chamber within the context of the corresponding European initiative. The Food sector is also expected to be prioritised through the

creation of the Cyprus Food Technology Platform, planned by the Cyprus Food and Drinks Network in cooperation with the Cyprus Chamber of Commerce and Industry based on the successful operation of the Cyprus Construction.

- The creation of the Cyprus Association of Research and Innovation Enterprises, which is expected to improve the dialogue between the business sector and policy makers.

Research policy is strongly internationally oriented and as such well aligned with the ERA pillars in particular in the context of research careers and internationalisation. University regulation is improving. Problem areas are the limited research infrastructures (which hamper the ability to implement excellent research) and gender issues, which are a general and not research-specific problem in the country. In both areas progress has been made but is still insufficient.

The recent reorientation of policies and the redesign of governance constitutes important progress. However, all changes take a much longer time than anticipated, partly due to external pressures (explosion, crisis) and partly to administrative delays. There is a need to be faster, as long delays undermine confidence.

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## 1 Introduction

Cyprus is the third largest Mediterranean island and one of the smallest member states of the European Union with a population of 803.000 (0.2% of the EU-27). The service sector dominates with 73% of GDP, composed mainly of tourism, which is the leading sector, followed by financial services and real estate. Manufacturing, transport-communication and construction account each for 7% of GDP<sup>2</sup>. Structural reforms followed the accession to the EU in 2004 and led to liberalisation of trade, finance and investments (Ministry of the Interior, 2008).

GDP per capita grew from 89% of the EU average in 2004, when Cyprus joined the EU, to 99% in 2010 reaching €21,200. Cyprus had a robust average annual growth of 4% outperforming the EU-27 average growth rates until the crisis (ERAWATCH Network, 2009). The driving forces were foreign direct investment and EU support. The economic crisis resulted in a decline of 1.9% in 2009. In 2010 real GDP started growing again (1.1%).<sup>3</sup> The IMF, however, declared its worries about further economic path of the country due to the excessive exposure to Greek bonds, the susceptible bank system and increasing fiscal deficit and asked for further reduction of public expenditures, as well as the consequences of a serious explosion affecting the electricity grid.

Cyprus is still ranked last in GERD/GDP shares among all the EU member states (0.49% in 2009, or about 1/4 of the EU average) but with a significant upward trend. BERD/GDP is among the lowest in the EU (0.1% in 2009 with the EU average reaching 1.24%). The higher education sector was and remains the major R&D performer. Its share increased from 43.7% to 49.6%<sup>(p)</sup> of GERD over the last three years and is more than two times higher than the corresponding share of the EU average.<sup>4</sup> Enterprises perform 19.8 % of total GERD (in comparison to the 61.7% of the EU average) and the trend is decreasing (table sent by the EWN PM, original source: Eurostat). The Government sector contributes 20.4%.

S&T graduates' share in the labour force is steadily increasing reaching almost 44% in 2010.<sup>5</sup> Research infrastructures are very small and only of local scale, but improvements are visible. The expansion (in terms of research priorities and graduate programmes) of the Cyprus University of Technology (CUT), continuous expansion of post-graduate courses in the universities and the development of new private universities (Neapolis University) are expected to increase human resources for research. The decision to generously fund cooperation with world-class universities may further improve results in terms of both human resources and infrastructure. Moreover, international cooperation as well as emphasis of policy on supporting FP participation is expected to increase competence and nurture excellence.

In terms of research output, Cyprus is underperforming. Total scientific publications passed from 197 in 2000 to 801 in 2008, only above Luxembourg and Malta in the former case but also surpassing Latvia in the latter. The country has however the third fastest growth rate in terms of publications in the corresponding period following Luxembourg and Malta. In terms of scientific publications within the 10% most cited scientific publications worldwide it passed from 10 to 66 (30.9% growth) (European Commission, 2011a) again with exactly the same ranking as in the total publications indicating a similar behaviour in terms of citations. Patenting under the PCT is very low and rates Cyprus only at about 13% of the European average. The situation with PCT patent applications in societal challenges is even worse (8.5% of the EU average). This performance does not seem to be improving over time. The country is only strong in trademarks (about 250% of the EU average)<sup>6</sup>.

Cyprus is a service-based economy. ICT, R&D, energy, shipping, financial service, education, professional and health services and tourism are among the key growth sectors prioritised on the island.

<sup>2</sup> <http://www.pwc.com/cy/en/about-cyprus/services-sector.jhtml>

<sup>3</sup> See table below

<sup>4</sup> The comparisons are made taking into consideration provisional data for 2010

<sup>5</sup> The figures refer to the HRST aged 25-64 as a percentage of active population from the Eurostat. More information is available in the Chapter 2.2.3

<sup>6</sup> The percentages are own calculations based on the data from the IUS 2010

ICT is the area with the highest demand for R&D services<sup>7</sup> and can potentially become one of the first priorities for demand-driven research. The government focuses on the development of an integrated National Strategy for the Information Society.

The RTDI system in Cyprus was born in the mid-1990s and is changing over time with the aim to increase efficiency and modernise the government, research and productive sector cooperation. At the political level, two new organisations, the National Council for Research and Innovation (NCRI) and the Cyprus Scientific Council (CSC), are the main bodies responsible for strategy and planning. The NCRI has exclusive responsibility for the adoption of long-term strategies in research and innovation, while the CSC constitutes the advisory scientific board (composed of 18 members of qualified scientists) (ERAWATCH Network, 2011) to the government.

The Planning Bureau is an independent government agency engaged in the formulation of strategy, the identification of objectives and the introduction of policy measures aiming at the promotion of research activities in Cyprus. The Planning Bureau, in collaboration with the Ministry of Finance, provides direct financing for research initiatives undertaken by the state research institutions / departments, through the annual Development Budget of the Republic. At the implementation level, research and innovation activities are integrated under the Research Promotion Foundation (RPF), which is an autonomous foundation under the supervision of the Planning Bureau. The Ministry of Commerce, Industry and Tourism (MCIT) is responsible for industrial policy, including the promotion of technology and entrepreneurship. A new “Technology Unit” was created in 2011 in the Ministry, which is expanding the activities of the already existing Technology Department and is expected to play a more active role. The Ministry of Agriculture is active in technology transfer services. A new organisation was created at the end of 2010, under the auspices of the Cyprus Chamber of Commerce and Industry, namely the Cyprus Association of Research and Innovation Enterprises. It represents R&D managers from 22 companies (consultants and manufacturing) targeting lobbying and influencing policies for the promotion of research and innovation support in the country.

Cyprus is a single region and policy is drafted and implemented centrally. Local authorities, namely districts, municipalities and communities only exceptionally play a role in implementing RTDI policies.

The main research performer group are the public universities (UCY<sup>8</sup> and CUT). The Open University has very few R&D projects. Four private universities are mainly offering undergraduate degrees and undertake applied research in the social sciences and humanities. Other major organisations undertaking research are the ARI, the Cyprus Institute of Neurology and Genetics (CING) and the Meteorological Centre. The [Cyprus International Institute \(CII\) for the Environment and Public Health](#), the joint venture with the Harvard School of Public Health, implements research in the respective sectors. Another top-class venture, the [Cyprus Institute \(Cyl\)](#), operates three Research Centres<sup>9</sup> in close collaboration with foreign establishments of international reputation.<sup>10</sup>

### Figure 1: Overview of the Cyprus RTDI system governance structure

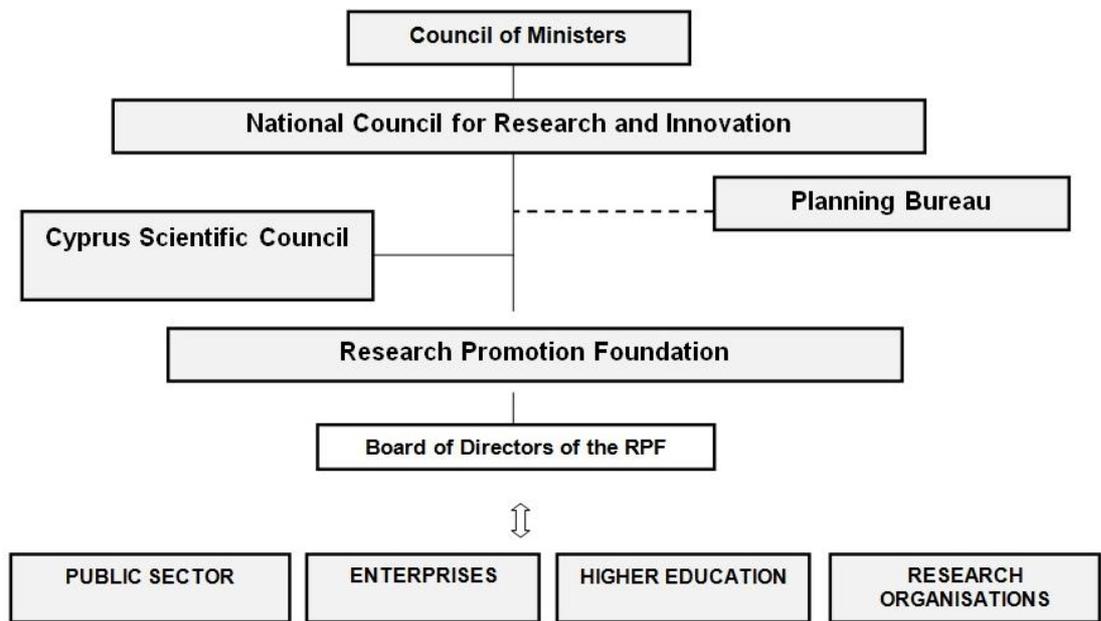
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<sup>7</sup> This conclusion is based on the response rates and success rates of applications to both the EU and the national framework programmes respectively where it appears that ICT is the area mostly demanded by Cypriot researchers

<sup>8</sup> University of Cyprus

<sup>9</sup> The Energy, Environment and Water Research Centre (EEWRC), the Science and Technology in Archaeology Research Centre (STARC) and the Computation-based Science and Technology Research Centre (CSTRC)

<sup>10</sup> Including the MIT, the University of Illinois and Centre de Recherche et de Restauration des Musées de France



Source: the diagram is based on the diagram provided by the Planning Bureau,  
<http://www.planning.gov.cy/planning/planning.nsf/All/52642699216544DEC22574F2002E97A1?OpenDocument>

## 2 Structural challenges faced by the national system

The Innovation Union Scoreboard 2010 (IUS) ranks Cyprus 12<sup>th</sup> in the composite index, positioning the country among the “innovation followers”. On the positive side the innovation performance of the country improves continuously since 2006 (when the country was classified as “catching-up” but fast growing country). However, a number of important indicators remain low or very low.

Resource mobilisation is still very limited and mainly funded by the public sector. Business sector involvement in RTD and innovation remains at the bottom of the EU. This relates to the size of the country (and the market), the development model pursued and the structure of the productive sector: traditional sectors and a very small number of large companies. Knowledge demand is higher in the public than in the private sector.

Public research and public funding have improved significantly. Higher education has grown and is gaining momentum, while public support for R&D, which started in the last decade, has grown rapidly. The government has introduced a whole set of measures targeting RTDI activities in companies, research organisations and their cooperation. Despite efforts to increase the budget and range of support activities, the business sector remains underrepresented in research funding and even in research performance.

The following structural challenges need to be persistently addressed to overcome the current deficiencies:

### Too broad research orientation lacking prioritisation

The rapid increase of public RTDI funding developed across all disciplines without focusing on a limited number of scientific fields, where the national innovation system could be expected to excel. Funding is spread throughout different research areas leading to broad research orientation covering too many areas, which are not justified by the size of the country and its economy.

Limited financial resources available for the investment in RTDI require stronger concentration to ensure smart specialisation. As recorded in the recently drafted new National Reform Programme 2011 (NRP), the new (under preparation) National Strategy for Research and Innovation 2011-2015 will make a first step into stronger focus suggesting prioritisation areas based on the advice of the CSC.

DESMI<sup>11</sup>, the main policy implementation package of support measures for RTDI, focused on fewer areas than in the past in its 2009-2010 version. More importantly, the government has recognised this

<sup>11</sup> Research Promotion Foundation’s (RPF) Framework Programme for Research, Technological Development and Innovation

weakness, which is persistently reported, and has taken action adopting the new governance system described above.<sup>12</sup> The operation of the new Councils since 2011 is expected to adopt clear priorities in the final elaboration and approval of the long-term National Strategy for Research and Innovation and the Action Plan focusing on the ERA priorities. The delays, however, in the establishment and operation of these two bodies hindered the progress.

### **Limited involvement of SMEs in R&I activities**

Insufficient involvement of firms in research and innovation activities in terms of participation and expenditures in R&D and innovation was and continues to be one of the major bottlenecks in the national RTDI system. According to the IUS 2010, in “Business R&D expenditure” Cyprus appears as the worst performer among all 27 member states and venture capital is practically absent in the island. The structure of the productive sector does not favour R&D: very small sized family-run enterprises with limited export orientation dominate the economy. Most firms tend to concentrate on low value added product and services and don't take risks in new products or export markets. As the economy is dominated by the service sector (tourism, transport and finance), with manufacturing representing only 7% it is understandable that demand for R&D is low and the business sector has not developed an innovation culture. Small and micro – enterprises oriented mostly on low value added support services are unlikely to invest in RTDI. University-industry cooperation is in its infancy.

The government is addressing the problem with generous financial incentives for business R&D, new support schemes for innovation (like innovation vouchers and positioning graduated in firms) and emphasis on university-industry cooperation and clustering.

Despite the continuous increase in national or European funding opportunities for SMEs, the mobilisation of SMEs is lower than national targets. Researchers from universities and research centres remain the main recipients of funding provided through the DESMI calls.

The situation may change by encouraging SMEs (especially from the services sector) to innovate. As referred in the NRP 2011, the currently elaborated RTDI strategy highlights the importance of other than technological innovation, including “innovation in design, in processing, in organisational reform, in public procurement etc.” and recommended to focus the R&I policies in the service sector (including ICT, health, education, tourism, shipping, financial and legal services). “SMEs innovating in-house” (41.55%) and “Innovative SMEs collaborating with others” (21.31%) being well above the EU average in the last IUS indicate progress. The indicators in the “Innovators” category are amongst the highest in the EU<sup>13</sup>. The expenditure on non-R&D innovation is also impressive (1.73% of the turnover). Further efforts are needed to maintain these positive trends.

### **Low exploitation capacity of innovative ideas in the market**

The inadequate knowledge exploitation is one of the major problems. The performance of the “Intellectual Assets” indicators of the IUS, which seem to be the weakest point of the national innovation performance, confirms that knowledge exploitation is limited. The number of patent applications filed under the PCT is very low and rates Cyprus only at about 13% of the European average. The situation with PCT patent applications in societal challenges is even worse (8.5% of the EU average). This performance does not seem to be improving over time. The country is only strong in trademarks (about 250% of the EU average)<sup>14</sup>. This is however compatible with the size and structure of the economy and it can only very slowly be improved.

Public policy has addressed the problem with policies and instruments to support the commercialisation of innovative ideas such as innovation/knowledge clusters, knowledge transfer platforms, and voucher

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<sup>12</sup> Two new coordination mechanisms were convened and recently became operational: the National Research Council for Research and Innovation (NCRI), which is the highest-level organisation with exclusive responsibility for the adoption of long-term strategies in research and innovation, and the Cyprus Scientific Council (CSC), which is an advisory scientific board, composed of 18 members that are qualified scientists. The NCRI is responsible for the adoption of the long-term research and innovation strategy, while the CSC plays the role of the advisory body to the NCRI and is responsible for the formulation of the research strategy proposals.

<sup>13</sup> As indicated in the Innovation Union Scoreboard SMEs introducing product or process innovations (42.24%) and SMEs introducing marketing/organisational innovations (47.34%)

<sup>14</sup> The percentages are own calculations based on the data from the IUS 2010

systems. In order to improve the general frameworks for research exploitation through limitation of obstacles and creation of incentives for patenting, the RPF has launched an action ("Patents") aiming at motivating individuals, research organisations and enterprises to file patent applications. The slow and inefficient operation of incubators and technology parks has been a barrier to innovative start-ups. The creation of young innovative companies is now expected to be supported by a dedicated scheme for the development of new high-tech companies highlighted in the NRP 2011. The recent mobilisation of the MCIT is recognised as a significant improvement. The creation of the Cyprus Association of Research and Innovation Enterprises under the auspices of the Cyprus Chamber of Commerce and Industry is also expected to help stakeholder involvement and influence policy making.

Given the limited potential of the very new national RTDI system to generate innovative ideas, the businesses could utilise new knowledge generated beyond the national borders. Knowledge and technology transfer mechanisms are however still inadequate in Cyprus, both in national and international levels. The creation of Liaison Offices has only recently been launched. Firms are unwilling to undertake the risk related to innovation. This results in insufficient demand hindering the increase in commercial exploitation of knowledge. Some steps have already been undertaken to improve cross-border transfer and exploitation of knowledge such as the collaboration agreement of the UCY with an Australian software company and the development of the Business Support Centre Cyprus (more information in the section 5 of the Annex).

### **Limited human resources for research**

Although there is a large potential in terms of very high education levels among young people (44.7%, which is among the highest rates in the EU-27 (European Commission, 2010a)) and improving efforts in life-long learning, the labour market for researchers is still very small. The number of graduates in mathematics, science and technology (4.6 per 1 000 of population in 2009) is very low in comparison to the EU average (14.3 per 1,000 of population in 2009).<sup>15</sup> The share of new doctorate holders is among the lowest in the Union (0.2 per 1000 population between 25 and 34 years (European Commission, 2010a)). This is mainly the result of the late creation of universities on the island and is expected to improve significantly over time although the low levels of knowledge demand discourage young people to follow research careers. Moreover, the lack of adequate conditions for research (narrow research base, absence of large research infrastructures) as well as low interest from businesses to employ researchers further limits the career choices for researchers and lead to a significant brain-drain.

The government has addressed the problem with the continuously rising number of postgraduate courses in universities. The CUT makes a difference with rapid growth in the S&E fields and is expected to cover current and latent market needs of S&E graduates. In addition, with the aim of enlarging the critical mass of researchers the national policy offers incentives to individual researchers as well as to research organisations and private enterprises to hire new researchers.

The challenges identified above are recognised by the government in the National Strategy for Research and Innovation 2011-2015, which, as already referred above, is currently under preparation.

## **3 Assessment of the national innovation strategy**

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### **3.1 National research and innovation priorities**

RTDI is among the key priorities of the National Strategic Development Plan (NSDP) 2007-2013, the main strategy document reflecting guidelines for R&D and innovation policy in the country and forming a basis for the preparation of the programming documents. The NSDP for the first time was adopted after consultation with different stakeholders through wider public debate. The promotion of research and development constitutes one of the eight strategic development pillars highlighted in the document.

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<sup>15</sup> Data for Graduates (ISCED 5-6) in mathematics, science and technology per 1 000 of population aged 20-29, Education and Training indicators, Eurostat, <http://epp.Eurostat.ec.europa.eu/portal/page/portal/education/data/database>

Specific multi-annual RTDI strategy, however, is still not in place. The main delivery instrument is the multi-annual and multi-thematic National Framework Programme for Research and Technological Development (DESMI), designed and managed by the RPF. The current DESMI 2009-2010 builds on the previous one without major shifts in goals and priorities. It is based on five pillars, which include a broad spectrum of measures through which it supports multi-thematic research projects in pre-selected fields, promotes research activities among young population, provides for the upgrading of existing and the built up of new research infrastructure, supports international collaboration as well as research and innovation in enterprises. Each new DESMI outperforms the previous in terms of budget and number of measures.

The major shift over the recent past was a new focus on innovation support. Since 2008, the RPF included in its framework programme new initiatives targeting cluster framework policies and innovation, the development of the innovation culture among economic actors, linking university and the business sector as well as the enhancement of endogenous capacity of enterprises to innovate. This much stronger emphasis on innovation and utilising existing research results is driven by the evidence of better performance of Cyprus in innovation rather than in R&D (Planning Bureau of Republic of Cyprus, 2009, p.60).

According to the information from the current NRP 2011, a new strategy (to be announced soon based on the scientific consultation in CSC and approval from the NCRI) will be based on the following pillars:

- Increase human capital in research activities
- Strengthen the scientific base
- Promote international cooperation
- Introduce innovation in the public sector
- Promote research and innovation in enterprises
- Prioritisation of research fields
- Exploitation of innovative ideas and launching them in the market

These priorities are to a large extent consistent with the challenges identified in the previous section. A clear prioritising of specific research fields is explicitly introduced for the first time. Commercialisation of research results, which has been for a long time mentioned as a policy priority is now taking better shape with new incentives. At a high political level, priorities were determined regarding the major societal challenges. Energy, environment and in particular water resources were identified as the real future challenges for the island and the wider Mediterranean region. New Research Institutes and Research Centres were established in the last five years on the basis of the bilateral agreements with European and international organisations and research centres of excellence.<sup>16</sup> Research in the determined grand societal challenges is also supported through DESMI allocations to projects in the fields of sustainable urban development, recycling, management of urban waste, control and protection from pollution under the Sustainable Development programme.

The Cyprus Construction and Technology Platform is a pilot of priority setting. It was initiated by the Cyprus Scientific and Technical Chamber within the context of the corresponding European initiative. The Strategic Action Plan includes the research priorities and needs of the construction industry and is expected to contribute to a large extent to the future planning of the national research programmes (Scientific and Technical Chamber of Cyprus, 2011). In this way, the platform is expected to influence the RPF concerning the new measures to be introduced (TrendChart, 2011). The construction sector is also prioritised through the implementation of the cross-border cooperation projects in the framework of the [ERACOBUILD](#) initiative in Cyprus.

The Food sector is also expected to be promoted through the creation of the Cyprus Food Technology Platform, planned by the Cyprus Food and Drinks Network in cooperation with the Cyprus Chamber of

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<sup>16</sup> Such as the [Cyprus International Institute \(CII\) for the Environment and Public Health](#) providing joint with the Harvard School of Public Health research, education and technology initiative for the environment and public health and [Cyprus Institute \(Cyl\)](#) already operating three research centres including one specialised on environment and water resources research in close collaboration with MIT

Commerce and Industry based on the successful operation of the Cyprus Construction and Technology Platform and is currently in the process of preparation (TrendChart, 2011).

The policy mix reflects focus on existing companies and public funding. Engaging non-R&D performers and the creation of new high-tech firms were neglected in the past. The promotion of internationalisation of RTDI systems remains the major priority concerning the overall R&D policy-making as it was considered as the important mechanism for strengthening the platform for higher R&D investments. However, a shift towards the private sector is gradually taking place. The overall policy was negatively affected by the crisis and the budget cuts of DESMI in 2010, which were associated more with internal organisation and less with the crisis. It especially concerned the route targeting research cooperation with the public sector, for which the specific new measures were designed but have not been launched. In addition, the financial crisis has further deteriorated business demand, as company finances are scarce and not available for R&D co-funding.

Despite the significant efforts made towards the development of higher-level research system and progress recorded in the recent years, the evaluation mechanisms are still inadequate. No external evaluations of the RTDI policies have been conducted in the last years but in 2012 the evaluation of the RPF Desmis (Framework Programmes) is expected to be launched.

Overall national priorities are consistent with the challenges identified, although they are sometimes delayed or under-funded.

### 3.2 Trends in R&D funding

Until 2009, Cyprus had a robust economic growth of by average 4% per year outstripping this of the EU-27 (ERAWATCH Network, 2009). The economic crisis had a visible effect on growth resulting to a decline of -1.9% in 2009. In 2010, the real GDP growth was again positive with 1.1%.<sup>17</sup>

Cyprus has a very low R&D intensity due to its economic structure and very young history of the national research system, which was practically developed in the last two decades. This results in a very low ranking of the country in terms of R&D expenditure. A positive trend, however, has become apparent over the past years: while in 2000 expenditure on R&D (GERD) was only 0.25% of GDP, in 2009 this figure doubled reaching 0.49% (Eurostat) thanks exclusively to a considerable expansion of research activities in the public sector. Despite the high growth in the last years, Cyprus is still ranked very low in GERD/GDP shares among the EU member states. The previous target of 1% by 2010 was not achieved and was considered as not achievable in 2020 (Planning Bureau of Republic of Cyprus, 2009). The national target for R&D expenditure is set at 0.5% of GDP but as it has already been achieved it may be revised. The business sector is still under-investing in R&D. Business R&D expenditures as a share of GDP are amongst the lowest in the EU (0.1% in 2009 with the member-states average reaching 1.24%). The enterprises only perform 19.8% of overall GERD (in comparison to the 61.7% of the EU average).<sup>18</sup> Worse than that, the share of BERD in the total GERD has decreased during the last three years by 5.3%. On the contrary, research performance by the higher education sector increased in the same period from 43.7% to 49.6% of GERD.<sup>19</sup> This share is more than twice the corresponding share of the EU average. The levels of GBAORD remained stable, with some increase in 2009, but returned to the levels of 2008 in 2010 (0.42% of the GDP). This share is very low in comparison to the European average of 0.77% in 2009. Funding received from abroad is about 12.1% in 2009 in comparison to 8.4% the EU average. The main source of foreign funds is the EU RTD Framework Programmes and other European research programmes.

**Table 1: Basic indicators for R&D investments in Cyprus**

	2008	2009	2010	EU average 2010

<sup>17</sup> See table below

<sup>18</sup> Own calculations based on the data from Eurostat ([http://epp.Eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.Eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database)), data for 2009.

<sup>19</sup> The comparisons are made taking into consideration provisional data for 2010.

	2008	2009	2010	EU average 2010
<b>GDP growth rate</b>	3.6	-1.9	1.1	2,0
<b>GERD as % of GDP</b>	0.43	0.49	0.5 (p)	2.0
<b>GERD per capita</b>	93	104.1	107.7 (p)	490.2
<b>GBAORD (€ million)</b>	72.3	84	72.2	92,729.05
<b>GBAORD as % of GDP</b>	0.42	0.5	0.42	0.76
<b>BERD (€ million)</b>	16.7	16.4	15.1 (p)	151,125.56
<b>BERD as % of GDP</b>	0.1	0.1	0.09 (p)	1.23
<b>GERD financed by abroad as % of total GERD</b>	14.7	12.1	N/A	N/A <sup>20</sup>
<b>R&amp;D performed by HEIs (% of GERD)</b>	43.7	46.1	49.6 (p)	24.2
<b>R&amp;D performed by PROs (% of GERD)*</b>	22.9	20.4	19.5 (p)	13.2
<b>R&amp;D performed by Business Enterprise sector (as % of GERD)</b>	22.8	19.8	17.4 (p)	61.5

\* R&D performed by the government sector

(p): provisional data

Source: Eurostat, (last updated 30.11.2011) and own calculations based on this data

The national research system is almost exclusively based on direct government support. No specific tax allowances exist, as corporate tax is already so low that it would not be a credible incentive to make R&D investment tax free. However, tax reductions for R&D are frequently requested by enterprises (TrendChart, 2011). Only for academic institutions operating under a 'non-profit' status tax exemptions and tax reductions may be applied for acquiring the equipment needed for research.

Competitive funding is the core support mechanism. It is mainly delivered in the form of grants, but several non-financial measures as well as competitions providing financial awards to the winners are introduced. With the exception of salaries (provided by General University Funds) most research undertaken in universities is financed through external funding via competitive procedures in the framework of either the RPF or the EU calls. The major share of the competitive funding for R&D is provided through the RPF programmes included in DESMI. The role of European funding is underlined in the context of the 2007-2013 Operational Programme (OP) "Sustainable Development and Competitiveness". Funding, provided entirely by the ERDF to RTDI-related actions, is estimated at €45m and is directed to a high degree to the financing of DESMI initiatives. The respective national contribution is 15%. Research proposals submitted in the framework of DESMI should cover one of the pre-selected fields (such as Technology, ICT, Sustainable Development, Health and Biological Sciences, Social and Economic Sciences and Humanities). Due to the global economic crisis and the austerity measures applied by the government of the Republic of Cyprus, the total budgets of the programmes and actions decreased by 35% in 2010 but were re-established in 2011.

Cyprus is very successful in raising funds from the FP7. Almost one third of the EU funds raised by Cypriot stakeholders through the FP7 in the period 2007-2010 (€11m out of total €34.5m) was directed to SMEs (Cyprus Research Promotion Foundation, 2011). The RPF encourages participation of the scientific community in the EU programmes through different events and seminars. It also participates in a range of inter-regional and cross-border programmes.<sup>21</sup> The national RTDI system, however, is not as

<sup>20</sup> 8.4 (2009), 9.04 (2005)

<sup>21</sup> Cross Border Cooperation Programme Greece-Cyprus 2007-2013, Transnational Cooperation Programme MED, Cross-Border Cooperation Programme of the Mediterranean Basin ENPI, Interregional Cooperation Programme Interreg IVC

successful in raising private funding. Public-private partnerships are negligible (with the exception of the newly developed Platforms) and venture capital (VC) is almost non-existent. Innovation support in the form of innovation vouchers is in place since 2008. Despite the quite low funding budget of the measure, a leverage effect is expected.

### **3.3 Evolution and analysis of the policy mixes**

The Policy Mix adopted in Cyprus is evolving in terms of scope and number of measures. The major progress is the increased emphasis given to innovation and R&D in enterprises (“innovation” set of measures of the RPF, newly created technology platforms). Among these measures, initiatives targeting research in firms and R&D public-private cooperation still exceed those focusing on innovation. The development of human resources in research as well as expansion and reinforcement of international cooperation continue to be strongly supported. Research and innovation policies are complimented by specific education, entrepreneurship and information society policies. In general, the policy mix is improving as more funds are dedicated to RTDI and the scope of intervention can be enlarged.

The detailed analysis of the policy mixes targeting research and innovation and its recent evolution is following below using the IU self-assessment tool (European Commission, 2010a, pages 32-35).

#### **The role of research and innovation in the overall national/regional policy mix**

There is still no integrated RTDI policy in the country. Although research and (since very recently) innovation are among the issues prioritised in the strategic papers for the overall development (NSRF 2007-2013), a detailed RTDI strategy still expected. Education policies are modernising. This includes in particular targeting the generation of science and technology awareness in schools and policies promoting entrepreneurship especially in the highest value added sectors. These policies started after the accession of Cyprus to the EU, they systematically continue and expand over time but they are still insufficient to make a significant shift into the adaptation of the economy to the knowledge society. The main instrument for the promotion of research and innovation policies remains the RPF’s DESMI. The major shift is expected to take place in a very near future with the adoption of the first specific National Research and Innovation Strategy.

Policies targeting R&D collaboration and education on energy, environment, water resources and health were put in place recently (in the form of new research institutes and research centres in collaboration with the distinguished institutions from abroad). Such collaboration is a particular strength for the small country to achieve excellence in the particular fields. A core target on sustainable development in the current DESMI is also evident. The resources directed to renewable energies (especially concerning the solar ones) are considered insufficient given the comparative advantage of the country.

#### **The quality of the governance of research and innovation policies**

Until very recently, the lack of vision, strategy and political coordination was the main weakness of the governance of the R&D policies. The integration of research and innovation activities under the RPF and the introduction, continuation and expansion of DESMI funding in a multi-annual basis RTDI activities in pre-selected fields aligned with the EU priorities was a step towards better governance. The major development was the operation of the new governance structure, which is expected to improve the effectiveness of the whole system by providing tools for monitoring and evaluation, thus allowing the development of evidence-based policy. The first integrated National R&I Strategy is expected to give an emphasis to better prioritisation on a few research fields. These announced steps are crucial for improvement.

#### **The scope of innovation policy (which should go beyond technological research)**

Innovation policies are recent in Cyprus and the government has still not fully shaped the adequate and clear context for the policy-design in this area. More measures are introduced in the current DESMI still tightly related with R&D. However, the measures announced were significantly delayed partly because of the fiscal consolidation and partly because the RPF underwent a reorganisation that delayed decision making. Demand, especially from the business sector, is extremely low. As indicated in the IUS indicators, there is, however, a high propensity for non-technological innovation in enterprises, and this may be addressed by policies to further improve it. A strong ICT base constitutes another strength, able to become a basis for the demand-side policy development and certain steps are already done (e-

government, e-procurement, e-inclusion systems etc.). A pre-commercial procurement policy is also announced. Non-technological innovation has only very recently attracted attention.

### **The adequacy of public funding and its leverage effect on private investment**

Although still very low in comparison to other EU countries, public funding directed to R&D is continuously growing. This can be manifested in the increased budgets for each new DESMI. Recent inclusion of innovation as one of the funding categories in DESMI allows securing public finances for specific initiatives in this area. Reinforcement of the private sector investments is prioritised and promoted through a wide range of measures, but the response is still very low. But, despite increased funding, the leverage remains limited as the main driver of private investment can only come from a change in the business culture, which has not yet taken place.

### **The primacy given to the pursuit of excellence in research and education policies**

The major strength in this area is the continuous progress towards the development and enhancement of the higher education system. Despite late start, the system has evolved rapidly over the last years with the development of new universities and faculties. A comparatively high level of academic autonomy allows universities to develop on their own their curriculum and methods of teaching, post institutional goals, areas, scope and methods of research, design their research agendas and topics of their research specialisation. However, there are some restrictions concerning the structure of their budget and the level of academic staff's salaries, which is common for the organisations receiving public funding in Cyprus.

Research implemented in the universities is mostly based on national funding with competitive procedures for project funding. Knowledge exploitation mechanisms are recent and no adequate policies are in place<sup>22</sup> to improve this situation.

### **The ability of the education system to produce the right mix of skills**

The major strength is a very high youth education level and further efforts to maintain them in terms of expansion of universities post-graduate programmes and plans for further expansion. New initiatives were introduced recently targeting awareness raising on science and research in primary and secondary education. Another positive point is a strong political commitment to develop cooperation with the leading foreign HEIs and certain steps have been made to this end.

The low S&E graduation rates were addressed by the creation of the Technical University. However, high levels of researchers' brain drain diminish the effectiveness of national policy efforts.

### **The promotion of partnerships at all levels and between all research and innovation stakeholders**

Promotion of partnership between all the stakeholders in R&I has gained some attention over the recent past with a range of new measures introduced by the RPF (cluster development, innovation vouchers, development of mediation systems). However, the implementation of these measures has not attained a critical mass. Other significant developments include the creation of liaison offices in the universities (still at pilot phase level) and the establishment of technology platforms mentioned above. The implementation of the Technology Park, significantly delayed, may give new impetus to partnerships, when finalised.

### **The development of framework conditions promoting private investment in research and innovation**

Business demand is low and the environment would need special effort to reverse the deeply rooted culture. Efforts are made but are still of limited impact: Policies promoting innovation are very young and still very limited with no adequate interconnections developed with the policies targeting the general business environment and entrepreneurship. Entrepreneurship measures such as support to youth and female entrepreneurship prioritise innovative activities. Innovation support is mainly relied on traditional direct funding; VC and other less-traditional financial incentives are practically absent. The co-financed JEREMIE initiative is expected to foster private investments in innovative activities. The environment improved through the recently operational Point of Single Contact and the Companies Registration System (e-filing).

<sup>22</sup> except for the RPF's low budget measure given in general incentives for patent application

**High quality, simple and easily accessible public support**

Support to business R&D and innovation is basically provided through DESMI and in the near future through the new schemes of the MCIT. Apart from the specialised measures targeting particularly enterprises, other DESMI measures are open for the private sector participation. DESMI actions are well-designed, clearly stated and adequately promoted. After an initial learning process timing and transparency have improved; a 2010 bottleneck created frustration to the business sector but was rectified in 2011.

The EU FP has attracted many SMEs and is considered as a high quality source of R&D funding.

**A public sector driving innovation through e.g. procurement**

As already emphasised above,<sup>23</sup> innovation (both, technological and non-technological) in the public sector has gained attention in this period and the framework for the comprehensive policies is expected to be shaped in the new R&I strategy. ICT is the major strength. Important steps were undertaken recently (mainly at the level of individual organisations) to promote the development of an effective scientific information system and facilitate the open access to knowledge within and across national borders.<sup>24</sup>

The adoption of pre-commercial procurement announced is expected to act as a major stimulus for driving innovation.

**3.4 Assessment of the policy mix**

The government is aware of the challenges referred in the Section 2 and efforts to tackle them are partly successful and partly delayed:

**Too broad research orientation lacking prioritisation**

Research in the country used to be promoted in a very broad way without focusing on specific fields. The first and significant step towards better prioritisation was the introduction of DESMI by the RPF, which may be considered an appropriate tool for providing support for research in several pre-selected fields. However, DESMI funds were thinly spread at the beginning.

The decision to delegate priority setting to the two newly established councils has raised expectations of more focus. However, the Cyprus Scientific Council has not completed this prioritisation yet.

More recent initiative was the establishment of the Construction and Technology Platform. While it is too early to appraise the effectiveness of the operation of the platform its value as a pilot cannot but improve policy focus. Moreover, based on the initial reaction to the platform, another technological platform in the food sector is planned to be established.

**Limited involvement of SMEs in R&I activities**

Policy measures addressing the involvement of enterprises in R&I activities consist of a wide range of interventions with the majority of them focusing on R&D rather than innovation. Innovation has become emphasised only recently, mostly with the view of the development of university-industry linkages (almost non-existent) and support to patenting (also very weak) with the introduction of several respective actions in the current DESMI (Innovation Vouchers, Innovation Clusters, Mediation Centres for Research and Innovation).

Point of concern remains the comparatively low response from the business sector. More responsive policies are needed as awareness campaigns prove insufficient. The operation of the CARIE and the technology platforms in specified industry sectors while transferring the ideas of the business sector to policy-makers may contribute to future design of more responsive policies fitting better to firms' real needs. The structure of the economy and the business sector apparently require stronger focus to non-technological innovations.

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<sup>23</sup> In the paragraph "The scope of innovation policy (which should go beyond technological research)" of the same Section, where more information may be found

<sup>24</sup> More information in the Section 5 of the Annex

## Low exploitation capacity of innovative ideas in the market

Measures addressing the involvement of SMEs are often linked to the exploitation of innovative ideas. The creation of Liaison Offices in the universities is progressing (two Offices have already been created, in the UCY and CUT) expected to bridge university research with industry. Similarly, the development of the Business Support Centre, if properly implemented, will provide intermediary services for the transfer of knowledge and technology. Incubators scheme was frozen since 2007, but three (out of four created) incubators remain operational, criticised however for their limited results.

Commercial exploitation of knowledge is difficult to increase further without adequate increase in demand, which is still too weak to stimulate improvements. Demand-side policies, however, are not promoted.

### Limited human resources for research

Support in this field seems to be well-designed and effectively addressing the problem. The strong basis for the development of human potential for R&D is the well-educated population as well as very intensive creation of new and expansion of existed education and research institutions. There are also incentives in place introduced by the RPF to attract new researchers, to train new scientists and to make research careers more attractive for the younger generations (pupils, students). Response is positive.

However, the development of adequate human resources depends also on the appropriate framework conditions for carrying out research. This refers to a more general problem that cannot be addressed in a limited context.

**Table 2: Assessment of the policy mix**

Challenges	Policy measures/actions <sup>25</sup>	Assessment in terms of appropriateness, efficiency and effectiveness
<b>Too broad research orientation lacking prioritisation</b>	New (under preparation) National Strategy for Research and Innovation 2011-2015 Operation of two Councils	It is expected that the new (also, the first in the country) strategy will lead to more focused approach in R&I national policy as the need to prioritise selected research fields is emphasised in the document under the specific pillar. The backing by internationally recognised personalities in the advisory council is expected to help in this direction.
	Limiting the fields addressed by DESMI	Well-structured, supporting research in pre-defined fields with higher number of measures and higher budgets in each sequent DESMI suggesting its relative success. The 2010 delays visibly deteriorated the efficiency of its implementation but efforts to make up for it have started.
	Technology Platforms in the construction and food (planned) sectors	The platforms seem an appropriate tool for mobilising the business sector. Rapid implementation of the construction sector platform and the decision to develop a second platform in the food sector based on the first pilot indicate that the business sector considers it an effective instrument.
<b>Limited involvement of SMEs in R&amp;I activities</b>	Research for Enterprises Programme	Appropriate and effective measure targeting directly the integration of research into the business sector. Very good uptake, high budget absorption and its inclusion in each successive DESMI with higher budget suggest the measure's successful implementation.

<sup>25</sup> Changes in the legislation and other initiatives not necessarily related with funding are also included.

Challenges	Policy measures/actions <sup>25</sup>	Assessment in terms of appropriateness, efficiency and effectiveness
	EUREKA-CYPRUS Programme	Appropriate and effective measure (especially given Cyprus strong orientation in internationalisation) targeting particularly applied research in enterprises. Relative success is apparent, given EUREKA announcements in each successive DESMI (since 2003).
	Innovation Vouchers	Relatively new measure targeting involvement of SMEs in innovative activities in collaboration with research organisations. Based on the European experience, simplicity in applicability make this measure an effective one for involving SMEs in innovation promotion. Despite its small budget the measure is expected to have relatively high leverage effect
	R&D and innovation awareness raising initiatives of the RPF	Although awareness raising has been implemented it does not seem to increase business participation in the DESMI.
	Operation of the CARIE	This organisation is expected to influence future R&I policy agenda directing it towards the development of more market-oriented policies and higher emphasis on innovation.
	Technology Platforms in construction and food (planned) sectors	This initiative is expected to involve SMEs because the two sectors are dominant in Cyprus manufacturing.
	Cyprus Innovation Award Competition	The annual competition targeting all the sectors (primary, manufacturing, services, public) is successively implemented since 2006. The effectiveness of the measure emanate from the fact that it provides certain incentives to SMEs to innovate as a means to increase their competitiveness
	Cyprus Entrepreneurship Competition	Effective as it provides direct incentives to young scientists to apply their innovative ideas into business plans. Moreover, it offers opportunities to potential investors to liaise with entrepreneurs.
<b>Low exploitation capacity of innovative ideas in the market</b>	Patents	This measure will eliminate the problems associated with the cost of patenting and will offer advice. It is, however, unlikely that it can contribute to a significant increase in international patenting, as the major problem is the quality of research results.
	Development of Liaison Offices in universities	Too early to apprise the real effect and efficiency of operation of the Offices, but the pilots developed rapidly and are hoping to develop strong academia-industry links.
	Business Support Centre Cyprus	A mechanism facilitating knowledge transfer, which the national system is still lacking.

Challenges	Policy measures/actions <sup>25</sup>	Assessment in terms of appropriateness, efficiency and effectiveness
	Development of Technology Park	Ambitious plans, but strong delays in implementation.
<b>Limited human resources for research</b>	Continuous expansion of new post-graduate courses in universities	Very efficiently and effectively utilised leading to continuous visible results.
	Support for Young Researchers-PENEK	Successful measure implemented for more than a decade aiming at training young researchers
	DIDAKTOR	Appropriate measure covering the need to involve more PhD holder in research activities with the special focus on the business sector.
	Development of Research and Innovative Culture	The measure responds to the need to create incentives (in the form of competition awards) for young generation (pupils and students of all education levels) to become involved in R&D activities.

## 4 National policy and the European perspective

ERA is seen by the Cypriot government as an opportunity to integrate the small national RTDI system in the broader European market. The policy mix adopted is in line with ERA objectives. The promotion of internationalisation of the research system is a high priority. National measures support participation in all EU research programmes and bilateral agreement with both member states and non EU countries exist and are regularly renewed. Cross-border networking and collaboration is reinforced also through openness of the majority of the national research calls to foreign representatives.

Comparatively satisfactory salaries coupled with financial assistance for research and employment support for young talented scientists make research an attractive career. Still there is a lack of adequate conditions for research activities (absence of large RIs and limited participation in international infrastructures, narrow research base, and insufficient demand for knowledge) which counterbalance the direct benefits. A significant wage gap may discourage female researcher. The most challenging problem in relation to ERA is the extremely low business sector involvement in research, despite increasing incentives. The structural factors such as the small size and the composition of the productive structure of the economy constitute the major challenge.

Thus, based on the findings from the previous sections and the detailed analysis of the policies in place for each of the ERA dimensions, the RTDI policy-making should concentrate on the following aspects:

- Reinforcement of the business sector involvement in RTDI: more responsive policies focusing on improving business environment and reinforcing innovation culture in industry are needed.
- Internationalisation of research and innovation activities: as a small country with limited financial resources available for research, Cyprus is expected to continue giving priority to the development of cross-border cooperation links and networking. In order to fulfil the ambition to play a prominent role as a centre of excellence in the Eastern Mediterranean, Cyprus should also develop tight links with the broader region.
- Development of the human resources in research: there is a strong potential in terms of very high shares of tertiary graduates, but unless the adequate framework is created to integrate it to the national RTDI system (increasing S&E post-graduate orientation, improving the conditions for implementing research, increasing knowledge-intensive employment positions), this huge potential will continue to “leak” out of the country leading to a significant brain-drain.

In general, more focused strategic approach and better prioritisation are needed in order to narrow down research priorities and enhance national research capacity. A limited set of priorities best fitting the needs of the economy should be identified so that they focus available resources in core areas where the island can build competence and excellence. Strong ICT and computing base makes it possible to give strong emphasis to this field. The new governance system is expected to provide better coordination and evaluation mechanism able to generate and adopt clearly focused and evidence-based policies.

**Table 3: 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	<b>Labour Market for Researchers</b>	<ul style="list-style-type: none"> <li>• Very low shares of graduates in mathematics, science and technology, especially post-graduates</li> <li>• Lack of adequate conditions for research activities (absence of large RIs, narrow research base)</li> <li>• Low demand for researchers by the business sector</li> <li>• Substantial brain-drain of S&amp;T graduates</li> <li>• A significant wage gap between men and women which may discourage women to build career in Cyprus (including research career)</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous rapid expansion of S&amp;E post-graduate courses in the universities (especially in the CUT);</li> <li>• The adoption of the “Aliens and Immigration” Law (2009) integrating the Scientific Visa Package, which makes the process of receiving a residence permit easier;</li> <li>• Continuously increasing initiatives targeting to stimulate study abroad and to attract foreign students to Cypriot tertiary education organisations (RPF special measures, PhD programmes in English language, inter-university agreements on joint research projects, students and staff exchanges);</li> <li>• The introduction of the co-financed by the European Social Fund National Action Plan for reducing gender pay gap (2010-2015) promoting a wide range of measures targeting to narrow gender inequality in wage levels.</li> </ul>
2	<b>Cross-border cooperation</b>	<ul style="list-style-type: none"> <li>• Increasing, but still limited interest of the business sector to participate in joint actions</li> <li>• The lack of awareness, inadequate human and capital resources, insufficient coordination of policies impede effective implementation of joint programming goals</li> </ul>	No major changes. The government continues to actively support the Cypriot participation in different EU initiatives (FP7, ESF, EUREKA, COST etc.)
3	<b>World class research infrastructures</b>	<ul style="list-style-type: none"> <li>• Absence of adequate research infrastructures</li> <li>• Lack of overall RI strategy, but only individual instruments and measures targeting to upgrade national RIs</li> </ul>	<ul style="list-style-type: none"> <li>• The separate Priority Axis for the development of RIs was included in DESMI (since 2008) with by far increased financial resources directed to the numbered actions introduced under this Priority Axis (the level of which, however, was negatively affected by the crisis and budget cuts);</li> <li>• There is no National Roadmap yet, but the administration is aware of the need to adopt one. However, the small size of the country and its research sector indicate that large infrastructures are unlikely to be a priority area.</li> </ul>

	ERA dimension	Main challenges at national level	Recent policy changes
4	Research institutions	<ul style="list-style-type: none"> <li>• Despite the significant progress during the recent period, there is still need for reinforcement of the universities</li> </ul>	<ul style="list-style-type: none"> <li>• New privately-financed university, the Neapolis University, has been established and started operation in the academic year 2010-2011;</li> <li>• New legal provisions increasing the autonomy of HEIs are expected</li> </ul>
5	Public-private partnerships	<ul style="list-style-type: none"> <li>• Lack of an efficient mechanism in place facilitating interactions between the research organisations and the business sector</li> <li>• Lack of awareness and interest from the side of enterprises to RTDI activities</li> <li>• Inefficient implementation of Technology Park and incubators</li> <li>• Non-existence of professor privileges impeding knowledge transfer</li> </ul>	<ul style="list-style-type: none"> <li>• Increased focus on the improvement of research-industry links and better knowledge transfer expressed through the introduction of the relative initiatives in the current DESMI (characterised, however, by significant delays in their implementation or even non-announcements of the respective calls due to the budget cuts);</li> <li>• The development of the Business Support Centre Cyprus aiming at the development of interactions and cooperation links among innovation actors and in providing intermediary services for knowledge and technology transfer;</li> <li>• The establishment (in process) and operation of the network of model offices for liaison between the academic and business worlds in the six Cypriot universities;</li> <li>• Signing of the Technology and Academic Collaboration Agreement between the Department of Computer Science of the UCY and the Australian software company, FMT Worldwide for training of the UCY graduates, conduction of joint research and innovation programmes and commercial collaboration;</li> </ul>
6	Knowledge circulation across Europe	<ul style="list-style-type: none"> <li>• Low participation of the business sector in the cross-border cooperation activities</li> <li>• Emerging (not yet developed) scientific information systems</li> </ul>	<ul style="list-style-type: none"> <li>• A series of projects/actions started to promote the development of an effective scientific information system and facilitate the open access to knowledge within and across national borders;</li> <li>• Increased budget with targeted measures to improve access to international knowledge (bilateral cooperation, international networking);</li> <li>• The development of the institutional repositories in CUT and UCY (in the process of development);</li> <li>• New joint research projects launched in 2011 with Slovenia (€150,000) and Romania (€200,000);</li> </ul>
7	International Cooperation	<ul style="list-style-type: none"> <li>• Few collaboration agreements signed with third countries</li> <li>• Orientation rather to the EU than third countries in the international networking.</li> </ul>	<ul style="list-style-type: none"> <li>• Preparations are in process for the conclusion of the collaboration agreements with a number of other countries, including China and Israel.</li> </ul>



## 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

The human resources for research in Cyprus remain in short supply despite the high potential in the form of the significant share of highly educated young population. The share of researchers in total employment is only 0.22%, while the corresponding EU average is 0.73% (Eurostat: [http://epp.Eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.Eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database)). The vast majority of researchers are hired by the higher education sector (55%) followed by the business sector (27%) and then the government sector (14%).<sup>26</sup> The employment of researchers in the higher education institutions increased during the last years mainly due to the creation of the new universities and research centres and their continuous expansion (from 326 in 2000 to 986 in 2009 (Eurostat: [http://epp.Eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.Eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database))<sup>27</sup>.

There are both, supply- and demand-driven obstacles for the expansion of the market for researchers on the island: the number of graduates in mathematics, science and technology is very low in comparison to the EU-27, while the share of new PhD holders is among the lowest in the Union. The rapid expansion of S&E post-graduate courses (especially in the CUT) and other initiatives aiming to make research careers in Cyprus more attractive seem to reverse this trend<sup>28</sup> and pave the way to improve the situation. However, the extremely low levels of knowledge demand discourage S&T graduates. The government tries to make up for that by offering incentives to research organisations and private enterprises to hire new researchers (mainly through the respective actions of the DESMI).

There is no specific statistical data on inward and outward flows of researchers. The Eurostat data on the citizenship of the researchers employed in Cyprus<sup>29</sup> suggests that the majority of researchers are Cypriot nationals with only 21% coming from abroad. The vast majority of foreign researchers come from other EU member states (94%). The share of non-EU researchers has declined by 6% since 2002.

There is a substantial brain-drain of S&T graduates to other countries (mainly, the UK and USA) determined by a still unfavourable environment for research activities.

Mobility of students and researchers (especially within the EU) is actively supported both by public incentives and at the organisational level. Concerning the former, the RPF introduced a wide range of measures and instruments aimed at promoting participation of Cypriot researchers in EU research programmes (EU FP, COST, EUREKA) as well as collaboration with international organisations supporting research activities ("Bilateral Collaboration" and "International Cooperation" programmes). The organisation also promotes Cypriot researcher participation in the activities of the EU Joint Research Centre (JRC). A programme called "Hosting of Researchers Based Abroad" aims to host talented researchers from abroad and help them assimilate into the research system of Cyprus. Trans-national mobility is also reinforced through the increasing collaboration with the world-wide top-quality academic and research organisations promoted by the Cyprus Cyl and the CII.

<sup>26</sup> Own calculations based on the data from Eurostat, figures for 2009 [http://epp.Eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.Eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database)

<sup>27</sup> The figures refer to Headcount (HC).

<sup>28</sup> The share of researchers in the total employment portrays significant increase by almost 0.12% during the only seven-year period 2000-2009 (source: own calculations based on the data from Eurostat, [http://epp.Eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.Eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database)

<sup>29</sup> The data concerns researchers (HC) in government and higher education sectors in 2009.

## 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

Research career building in Cyprus is relatively attractive, if taking into consideration the level of salaries coupled with other incentives offered to researchers, including financial assistance and employment support for young talented scientists. According to the study of the EC on the “Remuneration of researchers in the Public and Private Sectors” (CARSA, 2007), the annual average remuneration of a researcher reaches slightly more than €45,000, a figure well above the EU-25 average of approximately €38,000. Researcher pay is also quite high compared to similar occupations in all scientific domains. Moreover, a researcher in Cyprus can expect annual increments throughout his career. Strict fiscal policy and budget consolidations resulting in significant cuts of resources available for R&D are expected to negatively affect the research salaries’ growth and the additional benefits.

The process of adoption of the European Charter for Researchers, setting out the general principles for defining the role, responsibilities and rights of researchers as well as employers and research funding bodies in both the public and private sectors, is progressing in Cyprus. According to the information from the [EURAXESS Cyprus website](#), the majority of Cypriot Research Organisations and HEIs have endorsed both, the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.<sup>30</sup>

Research positions are open to foreign applicants. An indirect barrier for some positions may be the requirement for knowledge of the Greek language. Although there is no legal requirement for international advertising of research positions, it is common practice. Some job vacancies are advertised through the EURAXESS portal. The national portal on the European Commission’s EURAXESS Services Network has been recently put into operation.<sup>31</sup> It provides practical information concerning professional and daily life, information on job and funding opportunities. Assistance to mobile researchers is complemented by the support of the national EURAXESS Services Centre.

The procedure of admitting researchers coming from non-European countries was simplified by the adoption of the “Aliens and Immigration (Amending) Law of 2009”<sup>32</sup> which integrates the Scientific Visa Package<sup>33</sup> into national legislation. The RPF has been nominated as a competent authority for the approval of the research organisations wishing to host third-country researchers. A specific “hosting agreement” signed with the (approved) institution allows the researcher to acquire residence permit without additional bureaucratic procedures (work permit etc.).

Directive 2005/36/EC on the recognition of professional qualifications was transposed into national law by the Parliament of the Republic of Cyprus in 2008 establishing comparably easier mutual recognition of professional qualifications and greater liberalisation for the provision of related services. The recognition of academic degrees is based on the Directives of UNESCO and the Council of Europe. The criteria for the evaluation of a degree are those established by the equivalent degree of the University of Cyprus or other Public Higher Education Organisations. In the case when the equivalent title does not exist in Cyprus Institutions, the evaluation relies on the equivalent degree from the European accredited Institutions (primarily, Greek Institutions).<sup>34</sup> To further improve global recognition of academic qualifications Cyprus adopted credit transfer systems (ECTS). There is no official system to establish the equivalence of foreign academic ranks (e.g. professor, senior lecturer) with national ones.

Concerning the portability of grants, some public research schemes stipulate that all the partner organisations in the consortium must be affiliated in Cyprus. In such cases, the grant is not allowed to be moved to another country. In other cases there is a limited portability of grants.

<sup>30</sup> They include: Agriculture Research Institute (ARI), Cyprus College, Cyprus Institute Neurology and Genetics, Cyprus University of Technology, European University Cyprus, Frederick University, Intercollege, Neapolis University, Open University of Cyprus, The Cyprus Institute, The Frederik Institute of Technology, University of Cyprus, University of Nicosia (source:

<http://ec.europa.eu/euraxess/index.cfm/rights/charterAndCode#C>)

<sup>31</sup> <http://www.euraxess.org.cy/index.shtm>

<sup>32</sup> Law N.29(I)/2009

<sup>33</sup> EU Directive 2005/71/EC

<sup>34</sup> <http://www.kysats.ac.cy/?page=faq&id=105&lang=en>

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

As already mentioned in the above paragraphs of the same chapter, there is no adequate supply of science, technology, engineering and mathematics (post)graduates. The creation of the CUT as well as continuous expansion of its post-graduate courses are the main instruments in place leading to stable increase in qualified human resources and potential labour force in research.

The establishment of Industrial Liaison Offices is expected to increase opportunities for students to work in research projects. As universities modernise entrepreneurship courses are increasingly offered.

### 1.4 Promote equal treatment for women and men in research

A comparative research of the European Union agency Eurofound on the pay gap revealed a significant wage gap between men and women in the country, actually the biggest in the EU (European Foundation for the Improvement of Living and Working Conditions, 2010). It seems, however, that gender equality issue is gaining more attention. The same study indicates that “number of amendments were made to the existing legislation on equal pay for men and women for equal work or work of equal value that are expected to reduce the gender pay gap” in 2009. The National Action Plan on Gender Equality (2007-2013) covers all the major areas in the gender equality field such as employment, education, decision making, social rights, violence and gender stereotypes. Co-financed by the European Social Fund, the National Action Plan for reducing gender pay gap (2010-2015) promotes a wide range of measures such as specialised training programmes for equal pay inspectors, trade unions and employers associations, interventions for eliminating occupational and sectoral segregation, issuing guides and codes of practice for managers and human resource professionals and the setting up of a special gender equality Certification Body (Planning Bureau of Republic of Cyprus, 2011).

Specific measures adopted by the government aim to promote entrepreneurship among all social groups, especially in the sectors of special economic interest such as tourism, manufacturing and trade. A measure called “Support to Female Entrepreneurship” was adopted in 2002 by the MCIT with systematic calls ever since. It provides training and start-up financial support to women of 18 to 55 years who wish to establish an enterprise in manufacturing, trade, services or tourism sectors.

No policy framework explicitly addressing either low employability of women specifically on the research labour market, or gender imbalance on academic and research boards or committees have been developed. At the level of individual organisations, however, some efforts are made. The RPF plays a major role concerning the promotion of the gender equality in research by ensuring the equal opportunities in their research programmes as well as the organisation of special awareness campaigns aiming at increasing female participation in research. Thus, in April 2011, a special workshop was organised where the representatives from 14 women organisations were informed about the opportunities of their participation in research projects. The organisation provided funding for research projects thematically covering the equality of men and women.<sup>35</sup>

## 2. Facilitate cross-border cooperation, enhance merit-based competition and increase European coordination and integration of research funding<sup>36</sup>

The main instruments for promoting joint actions at the international level are special actions under the “International Collaboration” programme in DESMI. The objective is to foster cooperation between Cypriot and prominent international research organisations.

### Bi- and multilateral agreements with other ERA countries

<sup>35</sup> <http://www.research.org.cy/EL/news/3122.html>

<sup>36</sup> Promote more critical mass and more strategic, focussed, 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

“Targeted international cooperation”, “Participation in ESF” and “Participation in Joint European Programmes” are supported. Specific thematic fields include technology, ICT, sustainable development, health and biological sciences, social and human sciences.

Through the specific programme RPF promotes bilateral cooperation. Bilateral research and technological development agreements were signed with Greece, France, Italy, Slovenia and Romania. In the context of these agreements Joint Scientific and Technological Cooperation Programmes are organised by the RPF and the respective organisation of the partner country for selected thematic priorities, in areas of common strategic interest.

The [European Office of Cyprus](#) was set up in 2007. It aims to provide information and support concerning policies and funding opportunities offered by the European Union.

### **Opening up of national R&D programmes**

Research organisations and non-profit organisations from abroad are eligible to participate as partner organisations with the possibility of obtaining up to 30% of the funding in the national programmes run by the RPF. However, for SMEs based abroad the regulation is different: they are eligible for participation as partner organisations but cannot receive any funding. No particular countries are specified in opening-up programmes.

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

The national scientific landscape does not provide for large research infrastructures. Even the largest RIs are too small to be of particular interest for foreign access. The most important national RIs include the Agriculture Research Institute (ARI) established in 1962 as a cooperative project between the Government and the UNDP, the RI in the sectors of neurology, genetics, biomedical and other related sciences of the Cyprus Institute of Neurology and Genetics (CING) and the laboratories of the UCY with unique research facilities.<sup>37</sup>

Due to its strong ICT and computing base, Cyprus gives particular emphasis to e-infrastructure. The Cyprus Research and Academic Network (CyNet) provides for a network infrastructure and aims at the provision of advanced Internet services to the research and academic community of Cyprus. The network infrastructure connects CyNet to the European research and academic network GEANT as well as to the Mediterranean Research and Education Backbone, EUMEDCONNECT and the Cyprus Internet Exchange (CYIX) (Cyprus Research and Academic Network, 2009). The Point of Presence of the second EUMEDCONNECT project<sup>38</sup> has been set up in Nicosia in 2005 and is now well established.<sup>39</sup> The CyGrid initiative, launched by the HPCL, aims at establishing a contact point for local scientific community users interested in Grid.

There is no specific RI strategy in the country. The Government’s intention to upgrade the national RI was expressed mainly through individual instruments and measures. The first efforts towards the improvement of the scientific base in terms of the RIs were launched in 2003 with the introduction by the RPF of the specific action for the upgrade of the existing infrastructure. Significant developments took place in 2008 when the Priority Axis for the development of RIs was included in DESMI. The actions aimed at developing new research infrastructure, upgrading and supporting existing research laboratories and providing access to important research infrastructure abroad. Budgets for 2009-2010 programmes were negatively affected by the economic crisis and general research budget cuts and some of the planned programmes were not even announced.

There is no explicit policy expressed for ESFRI schemes with no funds committed for the second phase of ESFRI infrastructures implementation. However, some steps forward have been recently made by the

<sup>37</sup> such as the Micro- and Nano-Systems Laboratory dedicated to micro- and nano-manufacturing and analysis and the High Performance Computing Systems Lab (HPCL) aiming to promote and coordinate research activities in the areas of Parallel and Distributed Systems, Grid and Internet Computing, Middleware and Performance Engineering

<sup>38</sup> aiming at the establishment of the IP-based network that serves the research and education communities of the Mediterranean area and is linked to the pan-European GÉANT network

<sup>39</sup> [http://www.eumedconnect.net/upload/pdf/e-Infrastructures\\_across\\_the\\_Mediterranean.pdf](http://www.eumedconnect.net/upload/pdf/e-Infrastructures_across_the_Mediterranean.pdf)

RPF. The organisation is currently elaborating the draft of the National Roadmap (DARIAH) website:

[http://www.dariah.eu/index.php?option=com\\_content&view=article&id=16&Itemid=21](http://www.dariah.eu/index.php?option=com_content&view=article&id=16&Itemid=21).

Participation to CERN is provided by the RPF through the specific programme of DESMI. The general Cooperation Agreement with CERN was signed by the government in 2006 followed by the two Technical Cooperation Protocols allowing local researchers to participate in the programmes in the specific sectors including High Energy Particle Physics and High Performance Computing Applications.

Strengthening the scientific base in terms of the enhancement of both, the existing research infrastructures and the creation of new RIs in specific scientific fields will be highlighted under the specific pillar in the National Strategy for Research and Innovation 2011-2015 (Planning Bureau of Republic of Cyprus, 2011).

#### **4. Strengthen research institutions, including notably universities**

Universities in Cyprus are characterised by comparatively high level of academic autonomy (Estermann T. et al., 2011). As autonomous entities, universities are responsible for the development of their curriculum and methods of teaching, institutional goals, areas, scope and methods of research, the design of their research agendas and topics of their research specialisation. The strategic plan is a key instrument for determining activities and priorities. Moreover, the universities in Cyprus follow the dual governance model (they are governed by a Council and a Senate). The Council is responsible for shaping institutional strategic and development planning of the organisation.

However, there are some restrictions concerning the structure of their budget and the level of academic staff's salaries, which is common for the organisations receiving public funding in Cyprus. Public funding is allocated to institutions according to budget headings, which have to be strictly respected. Although universities are essentially free to recruit their own academic staff, salary levels are determined within fixed boundaries defined by the state. University full and associate professors, however, in addition to these predefined salaries may be offered additional remuneration in the form of research bonuses. Salary scales for academic and research personnel in private universities and research institutes are determined by the institutions and are generally more flexible.

A proposal for the unified Law for the national higher education system, presented in the beginning of 2010 envisages increased autonomy of the universities and the introduction of accountability mechanisms and quality control are among the major topics in this proposal. The proposal was presented in a special meeting for public debate in April 2010 and it is under stakeholder consultation. Proposals for its improvement were received from the academic community.

The mission of the universities focuses on both teaching and research. HEIs also highlight their focus on provision of education and research mainly in specialisations contributing to the social and economic development of the country and to the wider community. No significant changes took place concerning this topic in the last years.

Universities in Cyprus constitute the main bodies implementing both basic and applied research. All public universities are research-oriented, while the private universities also try to strengthen their research activities through instigating the proper institutions and providing incentives to their academic members to pursue quality research. There are no specific criteria (in terms of the number of students or scientific results) used to define the level of the allocation of university block funding for research. The basic funding for research is based on the needs presented by the institutions during the budget negotiation phase. Public funding provided for research in the form of block grants is allocated by the universities through internal competitions and in line with their own research priorities. However, the main financial means for research in universities constitutes external competitive funding for specific research programmes (mostly, in the framework of either the RPF or the EU calls).

In respect to the monitoring mechanisms in place of the research performance in HEIs, the University of Cyprus is required by University Law (144/1989 to 199(I)/2003 section 31) to submit to the Council of Ministers a Report at the end of each academic year on its yearly activities, policies and achievements. The same requirements are provided for in the law governing the Cyprus University of Technology (198(I)/2003). For private universities, the Law providing for the establishment and operation of private universities (109(I)/2005) requires the establishment by the University Council of an Internal Evaluation

Committee, responsible for evaluating academic work in all departments. Among the major provisions of the proposed new unified Law is the strengthening of the reporting and quality control mechanisms of universities.

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

Cyprus faces serious weakness concerning research-industry cooperation. The creation of links between the research institutions and the industrial sector is, however, very high in the government agenda and the initially (prior to budget cuts) increased budget directed more resources to the development of adequate mechanisms to facilitate such interactions. Thus, the "Development of Industrial Research and Innovation Activities" Pillar accounted for 1/5 of the RPF's DESMI budget in 2009-2010 (more than €8.3m per year). One of the major objectives of the actions under this Pillar is the development of strong links and cooperation activities between enterprises, research organisations and intermediary organisations. However, several measures were cancelled or postponed due to budget cuts in 2010. In 2011, the total budget of calls in this Pillar reached €2.8m and concerned mainly the actions targeting research activities in enterprises.

Two new measures were introduced by the RPF for the period 2009-2010 under the abovementioned Pillar. The "Mediation Centres for Research and Innovation" aims to bridge the gap between the supply and demand of innovation through a mechanism of intermediation between research/academic institutions and SMEs, while the "Innovation Clusters" targets the creation of cooperation networks between enterprises, PROs and intermediaries. A specific action ("Patents") targets to raise the profile of IPRs in Cyprus providing funding to individuals, research organisations and enterprises to cover all costs incurred for obtaining and validating patents.<sup>40</sup> Funding for the 2011 call for the action was determined at €80,000.

The RPF also supports the development of the "liaison offices" to facilitate the interaction between the academic and business sectors. Moreover, the organisation coordinates<sup>41</sup> the [Business Support Centre Cyprus](#) (member of the Enterprise Europe Network, the initiative promoted in the framework of the EU Competitiveness and Innovation Programme 2007-2013) for the provision of innovation, technology and knowledge transfer and research and innovation support services to SMEs. The Centre is supposed to play a significant role in the development of interactions and cooperation links among innovation actors and in providing intermediary services for knowledge and technology transfer. With the support of the Centre, the lecture "From University Research to Industrial Innovation: Best Practices and Pitfalls in Technology Transfer" was announced to take place in November, 2011 in Nicosia. In the context of this lecture, the head of the Technology Licensing Office of the Massachusetts Institute of Technology (MIT) would share the successful experience of the MIT with the Cypriot research and business community.

The implementation of the Technology Park in the municipality of Limassol<sup>42</sup> undertaken by the MCIT and co-funded from the EU Structural Funds develops slowly. After more than half a decade since its first announcement (the decision was taken in 2005), the tasks completed include only the feasibility study and the construction of the access road of 6 km. The recent revision of the plans resulted in the decision to reduce the area for expropriation from 4sq.km to 1sq.km and cut of the budget for the initial construction works and administrative costs for the first nine years from €82m to €21.5m. While in 2010 the budget for the first planning and expropriations works reached €2.5m, no budget was foreseen for this in 2011. There is a risk of further delays or even cancellation of the project in case neither a strategic investor nor an adequate number of companies interested in the construction of the Park would be identified.<sup>43</sup>

<sup>40</sup> Including drawing up the application, filing, translation, prosecution and defence of the validity of the right during any official prosecution of the application and possible defence proceedings, as well as annual fees for the protection of patents for a period of two years

<sup>41</sup> Another two members of the Centre are the Cyprus Chamber of Commerce and Industry and the Development Organisation TALOS

<sup>42</sup> Which is going to host research centres, business incubators and innovative SMEs

<sup>43</sup> <http://news.exnet.gr/cyprus/55009-texnologiko-parko-den-kounietai-fullo-sto-pentakomo.html>

Concerning the free access to the research results, the country has not officially introduced any Open Access policies nor is there a national repository able to record the research publications.<sup>44</sup> Moreover, no related awareness activity among the research community is promoted. Some steps, however, have already been taken mostly at the level of individual institutions.

There is no established culture of inter-sectoral mobility, partly because research in the private sector is very limited (and has been even more so in the past). Although no quantitative data is available on the inter-sectoral researchers' mobility the overall impression is that it is very low. University professors have a right within some limitations to work in parallel in the private sector organisations and enterprises.

The institutionalisation concerning knowledge transfer from the research organisations to the industry is only taking the first steps. Until very recently knowledge transfer offices did not exist on the island. The UCY was the first institution to establish an Office for Liaison with Industry. It also plays a role of coordinator of the EU Structural Funds project "Development and operation of Offices acting as a liaison between Business/ Industry and the various Universities in the Republic of Cyprus" (2009-2014). The project targets the establishment and operation of a network of model offices for liaison between the academic and business worlds in the six Cypriot universities, public and private. The total budget directed for the creation of these offices is €3.5m. The operation of the liaison offices is expected to enhance communication and cooperation between the business sector and the Universities on subjects such as technology transfer, collaboration in research, promotion of applied research that responds to specific needs of the industry, utilisation of the results of universities research, enhancement of employment potential of students in enterprises and, generally, the promotion of innovation in business and the universities.

The Australian software company, FMT Worldwide, signed in October 2011 a Technology and Academic Collaboration Agreement with the Department of Computer Science of the UCY. The main objective of this agreement is the establishment of an academic thread giving possibility to the UCY graduates to train in FMT's Application Mediation concept and technology platform, the conduction of joint research and innovation programme.

## ***6. Enhance knowledge circulation across Europe and beyond***

The government supports cross-border cooperation through actions and measures promoted and implemented by the RPF. Participation in the EU Framework Programmes and Structural Funds, European and international networking, hosting and participation in the international conferences as well as hosting of young and experienced researchers from abroad are among the measures introduced by the organisation for its current programming period. Participation in EUREKA and Eurostars is also supported. Networking between the local research organisations and companies and respective organisations from other countries is reinforced also through openness of the majority of the national research calls to foreign representatives.

Cross-border cooperation in areas with European value added is institutionalised through bilateral research and technological development agreements between the government of Cyprus and the EU and third countries.<sup>45</sup> Since no thematic priorities were set for international research cooperation in Cyprus each of the signed bilateral agreements for cooperation specifies its field of cooperation. The selected thematic areas reflect the common interests of both parties. Thus, for example, the Joint Cooperation Programme between Cyprus and Greece covers the thematic priorities of Health, IT, Agriculture and Environment, while the Cooperation Agreement with France covered all scientific fields, including human and social sciences, as the area of joint activity. New calls for the implementation of the new joint research projects were launched in 2011 with Slovenia (€150,000) and Romania (€200,000).

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<sup>44</sup> two institutional repository initiatives currently take place: one recently launched by the CUT and another which is under construction at the UCY

<sup>45</sup> More detailed information is available in the section 2 of the Annex.

In the context of the government policy for international top class academic cooperation, joint ventures with leading research organisations of excellence<sup>46</sup> have been launched in the recent past. Cooperation with top organisations internationally is expected to improve the quantity and quality of research results and trigger specialisation in research areas relevant for the country and the broader region.

A series of projects/actions have been recently started to promote the development of an effective scientific information system and facilitate the open access to knowledge within and across national borders, but, as already mentioned in the Section 5 of the Annex, such initiatives are undertaken at the level of separate institutions and not as a nationwide policy. Thus, the Library of the UCY launched the project titled INTRA aiming to record all scientific publications made by the academic staff of the university. It also developed and continuously updates an open access thematic database E-BiBa, which contains publications metadata and digital documents from Greece and Cyprus in the field of Information and Library Science and foresees systematic forwarding of the papers to the international open access repository E-LIS. Another project of the library concerns the creation of a database with the PhDs earned in the university. The library participates in the EU programmes Open AIRE and Open AIRE plus targeting to support open access to the results of co-financed research. Moreover, the university is the only university in Cyprus that signed Berlin Declaration for the open access to Knowledge in the Sciences and Humanities.<sup>47</sup>

On the other hand, the library of the CUT together with the Information Services proceeded with the development of the institutional repository (KTISIS). It contains any digital material relating to the various activities of the university, especially scientific publications of its academic staff and researchers. The material can be freely accessed using Creative Commons licences. A subscription contract with publisher Biomed Central (BMC) for an open access model to the BMC journals was recently signed by the Cyprus Academic Library Consortium (CALC).<sup>48</sup>

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

Although there is no formalised national strategy for international cooperation in Cyprus, the cooperation and networking with research institutions from abroad has been perceived by the government as a priority for the small country with relatively recent RTDI history. A number of measures targeting the strengthening of international cooperation have been launched (mostly by the RPF) and are continuously expanding.<sup>49</sup> Promoting of International Cooperation is set as one of the priority pillars of the future National Strategy for Research and Innovation 2011-2015. In the NSDP 2007-2013, internationalisation constitutes one of the four categories under which the specific actions, targeting research should be developed.

Cyprus participates actively in European cooperation via FP7. The RPF is responsible for the coordination of activities for the promotion of Cyprus participation in the EU FP7. The range of actions adopted includes systematic provision of information and assistance for the preparation of research proposals. Moreover, through the specific action "Participation in Joint European Programmes" the RPF promotes Cyprus participation in a number of European initiatives under Articles 185 and 187 of the TFEU<sup>50</sup> (ex Articles 169 and 171 of the TEC<sup>51</sup>) and the ERA-NETs. Through its membership in the ESF

<sup>46</sup> With Harvard in the area of Environment and Public Health (through the establishment of the Cyprus International Institute (CII)), with MIT, the University of Illinois and Centre de Recherche et de Restauration des Musées de France in the areas of energy, environment and water research, computational science and engineering and cultural heritage accordingly (through the research centres based on the Cyprus Institute (Cyl)).

<sup>47</sup> [http://www.openaire.eu/en/about-openaire/publications-presentations/doc\\_view/235-openaire-poster-cyprus-online](http://www.openaire.eu/en/about-openaire/publications-presentations/doc_view/235-openaire-poster-cyprus-online), <http://libblog.ucy.ac.cy/2011/11/blog-post.html>

<sup>48</sup> <http://www.openaire.eu/el/open-access/country-information/cyprus>

<sup>49</sup> They have already been described in the sections 2 and 6 of the Annex

<sup>50</sup> Treaty on the Functioning of the European Union

<sup>51</sup> Treaty establishing the European Community

since 2002, the RPF makes possible the participation of the local researchers in the activities of the organisation.

Cyprus is currently involved in two Joint Technology Initiatives such as Embedded Computing Systems (ARTEMIS) and Innovative Medicines Initiative (IMI), as well as in the AMBIENT ASSISTED LIVING (AAL) and the EUROSTARS joint programmes based on the Article 185 and the EUROCORES collaborative scheme of the ESF. It also participates in a number of ERA-NETs in the framework of FP7 including ARIMNet, ERACOBUILD, EUPHRESCO II, ICT-AGRI, MARTEC II and RURAGRI.<sup>52</sup>

Based on the analysis made by the RPF<sup>53</sup>, the programme “Cooperation” is the most popular programme for Cypriot participants with 2/3 of the all proposals submitted to this programme. Thematically, ICT remains the area with the highest number of Cypriot participants (336 in 293 proposals) and the highest number of projects selected for funding (39), which brought in 32% of the overall amount raised by Cypriot participants.

Through a specific action “Targeted International Cooperation” the RPF promotes collaboration with the research organisations in countries with high R&D profile. The 2011 Call determined the participation of Partner Organisations from the America (USA, Canada, Brazil), former Soviet Union countries (Russia, Ukraine) as well as South-East Asia (India, Japan, China, S. Korea). This action is used as an instrument for creation of collaboration networks with the research organisations from the third countries with which no bilateral agreements were signed. Health and Biological Studies and Technology are the top fields in which the collaboration projects were approved.<sup>54</sup>

At the political level, due to its geographical location and the ambition to play a prominent role in the Eastern Mediterranean, Cyprus has particular interest in cooperation with the countries from this geographic area. The first bilateral international (non-EU) Scientific Cooperation on Research and Development was signed with Egypt. Under this agreement, the first (and the only one so far) Joint Programme was launched in 2007 focused on the thematic fields such as energy, environment, agriculture, health, cultural heritage protection and new technologies. A Scientific Cooperation on Research and Development with Israel was recently signed and its implementation is expected in the near future. The agricultural sector is prioritised in cooperation with Syria. Collaboration agreements in science and technology have been signed also with the USA and India.<sup>55</sup> Preparation processes for the conclusion of the collaboration Agreements with a number of other countries, including China are under way.

There are no specific rules regulating the national collaborations with third countries nor any thematic priorities were set for international research cooperation. However, specific research fields are prioritised in each of the signed bilateral agreements.

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<sup>52</sup> <http://netwatch.jrc.ec.europa.eu/nw/index.cfm/info/Nets?status=all&CountryCode=CY>

<sup>53</sup> Analysis was based on the data from the e-CORDA database of the EC up to 26 October 2011 (source: Cyprus Research Promotion Foundation, 2011))

<sup>54</sup> according to the data from the evaluation results of the DESMI 2009-2010 by the end of Sept. 2010

<sup>55</sup> More information is available in the [ERAWATCH Country Profile for Cyprus](#)

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## List of Abbreviations

ARI	Agriculture Research Institute
BERD	Business Expenditures for Research and Development
CALC	Cyprus Academic Library Consortium
CARIE	Cyprus Association of Research and Innovation Enterprises
CEIF	Cyprus Employers’ and Industrialists’ Federation
CERN	European Organisation for Nuclear Research
CII	Cyprus International Institute for the Environment and Public Health
CING	Cyprus Institute of Neurology and Genetics
COST	European Cooperation in Science and Technology
CSC	Cypriot Scientific Council
CSTRC	Computation-based Science and Technology Research Centre
CUT	Cyprus University of Technology
Cyl	Cyprus Institute
CYIX	Cyprus Internet Exchange
CyNet	Cyprus Research and Academic Network

DESMI	Research Promotion Foundation's Framework Programme for Research, Technological Development and Innovation
ECTC	European Credit Transfer and Accumulation System
EEWRC	Energy, Environment and Water Research Centre
EIS	European Innovation Scoreboard
EPO	European Patent Office
ERA	European Research Area
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ERP Fund	European Recovery Programme Fund
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum on Research Infrastructures
EU	European Union
EU-27	European Union including 27 Member States
FDI	Foreign Direct Investments
FP	European Framework Programme for Research and Technology Development
FP	Framework Programme
FP7	7th Framework Programme
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
GPP	Green Public Procurement
GUF	General University Funds
HEIs	Higher Education Institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HPCL	High Performance Computing Systems Laboratory
HRST	Human Resources in Science and Technology
ICT	Information Communication Technology
IP	Intellectual Property
IU	Innovation Union
IUS	Innovation Union Scoreboard
JEREMIE	Joint European Resources for Micro to Medium Enterprises
JRC	Joint Research Centre
MCIT	Ministry of Commerce, Industry and Tourism
NCRI	National Research Council for Research and Innovation
NRP	National Reform Programme
NSDP	National Strategic Development Plan
OECD	Organisation for Economic Co-operation and Development
OP	Operational Programme
PCT	Patent Cooperation Treaty
PNP	Private non-profit sector
PRO	Public Research Organisations
R&D	Research and development
R&I	Research and innovation
RES	Renewable Energy Sources
RIs	Research infrastructures
RPF	Research Promotion Foundation
RTDI	Research Technological Development and Innovation
S&E	Science and Engineering
S&T	Science and technology
SF	Structural Funds
SME	Small and Medium Sized Enterprise

STARC	Science and Technology in Archaeology Research Centre
TTO	Technology Transfer Office
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UCY	University of Cyprus
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.

