

# ERAWATCH Country Report 2009

Analysis of policy mixes to foster R&D investment  
and to contribute to the ERA

## Cyprus

Lena Tsipouri and Dariya Rublova



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# ERAWATCH COUNTRY REPORT 2009: Cyprus

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## Executive Summary

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As highlighted by the Lisbon Strategy, knowledge accumulated through investment in R&D, innovation and education is a key driver of long-term growth. Research-related policies aimed at increasing investment in knowledge and strengthening the innovation capacity of the EU economy are thus at the heart of the Lisbon Strategy. This is reflected in guideline No. 7 of the Integrated Guidelines for Growth and Jobs. This advocates increasing and improving investment in research and development (R&D), with a particular focus on the private sector. This report aims at supporting the mutual learning process and the monitoring of Member States efforts. Its main objective is to characterise and assess the evolution of the national policy mixes in the perspective of the Lisbon goals, with a particular focus on the national R&D investments targets and on the realisation and better governance of the European Research Area. The report builds on the analytical country reports 2008 and on a synthesis of information from the ERAWATCH Research Inventory and other important available information sources.

The research and innovation system of Cyprus was developed only during the past decade. Accession to the EU was the driving force behind changes and an increased emphasis on R&D. Higher Education too has a short history. The University of Cyprus was the first to be established in the mid '90s. The Open University followed and the Technical University started operating in 2008. The Colleges were then upgraded to university status. Higher Education Institutions (HEIs) and Research Laboratories have increased their research efforts and output thanks to increasing national and international financial opportunities. The business community remains very sceptical regarding the return on R&D investments and industry-financed BERD is the lowest in the EU.

GERD is still very low (0.45% GERD/GDP compared to the EU average of 1.83% in 2007). However, there has been an increase over the past years, attributed mainly to considerable expansion of research activities in the broader public sector. A target of 1% by 2010 seems to be unattainable, mainly because the business sector has not raised its contribution. The government sector decreased its share from 35% in 2004 to 27% in 2007, while HERD rose from 35% to 42% respectively. Both shares are considerably higher than the EU average (13% and 22.5% respectively), whereas BERD accounting for 22% in Cyprus is notably lower (64%)<sup>1</sup>.

The Cypriot Government has established the foundations of its own strategy in line with the Lisbon Strategy and Barcelona objectives to a great extent. The updated National Reform Programme of Cyprus (NRP) for the period 2008 - 2010 is a continuation and enhancement of the previous NRP (incorporating its National Strategic Development Plan 2007-2013 as well as Government priorities). The main national challenges are reinforced in the document but remain the same.

Strategic goals as reflected in the NRP therefore are - macroeconomic stability, viable economic development, and social cohesion. Research, development and innovation are an integral part of the economic development target. Investing in knowledge and innovation constitutes one of the key priorities of the updated NRP and is considered as a factor of major importance for economic development in the

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<sup>1</sup> Data from Eurostat and own calculations based on the data from the Eurostat

country. In order to stimulate investment in R&D the government has earmarked a substantial increase to the Research Promotion Foundation (RPF) budget for its Framework Programme for Research, Technological Development and Innovation (DESMI). For the period 2008-2010 this stands at €120m, compared to €17m for 2006. The design and launch of the current DESMI linking R&D to innovation for the first time shows a more coherent approach towards research and technological development as a key to the competitiveness strategy of Cyprus. Greater emphasis is given to the effective implementation and exploitation of research results by the business world and Cypriot society in general.

Policies promoting the achievement of the European Research Area have been included in the updated NRP to enhance internationalisation. It is with this in mind that participation of the Cypriot research community in ERA Initiatives and implementation of the five initiatives announced by the Commission within the context of the Ljubljana Process are being promoted in the context of the NRP.

The size and composition of the productive sector is the main explanation for very limited resource mobilisation. Despite the continuous increase in national or European funding opportunities for SMEs, interest from enterprises is still limited. This is underpinned by the structure of the economy (service sector dominance) and small company size. Business associations claim that better and more responsive policies could improve the situation considerably. The Ministry of Commerce, Industry and Tourism is focusing on other areas and less so on R&D and innovation. The corresponding unit in the ministry is understaffed and shifting responsibilities from the Ministry to the RPF. This disappointing picture is complemented by the lack of interest of the banking sector in high-risk R&D ventures. As a result, it is still rather difficult for SMEs to have access to the collateral sought by credit institutions.

Inevitably the policy mix points to “route 6”, namely increasing R&D funding and performance in the public sector. Measures are addressing routes 2 and 3, by offering significant incentive to both R&D and non-R&D performers but the business response is slow. There is however some progress, as for instance SME involvement in European R&D programmes and projects. This progress is linked to a very low starting point. The focus on the internationalisation of research activities as the most important route of the overall research policy seems to be the best way to strengthen the basis for increased R&D investments.

Barriers to R&D investment	Opportunities and Risks generated by the policy mix
Lack of a long-term history and embeddedness of R&D policy	<ul style="list-style-type: none"> <li>• Recent intensified efforts after access to the EU</li> <li>• Internationalisation of research activities and cooperation with top international research and academic organisations expected to strengthen the R&amp;D potential of the country in the future</li> <li>• Multiannual and multithematic RPF's framework programme (DESMI) with substantially increased budget and special focus on business R&amp;D shows more coherent approach towards research and technological development</li> <li>• Reorganisation of the RPF and stronger emphasis on research and technology priorities constitutes an opportunity for more effective policies in the future</li> <li>• Public funding, still among the lowest in the EU possibly inhibiting implementation of the new ambitious policies.</li> </ul>
Size and structure of the productive sector	<ul style="list-style-type: none"> <li>• Strong emphasis on enhancing ICT potential both in business and public sectors may lead to higher R&amp;D activities and investments in the field</li> <li>• Access to the Single Market</li> <li>• Limited stakeholders' involvement</li> <li>• Specialisation in the service industry</li> </ul>
Limited awareness of the productive sector	<ul style="list-style-type: none"> <li>• A range of measures targeted at raising the awareness of the business community as to the advantages of R&amp;D and funding opportunities provided may boost business R&amp;D investment</li> <li>• A more proactive role by the Chamber of Commerce and Industry.</li> <li>• New incentives do not mobilise sufficient business resources</li> <li>• Inefficient implementation of expected interventions may lead to further disappointment and lack of company confidence</li> </ul>
Lack of coordination and an integrated strategy to secure long-term investments in research	<ul style="list-style-type: none"> <li>• The creation of the National Council of Research and Innovation and the Cypriot Science Council are expected to now focus research priorities</li> <li>• Integration of research and innovation activities under the Research Promotion Foundation</li> <li>• Insufficient progress towards the establishment of the two new coordination bodies</li> </ul>

Cyprus is a very active supporter of the ERA. The size of the country would not allow any specialisation unless in a broader alliance. In terms of governance and policy making the ERA has contributed to the design and implementation of the national R&D policy through the Lisbon agenda. Cyprus has made good use of participation in ERA-NETs and the Open Method of Coordination as well as CREST, which were very beneficial to the country.

The most visible effort and progress can be seen in the area of human resources, although changes are still needed in the legal and regulatory framework for facilitating transnational research careers as well as gender equality. The latter is a very weak point in the labour market for researchers. However, high salaries, coupled with other incentives offered to researchers, including financial assistance and employment support for young talented scientists, make research a highly attractive career in Cyprus.

Internationalisation is a well developed aspect, despite the need to further reinforce implementation of the institutional framework. Incentives for collaboration are manifold, national measures support participation in the EU FP and more measures are opening up to enable international and bilateral research cooperation.

The major weakness, namely the low industry-financed GERD, is also inhibiting progress towards the ERA. The university sector suffers from limited external funding

and opportunities for collaborative research. HEI research is almost exclusively funded by the public budget. A further challenge is limited availability and access to research infrastructures. The small size of the national research system limits the opportunities for participation in bigger research infrastructures. At this present point in time policies do not envisage immediate access to ESFRI or major international cooperation schemes. However, support for enhancing the national research infrastructure has increased: there is internal funding for local research teams and agreements have been signed to attract major investments, (two so far), in cooperation with universities of international repute which has resulted in the development of new research laboratories in the country.

More recent policies have addressed both challenges, the business sector and research infrastructures, but progress is slow and inhibited by factors external to the R&D system such as the overall size of the economy, the structure of production and the ultra peripheral position of the country. To compensate for these weaknesses trying to play a more prominent role in the Eastern Mediterranean may help the system thrive eventually.

	<b>Short assessment of its importance in the ERA policy mix</b>	<b>Key characteristics of policies</b>
Labour market for researchers	<p>The market is small but expanding.</p> <p>The Education System is a very open one with Cypriots frequently studying abroad. Considerable efforts are being made to attract foreign students to Cypriot universities</p> <p>Top priority given to opening up the national labour market to researchers and promoting mobility.</p>	<p>There are almost no barriers for foreign researchers to participate in national programmes. However, deficiencies in the social security system, a lack of harmonisation of pension schemes, a complete absence of specific provisions for mobile researchers as well as the delays in adapting and implementing scientific visa packages may prevent the increase of the mobility of researchers despite the plethora of measures and financial incentives envisaged by the national research policy.</p> <p>A significant number of measures have been adopted providing incentives and facilitating both inward and outward mobility of talented scientists.</p> <p>A number of special measures has been adopted 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).</p>
Governance of research infrastructures	<p>National RIs are limited but improving</p> <p>Given the small size of the country, Cyprus is unlikely to be able to play a significant role except possibly in ICT infrastructure</p> <p>Participation in major European RIs and ESFRI is practically non-existent</p>	<p>Despite the considerable increase in budget for infrastructure development, the infrastructures envisaged are mostly of the local level.</p> <p>Only as far as "virtual" infrastructures are concerned is there a possibility for Cyprus to play a leading role in the Eastern Mediterranean. Policies have started addressing this issue.</p> <p>As to Cypriot participation in transnational infrastructures, the national policy is explicitly not aimed at Cyprus becoming a full member in international organisations, since membership is not expected to bring any significant benefits to the country.</p>

	<b>Short assessment of its importance in the ERA policy mix</b>	<b>Key characteristics of policies</b>
Autonomy of research institutions	The Government supports the Bologna Process and makes efforts to further promote the autonomy of universities	For better implementation of the Bologna Process, the special Bologna Promoters Group has been established, in conjunction with the Cyprus Foundation for the Management of European Lifelong Learning Programmes, with the aim of disseminating information and promoting implementation of the Bologna requirements. Some steps towards higher autonomy have been taken by the Ministry of Education and Culture. This ERA-dimension, however, does not seem to be at the focus of the national <i>research policy agenda</i> .
Opening up of national research programmes	Opening up is rapid and successful	Cyprus actively promotes international networking and cooperation, especially at EU level but also the wider international level. Government support towards the European initiative on joining and coordinating national research programmes is reflected in the development of special strategies (designed by the RPF) to promote Cypriot stakeholders' participation in such initiatives. The lack of awareness, inadequate human and capital resources, insufficient coordination of policies and their implementation act as the main obstacle towards effective implementation of joint programming goals. The absence of provisions facilitating researcher mobility (social security, pensions and visa schemes) may impede successful opening up of national programmes. National programmes are open to foreign participation under certain reasonable constraints.

In conclusion, the Cypriot research and innovation system, though still small and recently-established, has made substantial progress within a limited period of time: it is increasing its research capabilities, opening up to the EU in a more coherent way than many other member states and has laid the foundations for international long-term cooperation and maximising on its geographical location between Europe and the Middle East. Public policy is well ahead of the business sector.

In the long run the system is expected to contribute to a new development model and increased competitiveness .



## TABLE OF CONTENTS

Executive Summary.....	3
1 Introduction.....	10
2 Characteristics of the national research system and assessment of recent policy changes.....	11
2.1 Structure of the national research system and its governance.....	11
2.2 Summary of strengths and weaknesses of the research system .....	14
2.3 Analysis of recent policy changes since 2008.....	17
2.3.1 Resource mobilisation.....	17
2.3.2 Knowledge demand .....	20
2.3.3 Knowledge production.....	21
2.3.4 Knowledge circulation .....	22
2.4 Policy opportunities and risks related to knowledge demand and knowledge production: an assessment .....	24
3 National policy mixes towards R&D investment goals.....	26
3.1 Barriers in the research system for the achievement of R&D investment objectives .....	26
3.2 Policy objectives addressing R&D investment and barriers .....	28
3.3 Characteristics of the policy mix to foster R&D investment.....	29
3.3.1 Overall funding mechanisms.....	29
3.3.2 Policy Mix Routes.....	30
3.4 Progress towards national R&D investment targets.....	34
4 Contributions of national policies to the European Research Area.....	37
4.1 Towards a European labour market for researchers .....	37
4.1.1 Policies for opening up the national labour market for researchers.....	38
4.1.2 Policies enhancing the attractiveness of research careers in Europe .....	40
4.2 Governing research infrastructures .....	42
4.3 Research organisations .....	43
4.4 Opening up national research programmes.....	46
4.5 National ERA-related policies - a summary.....	47
5 Conclusions and open questions.....	49
5.1 Policy mix towards national R&D investment goals.....	49
5.2 ERA-related policies.....	50
References .....	51
List of Abbreviations .....	53

## 1 Introduction

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As highlighted by the Lisbon Strategy, knowledge accumulated through investment in R&D, innovation and education is a key driver of long-term growth. Research-related policies aimed at increasing investment in knowledge and strengthening the innovation capacity of the EU economy are thus at the heart of the Lisbon Strategy. This is reflected in guideline No. 7 of the Integrated Guidelines for Growth and Jobs.<sup>2</sup> This advocates increasing and improving investment in research and development (R&D), with a particular focus on the private sector. For the period 2008 to 2010, this focus is confirmed as main policy challenge and the need for more rapid progress towards establishing the European Research Area, including meeting the collective EU target of raising research investment to 3 % of GDP, is emphasised.

A central task of ERAWATCH is the production of analytical country reports to support the mutual learning process and the monitoring of Member States' efforts in the context of the Lisbon Strategy and the ambition to develop the European Research Area (ERA). The first series of these reports was produced in 2008 and focused on characterising and assessing the performance of national research systems and related policies in a comparable manner. In order to do so, the system analysis focused on key processes relevant for system performance. Four policy-relevant domains of the research system have been distinguished, namely resource mobilisation, knowledge demand, knowledge production and knowledge circulation. The analysis within each domain has been guided by a set of generic "challenges", common to all research systems, which reflect possible bottlenecks, system failures and market failures which a research system has to cope with. The analysis of the ERA dimension still remained exploratory.

The country reports 2009 build and extend on this analysis by focusing on policy mixes. Research policies can be a lever for economic growth, if they are tailored to the needs of a knowledge-based economy suited to the country and appropriately coordinated with other knowledge triangle policies. The policy focus is threefold:

- An updated analysis and assessment of recent research policies
- An analysis and assessment of the evolution of national policy mixes towards Lisbon R&D investment goals. Particular attention is paid to policies fostering private R&D and addressing its barriers.
- An analysis and assessment of the contribution of national policies to the realisation of the ERA. Beyond contributing to national policy goals, which remains an important policy context, ERA-related policies can contribute to a better European level performance by fostering, in various ways, efficient resource allocation in Europe.

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<sup>2</sup> COM(2007) 803 final, "INTEGRATED GUIDELINES FOR GROWTH AND JOBS (2008-2010)", [http://ec.europa.eu/growthandjobs/pdf/european-dimension-200712-annual-progress-report/200712-annual-report-integrated-guidelines\\_en.pdf](http://ec.europa.eu/growthandjobs/pdf/european-dimension-200712-annual-progress-report/200712-annual-report-integrated-guidelines_en.pdf)

## 2 Characteristics of the national research system and assessment of recent policy changes

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### 2.1 Structure of the national research system and its governance

Cyprus is the third largest Mediterranean island and one of the smallest countries in the European Union with a population not exceeding 0.16% of the EU27. Tourism is the leading economic activity followed by financial services and real estate. Since the accession of Cyprus to the EU in 2004, significant structural reforms have transformed the economic landscape of the country: trade and interest rates were liberalised, investment restrictions were lifted and private finance initiatives were introduced for the operation of major infrastructure projects, (Ministry of the Interior, 2008). Over the last five years, Cyprus has had robust economic growth with an average real GDP increase of about 4% per year, outstripping by more than 1.5% the EU27 average of 2.4%. During 2008 economic growth was at 3.7% - well above the EU average of 1.4%<sup>3</sup> (Eurostat).

Cyprus has a very low R&D intensity emanating from its economic structure. The country ranks very low in terms of R&D expenditure. However, a positive trend has been observed over the past years, attributed mainly to a considerable expansion of research activities in the public sector. R&D expenditure in 1998 was only 0.22% of GDP, while in 2007 this figure reached 0.45% (compared to the 1.83% EU average). This figure is increasing very slowly, despite consistent efforts since accession to the EU. 66.5% of this comes from the government sector, while businesses only contribute to 16% of overall GERD financing<sup>4</sup> (Eurostat).

#### Main actors and institutions in research governance

The R&D system in Cyprus developed after the mid 90s. The system is composed of one organisation responsible for policy design (The Planning Bureau) and one agency responsible for implementation (The Research Promotion Foundation, RPF). The Planning Bureau is of an equivalent status to a ministry and has comprehensive responsibility for overall economic policy design. Research, innovation and human resources development are important elements of its competitiveness unit.

The Ministry of Commerce, Industry and Tourism (MCIT) is responsible for industrial policy, including the promotion of technology and entrepreneurship. Implementation is undertaken by both the Ministry and the Technology Promotion Foundation (TPF). An internal appraisal however has highlighted a lack of interest and resources in the Ministry and the TPF to design and implement R&D commercialisation and innovation policy.

As a consequence major decisions for changes in governance were taken in 2007:

- The TPF was absorbed by the RPF and the name of the consolidated agency is expected to change to reflect the new situation, moving from a Research Promotion Foundation to a Research and Innovation Promotion Foundation (RIPF). Changes in operational activities gradually started in 2008 but are not yet fully implemented.

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<sup>3</sup> Provisional data

<sup>4</sup> Data for 2006 (Eurostat)

- The MCIT decided to shift responsibility for incubators to the reorganised RPF.

The Ministry of Education and Culture has never been actively involved in either research or innovation. The Higher Education Authority is responsible for adult education.

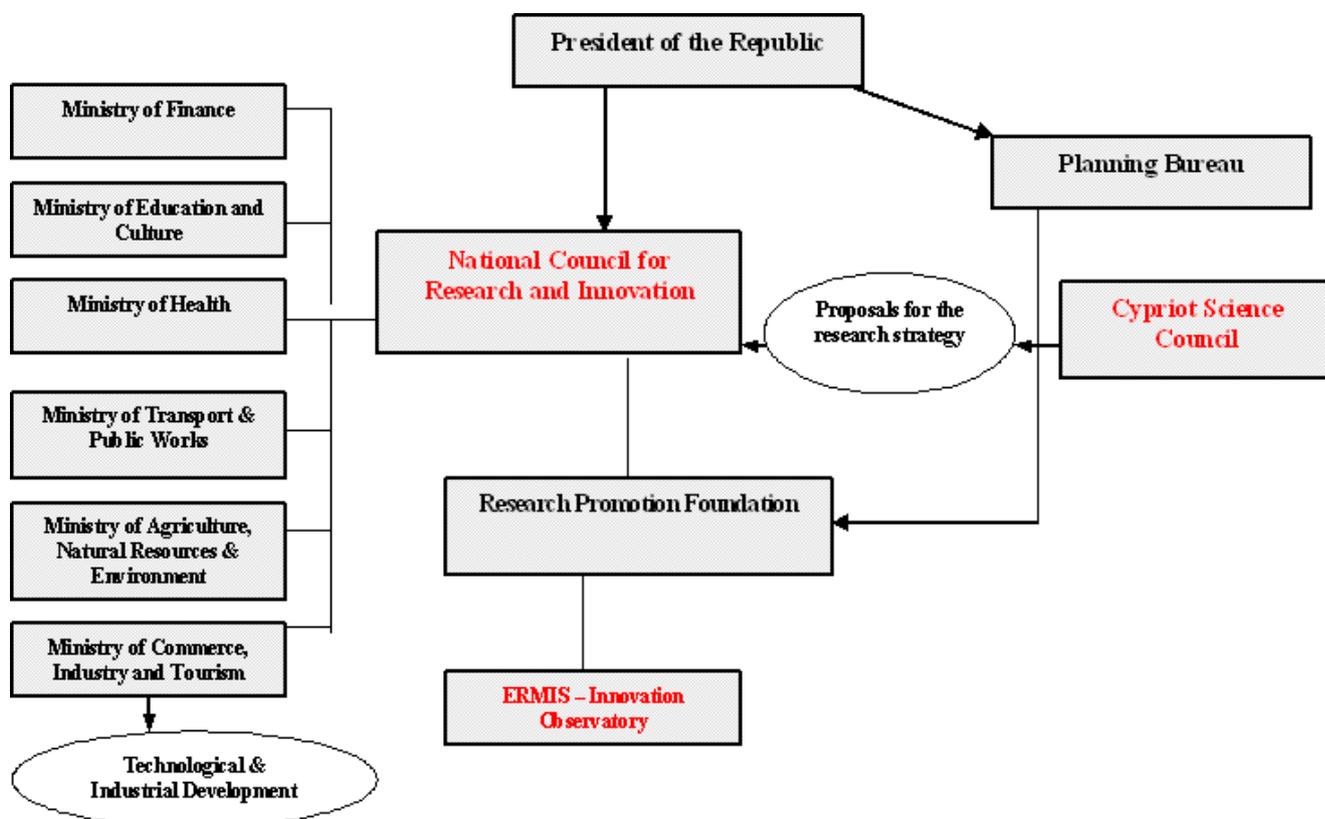
Due to the lack of comprehensive coordination a decision to create two new organisations was made as follows:

1. The National Council for Research and Innovation (NCRI) as the highest-level organisation with exclusive responsibility for adopting long-term strategies in research and innovation. The Council will be chaired by the President of the Republic (deputised by the Minister of Finance). Its members will be the Ministers of Commerce-Industry-Tourism, Finance, Education-Culture, Health, Transport-Public Works and Agriculture-Natural Resources-Environment.
2. The Cypriot Science Council (CSC) will be an advisory scientific board composed of 10-15 members, all qualified scientists, though not necessarily of Cypriot nationality. Its mandate will be to formulate research strategy proposals to the NCRI. The RPF will provide secretarial support.

This decision has not been implemented yet.

The current system (including planned changes) is best described by the following organigramme:

**Figure 1: Overview of the governance structure of the Cypriot research system**



Source: Authors. Note: red colour refers to the planned changes

## The institutional role of the regions in research governance

In the case of Cyprus, which is considered as a single region, local authorities comprising districts, municipalities and communities do not play a significant role in drawing up and implementing RTDI policies. It is the central government which generates policy. Recent provisions have reinforced the role of the regions. For example the recently established Technical University of Cyprus is located in the south (Limassol) and, in the future, will be the location of the first Technology Park in the country.

## Main research performer groups

In most EU Member States the business enterprise sector accounts for more than half of the total R&D expenditure, though this is not the case in Cyprus. The highest share of GERD was performed by the public sector, decreasing from 35% in 2004 to 27% in 2007. There has been corresponding increase from 35% to 42% in HERD. Both shares are considerably higher than the EU average (13% and 22.5% respectively). BERD accounts for 22% in Cyprus - notably lower than the EU average of 64%. The Private non-profit sector (PNPs) is considerably high at 7% vis-à-vis the EU average of about 1% (Eurostat and own calculations based on data from Eurostat).

In 2006, the service sector accounted for more than 66% of BERD with the IT and other business activities (including architectural and engineering activities and related technical consultancy) contributing the largest shares (37.5% and 15% of the total BERD respectively).

Similarly, in the manufacturing sector, which accounts for about 31% of BERD, the pharmaceuticals, medicinal chemicals and botanical products industries contribute to R&D investment by more than 13.5% (own calculations based on "Science and Technology" data from Eurostat). Given the small/very small size of the vast majority of the Cypriot businesses any dominant innovation / R&D oriented operators in the private sector would be rare.

The main research groups are the University of Cyprus, established a decade ago, and the Technical University of Cyprus, (TEPAK), established in 2004, with the first enrolment year in 2007. The Open University has very few R&D projects.<sup>5</sup> Colleges recently upgraded to university level, such as the European University Cyprus, Frederick University Cyprus and University of Nicosia are offering undergraduate degrees and undertake some applied research in the social sciences and humanities.

Other major organisations undertaking research are the Agricultural Research Institute, the Cyprus Institute of Neurology and Genetics and the Meteorological Centre.

Due to the small size of the country and the research and innovation system structure there are very few research organisations. However, a policy for international top class academic cooperation warrants a mention here. In the framework of the joint research, education and technology initiative for the environment and public health launched by the Cypriot government and the Harvard School of Public Health (HSPH), two new research and training bodies are already operational: The Cyprus International Institute (CII) for the Environment and Public

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<sup>5</sup> [http://www.ouc.ac.cy/index.php?page=res\\_programs\\_research&lang=en](http://www.ouc.ac.cy/index.php?page=res_programs_research&lang=en)

Health located in Nicosia and the HSPH-Cyprus Program (HCP) located in Boston, USA. The CII is about to be absorbed into the Cyprus University of Technology (TEPAK). The negotiations between TEPAK, the Harvard University and the CII are now in their final stage and post-graduate students are expected to be accepted in September 2009.

The Cyprus Institute (Cyl) was established in September 2007 and is a limited liability company set up to help implement the targets of the Cypriot Research and Educational Foundation (KEEI). Its remit is to promote research and education in Cyprus and abroad. The Cyl is a non-profit science and technology research and educational organisation offering pre- or post-doctoral fellowship programmes. It also develops a number of short courses on various subjects in collaboration with other international educational and research organisations. The Cyl has established and operates three Research Centres<sup>6</sup> in close collaboration with foreign establishments of international repute<sup>7</sup>. The organisation aspires to becoming a centre of excellence for the broader Eastern Mediterranean region.

## ***2.2 Summary of strengths and weaknesses of the research system***

The analysis in this section is based on the ERAWATCH Analytical Country Reports 2008 which characterised and assessed the performance of the national research systems. In order to do so, the system analysis focused on key processes relevant for system performance. Four policy-relevant domains of the research system have been distinguished, namely resource mobilisation, knowledge demand, knowledge production and knowledge circulation. The analysis within each domain has been guided by a set of generic "challenges", common to all research systems, which reflect possible bottlenecks, system failures and market failures a research system has to cope with. The Analytical Country Report for the specific country can be found in the [ERAWATCH web site](#).

At the moment the major strength identified is the commitment of the government to enhance research and gradually restructure the economy. As a result of accession to the EU, opportunities offered by the FP and the Lisbon agenda, the government is increasingly focusing on research. This has been translated into a substantial increase in budgetary commitments. The establishment and operation of new dynamic universities coupled with the decision to generously fund cooperation with world-class academic institutions are expected to generate more knowledge in the near future. Furthermore, high education levels, as well as the focus on internationalisation of research activities and cooperation with leading research organisations of excellence (MIT and Harvard) may develop a strong platform, thus further improving the country's research profile.

The R&D system and its governance is characterised by major weaknesses compared with the EU average but with a strong similarity with peer countries. The involvement of the social partners and the lack of public debate constitute a major weakness but there is an element of optimism seen in the redesign of governance,

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<sup>6</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>7</sup> Currently they include the MIT, the University of Illinois and Centre de Recherche et de Restauration des Musées de France

which was decided in 2007-2008; it is expected to produce visible results in the near future.

The real barrier is the structure of the productive sector, which is not geared to basic research and long-term investments. Public resources for research are increasing and a 1% of GERD/GDP target is set. This remains low compared to the EU average but comparable with peer countries. However, this target “is difficult to materialise and tends to be unattainable” (Planning Bureau of Republic of Cyprus, 2008, p.30). The launching of many calls for proposals to SMEs is increasing potential participation but with limited response so far. Infrastructure in the form of incubators and technology parks is implemented slowly and with limited efficiency. Efforts to support research infrastructure are increasing but still insufficient.

The well-known vicious circle of low demand and inadequate supply of research results is characteristic of the Cypriot R&D system. There are increasing efforts to stimulate research, but for the time being they are concentrated on support for the supply sector, since researchers respond to incentives faster than the business community. The lack of emphasis on R&D policy by the Ministry of Commerce, Industry and Tourism was and still is a major barrier.

There is internal commitment of the Planning Bureau and the RPF to assign priorities to anticipate latent demand. Monitoring is only internal and ad hoc, there is an almost total lack of systematic tools for priority setting, evaluations, foresight exercises and technology assessments.

The lack of human resources is addressed by the creation of universities and increasing programmes for life-long learning and its certification. The lack of medical and industrial design skills constitute a major weakness. Youth education levels are the main strength of the country.

Positive signs for knowledge production come from the universities and international cooperation, whereas exploitability of knowledge is much weaker than knowledge production. Limited specialisation in internationally growing sectors is the root cause here. Knowledge does not circulate between research organisations and the business sector and the vicious circle of low demand and lack of targeted supply along with a climate of mistrust has so far proven irreversible.

The lack of natural clusters or policies to create them, as well as insufficient specialised efficient intermediaries perpetuates the problem.

Overall coordination is limited and constitutes a main policy problem. The lack of competence and inadequate coordination by administration authorities may be the main reason for too many serious weaknesses in the Cypriot R&D system. Some efforts have been undertaken recently, such as the decision to establish two new collective bodies that are expected to improve the situation.

**Table 1: Summary assessment of strengths and weaknesses of the national research system**

Domain	Challenge	Assessment of strengths and weaknesses
Resource mobilisation	Justifying resource provision for research activities	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Increasing emphasis and public resources for research,</li> <li>Target of 1% of GERD/GDP set</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Insufficient contribution of the business sector to R&amp;D</li> <li>Low involvement of social partners and the lack of public debate</li> </ul>
	Securing long term investment in research	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Increasing efforts to raise long-term investments in R&amp;D,</li> <li>Intensive use of European funding as an investment instrument towards mobilisation of national research</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Unfavourable structure of the productive sector,</li> <li>Efforts to support research infrastructure are increasing but still insufficient</li> </ul>
	Dealing with barriers to private R&D investment	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Launching of many calls for proposals to SMEs supporting in-house R&amp;D and promoting academic-business R&amp;D cooperation,</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Limited response of the business sector to the numerous measures</li> <li>Slow and not very effective implementation of the infrastructure in the form of incubators and technology parks</li> <li>The lack of emphasis on R&amp;D policy by the MCIT</li> </ul>
	Providing qualified human resources	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Very high youth education levels</li> <li>Creation and operation of universities</li> <li>Increasing programmes for lifelong learning and its certification</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>The lack of medical and industrial design skills</li> </ul>
Knowledge demand	Identifying the drivers of knowledge demand	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Increased role of the Chamber of Commerce &amp; Industry in sensitising its members as to new approaches to competitiveness</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Sectoral specialisation of the economy is not favouring knowledge demand</li> <li>Insufficient awareness of the public sector as to the potential benefits of research results for social innovation</li> </ul>
	Co-ordination and channelling knowledge demands	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Internal commitment in the Planning Bureau and the RPF to design priorities to anticipate latent demand</li> <li>Political commitment to energy, environment and water resources</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Overall coordination limited,</li> </ul>
	Monitoring of demand fulfilment	<p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Monitoring is only internal and ad hoc,</li> <li>Almost total lack of systematic tools for priority setting, evaluations, foresight exercises and technology assessments</li> </ul>

Domain	Challenge	Assessment of strengths and weaknesses
Knowledge production	Ensuring quality and excellence of knowledge production	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Increasing role of universities and research organisations</li> <li>Increased funding for knowledge production</li> <li>Commitment to excellence and international cooperation via the FP</li> <li>International cooperation with top educational organisations from the US</li> <li>Bilateral research cooperation agreements</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Limited knowledge production,</li> </ul>
	Ensuring exploitability of knowledge	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>A new scheme for incentives supporting patenting</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Limited specialisation in internationally growing sectors,</li> <li>Very low share of patentable research results,</li> <li>Very low share of international patenting,</li> <li>No intermediary organisations</li> </ul>
Knowledge circulation	Facilitating circulation between university, PRO and business sectors	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Increasing effort to encourage university-industry cooperation from the side of the RPF in the form of new measures and calls for proposals</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>No specialised efficient intermediaries,</li> <li>Neither natural clusters nor policy to create them</li> </ul>
	Profiting from international knowledge	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>Good access to international knowledge,</li> <li>High transborder mobility with a series of mobility and cooperation support measures offered to further improve it</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>Low levels of participation of the business sectors in the FPs</li> </ul>
	Enhancing absorptive capacity of knowledge users	<p><i>Strengths:</i></p> <ul style="list-style-type: none"> <li>High youth education attainment level,</li> <li>Improving lifelong learning</li> </ul> <p><i>Weaknesses:</i></p> <ul style="list-style-type: none"> <li>BERD and S&amp;E that would facilitate absorptive capacity are low</li> </ul>

### 2.3 Analysis of recent policy changes since 2008

The contribution of research and research policies to Lisbon goals (as well as to other societal objectives) goes beyond the fostering of R&D investment. It is therefore important to also analyse how other remaining shortcomings or weaknesses of the research system are addressed by the research policy mix. The focus of the section is on the analysis of main recent policy changes which may have a relevant impact on the four policy-related domains.

#### 2.3.1 Resource mobilisation

Investing in knowledge and innovation constitutes one of the key priorities of the updated NRP. The main instrument through which the Government will stimulate investment in R&D and therefore nurture research activities is the substantial increase in the budget of the RPF's Framework Programme for Research, Technological Development and Innovation (DESMI). The RPF's DESMI provides a long-term prospect through recurring funding for the adopted projects. The present

DESMI 2008-2010 has secured €120m for the three-year period, the amount which is by far higher than for the previous period.

It was launched in February 2008 with a total budget of €70m for the first year of financial planning. (the budget for DESMI 2006 was €17m). The adoption and publication of DESMI, which explains the rationale and complementarity of the whole spectrum of the programmes and support mechanisms, demonstrates how the organisation intends to streamline its activities.

In order to address the lack of public interest and to raise awareness among the business community and the public in general as to the importance of R&D and Innovation, the RPF organised an [Awareness Campaign for the Importance of Innovation and R&D](#). There are also Information Days, Programmes for the development of Research and Innovation culture within the educational system such as -“Schoolchildren in Research Competition”, “Students in Research Competition”,<sup>8</sup> Annual Researcher’s Evenings,<sup>9</sup> as well as other events and seminars, aimed at creating a greater momentum for research.

Investment contribution of businesses to R&D remains at the very low levels. Due to the structure of the productive sector any significant increase of BERD is unlikely in the near future.

Measures promoting academic-business cooperation and supporting in-house R&D (e.g. EUREKA participation, Innovation Vouchers) are introduced by the RPF’s DESMI for the new period. The first call for the Innovation Vouchers was published in February 2008 with a total budget of €0.3m. In 2008, 18 applications for coupons were submitted to the RPF.

Enterprises involved in R&D have limited access to loans due to the lack of interest of the banking sector in high-risk R&D ventures. This may be partially overcome by setting up a Loan Guarantee Granting Facility. The measure has been included in the updated NRP and a Feasibility Study is underway.

European funding is also used as an investment instrument for mobilising national research. The NRP explicitly states that Cyprus is expected to succeed in raising funds from the FP7 with the RPF encouraging participation of the scientific community through different events and seminars. The role of European funding in research mobilisation is also underlined in the context of the 2007-2013 Operational Programme (OP) Sustainable Development and Competitiveness set out in the National Strategic Reference Framework and will be co-financed with more than €490m from EU funds (European Regional Development Fund and Cohesion Fund). Thus, a series of projects targeting at strengthening research and technological development have been included in the OP under the priority axis “Knowledge Economy and Innovation”.

Despite high education levels among young people on the island there is a lack of human resources involved in research, therefore a whole host of measures to promote a research culture at all levels of education and create a critical mass of researchers was introduced in the new DESMI under the strategic pillar “Development of Human Resources in Research”.

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<sup>8</sup> More information on these programmes may be found following the link [http://crpf.metacanvas.com/EN/national\\_programmes/desmi\\_2008/human\\_resources/mera\\_profit/index.html](http://crpf.metacanvas.com/EN/national_programmes/desmi_2008/human_resources/mera_profit/index.html)

<sup>9</sup> More information available in Greek: <http://crpf.metacanvas.com/EL/news/1561.html>

The programmes for training of new researchers launched by the RPF are addressed to both PhD candidates and PhD holders, and include actions for the entry, improvement and mobility of new researchers. In February 2008, the RPF opened the first call for the "[DIDAKTOR](#)" Program. There is also a programme to attract both new and experienced foreign researchers and to incorporate them for a specific period of time into the local research system.

Three private universities started operating in September 2007. In 2008 intake increased as well the courses on offer. More highly skilled human resources were therefore created. This is also the case for the recently established Cyl. The Government has also continued with more actions to enhance life-long learning since the national Life-long learning Strategy (LLL) was approved on 7th November 2007. The assessment of the LLL Strategy progress during the first year of implementation is still ongoing.

#### **Changes in National Reform Programme regarding the role of research in the broader economic growth strategy**

The revised 2008-2010 National Reform Programme of Cyprus (NRP) continues and enhances the previous NRP. It was updated to take into consideration the country's National Strategic Development Plan 2007-2013 and government priorities. The main focus of national challenges has been reinforced in the new NRP and its strategic goals are macroeconomic stability, viable economic development and social cohesion. Special emphasis is now given to competitiveness, pensions and the health care system.

Promotion of knowledge and innovation continues to be a top priority of the reform programme enhanced in the current period with a series of new measures introduced mainly in the 2008-2010 Framework Programme for Research, Technological Development and Innovation (DESMI) of the NFP. Despite increased R&D expenditure in absolute terms the national target of 1% of GDP in 2010 "tends to be unattainable" (Planning Bureau of Republic of Cyprus, 2008, p.30) due to the expected high levels of GDP growth and limited increase of business R&D expenditure.

The main measure taken by the Government for stimulating investment in R&D is the sizable increase in the budget of the RPF's DESMI for the period 2008-2010 to €120m, compared to €17m for 2006. Moreover, in comparison with the previous period, effective implementation and exploitation of research results by both enterprises and the Cypriot society in general has been enhanced. Moreover, policies for achieving a European Research Area have been included in the updated NRP. To this end, promotion of the participation of the Cypriot research community in the various ERA Initiatives as well as implementation of the five initiatives announced by the Commission within the context of the Ljubljana Process have been emphasised. The significant step towards the design of a more integrated approach concerning the promotion of information technology was the appointment in February 2008 of a Commissioner for the Information Society.

**Table 2: Main policy changes in the resource mobilisation domain**

Challenges	Main Policy Changes
Justifying resource provision for research activities	<ul style="list-style-type: none"> <li>• more emphasis on RTDI with new measures to support it</li> </ul>
Securing long term investments in research	<ul style="list-style-type: none"> <li>• adoption of a more integrated, long-term strategy for research and innovation</li> <li>• use of EU funding as a long term investment instrument towards mobilisation of resources for research</li> <li>• long-term support for research activities and programmes is foreseen by the programming documents prepared for the Cohesion Policy</li> <li>• joint research ventures with world-class research organisations</li> </ul>
Dealing with uncertain returns and other barriers	<ul style="list-style-type: none"> <li>• increasing incentives to the business sector</li> <li>• opening up more programmes of the RPF to the industry</li> <li>• increased number of awareness and training initiatives for SMEs</li> </ul>
Providing qualified human resources	<ul style="list-style-type: none"> <li>• new measures aimed to enhance human resources in R&amp;D</li> <li>• increased funding for “Development of Human Resources in Research” RPF’s strategic pillar</li> <li>• increased intake and number of courses offered by the newly established universities</li> <li>• operation of the Cyprus Institute</li> <li>• implementation of the recently approved national life-long learning strategy ongoing</li> </ul>

### 2.3.2 Knowledge demand

Given the structure of the economy with its limited number of manufacturing companies and the dominant position of the service sector, knowledge demand was and still is limited. ICT is the area mostly demanded by Cypriot researchers. A series of measures has been included in the NRP to develop an integrated National Strategy for the Information Society. Indirectly, measures promoting e-Government, e-health, e-learning, e-commerce, the introduction of an Office Automation System in all government departments as well as the development of an e-procurement system may raise knowledge demand. The Awareness Campaign included in the new DESMI is expected to relay the message to the business community and the public in general as to the importance of RTD and innovation.

The National Action Plan for Green Public Procurement (GPP) was recently approved. This may promote environmentally friendly products and services onto the market and generally stimulate more sustainable production and consumption patterns in the country enabling emerging sectors to grow faster and encourage knowledge demand. In order to anticipate latent demand, the RPF has introduced a set of thematic priorities covering a wide range of areas which were used for the design of a series of measures included in the organisation’s new framework programme.

There is no apparent progress towards better monitoring of demand fulfilment. No new policies have been adopted to tackle the lack of systematic tools for priority setting and evaluation processes and other monitoring mechanisms. Knowledge demand is monitored within the overall context of RTDI monitoring. It was only in 2006 that the RPF proceeded with an ex-ante evaluation of research programmes for

2004 – 2005. This provided an evaluation of the organisation’s structure as well as results of its research programmes ([ERAWATCH Network, 2008](#)). Generally, the Planning Bureau and the RPF undertake to internal and informal evaluations of their own performance and policy design towards meeting knowledge demand. The creation of an innovation observatory (ERMIS) expected to monitor the progress of implementation of the Action Plan RISC (introduced in 2006) and evaluate the results of the various measures to be adopted is covered by the NRP.

**Table 3: Main policy changes in the knowledge demand domain**

Challenges	Main Policy Changes
Identifying the drivers of knowledge demand	<ul style="list-style-type: none"> <li>• Increased focus and allocation of funds to the ICT area, which is apparently the main source of demand for technology</li> <li>• Awareness campaign is expected to contribute to higher social demand for new knowledge</li> </ul>
Co-ordinating and channelling knowledge demands	<ul style="list-style-type: none"> <li>• The Reform of Research and Innovation System provides for better coordination mechanisms that will improve the exchange of knowledge and synergies</li> <li>• The integration of research and innovation under the RPF, already completed in 2008, may contribute to the improvement of coordination in the future</li> <li>• The on-going implementation of the recently approved National action plan for Green Public Procurement may develop market conditions for more knowledge opportunities</li> <li>• New research ventures in close collaboration with international leaders</li> </ul>
Monitoring demand fulfilment	<ul style="list-style-type: none"> <li>• No dedicated monitoring, an overall observatory may improve this in the future</li> </ul>

### 2.3.3 Knowledge production

The most important step towards the higher and better knowledge production in the island is the substantial increase in the budget of the new RPF’s framework programme mentioned before. In 2008, more than €12.5m from the total €70m of DESMI for 2008 budget has been used to promote Strategic and Multi-thematic Research. The programmes under this pillar aim to improve the capacity of the Cypriot research system, to increase the production of high quality research in “cutting-edge scientific fields” such as Health and Biological Sciences, Technology, Sustainable Development, Information and Communication Technologies and Social and Economic Sciences and Humanities.

The establishment and operation of the Technical University of Cyprus (TEPAK), since Autumn 2007, was an important step towards tackling the apparent lack of knowledge production. The TEPAK is already actively participating both in the EU FP and the national research programmes. Cooperation with Harvard University and the incorporation of the Cyprus International Institute for the Environment and Public Health will help develop a stronger base for production of new knowledge in the field of environment and health.

The newly established three private universities may also serve as a basis for the production of new knowledge. The University of Nicosia and the European University Cyprus have set up an Applied Research Centre, while the Frederick University Cyprus hosts its own Research Centre, covering a wide spectrum of themes, from

engineering and environmental sciences to social sciences. The launch of operations in February 2008 of the Jean Monnet Centre of Excellence based on the University of Cyprus may enable knowledge accumulation as regards European integration.

The government has become aware of the considerable gap between knowledge production and its exploitation. This has led to an increased effort to encourage utilisation and commercial exploitation of research results. In order to limit obstacles and create incentives for patenting, the RPF has launched a measure called “Patents” (“Evresitehnia”). This action, adopted as a response to the RISC recommendations, is aimed at motivating individuals, research organisations and enterprises to file patent applications with the aim of raising the profile of IPR in Cyprus. The measure provides funding to cover all costs incurred in obtaining and validating patents, 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. This therefore provides the possibility of patenting significant research results that arise from research programmes managed and/or funded by the RPF, the EU or any other organisation. The measure mainly aims at an annual increase in the number of patents submitted by Cypriot enterprises, research organisations and individual researchers / inventors and the further commercial exploitation of these patents by local individuals and bodies. Funding for the “Patents” action in 2008 was €200,000.

**Table 4: Main policy changes in the knowledge production domain**

Challenges	Main Policy Changes
Improving quality and excellence of knowledge production	<ul style="list-style-type: none"> <li>• Increased budget for improving the capacity of the national research system to raise research production in the “cutting-edge scientific fields”</li> <li>• Active involvement in research of the recently established universities</li> <li>• Introduction of the international examination system by the University of Cyprus will open doors for more candidates</li> <li>• Operation of new centres of excellence</li> </ul>
Ensuring exploitability of knowledge production	<ul style="list-style-type: none"> <li>• More measures and increased budget for the encouragement of research/industry cooperation as well as utilisation and commercial exploitation of research results</li> <li>• “Patents” scheme of the RPF</li> </ul>

### 2.3.4 Knowledge circulation

The National Strategic Development Plan for 2007-2013 has set as a strategic target the enhancement of the Cypriot RTD system and its link to the productive base, as well as bridging the gap between the research/academic and business community.

Weak R&D cooperation has been enhanced through a set of measures introduced by the RPF in its new DESMI and covered by the NRP. The action called ["Thematic Innovation Networks"](#) aims directly at the creation of the cooperation networks between enterprises, research institutions and intermediate bodies. The creation of the “Research and Technology Mediation System” targets the design of the intermediation mechanism between SMEs and research organisations. Both measures have not been implemented yet with the first call for proposals expected to be published in the early 2009. The RPF supports also the development of the

“liaison offices” targeted to facilitate the interaction between the academic and business sectors. Concerning the establishment of Science and Technology Park, adopted by the MCIT, the feasibility study is almost completed. However, according to the NRP Third Progress Report (Planning Bureau of Republic of Cyprus, 2008), the basic infrastructure has been completed. The updated NRP has included the measure aiming at the introduction of a business incubator accreditation system.

Cyprus’ intention to access the international knowledge is explicit and expressed through a wide range of measures promoting bilateral and multilateral cooperation, participation in EU FP and Structural Funds, international networking, hosting and participation in the international conferences as well as hosting of young and experienced researchers from abroad. All these measures have been adopted by the RPF for its current programming period and are on-going. The budget for these measures reached €2.65m for 2008.

The really important step to tackle the very limited absorptive capacity in Cyprus was the launching of operation of the TEPAK in late 2007. In order to increase the inadequate levels of participation of SMEs in numbered programmes designed to enhance business R&D, awareness and training programmes for the Development and Utilisation of Innovation Opportunities for enterprises have been put forward by the RPF. Effort towards the enhancement of life-long learning, strengthened also in the Country Specific Recommendations, has been expressed through the design of the national life-long learning Strategy, approved in late 2007. The national Committee has been appointed as tool for monitoring the implementation of the Strategy and the assessment of first-year progress is under way (Planning Bureau of Republic of Cyprus, 2008). The Cyprus Productivity Centre (CPC) has included in its Action Plan 2007-2009 the programme targeting at the incorporation of the R&D in enterprises through provision of incentives for the implementation of life-long learning mechanisms and continuous improvement in businesses. The programme is expected to be implemented during the period from September 2008 to December 2009 with funding of about €430,000.

**Table 5: Main policy changes in the knowledge circulation domain**

Challenges	Main Policy Changes
Facilitating knowledge circulation between university, PRO and business sectors	<ul style="list-style-type: none"> <li>• Bridging the gap between research/academia and business communities has been enlisted among the core strategic targets of the development policy resulting in increased budget and number of measures for this purpose</li> <li>• Completion of basic infrastructures for the Technology Park</li> <li>• Support to the development of “liaison offices”</li> <li>• Measures towards the introduction of a business incubator accreditation system.</li> </ul>
Profiting from access to international knowledge	<ul style="list-style-type: none"> <li>• Increased budget with targeted measures to improve access to international knowledge (bilateral cooperation, international networking)</li> </ul>
Absorptive capacity of knowledge users	<ul style="list-style-type: none"> <li>• Operation of the TEPAK (end of 2007)</li> <li>• Increasing access of the business sector to RPF support mechanisms</li> <li>• Early Implementation of the national Life-long learning Strategy</li> <li>• New programmes of the Cyprus Productivity Centre</li> </ul>

## ***2.4 Policy opportunities and risks related to knowledge demand and knowledge production: an assessment***

Following the analysis in the previous section, this section assesses whether the recent policy changes respond to identified system weaknesses and take into account identified strengths.

One of the major policy-related opportunities stem from the recently introduced multi-sector, multi-annual RPF framework programme (DESMI 2008-2010) because it is the main tool for implementing government objectives related to R&D enhancement. Equally important is the emphasis on internationalisation, in general and participation in the EU FP, in particular.

The design and launch of the current DESMI linking R&D to innovation for the first time reveals a far more coherent approach towards research and technological development. The significant increase the DESMI budget (mentioned in above sections) reflects the intention of the Government to increase investments in research. A first round of calls was launched between March and May 2008 with a satisfactory response rate (more than 1000 proposals submitted) - mostly for the programmes targeted at strategic, multi-thematic research and the development of human resources. A new round of calls is expected in 2009.

However, there is a risk that the numerous measures targeted to increase RTD potential in the business sector might not find an adequate response. Initial results of proposal evaluations from the first round of calls of DESMI (Cyprus Research Promotion Foundation (2008a)), the overall response to the calls for the programmes targeted at enterprises are disappointing. One reason for low participation may be the fact that Cypriot enterprises operate mainly in the service sector (tourism and finance) with manufacturing companies almost non-existent. Policies are pre-emptive with a set of generic incentives (overall tax) and specific incentives, such as "Research for Enterprises", "[EUREKA Cyprus](#)" and "Innovation". A more proactive role of the Chamber of Commerce and Industry would also improve participation.

The establishment of the National Council for Research and Innovation and the Cyprus Science Council are expected to improve coordination of implementation mechanisms and better focus on research priorities. Responsibilities for research and technology are concentrated in one organisation, which is expected to generate significant effects of both scale and scope. The reorganisation can lead to policy redesigning so as to better address the deficiencies arising from the lack of a clear long-term strategy. However, the very slow implementation of these decisions creates a risk per se. Increasing international cooperation expressed through new bilateral and multilateral agreements and active participation in the EU programmes may create new opportunities, in particular for the role Cyprus can play in the Eastern Mediterranean. Joint ventures with leading world organisations (Harvard university, MIT and other Cyl partners), if successful, can attract more global organisations into the country contributing in this way to building a stronger platform for excellence in research on the island. The active participation of Cyprus in the EU FP, apart from funding, offers the opportunity to learn more from EU practices to better design its own R&D policies. However, it might be important for Cyprus not just copy automatically measures from the most developed economies that would not be as effective in the specific environment of the country.

The overall delays in launching programmes, which is a frequent phenomenon in the case of Cyprus, may be seen as a risk for successful implementation of policies drafted to tackle the country specific challenges.

**Table 6: Summary of main policy related opportunities and risks**

Domain	Main policy related opportunities	Main policy-related risks
Resource mobilisation	<ul style="list-style-type: none"> <li>• New RPF's framework programme (DESMI) with substantial budget increase</li> <li>• Active participation in EU programmes</li> <li>• Creation of the National Council of Research and Innovation and the Cypriot Science Council expected to improve coordination of implementation mechanisms and better focus on the research priorities</li> <li>• Operation of the Technical University</li> <li>• Cooperation with top international organisations</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient business response despite the increased number of measures targeting SMEs</li> <li>• Overall delays in launching and implementing programmes and organisation</li> </ul>
Knowledge demand	<ul style="list-style-type: none"> <li>• Raising of awareness of SMEs to encourage their involvement in the R&amp;D related activities</li> <li>• Increase in the allocation of funds and more integrated approach towards the diffusion of ICT</li> <li>• Hiring graduates from the Technical University and other recently established universities in the future will increase the absorptive capacity of the business sector</li> </ul>	<ul style="list-style-type: none"> <li>• Persistent low demand due to structural composition of the business sector</li> <li>• Indifference of stakeholders</li> </ul>
Knowledge production	<ul style="list-style-type: none"> <li>• New research centres based on the international cooperation with top academic organisations</li> <li>• New private and public universities</li> <li>• New calls of proposals by the RPF</li> </ul>	<ul style="list-style-type: none"> <li>• Production and commercial exploitation of knowledge is difficult to increase further without adequate increase in demand</li> <li>• Low scale of activities inhibiting international specialisation</li> </ul>
Knowledge circulation	<ul style="list-style-type: none"> <li>• Further emphasis on bridging the gap between the research and business communities</li> <li>• Active role in EU R&amp;D-related initiatives and further promotion of international cooperation</li> <li>• New dynamic universities as a means to attract foreign students and highly qualified human resources</li> <li>• Further promotion of life-long learning by designing and implementing the national Life-Long Learning Strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient response from the business community</li> <li>• Frequent delays in launching and implementing measures lead to the lack of private sector confidence</li> </ul>

### 3 National policy mixes towards R&D investment goals

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The aim of this chapter is to deepen the analysis of national policy mixes with a focus on public and in particular **private R&D investment**. The Lisbon strategy emphasises an EU overall **resource mobilisation objective** for 2010 of 3% of GDP of which two thirds should come from private investment. R&D investment is seen as important yardstick for the capacity of an economy to turn the results of science and research into the commercially viable production of goods and services and hence knowledge into growth. Corresponding investment policies are mainly pursued at national level and determined with a national focus.

The chapter is structured around five questions:

1. What are the specific barriers in the country that prevent reaching the Lisbon goal? What barriers exist in the country to prevent reaching the specific targets, particularly related to the private sector R&D investments?
2. Given the above, what are the policy objectives and goals of the government that aim to tackle these barriers?
3. What Policy Mix routes are chosen to address the barriers and which specific instruments and programmes are in operation to implement these policies?
4. What have been the achievements in reaching the above mentioned R&D investment objectives and goals?
5. What are the reasons for not reaching the objectives, adaptation of the goals?

The chapter aims to capture the main dimensions of the national policies with an emphasis on private R&D investment. The chosen perspective of looking at investments in R&D is the concept of Policy Mixes. The analysis and assessment follows a stepwise approach following the five questions mentioned above.

#### ***3.1 Barriers in the research system for the achievement of R&D investment objectives***

Cyprus does not have a long-time tradition in R&D and other related activities, such as investment in research and innovation, which puts it at a disadvantage in terms of the prevailing environment for its promotion. This is mainly due to the fact that research has never played a significant role in the design of national economic policy. Only with the accession to the EU has the role of R&D been enhanced. Although efforts towards developing a more effective research and innovation system and increasing investments in the field have been made, overall spending in R&D is still very low (0.45% GERD/GDP). State tertiary level education has been operating for less than two decades which is mirrored in the negative research environment. Despite the generally very high education levels reached in recent years and the prompt expansion of newly established universities and research centres there is still a considerable lack of research and innovation culture among the population of the island which is not conducive to higher R&D investment.

The size and composition of the productive sector is the main cause for very low resource mobilisation. Neither business associations nor the general public have

realised the relevance and potential of R&D for the economy and development. The structure of the business sector in Cyprus does not favour R&D. There are no big multinationals with headquarters on the island and even the biggest among national companies are effectively SMEs by European criteria. The majority of SMEs are very small family-based companies. Most enterprises tend to concentrate on low added value activities. Hence, marginal BERD: with 22% of GERD at the lowest in the EU. Very low demand for knowledge and innovation may also be explained by the sectoral structure of the economy which is dominated by the service sector (tourism and finance) with manufacturing representing only a small fraction. The services sector accounts for more than 66% of BERD with ICT being the major source of demand for R&D services.

An additional barrier is the lack of awareness among the business community as to the importance of R&D. This leads to insufficient interest from enterprises in many national or European funding opportunities. Companies are not familiar with research activities and they are not willing to undertake the necessary back-office work to attain research grants. The situation becomes more complex due to the absence of systematic university-industry linkage. The business and the academic sectors act independently and in parallel in Cyprus. Business structures and recently promoted research activities in the country have not built bridges to each other yet. All in all, the business sector complains about bureaucracy and its delays. Ineffective policy implementation aimed at creating incentives for industry to undertake research and building an infrastructure of incubators and a technology park have undermined the confidence of the business sector.

The Cypriot market has not generated economies of scope and opportunities for firms, nor made them aware of the merits of technology to coax them into investing in internal capabilities. Last year's calls for response showed some improvement from companies but it is still significantly lower than that of universities. The calls for funding were for both the academic and business sectors as eligible for support. Limited exploitability of knowledge also does not help enhance the R&D profile in Cyprus.

Another serious obstacle is the lack of coordination between various significant public institutions linked to R&D activities. Despite efforts undertaken by the Planning Bureau, the RPF and the Ministries of Finance and Education to raise long-term investments, the extreme lack of any broader research strategy adopted at an inter-ministerial level generally inhibits securing long-term investments.

This disappointing picture is complemented by the lack of interest of the banking sector in high-risk R&D ventures. Despite recent improvement of access to financing for SMEs as a result of interest rates and capital movement liberalisation, the problem persists and it is still rather difficult for SMEs to access the collateral required by credit institutions. Although venture capital may facilitate access to finance for enterprises not qualified for receiving bank loans, the use of VC in Cyprus is insufficient given the rather unfavourable environment for such investments (small and very small firms, lack of highly qualified human resources and generally low potential for mid- and high-tech development).

This all results in limited opportunities offered to stimulate the creation and expansion of R&D intensive companies. Limited access of R&D companies to bank loans may be partly addressed by setting up a Loan Guarantee Granting Facility now undertaking a Feasibility Study.

### **3.2 Policy objectives addressing R&D investment and barriers**

Until recently R&D and innovation was not seen as an area of explicit policy intervention in the form of any integrated strategy. However, having realised the significance of R&D towards the improvement of competitiveness and growth, the Government placed the promotion of RTDI among the key priorities of the National Strategic Development Plan. In full cognisance of the need for communication, the newly introduced NSDP 2007-2013 involved a wide public dialogue for the first time as a means for its development. Special emphasis was given to implementation of measures co-funded by the EU to make maximum use of Community funds and implement the National Reform Programme. This plan, drafted by the Planning Bureau and approved by the Government, constitutes the main strategy document giving guidelines for R&D and innovation policy in Cyprus.

As mentioned above, the plan defines the aims and objectives of the R&D policy for Cyprus. The promotion of research and development constitutes one of the eight strategic development pillars. Investing in knowledge and innovation has been defined as a priority area in the current NRP. A national target has been set for 1% of GDP to be earmarked for research by 2010.

The objective is to achieve an overall increase in R&D investments. This is reflected in the strategic objective to improve the general support framework for research activities. To this end a gradual increase of public funding channelled through the RPF has been planned.

To comply with the goal to increase BERD, the Government has directed its efforts towards R&D encouragement in the private sector and defined special objectives, communicated through the Strategic Plan as follows:

- Strengthening the national research and development system and its link with the productive base
- Stimulating the business sector's internal capability to develop innovation-related activities
- Bridging the gap between the business and the academic/research communities
- Developing funding mechanisms for innovative activities
- Developing an innovation culture and sensitising public to R&D

These objectives have been implemented in practice mainly through the measures under the priority pillar "Development of Industrial Research and Innovation Activities" of the new DESMI as well as through specific measures undertaken by the MCIT. The Lisbon strategy and the Barcelona objectives are of particular importance for Cyprus since they highlight the role of R&D and innovation in the overall economic policy. This means that goals set at national level and policy instruments adopted to achieve them are expected, if successful, to bring the country closer to the Barcelona targets.

Moreover, the Government's intention not to proceed with major changes in the NRP in order to implement pending reforms shows consistency of objectives. However, it has been realised and explicitly mentioned in the context of the current NRP that the national target of increasing R&D spending to 1% by 2010 is almost impossible to achieve. Although there has been a substantial increase in overall R&D expenditure in the current period, expressed mainly through the RPF's DESMI increased budgeting, this can hardly change the current levels of GERD as a % of GDP (only

0.45% in 2007) since the growth rates of the GDP are expected to remain high while business sector will not, it is expected, increase its contribution to R&D expenditure.

As to industry's involvement in R&D investment, although government objectives seem to be in line with present needs and to respond ably to challenges identified, they may be over-ambitious. The very unfavourable structure of the business sector, the lack of tradition in R&D as well as weak coordination mechanisms may impede the achievement of the goals set. Another major problem is limited involvement of the MCIT in the RTDI policy.

All in all, it seems that the long-term policy goals address the need for change though in a fragmented way. The lack of overarching research strategy adopted at an interministerial level make it almost impossible to secure long-term investment. The challenge for longer-term investment in R&D is to shift into new areas and help restructure the economy and make production more competitive.

### ***3.3 Characteristics of the policy mix to foster R&D investment***

This section is about the characterisation and governance of the national policy and instrument mix chosen to foster public and private R&D investment. While policy goals are often stated at a general level, the policy mix has a focus on how these policy goals are implemented in practice. The question is what tools and instruments have been set up and are in operation to achieve the policy goals? The following sections will each try to tackle a number of these dimensions.

#### **3.3.1 Overall funding mechanisms**

GERD is financed almost exclusively by the public sector supported by the EU funds. Allocation of the Government budget is realised mainly through the RPF's multiannual framework programmes. DESMI is partly financed by the European Fund of Regional Growth and comprises the set of competitive calls advertised periodically and addresses research institutions, enterprises, public organisations and individual researchers. In its attempt to increase overall spending in R&D, the Organisation proceeded with a substantial increase in the budget for the current DESMI (2008-2010). Financing for private sector R&D takes the form mainly of calls aiming to promote interaction between SMEs and academia as well as to stimulate research and innovation-related activities among the business community. The budget set for the current DESMI for these actions is 11.2m out of a total €70m, which is about 16% of total RPF funding. Introducing tax allowances was studied and rejected, as corporate tax is already so low that it would not be a credible incentive to make R&D investment tax free. However, tax exemptions are offered to academic institutions operating under a 'non-profit' status and there are tax reductions provided for acquiring research related equipment.

In the past, the MCIT, through the TPF, financed programmes directed at stimulating R&D commercialisation and innovation (more details in the section 2.1). However, in 2007 the Council of Ministers approved the decision to integrate research and innovation activities under the RPF where the Organisation is the main body responsible for the design and financing of national R&D policies.

The majority of programmes and policies targeted to support R&D are horizontal and concern the improvement of the general support framework for research activities, the upgrading of human resources and research infrastructures, encouragement of SMEs' participation in research activities and the growth of international networking

and collaboration. As far as thematic instruments are concerned, the funds are mainly targeted at the areas of ICT, Sustainable development, Bio-related sciences and Social Sciences (Strategic and Multi-thematic Research pillar of DESMI). The concentration of funding allocation in these areas is a result of the specific structure and deficiencies of the country's economy described in the section 2.4. Special emphasis, expressed through the number of new measures highlighted by the current NRP, is given to "facilitating the spread and effective use of ICT", revealing the intention of the Government to focus on the enhancement of national ICT potential as a basis for developing an inclusive information and knowledge society.

As mentioned in the NSDP, funding should be focused on the cutting-edge thematic fields that comprise a comparative advantage for Cyprus. These fields will be defined by the newly created Cypriot Science Council.

### 3.3.2 Policy Mix Routes

The "Policy Mix Project" identified the following six 'routes' to stimulate R&D investment:

1. promoting the establishment of new indigenous R&D performing firms;
2. stimulating greater R&D investment in R&D performing firms;
3. stimulating firms that do not perform R&D yet;
4. attracting R&D-performing firms from abroad;
5. increasing extramural R&D carried out in cooperation with the public sector or other firms;
6. increasing R&D in the public sector.

The routes cover the major ways of increasing public and private R&D expenditures in a country. Each route is associated with a different target group, though there are overlaps across routes. The routes are not mutually exclusive as, for example, competitiveness poles of cluster strategies aim to act on several routes at a time. Within one 'route', the policy portfolio varies from country to country and region to region depending to policy traditions, specific needs of the system etc.

#### **Route 1: Promoting the establishment of new indigenous R&D performing firms**

Given the country's limited experience in R&D related activities and the lack of innovation and research culture among the business community, the Government has realised the need to develop a platform for the creation of new technology-based enterprises. To this end, a set of measures has been introduced in recent years mainly in the context of innovation promotion. They include targeted measures to encourage the development of spin-off businesses from large companies and the creation of business incubators to support new inventors to develop and commercialise their innovative ideas. The planned [Network of Business Angels](#) is expected to develop an appropriate financing mechanism for innovative business activities. The creation of the Technology Park for establishing new research centres, business incubators and high-technology start-ups will further encourage new company creation. Several measures introduced in the context of policies targeted at enhancing competitiveness and entrepreneurship in the current NRP, through the development of appropriate business conditions may also indirectly contribute to the development of new R&D performing firms. Such measures include promotion of

[female](#) and [young entrepreneurship](#) and the creation of a one-stop-shop for new companies.

### **Route 2: Stimulating greater R&D investment in R&D performing firms**

As mentioned above, there is a limited number of R&D performing firms in Cyprus. Additional measures targeting R&D performers were introduced in the framework of the new RPF's DESMI under the pillar Strategic and Multithematic Research. These measures aim at implementing research projects in the areas of ICT, Sustainable development, Bio-related sciences and Social Sciences. However, they are not designed exclusively for the representatives of the business community: SMEs, academic institutions, SME associations and individual researchers are eligible to participate. Funding for these actions in 2008 was €12.7m, or more than 18% of the overall budget of DESMI. Besides, the RPF actively encourages the participation of Cypriot enterprises in the EU R&D related programmes with a view to upgrade the quality and quantity of R&D related activities among the Cypriot business community. ["EUREKA Cyprus"](#) is another measure supporting business R&D. It was introduced for the first time in the period 2003-2005 and has continued ever since.

The Cyprus Employers' and Industrialists' Federation (CEIF) still awards an Innovation Prize for businesses (in manufacturing, services and wider public sectors), launched in 2006.

### **Route 3: Stimulating firms that do not perform R&D yet**

Given that the vast majority of companies operating in the country who base their activity on traditional methods and technology and the intention of the Government to promote R&D investments in businesses, dedicated measures were introduced to stimulate research and innovation in firms that do not perform R&D yet. Most of these programmes were introduced by the new DESMI under the strategic pillar Development of Industrial Research and Innovation Activities and aim at the development of applied research in enterprises, the development of the R&D culture in enterprises, but also at the strengthening of the links between the business and the academic/research community. The main objective of the programme ["Research for Enterprises Actions"](#) is the involvement of Cypriot enterprises in research activities. The programme "Innovation", which includes the measures such as ["Innovation Vouchers"](#) and "Patents", aims primarily to engage Cypriot enterprises with innovation activities. Both of these programmes also aim to bridge the gap between the research and business communities. The ["EUREKA Cyprus"](#) can also be used by firms not involved in R&D in the past. The budget for these programmes was about €11.2m in 2008, ie., about 16% of the total budget of DESMI.

The RPF also promotes awareness and training of SMEs for the development and utilisation of innovation opportunities. The Awareness Campaign for Innovation and R&D is designed to raise awareness among the business community and the public in general on the importance of RTDI.

Generally, the significance of including research and innovation related activities in the framework of operations of the Cypriot enterprises, the urgent need to upgrade the technological base of SMEs and to develop the overall innovation and an R&D culture among the business community were all explicitly mentioned in the National Strategic Development Plan.

#### **Route 4: Attracting R&D-performing firms from abroad**

This route is not a priority for policy-makers. There are no direct instruments directed to attract foreign R&D-performing companies. The R&D system in the country is still too weak for that: the research base is insufficient; the business sector is hardly involved in R&D and knowledge transfer mechanisms are rudimentary. In recent years however, the Government has made some effort at developing attractive conditions for foreign firms willing to locate in Cyprus. In 2005, the Council of Ministers decided to establish the Cyprus Investment Promotion Agency (CIPA) to promote Cyprus as an entrepreneurial base to attract direct foreign investments. It started operating in January 2008 with budget of €1m for 2008. Moreover, the MCIT initiated the establishment in 2007 of a One-Stop-Shop (OSS) for business start-up with a view to enhancing competitiveness of the economy. While all this addresses FDI in general, offering a wide range of services for investors, the OSS can also make a substantial contribution to attracting FDI in the high-tech industries.

#### **Route 5: Increasing extramural R&D carried out in cooperation with the public sector**

The Government has focussed on this route as a top priority and strategic goals of national research and innovation policy since 2005. A wide range of measures promoting cooperation of companies and research institutions was introduced by the RPF. In the new planning period several new measures have been added.

The creation of a Research and Technology Mediation System, the development of Thematic and Innovation Networks providing mechanisms of intermediation between research/academic institutions and SMEs are among the new measures. Measures referred for route 3 (which are the part of the same pillar of DESMI) target at bridging the academia/industry gap as well. Hence, it is difficult to define the exact amounts from the budget earmarked for one or the other route. As to the programmes mentioned in this section, the EUREKA budget for 2008 was €2m, while the Research and Technology Mediation System and the Thematic and Innovation Networks has been allotted an annual amount of about €860,000 and €4.3m respectively.

#### **Route 6: Increasing R&D in the public sector**

There is a wide range of programmes directly or indirectly contributing to this route such as programmes targeted at the development of research infrastructure, measures promoting multi-thematic research and those aimed at the development and upgrading of human resources in research, as well as the initiatives promoting industry/academia linkages and international networking in the field of R&D. All areas mentioned are covered by current DESMI and both public and private sector are eligible for application. As enterprises are much more hesitant, representatives of the academic and research community account for the largest share of responses. Practically all of the measures included in DESMI are appropriate for the public sector. This demonstrates the relative importance of the route for the R&D policy-makers. The overall budget of DESMI 2008 was €70m.

#### **The importance of education and innovation policies**

Policies targeting at upgrading human resources in general, such as opening of new universities, running the Open University, improving education infrastructure as well as creating a stronger ICT base in educational organisations (primary, secondary and

tertiary) intensively promoted in Cyprus may contribute to a great extent to all of the routes. Life-long learning and SMEs innovation training programmes has been recognised as being very important for the development of a research and innovation culture in the business world thus affecting positively Routes 1 and 3.

The operation of the Technical University and the Engineering Faculty of the Cyprus University are also expected to facilitate diffusion of R&D in the business sector contributing equally to the Routes 1 and 3. Moreover, as mentioned in the section describing Route 1, a number of measures introduced in the context of innovation policies (incubators, spin-offs) may have an indirect, but significant impact on the establishment of new high-tech companies.

Moreover, in recent years Cyprus is making a major effort towards upgrading the education and research system by establishing new universities (Technical University), research centres and promoting joint ventures with top international organisations of research excellence (e.g. Harvard and MIT ventures). The establishment and operation in 2007 of the Cyprus Institute as a regional educational and research centre of excellence has been explicitly referred to in the framework of the current NSDP as a significant step towards the enhancement of a research and scientific base on the island. Innovation policies adopted in Cyprus aim mostly at the utilisation of broader R&D results and incorporation of innovative processes and products, as well as new technology in the business activities, but have a weak impact in the stimulation of in-house research.

As already mentioned in the section for Route 1, policies targeted at the enhancement of competitiveness and entrepreneurship such as facilitation of access to finance for SMEs (business angels, Loan Guarantee facility), if successfully implemented, can contribute to higher private R&D investment. The operation of the one-stop-shop may also help create appropriate framework conditions for setting up new R&D intensive firms.

### **Assessment of the importance of policy mix routes and their balance**

As far as stimulation of R&D investments is concerned, the policy mix chosen in Cyprus seems to contribute mostly to route 6 i.e. increasing R&D in the public sector. However, recognising the importance of promotion of research and innovation in the private sector and the need to involve more businesses in the R&D activities, the Government is designing policies for the current period with special emphasis on the promotion of business R&D investments. The vast majority of such measures aim at involving existing businesses in R&D related activities, but also the development of new high-tech units. There are also instruments targeted at stimulating greater R&D investment in the firms already performing R&D, but given the general lack of such businesses in the country Routes 1 and 3 remain a priority.

The promotion of internationalisation of research systems seems to be the first priority concerning the overall R&D policy-making. It appears that this priority is of relatively higher importance than each of the routes in question given the advantages of a strong diaspora, language skills etc.

**Table 7: Importance of routes in the national policy and recent changes**

Route	Short assessment of the importance of the route in the national policy	Main policy changes since 2008
1	Important with a number of measures introduced mainly in the context of innovation and entrepreneurship policy or through the improvement of framework conditions for company start-up or facilitating access to finance	Decision of the Council of Ministers to develop Business Incubators Accreditation System for establishing and operating business incubators New calls for proposals expanding existing programmes
2	Important, but with limited results because of the general substantial lack of R&D performing companies	Substantial increase in budget for the new DESMI Inclusion of the measures stimulating greater R&D performing at the forefront of scientific fields
3	Highly important with continuously increasing number of measures promoting involvement of existing SMEs in R&D and innovation related activities	Substantial increase in budget for the new DESMI A number of new measures and new calls introduced by the RPF's framework programme
4	Limited importance because the necessary conditions do not apply	Improvement for the allocation of inward investment in general (not R&D inclusive as a separate category) Recently introduced mechanisms (CIPA, one-stop-shop) aiming to effectively promote Cyprus as an entrepreneurial base for the FDI especially in high-tech industries Fully staffed CIPA launched its operation in January 2008
5	Explicitly referred to in the national strategy papers as one of the priority areas of R&D policy-making.	Substantial increase in budget for the new RPF's DESMI A number of new measures introduced by DESMI
6	Very important. Almost all measures and instruments introduced in the framework of the national research policy apply to the public sector (in many cases for both, private and public sectors) as a result of the Government's intention to reshape and renew the overall research system on the island represented mainly by public research and academic organisations.	Substantial increase in budget for the new DESMI enriched with the number of new measures Development of the new research centres based on the Cyprus Institute (detailed description in the section 2.1)

### **3.4 Progress towards national R&D investment targets**

Research and technology policies were not at the focal point of overall economic policy before the accession of Cyprus in the EU. The policy mix targeting the development of a stronger R&D base in the country emerged mostly through the need for Cyprus to harmonise its economy and research activities with those of the European Union. Thus, the main features of national strategy related to research and innovation have been shaped since 2005 and incorporated in the first NRP 2005-2008. The current national programme for research builds on the previous one without major shifts in goals and priorities. Having realised the need to restructure the existent weak research system, the Government substantially increased the overall budget for R&D to stimulate the private R&D. The budget of the RPF's DESMI 2008 is more than three times higher than the previous one and it is co-financed to a substantial degree by the European Structural Funds. It is also worth mentioning that

between 2005 and 2007 Cyprus increased its GBAORD from 0.74% to 0.97% of overall government expenditure, which however, is still lower than that of the average EU-27 (1.55%) (Eurostat).

**Table 8: Main R&D investment indicators for Cyprus**

	2005	2006	2007	2008	EU-27 (latest year)	
					Average	Year
GERD (euro million)	55	62	70	na	226120	2007
R&D intensity (GERD as % of GDP)	0.40	0.43	<i>0.45</i>	na	1.83	2007
GERD financed by government as % of total GERD	67.0	66.5	na	na	34.2	2005
GERD financed by business enterprise as % of total GERD	16.8	15.9	na	na	54.5	2005
GERD financed by abroad as % of total GERD	10.9	12.1	na	na	9.0	2005
GBAORD (euro million)	44	48	65	na	87639	2007
GBAORD as % of general government expenditure	0.74	0.75	0.97	na	1.55	2007
BERD (euro million)	12	14	16	na	144089	2007
Business sector R&D intensity (BERD as % of GDP)	0.09	0.10	<i>0.10</i>	na	1.17	2007
BERD financed by government as % of total BERD	14.3	22.7	na	na	7.2	2005

Data source: Eurostat. Note: Values in italics are estimated or provisional

Despite apparent compliance with targets set the policy mix however remains fragmented. There is still no integrated research strategy<sup>10</sup> directed at stimulating R&D investment, especially concerning the involvement of the business sector in research. The response from the business community is still very limited. Companies are not interested in undertaking research as they are not aware of the advantages of the R&D. Moreover, sometimes bureaucracy related to supporting programmes and the continuous delays in the implementation of the measures may discourage enterprises to proceed with application for support. As for stimulating establishment of new high-tech companies (Route 1), the way incubators and support to their tenants is designed is criticised, as sometimes newly created companies are left without any state support at the seed stage. State bodies in charge (chiefly the MCIT) have not succeeded in reversing barriers. A positive sign concerning mainly Route 2, has been the noteworthy progress made in the Government's intention to stimulate SMEs to becoming involved in European R&D programmes and projects and to take advantage of EU funds.

The needs of the public sector seem to be addressed better than those of businesses. Investments such as new universities and research centres in collaboration with the world top academic and research organisations are expected to recompense with sufficiently upgraded human resources and an improved academic/research environment, increasing the potential of the country to play a more significant role in the European research arena and to a greater extent in the Eastern Mediterranean. There are also actions foreseen by the RPF's DESMI that

<sup>10</sup> Some efforts have been made through the integration of the research and innovation policies in the RPF and the design of the new DESMI, as well as through the decision to proceed with the concentration of responsibility for the adoption of long-term strategies in research and innovation within a single high-level organisation - the National Research Council for Research and Innovation (NCRI).

target greater participation of the country in the ESF. Greater emphasis on the internationalisation of research activities (bilateral and multilateral agreements, greater stimulation to participate in EU programmes, international collaboration) may contribute successfully to the strengthening the platform for higher R&D investments.

**Table 9: Main barriers to R&D investments and respective policy opportunities and risks**

Barriers to R&D investment	Opportunities and Risks generated by the policy mix
Lack of a long-term history and embeddedness of R&D policy	<ul style="list-style-type: none"> <li>• Recent intensified efforts after access to the EU</li> <li>• Internationalisation of research activities and cooperation with top international research and academic organisations expected to strengthen the R&amp;D potential of the country in the future</li> <li>• Multiannual and multithematic RPF's framework programme (DESMI) with substantially increased budget and special focus on business R&amp;D shows more coherent approach towards research and technological development</li> <li>• Reorganisation of the RPF and stronger emphasis on research and technology priorities constitutes an opportunity for more effective policies in the future</li> <li>• Public funding, still among the lowest in the EU possibly inhibiting implementation of the new ambitious policies.</li> </ul>
Size and structure of the productive sector	<ul style="list-style-type: none"> <li>• Strong emphasis on enhancing ICT potential both in business and public sectors may lead to higher R&amp;D activities and investments in the field</li> <li>• Access to the Single Market</li> <li>• Limited stakeholders' involvement</li> <li>• Specialisation in the service industry</li> </ul>
Limited awareness of the productive sector	<ul style="list-style-type: none"> <li>• A range of measures targeted at raising the awareness of the business community as to the advantages of R&amp;D and funding opportunities provided may boost business R&amp;D investment</li> <li>• A more proactive role by the Chamber of Commerce and Industry.</li> <li>• New incentives do not mobilise sufficient business resources</li> <li>• Inefficient implementation of expected interventions may lead to further disappointment and lack of company confidence</li> </ul>
Lack of coordination and an integrated strategy to secure long-term investments in research	<ul style="list-style-type: none"> <li>• The creation of the National Council of Research and Innovation and the Cypriot Science Council are expected to now focus research priorities</li> <li>• Integration of research and innovation activities under the Research Promotion Foundation</li> <li>• Insufficient progress towards the establishment of the two new coordination bodies</li> </ul>

## 4 Contributions of national policies to the European Research Area

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ERAWATCH country reports 2008 provide a succinct and concise analysis of the ERA dimension in the national R&D system of the country. This Chapter further develops this analysis and provides a more thorough discussion of the national contributions to the realisation of the European Research Area (ERA). An important background policy document for the definition of ERA policies is the Green paper on ERA<sup>11</sup> which comprises six policy dimensions, the so-called six pillars of ERA. Based on the Green Paper and complementing other ongoing studies and activities, this chapter investigates the main national policy activities contributing to the following four dimensions/pillars of ERA:

- Developing a European labour market of researchers facilitating mobility and promoting researcher careers
- Building world-class infrastructures accessible to research teams from across Europe and the world
- Modernising research organisations, in particular universities, with the aim to promote scientific excellence and effective knowledge sharing
- Opening up and co-ordination of national research programmes

In the ERA dimension, the *wider context of internationalization of R&D policies* is also an issue related to all ERA policy pillars and is normally present in the dynamics of national ERA-relevant policies in many countries.

### 4.1 Towards a European labour market for researchers

The national labour market for researchers is small because of the overall size of the research system. This is more pronounced in the business sector, because of the extremely low number of enterprises (mostly SMEs) involved in research. However, the situation is improving. Newly established universities and research centres appoint new researchers and careers become more attractive. This is accompanied by continuous and systematic awareness-raising campaigns.

With the aim of enlarging the critical mass of researchers the government offers incentives to individual researchers as well as to research organisations and private enterprises to hire new researchers. All funding schemes are linked to opportunities to recruit young researchers. The majority of researchers are now employed by universities, but in relative terms there is an increase in the business sector as well: In 1998, the government sector employed the vast majority of all researchers (62%) and the business sector five times fewer or only 14% of the total. In 2006, the government sector accounted for only 29% of all employed researchers which is very close to the private sector percentage (25%). In the higher education sector, the corresponding figures were 20% in 1998 and 38% in 2006 which means that the

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<sup>11</sup> Commission of the European Communities: Green paper: The European Research Area: New perspectives. Brussels 4.4.2007, COM(2007) 161final (see [http://ec.europa.eu/research/era/pdf/era\\_gp\\_final\\_en.pdf](http://ec.europa.eu/research/era/pdf/era_gp_final_en.pdf)).

higher education sector holds a leading position in researcher employment (Statistical Service of Cyprus).

On the supply side there is a well educated labour force. In 2006, tertiary education graduates aged 25-64 made up 30.5% of the total population, a figure much higher than that of the corresponding EU average of 22.8% (Statistical Service of Cyprus, 2008). This trend is continuing. However, science and engineering graduates accounted for only 28% of the European average in 2005; this share is rapidly increasing (European Commission, 2007d) in particular since the creation of the Technical Faculties on the island. The number of PhD graduates is also increasing, although it is still lower than the EU average. In 2006, tertiary ISCED6 graduates accounted for about 0.2 per thousand of the population aged 25-34, which is about 13% of the corresponding share of the EU-27 (Eurostat). The researcher percentage in total employment (0.4%) is also low in comparison with the EU average (0.9%), (Statistical Service of Cyprus, 2008). Unemployment rates in Cyprus are relatively low. In 2007, unemployment rate among researchers reached 2.8% and are well lower than the European average (3.6%), (Eurostat).

Researcher remuneration in Cyprus is comparably high with the annual average salary reaching slightly more than €45,000, a figure well above the EU-25 average of approximately €38,000.<sup>12</sup> Researcher pay is also quite high compared to similar occupations in all scientific domains. The highest differentials are observed in engineering sciences, economics and chemistry. Moreover, a researcher in Cyprus can expect annual increments throughout his career.<sup>13</sup> High salaries, coupled with other incentives offered to researchers, including financial assistance and employment support for young talented scientists, make research a highly attractive career in Cyprus.

In conclusion, while the size of the research community is small with a late start, the labour force is well-educated and the government is making a systematic and visible effort to increase the attractiveness of a research career as a means of improving the overall research potential of the country. Programmes targeting at promoting research careers have been recently introduced and are now on-going. New universities and research organisations are expected to upgrade the national labour market for researchers and to attract more highly skilled professionals. A policy for international top class academic cooperation complements this policy.

#### **4.1.1 Policies for opening up the national labour market for researchers**

The role of the ERA is crucial for Cyprus as for all very small member states: it offers a potential to scale up some research activities and benefit from exchanges. For this reason the internationalisation of research activities is at the focus of national research policy.

Many measures were introduced supporting young people to study abroad and others attracting foreign students to enrol in Cypriot tertiary education. In recent years Cyprus is becoming a more attractive destination for students from abroad taking the top position of foreign students in tertiary education with 32% in 2004 compared to 7.6% European average (European Commission, 2007d). The most frequent destinations for Cypriot students are Greece and the UK. Foreign students

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<sup>12</sup> Annual average salary = Net yearly salary received + Employers' charges + Employee's charges

<sup>13</sup> Source: European Commission, 2007e

in Cyprus mainly come from countries of the British Commonwealth and the Middle East.<sup>14</sup>

Universities and research organisations have increased their efforts towards stimulating researcher mobility at the PhD level. The University of Cyprus offers programmes in an international language (the programme is already offered in one of the two official languages of teaching, i.e. Greek and Turkish). This allows foreign students to enrol in the national postgraduate programmes. Much the same provision is incorporated in the legislation of the other two public universities. Moreover, the University of Cyprus and the Cyprus University of Technology operate Foreign Language Centres facilitating mobility for incoming and outgoing students. The Cyprus Institute of Neurology and Genetics which has an international reputation, offers several research and teaching programmes in collaboration with research and academic organisations from abroad. For example, the Institute is recognised for PhD studies by the London Imperial College of Science, Technology and Medicine, as well as by Greek universities. Students are able to pursue their studies at the Institute with joint supervision and by spending some time abroad.

The University of Cyprus has signed a Bilateral Framework of Cooperation with about fifty universities all over the world (Europe, Australia, Asia and the USA). The Framework consists of a range of inter-university and inter-departmental agreements providing for mutual exchanges of student and academic staff, joint research programmes and exchange of teaching and research material.

Eurostat provides data on researchers by citizenship in government and higher education sectors: in 2006, almost 19% of all research positions in these two sectors were held by citizens of other countries. The vast majority of foreign researchers were from the EU, with only 10.5% originating from third countries. Compared with 2002 the share of foreigners fell by about 3.5 percentage points. This can be explained by the significant increase in the number of nationals graduating in Cyprus and engaging in research careers. The share of non-EU researchers has also declined. Most researchers from abroad are engaged in higher education.

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. To further improve global recognition of academic qualifications Cyprus adopted credit transfer systems (ECTS) and the Diploma. With the purpose of stimulating exchange and cooperation in the field of science and higher education the bilateral agreement between Germany and Cyprus on mutual recognition of equivalent formal higher education qualifications became operative in March 2006. The agreement facilitates the commencement or continuation of studies in either country, ensuring the recognition of learning achievements, degrees and the use of academic titles obtained.

Similar agreements with Romania and Italy are now in the final stage. Discussions are also under way with China.

In recognition of the importance of integrating Cypriot researchers into international R&D activities, the government has adopted substantial initiatives and activities to this end. The RPF introduced a wide range of measures and instruments aimed at promoting participation of Cypriot researchers in EU research programmes (EU FP,

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<sup>14</sup> <http://www.ctcdubai.org/subcat.asp?cid=7&scid=12>

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).

The current RPF’s DESMI introduced a programme called “Hosting of Researchers Based Abroad” to host talented researchers from abroad and their incorporation for a specific period into the research system of Cyprus. Currently, 11 projects submitted for this programme are expected to be funded with an approximate budget of €0.55m.

Cyprus may be considered a model European country in the way it deals with the brain drain. National policies consider only those human resources leaving the EU as a brain-drain. Foreign researchers are given incentives to work in Cyprus but emigration of Cypriot researchers is not discouraged, as long as their country of destination is a European country.

The Social Insurance Scheme is compulsory for every person gainfully employed in Cyprus regardless of legal status (employed, self-employed, part-time, temporary employment, fixed-time contract) without any differentiation for Cypriots, Europeans or third-country citizens. The Scheme covers all professions without any specific differentiation for researchers. Conditions on supplementary pension rights, dormant pension rights and the transfer of acquired rights have an effect on worker mobility and provisions for researchers are the same as for any other occupation.

Council Regulation No 1408/71 has been transposed into national legislation since 1.05.2004. The Department of Social Insurance Services of the Ministry of Labour and Social Insurance is responsible for government policy implementation of social insurance legislation. Cyprus has concluded social security bilateral agreements with the United Kingdom, Greece, Egypt, Canada, Quebec, Australia, Austria, Slovakia, Switzerland, the Czech Republic, Bulgaria and the Netherlands but there are no specific regulations for researchers in these Agreements.

Concerning facilitation of third-countries researchers’ entry and integration into the Cypriot labour market, the “Scientific Visa Package” has been incorporated into national legislation since 2008 but has not yet been applied.

Information on social security and pension schemes is available in three languages (Greek, English and Turkish) in the Department of Social Insurance Services site ([http://www.mlsi.gov.cy/mlsi/sid/sid.nsf/dmlindex\\_en/dmlindex\\_en?OpenDocument](http://www.mlsi.gov.cy/mlsi/sid/sid.nsf/dmlindex_en/dmlindex_en?OpenDocument)).

As far as researcher mobility is concerned, all relevant information on national social security, entry and residence permits, legislation for mobile researchers and life and employment in Cyprus is expected to be accessible via the internet before the summer 2009 within the framework of the National Euraxess Portal for Cyprus.

#### **4.1.2 Policies enhancing the attractiveness of research careers in Europe**

##### **Uptake of the Charter of Researchers**

The process to adopt the European Charter of Researchers has been launched. So far three academic organisations, namely the former Cyprus College, the Intercollege and the Frederick Institute of Technology have already adopted the Charter and the Code for the Recruitment of Researchers and signed the corresponding Declaration. The Charter sets 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. Its objective is the successful transfer and dissemination of knowledge, technological development and career development of researchers. The main purpose of the Code of Conduct is to improve researcher recruitment.

The RPF is actively promoting the further uptake of these documents by Cypriot research organisations. In 2008 consultations with research organisations and other competent establishments were held. The RPF is processing the results in order to draft a proposal to the Council of Ministers on the adoption of the provisions of these two documents.

### **Remuneration policies**

As far as public universities are concerned salaries for academic staff are in line with corresponding wage scales defined by the Treasury of the Republic of Cyprus. University professors may be offered additional remuneration only in the case of undertaking research in the framework of the European projects, if payment for permanent university staff is included in the eligible costs of the specific research programme. At the University of Cyprus, professors and associate professors receive a research bonus in addition to normal salaries. In private universities and research institutes, remuneration of academic and research personnel is determined by the organisation and are more flexible. Bonuses are provided as a means to attract the most talented scientists. The salaries in PPE are satisfactory.

### **Promotion of Women**

Gender imbalance seems to be a serious issue in science and technology, particularly in the area of research. There is clear evidence that women are under-represented. In 2003 they represented only 31% of total researchers. This percentage, however, is slightly higher than that of the EU-25 average (29%). Moreover, the growth rate in women's participation between 1999 and 2003 (18%) was the highest among all the EU countries (the EU average rate was only 4%) and 7% higher than that of men (11%).

The majority of female researchers are employed in the government (40%) and higher education (31%) sectors with only 22% in business sector. Female under-representation in academic careers is also pronounced with the percentages of women at all career stages (from PhD student to full professor) being lower than the corresponding figures for the EU average.

Cyprus "leads" the European countries in terms of the gender wage gap with the difference in gross hourly earnings reaching 25% in 2004 as calculated for the whole economy, the widest in the EU. What is worse, this difference has remained unchanged since 2002.<sup>15</sup> As far as researcher salaries are concerned, there is also a considerable difference of more than 30% in total yearly salaries between female researchers and their male peers (European Commission, 2007e). Furthermore, as reported in the "She Figures 2006" Report (European Commission, 2006), Cyprus has the worst figures in the EU concerning women's access to grant funding (gender differentials in research funding success is 13.5%) as well as female participation in decision-making processes through membership on scientific boards (7%).

There are no policy actions explicitly addressing either low employability of women on the research labour market, or gender imbalance on academic and research

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<sup>15</sup> European Commission, 2006

boards or committees. However, the general aim of the government to promote entrepreneurship among all social groups, especially in the sectors of special economic interest such as tourism, manufacturing and trade, has been expressed through a measure called “Support to Female Entrepreneurship” funded and managed by the MCIT. The measure includes a 6-month training programmes for women aged 18 to 55 years who wish to establish an enterprise in manufacturing, trade, services or tourism sectors and provides start-up funding. One of the major objectives of the measure is to support women to benefit from new technological capabilities and innovations by establishing new entrepreneurial activities thus promoting equal opportunities in the market.

In 2002, the law on “The Equal Treatment of Men and Women in Employment and Vocational Training” was promulgated (Law, No. 205(I)/2002). This Law targets “the application of the principle of equal treatment for men and women in respect of employment, access to vocational guidance, vocational education and training and the conditions of their provision, including professional development and the conditions and preconditions of dismissal” without affecting the provisions related to women’s protection (concerning pregnancy, childbirth, breastfeeding and maternity). Measures for promoting female access to the labour market have also been introduced under the Single Programming Document for Objective 3 and the Community Initiative Program for EQUAL of the European Social Fund for the period 2004-2006.

#### ***4.2 Governing research infrastructures***

Given the country’s very recent tradition in R&D and its small size there has not been any broad strategy concerning research infrastructure (RI). The Government’s intention to upgrade the national RI was expressed mainly through distinct instruments and measures shaped without any integrative approach towards overall RI development. As part of its objective of implementing the Lisbon goals, Cyprus is now making an effort to develop a strategy that will be a platform for further infrastructure strengthening. Thus, one of the five pillars of the RPF’s DESMI 2008 is entitled ‘Development of Research Infrastructure’ and contains programmes aimed at developing new research infrastructure, upgrading and supporting existing research laboratories and providing access to important research infrastructure abroad. The budget for this pillar was €37.2m in 2008 and is much higher than in the previous years.

However, the strategies developed by the RPF mainly aim at developing and upgrading small-scale local-level infrastructure without particular emphasis on the broader European vision. There is no direct policy concerning ESFRI schemes and the absence of appropriate mechanisms hinder commitment of funds to specific ESFRI programmes. No funds have therefore been committed for the second phase of ESFRI infrastructures implementation. The European University has expressed its interest in some programmes recorded by the ESFRI roadmap, though it is still uncertain whether the university would manage to secure the necessary funds.

Cyprus does not have a large RI that can compete in size and importance on the global or European level. One of the larger and oldest research infrastructures is the Agricultural Research Institute (ARI) established in 1962 as a cooperative project between the Government of Cyprus and the UNDP. The laboratories of the Cyprus Institute of Neurology & Genetics carry out applied and to a lesser extent basic research in the field of genetics disease diagnosis. There are also several

laboratories established on the premises of the University of Cyprus with unique research facilities, such as the Micro- and Nano-Systems Laboratory dedicated to micro- and nano-manufacturing and analysis and the High Performance Computing Systems Laboratory (HPCL). Concerning “virtual” RI, the University of Cyprus in collaboration with the RPF and the Planning Bureau have established the Cyprus Research and Academic Network (CyNet) which aims at the creation of a network infrastructure and the provision of advanced internet services to the research and academic community of Cyprus.

National policy explicitly aims for the country not to become a full member in international organisations as membership is not expected to bring any significant benefits. Thus Cyprus is not a member of ESA. However, it participates in CERN programmes and promotes further collaboration with the organisation. Given the high profile in the areas of ICT and computing, the country focuses to a large extent on building “virtual” infrastructure in the field of computer and data treatment, such as grid computing facilities. Thus, CyNet participates as a partner in the GÉANT2 Network run by the UK-based limited liability company Delivery of Advanced Network Technology to Europe (DANTE) and designed to provide very high performance connectivity to support equivalent national facilities in the connected research and education networks in Europe. One of the main objectives of CyGrid, initiated by the HPCL is to support access to the European Grid infrastructures through locally run and managed resources and services.

Given the historical deficits in infrastructure funding, Cyprus is still far behind other member states competing and collaborating in international research programmes. The country’s research base remains narrow at the highest international level and does not provide for large national infrastructures or scientific technological platforms that may be of special interest for foreign access. However, further development in the field of grid computing and e-infrastructure is a top priority in political, research and scientific circles. The need to develop national strategy in relation to e-infrastructure as well as establishing an independent body responsible for grids has been the subject of discussions, while the prospect of Cyprus playing a leading role in the Eastern Mediterranean as a e-infrastructure centre has been emphasised.

### **4.3 Research organisations**

Cyprus joined the Bologna Process at the first ministerial meeting after the Bologna Summit in Prague, on 17 May 2001 thus endorsing its support to the major objectives of the Process: increased mobility and employability of higher education graduates, teachers and researchers leading to better competitiveness of European higher education. The body responsible for implementing the main trends and aspects of the Bologna Process in Cyprus is the Directorate of Tertiary Education under the Ministry of Education and Culture. By drawing up the appropriate legal framework in consultation and close collaboration with all the institutions and the stakeholders of Cypriot higher education, the Department tries to develop a higher education structure based on three cycles: the adoption or general implementation of the European Credit Transfer and Accumulation System (ECTS), the Diploma Supplement, the establishment of a national qualifications framework and joint/double degrees, as well as, the development of measures for quality assurance. The Cyprus Bologna Promoters Group was established in conjunction with the Cyprus Foundation for the Management of European Lifelong Learning Programmes,

aimed at disseminating information and promoting implementation of the Bologna requirements.

One significant step towards higher autonomy of the HEIs was the adoption in 2004 of the 'Social Agreement' by the University of Cyprus (the only University in the country at the time). The Agreement provides for more flexibility in the management of government funds, which would be decided automatically using special formulae based on the number of full-time students. At the same time, this document provides for better accountability mechanisms, such as mandatory annual reporting on activities implemented and goals achieved that should be submitted by the HEIs. With the purpose of increasing the autonomy of HEIs and allowing the necessary flexibility with regard to their internal operations and utilisation of resources it has been decided to draw up a unified Higher Education Law. To this end, the Minister of Education and Culture has appointed a committee of specialists comprised of university professors and high level administrators. The future approval of such a Higher Education Law is deemed of major importance for facilitating the introduction of relevant educational reforms. It is expected to contribute substantially to quality higher education and research and the establishment of more transparent accountability mechanisms.

The University of Cyprus is considered as an autonomous public corporation and is governed by a Council and a Senate. The Council is a decision-making and advisory body of the University and is responsible for the management of the administrative and financial matters, shaping institutional strategic and development planning of the organisation. The annual budget, salary scales and fringe benefits as well as funding distribution for the building infrastructure of the University are also among the core responsibilities of the Council. The Council also has the authority to sanction appointments or promotions of the academic or the administrative staff. It is composed of internal and external stakeholders: seven external members, consist of four representatives appointed by the Council of Ministers and three members appointed by the Senate, and university members that include the Rector, Vice Rectors, two representatives of the academic staff, one representative of the administrative staff, one student representative and the Director of Administration and Finance. The Chairperson and Vice Chairperson of the University Council are appointed by the President of the Republic and are selected from outside the University. This governance scheme is a mix between the mechanisms of external guidance and managerial self-governance. On the other hand, the Senate constitutes the supreme academic body and is responsible for academic work, both in teaching and research. The Rector, also a member of the Senate, is elected by the entire academic personnel and representatives of both students and administrative staff.

Concerning the other two state universities, the Cyprus University of Technology follows the same governance pattern as the University of Cyprus, while the Open University until its complete autonomy is governed by an Interim Governing Board appointed by the Council of Ministers. The three private universities have the status of a corporation and are considered private law organisations.

As autonomous entities, universities should be responsible for their development and institutional goals. In this context, the strategic plan is a key instrument for determining activities and priorities. To this end, 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.

Universities in Cyprus play an extremely important role in both basic and applied research. All state universities in Cyprus are research-oriented, while the newly established 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 with an international impact and visibility. Since members of academic staff are expected to be actively involved in research projects, any research activity plays a major role in recruitment and promotion criteria for academic staff.

As concerns decision-making processes for salaries and promotions public universities are at a disadvantage. As already mentioned in Section 4.1 salary scales tend to follow the regulatory state models leading to serious limitations of institutional autonomy in this respect. Private university and research institute remuneration for academic and research personnel is set by the institutions and are generally more flexible. There is more autonomy granted to universities and research organisations concerning the design of their research agendas and topics of their research specialisation.

Autonomy in terms of financial management is a key element that allows institutions to develop strategic policies aimed at meeting their own objectives as well as national priorities in the area of higher education. Cyprus is among the countries that allocate public funding to institutions according to budget headings, which have to be strictly respected (Eurydice, 2008a). There are no funding formulas or 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 institutions during the negotiation phase. The financial resources received in the form of block grants from the state are allocated by the universities in autonomous way through internal competitions and in line with their own research priorities.

Most research undertaken in universities is financed through external funding via competitive bidding procedures for specific research programmes in the framework of either the RPF or the EU calls. Since there is no government block funding private universities have a greater incentive to seek out competitive research funding opportunities.

One major aspect of university autonomy with respect to financial management is the possibility of access to private funds. Diversification of HEI funding is a key aspect in developing the entrepreneurial university model. In this context, Cypriot institutions have a very high level of autonomy in establishing companies, making financial investments and borrowing money without any limitations.

On the other hand, there are very limited public incentives implemented by the country to support HEIs in their search for private funding and in their partnerships with the private sector. There is no tax relief for universities relating to donations or other types of private funding, nor are there any tax incentives for sponsors and private partners. Moreover, an organisation's capacity to obtain private funding is not taken into consideration when determining the amount of public funding. The only significant legislative incentive which may favour private funding of universities is the existence of the regulatory framework authorising HEIs to own the intellectual property rights to the results of research conducted by their staff and allowing them to

generate resources from the possible commercialisation of results (Eurydice, 2008a) In general, institutional ownership in Cyprus is expected to lead to a general improvement in the technology transfer capability of institutions. However, the fact that professors cannot appropriate intellectual property (professors' privileges as such do not exist in Cyprus) does not help improve incentives for research in Universities.

#### ***4.4 Opening up national research programmes***

The Cypriot Government actively promotes international networking and cooperation, especially at the EU level. This is seen as an opportunity for a small country such as Cyprus with a weak research profile, limited experience in research policy making and a lack of human and financial capital to derive major benefits from participating in joint initiatives. The Government's support for European initiatives on joining and coordinating with national research programmes is expressed through the development of special strategies aimed at promoting Cypriot stakeholders' participation in such initiatives. The design and implementation of these strategies is the remit of the RPF, which, as mentioned already in the report, is the main tool for the implementation of overall national research and innovation policy. The main instruments introduced by the RPF for promoting joint actions at the international level are special actions under the "International Collaboration programme, which has been included in the current RPF's DESMI 2008. The general objective of the programme is to foster cooperation between Cypriot and prominent international research organisations. Apart from encouraging knowledge and experience transfer to Cyprus, a "re-orientation of the research activities of the Cypriot organisations to new research and technology areas in issues important to the development of their activities are expected to be achieved. To this end, three actions have been included in the programme,

- "Targeted international cooperation"
- "Participation in ESF"
- "Participation in Joint European Programmes"

The last action mentioned aims directly at the promotion of Cyprus participation in a number of European initiatives under Article 169 and the ERA-NETs. Increased participation of the Cypriot research community in the various ERA initiatives is also referred to in the current NRP.

Cyprus has been involved in a series of ERA-NET projects of the Sixth Framework Programme, such as CORNET, eTRANET, SAFEFOODERA, MARIFISH, URBANET (RPF), EUPHRESCO (Ministry of Agriculture, Natural Resources & Environment, Agricultural Research Institute). In the framework of the FP7, Cyprus has already entered for such ERA-NETs as ARIMNet (Agricultural Research Institute), EMIDA (Veterinary Services, Ministry of Agriculture), and ERACOBUILD (RPF). The RPF also participates in the Joint Technology Initiative ARTEMIS, as well as in the AMBIENT ASSISTED LIVING (AAL) joint programme based on the Article 169 of the EC treaty and the EUROCORES collaborative scheme of the ESF.

Through Bilateral Agreements for Research and Technological Development that have been signed so far with Greece, France, Slovenia, Italy, Romania and Egypt, Cyprus promotes cooperation and networking between research organisations and

enterprises from the two countries for selected thematic priorities, in areas of common strategic interest.

At the European level, Cyprus through specific strategies of the RPF participates in programmes such as COST, EUREKA, and EUROSTARS.

As to the opening-up of national programmes run by the RPF, 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. However, for SMEs based abroad the regulation is different: they are eligible for participation as partner organisations but cannot receive any funding. There are almost no barriers for foreign researchers to participate in national programmes. The only possible limitation for some positions may be the requirement for knowledge of the Greek language. However, the lack of regulations that facilitate researchers' mobility (social security, pensions and visa schemes) may impede successful opening up of national programmes.

In order to create collaboration networks with researchers from abroad, the RPF is currently running two programmes aimed primarily at hosting experienced as well as young researchers based abroad and their involvement in the activities of Cypriot research organisations and enterprises. The action targeted at experienced researchers could also apply to Cypriot citizens that went abroad to study but remained to work after completion of their studies for more than five years. This is not, however, the case for hosting young scientists.

The role of the ERA and joint programming and coordination is crucial for Cyprus. For a country with an insufficient R&D base and lack of experience in research programming mutual opening of research activities and development of synergies with other European countries in research policy implementation may enable the national system to take on tasks that it would not have been able to tackle independently. Having realised the benefit of joint ventures, the Cypriot Government seems to be clearly in favour of further involvement of the country in such initiatives. However, for such plans to succeed an integrated and well-coordinated strategy needs to be developed, as well as consistent efforts and cooperation of all stakeholders. The lack of awareness, inadequate human and capital resources, insufficient coordination at a policy-making and implementation level and a general preference for national research teams to apply for less competitive and less demanding national programmes constitute the main barriers the Government should tackle to ensure effective implementation of joint programming goals.

#### ***4.5 National ERA-related policies - a summary***

Whether by necessity or conviction Cyprus is a very active supporter of the ERA. The size of the country would not allow any specialisation unless it is within a broader alliance. In terms of governance and policy establishing the ERA has contributed to the design and implementation of the national R&D policy through the Lisbon agenda, a guideline taken very seriously by the national administration, but also through participation in numerous ERA-NETs and the Open Method of Coordination as well as CREST. The national administration has benefited significantly from these opportunities and has designed the national system almost in full compliance with EU guidelines and opportunities. Internationalisation opportunities offered by the EU FP have contributed to opening up the system and has offered the potential for research collaboration that Cypriot researchers were lacking in the past.

In full cognisance of this the government is actively promoting the ERA enhancing this effort towards developing initiatives and activities in this direction. The majority of these actions concern the promotion of Cypriot researcher participation in EU programmes, but also the development of relations with international organisations supporting research activities.

The most visible effort and progress can be seen in the area of human resources: investments for more higher education, emphasis on S&E, incentives for research careers and the modernisation of university governance are among the major strengths of Cyprus. However, in this context, gender issues remain a weakness and are still not explicitly addressed by policy measures, except for entrepreneurship.

Internationalisation is another well developed aspect, despite the need to further reinforce the implementation of the institutional framework. Incentives for collaboration are abundant, national measures support participation in the EU FP and more measures are opening up for international and bilateral research cooperation.

The major weaknesses, which are also reflected in the progress towards the ERA, remain the low industry-financed GERD and the limited research infrastructures. The former is bound by the structure of the economy and is only changing very gradually. The university system suffers from limited external funding and opportunities for collaborative research. Similarly, the small size of the national research system, limits opportunities for participation in bigger research infrastructures. However, recent policies have tried to address both these challenges but progress is slow and inhibited by factors external to the R&D system.

**Table 10: Importance of the ERA pillars in the ERA policy mix and key characteristics**

	<b>Short assessment of its importance in the ERA policy mix</b>	<b>Key characteristics of policies</b>
Labour market for researchers	The market is small but expanding. The Education System is a very open one with Cypriots frequently studying abroad. Considerable efforts are being made to attract foreign students to Cypriot universities Top priority given to opening up the national labour market to researchers and promoting mobility.	There are almost no barriers for foreign researchers to participate in national programmes. However, deficiencies in the social security system, a lack of harmonisation of pension schemes, a complete absence of specific provisions for mobile researchers as well as the delays in adapting and implementing scientific visa packages may prevent the increase of the mobility of researchers despite the plethora of measures and financial incentives envisaged by the national research policy. A significant number of measures have been adopted providing incentives and facilitating both inward and outward mobility of talented scientists. A number of special measures has been adopted 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).

	<b>Short assessment of its importance in the ERA policy mix</b>	<b>Key characteristics of policies</b>
Governance of research infrastructures	National RIs are limited but improving Given the small size of the country, Cyprus is unlikely to be able to play a significant role except possibly in ICT infrastructure Participation in major European RIs and ESFRI is practically non-existent	Despite the considerable increase in budget for infrastructure development, the infrastructures envisaged are mostly of the local level. Only as far as "virtual" infrastructures are concerned is there a possibility for Cyprus to play a leading role in the Eastern Mediterranean. Policies have started addressing this issue. As to Cypriot participation in transnational infrastructures, the national policy is explicitly not aimed at Cyprus becoming a full member in international organisations, since membership is not expected to bring any significant benefits to the country.
Autonomy of research institutions	The Government supports the Bologna Process and makes efforts to further promote the autonomy of universities	For better implementation of the Bologna Process, the special Bologna Promoters Group has been established, in conjunction with the Cyprus Foundation for the Management of European Lifelong Learning Programmes, with the aim of disseminating information and promoting implementation of the Bologna requirements. Some steps towards higher autonomy have been taken by the Ministry of Education and Culture. This ERA-dimension, however, does not seem to be at the focus of the national <i>research policy agenda</i> .
Opening up of national research programmes	Opening up is rapid and successful	Cyprus actively promotes international networking and cooperation, especially at EU level but also the wider international level. Government support towards the European initiative on joining and coordinating national research programmes is reflected in the development of special strategies (designed by the RPF) to promote Cypriot stakeholders' participation in such initiatives. The lack of awareness, inadequate human and capital resources, insufficient coordination of policies and their implementation act as the main obstacle towards effective implementation of joint programming goals. The absence of provisions facilitating researcher mobility (social security, pensions and visa schemes) may impede successful opening up of national programmes. National programmes are open to foreign participation under certain reasonable constraints.

## 5 Conclusions and open questions

### 5.1 Policy mix towards national R&D investment goals

The size and composition of the productive sector is the main explanation of the very limited resource mobilisation. Despite the continuous increase in national or European funding opportunities for SMEs business interest is still low. This is due to the structure of the economy (service sector dominance) and the small company size. Business associations claim that better and more responsive policies can improve the situation considerably. The Ministry of Commerce, Industry and Tourism is focusing on other topics, less so on R&D and innovation. The corresponding unit is

understaffed and shifting responsibilities from the Ministry to the RPF. This disappointing picture is complemented by a lack of interest in the banking sector in high-risk R&D ventures. As a result, it is still rather difficult for SMEs to source the collateral required by credit institutions.

Inevitably the policy mix focuses on “route 6”, namely the increasing R&D funding and performance in the public sector. Measures are addressing routes 2 and 3, by offering significant incentives to both R&D and non-R&D performers but the business response is slow. There is however some progress, as for instance SME involvement in European R&D programmes and projects. This progress is however linked to a very low starting point. The focus on internationalisation of research activities as the most important route of overall research policy seems to be the best way to strengthen the platform for higher R&D investments.

## **5.2 ERA-related policies**

Cyprus is a very active supporter of the ERA. The size of the country would not allow any specialisation unless within a broader alliance. In terms of governance and policy making the ERA has contributed to the design and implementation of a national R&D policy through the Lisbon agenda. Cyprus has made good use of participation in ERA-NETs and the Open Method of Coordination as well as CREST, which were very beneficial to the country.

The most visible effort and progress can be seen in the area of human resources, although changes are still needed in the legal and regulatory framework for facilitating transnational research careers as well as gender equality. The latter is a very weak point in the labour market for researchers. However, high salaries, coupled with other incentives offered to researchers, including financial assistance and employment support for young talented scientists, make research a highly attractive career in Cyprus.

Internationalisation is a well developed aspect, despite the need to further reinforce the implementation of the institutional framework. Incentives for collaboration are abundant, national measures support participation in EU FP and more measures are opening up for international and bilateral research cooperation.

The major weakness, namely the low industry-financed GERD, is also inhibiting progress towards the ERA. The university system suffers from the limited external funding and opportunities for collaborative research. HEI research is almost exclusively funded by the public budget. A further challenge is limited availability and access to research infrastructures. The small size of the national research system limits the opportunities for participation in bigger research infrastructures. Policies at that stage do not envisage immediate access to ESFRI or major international cooperation schemes. However, support for enhancing the national research infrastructure has increased: there is internal funding for local research teams and agreements have been signed to attract major investments, (two so far), in cooperation with universities of international repute which has resulted in the development of new research laboratories in the country.

Recent policies address both challenges, the business sector and research infrastructures, but progress is slow and inhibited by factors external to the R&D system such as the overall size of the economy, the structure of production and the ultra-peripheral position of the country. The concept of off-balancing this by playing a prominent role in the Eastern Mediterranean may help the system thrive eventually.

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## List of Abbreviations

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ARI	Agriculture Research Institute
BERD	Business Enterprise Expenditure on R&D
CEIF	Cyprus Employers' and Industrialists' Federation
CERN	European Council for Nuclear research
CIPA	Cyprus Investment Promotion Agency
CII	Cyprus International Institute for the Environment and Public Health
CPC	Cyprus Productivity Centre
CSC	Cypriot Scientific Council
CSRED	Centre of Scientific Research Evaluation Development
CSTRC	Computation-based Science and Technology Research Centre
Cyl	Cyprus Institute
CyNet	Cyprus Research and Academic Network
CYS	Cyprus Organisation for Standardisation
DANTE	Delivery of Advanced Network Technology to Europe
DESMI	Research Promotion Foundation's Framework Programme for Research, Technological Development and Innovation
ECTS	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
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum on Research Infrastructures
FDI	Foreign Direct Investment
FP	Framework Programme
GBAORD	Government Budget Appropriations or Outlays on R&D
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GPP	Green Public Procurement
HEIs	Higher Education Institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HPCL	High Performance Computing Systems Laboratory
HRDA	Human Resource Development Authority of Cyprus
ICT	Information Communication Technology
JRC	Joint Research Centre
KEEI	Cypriot Research and Education Foundation
LLL	Life-long learning Strategy
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
OSS	One-Stop Shop
PNP	Private non-profit sector
R&D	Research and Development
RIPF	Research and Innovation Promotion Foundation
RIs	Research infrastructures
RISC	Regional Innovation Strategy Cyprus
RPF	Research Promotion Foundation
RTDI	Research Technology Development Innovation
S&E	Science and Engineering
SME	Small and Medium Sized Enterprise
STARC	Science and Technology in Archaeology Research Centre
TEPAK	Technological University of Cyprus
TPF	Technology Promotion Foundation

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### **Abstract**

The main objective of the ERAWATCH Policy Mix Country reports 2009 is to characterise and assess in a structured manner the evolution of the national policy mixes in the perspective of the Lisbon goals, with a particular focus on the national R&D investments targets and on the realisation and better governance of the European Research Area. The reports were produced for all EU Member State and six Associated States to support the mutual learning process and the monitoring of Member and Associated States' efforts by DG-RTD in the context of the Lisbon Strategy and the European Research Area. The country reports 2009 build and extend on the analysis provided by analytical country reports 2008 and on a synthesis of information from the ERAWATCH Research Inventory and other important available information sources.

This report encompasses an analysis of the research system and policies in Cyprus.

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