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THE CHOICE OF INDICATORS IN THE LISBON ASSESSMENT FRAMEWORK (LAF)

Part 3: Innovation and Knowledge

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* This study is part of a project sponsored by the Planning Bureau and funded by the Research Promotion Foundation (RPF) through the Economics Research Center (ERC). It aims to reach a better appreciation of the LAF methodology and, following a critical assessment, to propose improvements to this approach. Its application to Cyprus is scrutinised and several suggestions are offered and quantified.

TABLE OF CONTEXT

INTRODUCTION

This document contains a detailed description and analysis of all indicators included in the second part of the LIME Assessment Framework (LAF). LAF is a tool developed by the Lisbon Methodology (LIME) Working Group of the Economic Policy Committee (EPC) in order to evaluate the economic progress of all Member States and progress with their structural reforms, based on the Lisbon Strategy targets and guidelines.

The second part is an analysis of 282 indicators in 20 policy areas related to: (i) Labour market, (ii) Product and capital market regulations, (iii) Innovation and knowledge and (iv) Macroeconomy. Each policy area contains multiple indicators varying in number from eight to twenty-one, depending on the area. An aggregate score is calculated for each policy area both in levels and changes over time. In the calculations of the aggregate score, only a subset of indicators are included, called the "narrow list" indicators, while the remaining indicators are called the "wider list" indicators. Each narrow list indicator can get different aggregation weights as assigned by the LIME Working Group. All data and calculations are included in an automated Excel based application, called the "Maquette".

In this note, we provide information for each indicator, such as definition, indicator source, data source, indicator type (performance/policy), time coverage, geographical coverage, data and score values for Cyprus, aggregation weights, reason excluded from narrow list, comments on data quality and score calculations, alternative data and score values in cases of inaccuracies and general comments on the appropriateness of each indicator for Cyprus. In addition, we provide suggestions for improvement such as alternative indicators for the narrow list, alternative aggregation weights, improved indicator definitions and more accurate data sources that could be used.

In addition to indicator specific information, we provide relevant information from the existing literature for Cyprus when available, and appendices with more information regarding regulations, institutions and relevant market conditions for each section.

"The Choice of Indicators in LAF" is divided into four parts, one for each section:

- *Part 1 relates to labour market policies and includes the following policy areas: Active labour market policies, making work-pay: interplay of tax and benefit system, labour taxation to stimulate labour demand, job protection and labour market segmentation/ dualisation, increasing working time, specific labour supply measures for women, specific labour supply measures for older workers, wage*

bargaining and wage-setting policies, immigration and integration policies, labour market mismatch and labour mobility.

- *Part 2 contains areas for product and capital market regulations: Competition policy framework, sector specific regulation, entrepreneurship and business environment, business dynamics – start-up conditions, financial markets and access to finance, market integration – openness to trade and investment.*
- *Part 3 has to do with education and knowledge with three policy areas: R&D and innovation and ICT, education and lifelong learning.*
- *Finally, part 4 relates to macroeconomic indicators with two policy areas: Orientation and sustainability of public finances and Macroeconomic background information.*

Part 1 uses data coming from the LAF Maquette updated up to May 2009. For parts 2, 3, and 4, a newer Maquette version is used; updated up to December 2009.

3 INNOVATION AND KNOWLEDGE

3.1. R&D and Innovation

It is the discovery of new knowledge and the application of that knowledge to create new and improved products, processes of production and services that fill market needs. R&D is usually undertaken by specialized units in companies or universities.

R&D is the main determinant of technological progress and increases economic growth by shifting the production function upward, mainly through boosting TFP. This can be done by creating a new product or a new quality of the good, a new method of production or a new source of supply of raw materials and by opening up a new market. Technological progress also generates changes in the relative prices of production factors and the volume of these factors. The price decline for investment goods increases investment and deepening of the capital stock. Moreover, R&D helps improve human capital and therefore it has a positive impact on the labour quality.

3.1.1. Summary Innovation Index 2008

Description: Measures aggregate innovation performance. It is constructed as the weighted average of various innovation indicators, which can vary from 12 to 20 depending on the country. The indicators are grouped into two main themes; inputs and outputs. Innovation inputs cover: (i) innovation drivers to measure the structural conditions required for innovation potential, (ii) knowledge creation which measures the investment in R&D activities, (iii) innovation and entrepreneurship which measures the efforts toward innovation at firm level. Innovation outputs cover: (i) applications measure the performance, expressed in terms of labour and business activities and their value added in innovative sectors and (ii) intellectual property which measures the achieved results in terms of successful know-how.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: European Innovation Scoreboard[1]

Data source: European Innovation Scoreboard report

[1] http://www.insme.info/documenti/Innovation_Scoreboard_2004_EN.pdf

Data values for Cyprus[2] (percentage points):

	1999	2000	2001	2002	2003	2004	2005	2006	2007
CY					0,37	0,36	0,38	0,43	0,47
EU15									0,50

LAF Maquette, December 2009

Other info: Provides a relative instead of an absolute ranking. Having an SII, twice that of another country, does not mean that the absolute innovation performance is also twice as good. Indicator values are normalized to take values in the range (0,1) before calculating the average.

Time coverage: 2003-2007

Geographical coverage: 27 Member States (MSs)

Indicator values for Cyprus:

LAF Maquette INDICATOR 1: Summary Innovation Index

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	0,5	-2	0,03	30	0	++
EU15	0,5		0,01			
St.dev.	0,1		0,00			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Redundant- highly correlated with other indicators

General comments:

The score in levels is neutral, while the score in changes is evaluated as good. Calculating the score is probably not necessary here, since the indicator already shows the relative performance. Seems hard to interpret and check for possible mistakes in the data or indicator calculations since there are multiple indicators included. In the Maquette the data values are considered as a rate, but they appear to be index values.

[2] Data values for all previous years are revised (different values from those appearing in the June 2008 Maquette version)

3.1.2. Gross domestic expenditure on R&D as a percentage of GDP (GERD)

Description: Gross domestic expenditure on R&D - % of GDP. "Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications" (Frascati Manual, 2002 edition, § 63). R&D is an activity where there are significant transfers of resources between units, organisations and sectors and it is important to trace the flow of R&D funds. Total expenditure on R&D (GERD) is composed of:

(i) Business enterprise expenditure in R&D (BERD)

(ii) Higher Education expenditure in R&D (HERD)

(iii) Government expenditure in R&D (GOVERD)

(iv) Private non-profit expenditure in R&D (PNRD)

It measures knowledge creation efforts.

(+) A high value is desirable

Indicator Type: Performance Indicator

Indicator Source: Eurostat -Structural Indicators (STRIND), Innovation and research theme [3]

Data source: Annual Eurostat R&D questionnaires- completed by member countries and send to Eurostat.

Other info: Possible consequences of the revision of the Frascati Manual (Proposed Standard Practice for Surveys of Research and Development - Frascati Manual, OECD, 2002) and the implementation by countries of the new guidelines. This might have an influence on the R&D expenditure and personnel data in the next years.

Indicators are calculated using current ECU/EUR

[3] http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research

Data values for Cyprus (% of GDP):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CY	0,23	0,24	0,25	0,30	0,35	0,37	0,40	0,43	0,45	0,47
EU15	1,89	1,91	1,92	1,93	1,92	1,9	1,9	1,9	1,93	1,99

LAF Maquette, December 2009

Time coverage: 1999-2008

Geographical coverage: 27 MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 2: Gross domestic expenditure on R&D (GERD) - Percentage of GDP

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	0,5	-23	0,03	5	--	+
EU15	2,0		0,01			
St.dev.	0,7		0,03			

LAF Maquette, December 2009

Aggregation weight: 100% (narrow list indicator)

General comments

Cyprus has among the lowest percentages of GDP on R&D expenditure. The score on levels is poor, while the score on changes is fairly good.

3.1.3. Gross domestic expenditure on R&D (GERD) by source of funds –industry

Description: Percentage of gross domestic expenditure on research and development (GERD) financed by the business enterprise sector, the government and abroad respectively.

"R&D is an activity, where there are significant transfers of resources between units, organisations, sectors and countries. The importance of the source of funding has been recognized in one of the Barcelona targets of the Lisbon agenda where it is said that the appropriate split for R&D is 1/3 financed by public funds and 2/3 by private."

(+) A high value is desirable

Indicator Type: Performance Indicator

Indicator Source: Eurostat - STRIND, Innovation and research theme [4]

Data source[5]: Annual Eurostat R&D questionnaires.

Data Values for Cyprus (% of GDP):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CY- industry	0,04	0,04	0,04	0,05	0,07	0,07	0,07	0,07	0,07	
EU15-industry	1,06	1,08	1,08	1,06	1,05	1,04	1,04	1,07	1,07	1,11
CY- government	0,16	0,16	0,16	0,18	0,21	0,24	0,27	0,29	0,29	
EU15-governm.	0,65	0,65	0,64	0,65	0,67	0,65	0,64	0,64	0,63	0,66
CY- abroad	0,02	0,02	0,03	0,05	0,05	0,04	0,04	0,05	0,07	
EU15-abroad	0,14	0,14	0,16	0,17	0,17	0,16	0,17	0,17	0,18	0,18

LAF Maquette, December 2009

Geographical coverage: 25 MSs

Time coverage: 1999-2008

Indicator values for Cyprus:

LAF Maquette INDICATORS 3-5: Gross domestic expenditure on R&D (GERD) by source of funds - Percentage of GDP

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY industry	0,1	-19	0,00	0	- -	0
EU15 industry	1,1		0,00			
St.dev.EU15	0,5		0,03			
CY government	0,3	-26	0,02	12	- -	++
EU15 government	0,7		0,00			
St.dev.EU15	0,1		0,01			
CY abroad	0,1	-11	0,01	3	- -	0
EU15 abroad	0,2		0,00			
St.dev.EU15	0,1		0,00			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reasons excluded from the narrow list: Minimum statistical standards

[4] http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research
[5] Before 2001, the data source was OECD -Main Science and Technology Indicators (MSTI).

General comments

Most of the R&D expenditure in Cyprus is financed by the government, which is however still among the lowest government contributions in the EU. Government expenditure for 2005 and on is expected to increase because of expenditure on higher education. However, these numbers need to increase more.

3.1.4. Gross domestic expenditure on R&D (GERD) by source of funds – government

Please see Indicator 3.1.3.

3.1.5. Gross domestic expenditure on R&D (GERD) by source of funds –abroad

Please see Indicator 3.1.3.

3.1.6. Science and technology graduates-Total

Description: Number of tertiary graduates in science and technology per 1000 of population aged 20-29. It includes new tertiary graduates in a calendar year from both public and private institutions completing graduate and post graduate studies relative to an age group that corresponds to the typical graduation age in most countries.

Note that it does not correspond to the number of graduates in these fields who are available in the labour market in this specific year. It includes all graduates during the reference year, in tertiary university education, tertiary non-university education and advanced research education.

Increasing science and technology graduates is a key structural condition for innovation potential.

(+) A high value is desirable

Indicator Type: Performance Indicator

Indicator Source: Eurostat - STRIND, Innovation and research theme[6]

Data source: The joint UIS (UNESCO Institute of Statistics) – OECD –Eurostat (UOE) questionnaires on education statistics

Data values for Cyprus (individuals per 1000):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	3,8	3,4	3,70	3,80	3,60	4,2	3,60	4,30	4,20		
EU15	10,7	11,0	11,9	12,4	13,3	13,6			13,7		

LAF Maquette, December 2009

Comments on data:

*3-4 /1000 Cypriots graduating in science related subjects, seems very low. Searching the data source information, this indicator for Cyprus **excludes tertiary students graduating abroad**, which account for over half of the total number of Cypriot tertiary students. Hence, this indicator should be marked as problematic for Cyprus.*

Corrected data values for Cyprus:

	1999	2000	2001	2002	2003	2004	2005	2006	2007
CY*				10,9	12,0	12,8	12,7	13,4	13,5
EU15	10,7	11,0	11,9	12,4	13,3	13,6			13,7
*These are the corrected values for Cyprus. The corrected indicator values on graduates in science and technology is based on approximations made, using education statistics, from the Statistical Services, Cyprus. Detailed description of the approximation method can be found in Appendix C2.									

LAF Maquette, December 2009

Time coverage: 1999-2007

Geographical coverage: 27 MSs

[6] http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research

Indicator values for Cyprus:

LAF Maquette INDICATOR 6: Science and technology graduates

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	4,2	-22	0,05	-6	--	-
CY*	**13,5**	**-1**	**0,5**	**5**	**0**	**+**
EU15	13,7		0,29			
St.dev.EU15	4,3		0,42			
* Estimates of the true value based on the corrections made on the data. Please see Appendix C2 for more details.						

LAF Maquette, December 2009

Aggregation weight: 100% (narrow list indicator)

General comments

The data values for Cypriot graduates in science are much smaller than the true values which results in the poor (double negative) performance shown in the table above. By correcting it, the numbers reach the EU15 average which turns the performance into average (neutral). In terms of growth, the performance becomes fairly good instead of fairly poor. These corrections have implications for the aggregate scores for the R&D and Innovation policy sector as well, since this is one of the four indicators included in the narrow list.

The problem described also raises the issue of how representative is this indicator for each country. Assuming that this is a measure of how qualified is the labour force of a country, this indicator is misleading. If this is true for all countries, then countries like Cyprus have underestimated numbers while big education exporters like the UK for example, will have overestimated performance. At the moment, this indicator seems to measure the capacity of a country to produce graduates, rather than the flow of new science graduates available for productive employment in the country where they are produced.

Please see appendices C1 and C2 for more information on tertiary education and graduates in Cyprus.

3.1.7. Patent applications to the European Patent Office (EPO)

Description: Number of patent applications submitted to EPO per million of inhabitants. Patent applications are counted according to the year in which they were filed at the EPO. They are also broken down according to the inventor's place of residence, using fractional counting if multiple inventors or IPC classes are provided to avoid double counting.

Patents is a measure for R&D and innovation activity output.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat – STRIND, Innovation and research theme[7]

Data sources: EPO-patent data, European Labour Force Survey (EU-LFS)- Eurostat collection of population, GDP data are based on the national accounts.

Other data info: Million inhabitants refer to the population the 1st of January each year.

Data values for Cyprus (applications per million of individuals):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	6,1	9,0	22,6	9,3	9,4	8,2	21,4	25,0			
EU15											

LAF Maquette, December 2009

Comments on the data:

Patent data for Cyprus vary and we cannot identify a trend. Moreover, values are continuously revised. Comparing the three different patent sources used by the LIME working group, we can see that data values for Cyprus differ significantly among sources as shown below.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
EPO	6,1	9,0	22,6	9,3	9,4	8,2	21,4	25,0	
USPTO	4,4	6,8	2,9	4,0	3,1				
Triadic	2,6	3,4	8,4	4,2	3,3	2,2	2,5		

LAF Maquette, December 2009

[7] http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research

Patent data from EPO refer to patent application as opposed to patents granted which is the case of USPTO. Note that it takes around 2 years to decide if the application is going to be accepted or not, which makes it more difficult to compare the two. Triadic patents includes only a filtered subset of patent families for which there is evidence of patenting activity in all trilateral block; USPTO, EPO, JPO.

In general, data on patents reflect differences in patent regulations across countries which make it difficult to compare counts of patents applied or granted in different countries. Moreover, it is difficult to draw comparisons between countries of invention based on patent applications filed in any given country: various biases (due to home advantage or trade flows) tend to bias the foreign country shares within any country. Also changes in patent law over the years make it difficult to analyze trends over time. The list of technologies covered has grown longer over time and in some countries now includes software and genetic sequences, which had been excluded until recently.

Time coverage: 1999-2006

Geographical coverage: 27 MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 7: Patent applications to the European Patent Office (EPO)

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	25,0	-13	N/A	N/A	--	N/A
EU15	147,8		N/A			
St.dev.EU15	93,5		#DIV/0!			

LAF Maquette, December 2009

Comments on score calculations:

The score in changes has been removed from the calculations in this version of the Maquette, probably due to the high variation across years.

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Minimum statistical standards

General comments

The patent performance for Cyprus is poor in levels (double negative) using any of the three indicators related to patents (see indicators 3.1.8 and 3.1.9 in the wider list). There is no clear reason on why choosing the EPO data instead of the other 2 patent data sources and it is hard to compare them. Concluding in terms of innovation output, Cyprus is not performing well which is expected since the economy is based on services and not on high-tech manufacturing.

3.1.8. Patents granted by the United States Patent and Trademark Office (USPTO)

Description: Number of patents granted by the United States Patent and Trademark Office (USPTO) per million inhabitants. Patents is a measure for R&D and innovation activity output.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: STRIND

Data Source: USPTO

Other data info: USPTO data refers to patents granted while EPO data refers to patent applications. Data are recorded by year of publication as opposed to the year of filing used for the EPO data. This is because patents in the US (at least in the past) were only published once they were granted. Patents are allocated to the country of the inventor, using fractional counting in the case of multiple inventor countries. The methodology used is not harmonised with that of Eurostat and therefore the comparison between EPO and USPTO patents data should be interpreted with caution.

Data values for Cyprus (patents per million individuals):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	4,39	6,81	2,87	4,01	3,11						
EU15											

LAF Maquette, December 2009

Comments on data:

In previous Maquette versions, data values up to 2005 were included. This might be a correction of a previous mistake, since Eurostat includes values only up to 2004.

Time coverage: 1999-2003

Geographical coverage: 27 MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 8: Patents granted by the United States Patent and Trademark Office (USPTO)

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	N/A	N/A	N/A	N/A	N/A	N/A
EU15	N/A		N/A			
St.dev.EU15	N/A		N/A			

LAF Maquette, December 2009

Comments on score calculations:

There are no scores calculated for this indicator in the December 2009 update. Score calculations on previous versions are provided below.

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	14,5	-13,5	1,7	-3	- -	0
EU15	131,1		3,1			

LAF Maquette, June 2008

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Minimum statistical standards –insufficient time coverage

General comments

Please see Indicator 3.1.7. for more comment.

3.1.9. Triadic patents

Description: Number of patents all applied for at the EPO, USPTO and JPO (Japan Patent Office) per million inhabitants. Patents is a measure for R&D and innovation activity output.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: OECD

Data Sources: EPO, USPTO, JPO

Data values for Cyprus (patents per individuals):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	2,6	3,4	8,4	4,2	3,3	2,2	2,5				
EU15	37,6	37,2	37,5	36,8	36,7	37,0	36,8				

LAF Maquette, December 2009

Time coverage: 1999-2006

Geographical coverage: 27 MS (for 2005)

Indicator values for Cyprus:

LAF Maquette INDICATORS 9: Triadic patents

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	2,5	-13	N/A.	N/A	--	N/A
EU15	36,8		N/A			
St.dev.EU15	26,5		#DIV/0!			

LAF Maquette, December 2009

Comments on score calculations:

The score in changes has been removed from the calculations in this version of the Maquette.

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Minimum statistical standards

General comments

Please see Indicator 3.1.7. for more comments.

3.1.10. Venture capital investments-early stage- % of GDP

Description: Venture capital investment is defined as private equity raised for investment in companies; management buy-outs, management buy-ins and venture purchase of quoted shares are excluded. Data are broken down into two investment stages: Early stage (seed + start-up) and expansion and replacement (expansion and replacement capital).

Seed is defined as financing provided to research, assess and develop an initial concept before a business has reached the start-up phase. Start-up is defined as financing provided for product development and initial marketing, manufacturing, and sales. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat- STRIND –Innovation and research theme[8]

Data Sources: European Private Equity and Venture Capital Association (EVCA). The data is based on the European Private Equity Survey of all private equity and venture capital companies.

Other data info: The indicators are presented in EUR million, as a percentage of GDP, as a number of investments and number of companies.

The data cover EU-27 MSs (excluding Bulgaria, Estonia, Cyprus, Lithuania, Latvia, Luxembourg, Malta and Slovenia), EU-15, Norway, Switzerland and the United States.

Time coverage: 1999-2008

Geographical coverage: 18MS

[8] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir080

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Not mentioned

No data available for Cyprus

3.1.11. High tech exports

Description: Exports of high technology products as a share of total exports.

"High technology products" means all movable goods belonging to specific subcategories of the following sectors: aerospace, computers and office machines, electronics and telecommunications, pharmacy, scientific instruments, electrical and non-electrical machinery, chemistry and armament.

"Exports" means all outward flows recorded at the frontier of the reporting country, which implies that only extra-EU exports are considered when calculating the indicator for the EU as a whole while intra-EU and extra-EU exports are aggregated when calculating the indicator for each Member State separately.

Measures the technological competitiveness of the country, i.e. the ability to exploit and commercialize the results of research and development and innovation in the international markets.

(+) A high value is desirable

Indicator Source: STRIND[9]

Data source: Eurostat: External trade statistics (COMEXT database).

Data is transmitted to Eurostat by the EU MSs. Statistical information is mainly provided by the traders on the basis of Customs (extra-EU) and Intrastat (intra-EU) declarations.

Other data info: Indicators are calculated at current prices using national currency.

The exports are evaluated on a FOB basis (free on board) and therefore includes only incidental expenses (freight, insurance) incurred in the part of the journey located on the territory of the reporting country. The statistical value does not include taxes such as value added tax, export refunds or other taxes with similar effect. Re-exportation is included.

[9] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir160

Data values for Cyprus (% total exports):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	4,01	3,04	3,99	3,46	4,20	15,89	31,56	21,35			
EU15	19,5	20,6	20,4	18,2	17,7	17,7					

LAF Maquette, December 2009

Comments on data:

*There is a huge gap between 2003 and 2004 values and great variation in general. This is probably because **re-exportation is included** in the external trade statistics, which makes the indicator not representative for the innovating activity of a country like Cyprus.*

Further investigation on the data

According to Eurostat data, the big increase from 2004 and onwards, is due to an increase in exports of computers-office machines, electronics- telecommunications, scientific instruments and armament which are possibly not domestically produced products.

Table 3.1.1: High-tech trade for Cyprus by high-tech group of products in million euro

Category\Year	1999	2000	2001	2002	2003	2004	2005	2006
Aerospace	0.072	0.029	0.027	0.019	0.063	0.252	8.745	15.919
Computers-office machines	2.053	4.588	4.809	3.811	2.763	16.622	15.304	11.387
Electronics-telecommunications	3.685	2.703	8.068	5.133	7.051	79.893	295.746	148.195
Pharmacy	3.287	1.864	1.253	1.191	3.356	7.991	20.341	22.124
Scientific instruments	1.098	0.871	2.320	1.896	2.190	12.919	23.500	25.672
Electrical machinery	0.198	0.382	0.240	0.217	0.159	0.632	0.155	0.221
Chemistry	1.877	0.833	0.540	1.537	0.624	0.663	1.534	0.751
Non-electrical machinery	0.016	0.034	0.158	0.048	0.018	0.158	0.343	0.175
Armament	3.410	1.936	1.986	1.683	1.454	1.947	5.952	2.202
Total high-tech	**15.694**	**13.24**	**19.401**	**15.536**	**17.676**	**121.077**	**371.619**	**226.646**

External trade statistics, Eurostat[10]

Looking at the domestic exports for Cyprus in 2007, manufacturing product exports are around 232 million euro of which the highest subcategories are pharmaceuticals (85 million), photosensitive semiconductor devices (36 million) and waste and scrap (23

[10] Info taken from D. Jung email - ESTAT-STRUCTURALINDICATORS@ec.europa.eu

million). The rest of the subcategories are less than 1% of total domestic exports and mainly non high tech products.

Table 3.1.2: Exports of domestically produced goods for Cyprus in 2007

Exports of domestically produced goods 2007	€000´s	million €	% total
Agricultural products	93.850	93,85	22,76
Minerals	9.884	9,88	2,40
Industrial Products of Agricultural origin	60.320	60,32	14,63
Industrial Products of Mineral origin	15.861	15,86	3,85
Industrial Products of Manufacturing origin	232.402	232,40	56,36
-Pharmaceutical	84.870	84,87	20,58
-Photosensitive semiconductor devices	36.364	36,36	8,82
-Waste and scrap	23.125	23,13	5,61
Total	**412.361**	**412,36**	**100**

Import and export statistics, Statistical service, Cyprus

Pharmaceuticals are 20,6% of total domestic exports for Cyprus but not all of them are classified as high tech products. Eurostat classifies as high tech pharmacy products only antibiotics and hormones, their derivatives, medicaments containing them and glycosides, glands, antisera and vaccines.

Time coverage: 1999-2006

Geographical coverage: 27 MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 11: High-tech exports

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	21,4	9,1	N/A	N/A	+	N/A
EU15	14,6		N/A			
St.dev.EU15	7,4		#DIV/0!			

LAF Maquette, December 2009

Comments on score calculations:

The score in changes has been removed from the calculations in this version of the Maquette.

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Not mentioned

General comments

High tech exports for Cyprus have a fairly good performance (positive) in levels. However, since re-exportation is included, the indicator is not representative for the technological competitiveness of the country. A more appropriate measure suggested, is "High tech domestic exports".

3.1.12. Scientific articles per million population

Description: Article counts are based on science and engineering (S&E) articles, notes and reviews published in a set of the world's most influential scientific and technical journals, as tracked by the Institute for Scientific Information (ISI at www.isinet.com). This set of over 5,000 journals is continuously expanding. It excludes all documents for which the central purpose is not the presentation or discussion of scientific data, theory, methods, apparatus or experiments. Fields are determined by the classification of each journal. Articles are attributed to countries by the author's institutional affiliation at the time of publication. A paper is considered co-authored only if its authors have different institutional affiliations or are from separate departments of the same institution. The same logic applies to cross-sectoral or international collaboration.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: OECD

Data source: N/A

Time coverage: 2003; 2005

Geographical coverage: 21 MSs

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Not mentioned

No data available for Cyprus

3.1.13. Employment in high-tech sectors

Description: Employment in high-tech manufacturing and knowledge incentive high-technology services as a percentage of total employment.

Knowledge incentive high technology services provide services directly to the consumers and inputs to the innovating activities of other firms in all sectors. Such services include post and telecommunications, computer and related activities and research and development activities.

High-technology manufacturing include (NACE) categories related to aircraft and spacecraft, computers and office machinery, electronics and communication equipment, pharmaceuticals, medical and other scientific instruments, electrical machinery, chemicals, motor vehicles and other transport equipment.

It is important because it is a structural condition required for innovation potential and shows the ability of a country to use its qualified labour force in technology sciences. It also reflects the importance of high tech sectors in the economy.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat[11], OECD

Data source: Community Labour Force Survey (CLFS)

Data values for Cyprus (% of total employment):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	1,56	1,76	1,89	1,93	2,15	2,30	2,21	2,12	2,46	2,27	
EU15											

LAF Maquette, December 2009

Comments on data

In 2002-2003 the Cyprus telecommunication market was liberalized with new companies entering the market, which might explains the increase in 2003.

Time coverage: 1999-2008

[11] http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/htec_esms.htm

Geographical coverage: 27 MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 13: Employment in High-tech sectors

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	2,3	-27	0,08	11	--	++
EU15	4,6		0,01			
St.dev.EU15	0,9		0,06			

LAF Maquette, December 2009

General comments

Employment in high-tech sectors is probably one of the key problems for the innovation progress in Cyprus. The score on level is poor (double negative). Many scientists remain working abroad, since they are unable to find a job in their subject of study, or return and find employment in jobs not so related to their field. Most of the graduates in sciences such as physics, mathematics, chemistry and biology work as professors in secondary schools, since there is nothing else relevant. There is an improvement during the last years with a "good" (double positive) score on growth.

3.1.14. SME innovating in house (% total smes)

Description: Sum of small and medium enterprises (SMEs) with in-house innovation activities. Innovative firms are defined as those who introduced new products or processes, either (1) in-house, or (2) in combination with other firms. This indicator does not include new products or processes developed by other firms. This indicator measures the degree to which SMEs, that have introduced any new or significantly improved products or production processes during the period 1998-2000, have innovated in-house. The indicator is limited to SMEs because almost all large firms innovate and because countries with an industrial structure weighted to larger firms would tend to do better.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat

Data source: N/A

Data values for Cyprus (% of total SME):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						33,7		37,5			
EU15								34,5			

LAF Maquette, December 2009

Comments on data:

There were no data available for Cyprus in previous Maquette versions.

Time coverage: 2004; 2006

Geographical coverage: 22 MSs

LAF Maquette INDICATOR 14: SME- Innovating in house

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	37,5	4	N/A	N/A	+	N/A
EU15	34,5		N/A			
St.dev.EU15	8,5		#DIV/0!			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list:

General comments:

Cyprus performs around the EU average in the percentage of SMEs that innovate in-house. The score on levels is fairly good. There is no score on growth.

3.1.15. Total innovation expenditure as a share of total turnover

Description: Total innovation expenditures as a share of total turnover.

Innovation expenditure is the sum of the following: (i) in house R&D, (ii) extramural R&D, (iii) machinery and equipment linked to product and process innovation, (iv) spending to acquire patents and licenses, (v) industrial design, (vi) training and (vii) marketing of innovations.

Total turnover for all enterprises, includes firms that do not innovate, whose innovation expenditures are zero.

It shows transmission and application of knowledge

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat, Science and Technology theme

Data source: The third Community innovation survey (CIS3), Survey on Innovation in EU enterprises

Other data info: It covers the following NACE classes: mining and quaring, manufacturing, electricity, gas and water supply, wholesale trade, transport, storage and communication, financial intermediation, computer and related activities, research and development, architectural and engineering activities and technical testing and analysis. The survey covers at least all enterprises with 10 or more employees.

Data values for Cyprus (% in total turnover):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						2,6		2,1			
EU15								0,8			

LAF Maquette, December 2009

Geographical coverage: 26 MSs

Time coverage: 2004; 2006

Indicator values for Cyprus:

LAF Maquette INDICATOR 15: Total innovation expenditure

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	2,1	30	N/A	N/A	++	N/A
EU15	0,8		N/A			
St.dev.EU15	0,3		#DIV/0!			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reasons excluded from narrow list: Redundant: Partly overlaps with the indicator on business R&D expenditure, Statistical: limited time coverage.

General comments:

Cyprus has a good score in total innovation expenditure compared to the rest of the EU countries. This indicator might be misleading, because the number of firms with more than ten employees is very small; this may explain why in this selected sample the score on level is so high. There is no score on growth.

3.1.16. Sales of new- to- market products

Description: Sales of new- to- market products, as a percentage of total turnover. Total turnover for all enterprises, includes firms that do not innovate, whose innovation expenditures are zero. Shows transmission and application of knowledge

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat, Science and Technology theme

Data source: Results of the third community innovation survey (CIS3), Survey on Innovation in EU enterprises.

Other data info: The survey covers at least all enterprises with 10 or more employees.

Data values for Cyprus (% in total turnover):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						1,9		5,3			
EU15						6,2		6,7			

LAF Maquette, December 2009

Geographical coverage: 27 MSs

Time coverage: 2004; 2006

Indicator values for Cyprus:

LAF Maquette INDICATOR 16: Sales of new-to-market products

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	5,3	-6	N/A	N/A	-	N/A
EU15	6,7		N/A			
St.dev.EU15	2,5		#DIV/0!			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Statistical: limited time coverage

General comments:

Cyprus has a fairly poor score in sales of new-to-market products compared to the EU15. There is no score on growth.

3.1.17. Sales of new-to-firm products

Description: The turnover, of new or significantly improved- to-firm products, as a percentage of total turnover. These products are not new to the market. Total turnover for all enterprises, includes firms that do not innovate, whose innovation expenditures are zero. It shows transmission and application of knowledge. It is a proxy for the degree of diffusion for the state of the art technologies.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat, Science and Technology theme

Data source: Third Community innovation survey (CIS3), Survey on Innovation in EU enterprises.

Other data info: The survey covers at least all enterprises with 10 or more employees.

Data values for Cyprus (% in total turnover):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						3,7		7,0			
EU15						7,5					

LAF Maquette, December 2009

Geographical coverage: 27 MSs

Time coverage: 2004; 2006

Indicator values for Cyprus:

LAF Maquette INDICATOR 17: Sales of new- to- firm products

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	7,0	1	N/A	N/A	0	N/A
EU15	6,7		N/A			
St.dev.EU15	2,2		#DIV/0!			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Statistical: limited time coverage

General comments:

Cyprus has a neutral score in sales of new-to-market products compared to the EU15. There is no score on growth.

3.1. A. Indicator Evaluation for Policy Area "R&D and Innovation"

In this section, we list all indicators included in the narrow and wider list, along with the relevant aggregation weight used in the Maquette for each of them. In the columns next to each indicator we summarize any problems observed that affect the reliability or the relevance of the indicator for this policy area, focusing on the case of Cyprus. The problems have already been analyzed in detail.

Table 3.1.3: Indicator Evaluation for "R&D and Innovation"

Indicator	Weight	No data available for Cyprus in the Maquette	Incorrect/ inaccurate data for Cyprus	Not representative/ useful indicator for Cyprus	Insufficient description/ unclear computation procedure	Inappropriate indicator for this policy area	Possible improvements for the indicator
Narrow List Indicators:							
2. Gross domestic expenditure on R&D	0,25						
6. Science and technology graduates -total	0,25		Incorrect data for CY				
7. Patent applications to EPO	0,25		Inaccurate data				
13. Employment in high- tech sectors	0,25						
Wider List Indicators:							
1. Summary innovation index							
3. Gross domestic expenditure on R&D by source of funds-industry							
4. Gross domestic expenditure on R&D by source of funds-government							
5. Gross domestic expenditure on R&D by source of funds-							

abroad			
8. Patents granted by the USPTO		Inaccurate data	
9.Triadic patents –patents all applied for EPO, USPTO and JPO		Inaccurate data	
10. Venture capital investment – early stage-% of GDP	No data for CY		
11. High- tech exports		Data includes re-exportation	Use only domestic exports
12. Scientific articles per million of inhabitants	No data for CY		
14. SMEs innovating in house			
15. Innovation expenditure			
16. Sales of new- to-market products			
17. Sales of new- to- firm products			

3.1. B. Aggregate Scores on "R&D and Innovation"

To calculate the aggregate score both in levels and changes, we calculate the weighted average of the indicators included in the narrow list given the aggregation weights specified. This policy area includes four indicators given equal weights. One of the four indicators included in the narrow list is found to be wrong, so the aggregate score is underestimated. By correcting it, the score on level becomes -15,8 instead of -21,3, while the score on growth becomes 7 instead of 4.

Concerning the choice of indicators included in the narrow list, we would like to have indicators representing inputs (human capital, high tech firms companies, funding) and output of innovation activities (patents, new products and technologies in the market and scientific articles). Unfortunately we cannot have accurate data for most of the activities, which makes the current selection the most appropriate.

Taking into account the fact that the economy in Cyprus is totally based on services, however, we can give a higher weight on gross domestic expenditure on R&D and lower to the rest of the indicators which are related to high-tech manufacturing. The alternative weight combinations are shown in Table 3.1.4. The scores do not seem to change much.

Table 3.1.4: R&D and Innovation Policy sector– Aggregate scores

	Gross domestic expenditure on R&D	Science and technology graduates	Patent applications to the European Patent Office	Employment in High-tech sectors	Aggregate score
Aggregate score on LEVEL					
Aggr. weights	0,25	0,25	0,25	0,25	
CY	-22,98	-21,94	-13,14	-27,27	-21,3
CY*	-22,98	0,04	-13,14	-27,27	-15,8
Aggr. Weights2	0,33	0	0,33	0,33	
CY*2	-22,98	0,04	-13,14	-27,27	-21,1
Aggr. Weights3	0,4	0,2	0,2	0,2	
CY*3	-22,98	0,04	-13,14	-27,27	-21,7
Aggregate score on GROWTH					
Aggr. weights	0,25	0,25	0,25	0,25	
CY	5,40	-5,72	N/A	11,24	4
CY*	5,40	3,74	N/A	11,24	7
Aggr. Weights2	0,33	0	0,33	0,33	
CY*2	5,40	3,74	N/A	11,24	8
Aggr. Weights3	0,4	0,2	0,2	0,2	
CY*3	5,40	3,74	N/A	11,24	4
* Estimates of the true value based on the corrections made					

LAF Maquette, December 2009

3.1. C. General evaluation of the policy area

During the last years, the government has been contributing to the R&D expenditure by creating the Engineering School at the University of Cyprus and by founding the Cyprus Technological University, which is the second public university level institute in Cyprus. This is expected to have a positive effect on the indices for expenditure on R&D and the number of science and technology graduates. Moreover, this gives the opportunity to many Cypriot scientists to find employment in academia and continue research in their country, instead of working in foreign universities or foreign research organizations. The foundation of a university level technical school also implies the increase in research and possibly the increase in patents gained for Cyprus, through the university. Due to the fact that most of the Cypriot scientists work or study abroad, many patents invented by them are attributed to other countries, or foreign companies.

On the other hand, private R&D activities are limited. The Cypriot economy is based on services and 99% of private companies are smaller than 10 employees in size, so the creation of private R&D units is not possible. The government can only encourage the creation of private research units in the very few fields with high tech potential that are developed in Cyprus. The pharmaceutical industry for example, seems to grow and according to Cyprus external trade statistics 2007, 20.6% of Cyprus exports are pharmaceutical products. Incentives to pharmaceutical industries for private R&D units will employ more scientists in the field, possibly increase the number of patents gained for Cyprus and help the sector grow further since now is mainly based on replicating existing medical products. However, this requires careful studies, organization and work to achieve the necessary infrastructure and the minimum standards to compete internationally, which makes it a very risky plan.

Concluding, R&D funded by the government is what Cyprus has to focus on. Investing in universities and research centers should be the main target of the government in the near future.

3.1. D. Quantitative analysis from the existing literature

Athanasiadou, Mamuneas and Savva (2007) study the R&D activities in Cyprus and the EU. They use a Cobb Douglas production function and data covering the period 1995-2005. According to their estimated elasticity, a 1% increase in R& D expenditure increases total output by 0.226% which is the highest among the new EU members. Given the percentage of the labour force with tertiary education, the return of R&D expenditure is 42% which is much higher than any other new EU country, even though the R&D expenditure is so low. This is explained by the authors as the result of diminishing returns to scale (high returns in low levels). Another explanation is that Cyprus can easily take advantage of the technology and R&D results produced in other developed countries. They conclude that increasing R&D expenditure will add significantly to the growth of the economy.

3.2. ICT

It includes all technologies used for the manipulation and communication of information, with an impact on many sectors other than the ICT producing industry itself. It is actually part of R&D, but traded separately because of its great impact on growth.

ICT has a direct and significant impact on growth since the use of Information and communication technologies directly boosts production, increases efficiency and productivity in many sectors, especially those providing services. ICT reduces the administrative burden on companies (the time needed for a specific aspect to be done) and leads to a better organization of firms and government services. Moreover, the fast transportation of any kind of information through the internet leads to the faster adoption of new technologies in production.

3.2.1. ICT expenditure-IT

Description: Annual expenditure on Information and communication Technology-hardware, equipment, software and other services - as a percentage of GDP

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: STRIND, Innovation and research theme[12]

Data source: The annual report of the EITO (European Information Technology Observatory). The EITO publication is released each year in spring.

Time coverage: 2004-2006

Geographical coverage: 23MSs

Aggregation weight: 50% (narrow list indicator)

No data available for Cyprus

[12] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir090

3.2.2. ICT expenditure- Telecommunications

Description: Annual expenditure on Telecommunications Technology –equipment and services- as a percentage of GDP.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat- STRIND, Innovation and research theme[13]

Data source: The annual report of the EITO (European Information Technology Observatory). The EITO publication is released each year in spring.

Time coverage: 2004-2006

Geographical coverage: 23MSs

Aggregation weight: 50% (narrow list indicator)

No data available for Cyprus

3.2.3. Level of internet access

Description: Percentage of households with internet access at home. All forms of Internet use are included. The population considered is aged 16 to 74.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat –STRIND- Innovation and research theme[14]

Data source: Eurostat's annual model surveys on ICT usage in households and by individuals. Data is collected by the National Statistical Institutes or Ministries.

[13] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir090
[14] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir040

Data for Cyprus (% of households):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY				24,00	29,00	53,00	32,00	37,00	39,00	43,00	53,00
EU15				39,00	43,00	45,00	53,00	54,00	59,00	64,00	68,00

LAF Maquette, December 2009

Comments on the data:

The 2004 value could be wrong or could be a result of the increased competition that year[15] *which resulted in an increase in internet subscription price offers.*

Comparing this to the broadband penetration rate data, it is more likely that it is due to a mistake, since there is no decrease in the number of subscribers in 2005. Looking at the Table below, it seems that the number of subscribers, as a percentage of the population, kept increasing from 2004 onwards.

Broadband penetration rate for Cyprus
(Number of internet subscribers over total population)

	2002	2003	2004	2005	2006	2007
CY			2,0	2,7	6,6	11,10
EU15	2,3	4,5	7,6	12,0	16,5	20,80

Source: LAF Maquette, June 2008

Geographical coverage: 27MSs

Time coverage: 2002-2009

Indicator values for Cyprus:

LAF Maquette INDICATOR 3: Level of internet access

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	53,0	-12	4,14	0	- -	0
EU15	68,0		4,14			
St.dev.EU15	12,8		1,20			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

[15] The telecommunication market was liberalized in 2002 so new companies entered the market after that with price offers and other deals.

Reason excluded from narrow list: Redundant- Highly correlated with the Broadband penetration rate and did not provide any additional info

General Comments

The percentage of households having internet access at home is evaluated as poor (double negative), while the growth is neutral. The 2004 data value appears to be excessively high.

3.2.4. E-commerce via internet

Description: Percentage of enterprises' total turnover from e-commerce via internet. Enterprises included are those with at least 10 full time employees and they are relating to Manufacturing, Distributive trades, Hotels and accommodation, Transport and communication and Real estate, renting and business activities. Sales through other networks are not included, leaving out for instance EDI-based sales.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat – STRIND- Innovation and research theme[16]

Data Source: Eurostat's annual model survey on ICT usage and e-commerce in enterprises. Data is collected by National Statistical Institutes

Other data info: The year given relates to the survey year. The e-commerce data relates to the year prior to the survey.

Data for Cyprus (% of total turnover):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY							0,2	1,4	0,6		
EU15				0,9	1,1	2,2	2,8	4,2	4,4		

LAF Maquette, December 2009

Geographical coverage: 15 MSs (varies by year and by country)

Time coverage: 2002-2007

[16] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir100

Indicator values for Cyprus:

LAF Maquette INDICATOR 4: E-commerce via internet

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	0,6	-16	0,20	-10	- -	-
EU15	4,4		0,73			
St.dev.EU15	2,4		0,51			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Not mentioned - Limited geographical coverage

General comments

Cyprus online stores and services are still limited and the score performance of this indicator is poor in levels and fairly poor in growth. Due to the small size of the country and limited mail service possibilities for delivery people still prefer to buy their products in stores. Safe online services are becoming more popular and should be encouraged. The performance of this indicator depends on the availability of online stores and services and individual internet access as well.

3.2.5. E-government online availability

Description: The indicator shows the percentage of the 20 basic services which are fully available online i.e. for which it is possible to carry out full electronic case handling. For example, if in a country 13 of the 20 services were measured as being 100% available on-line and one service was not relevant (e.g. does not exist), the indicator is 13/19 which is 68.4%.

Services for citizens include income taxes, job search services, social security benefits, personal documents, car registration, application for building permission, declaration to the police, public libraries, birth and marriage certificates, enrollment in higher education, announcements of moving, health related services. Services for businesses include social contribution to employees, corporate tax, VAT, registration of a new company, submission of data to statistical offices, custom declarations, environment related permits, public procurement.

(+) A high value is desirable

Indicator type: Policy indicator

Indicator Source: Eurostat – STRIND- Innovation and research theme[17]

Data source: A sample of around 8,000 URLs agreed with MSs as relevant for each service. The work was undertaken by the consultancy company Capgemini. Native speakers in each language then carried out a web survey to measure the degree of sophistication of online availability using a 4 stage classification (1. Basic Information; 2. One-way Interaction; 3. Two-way Interaction; 4. Full electronic case handling).

Data for Cyprus (% services):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						25,00	35,00	45,00			
CY*						25,00		35,00	45,00		50,00
EU15				36,00	47,00	49,00	56,00	68,00			
EU15*				36,00	47,00	49,00		56,00	68,00		81,00
*Indicates values provided in Eurostat website for this indicator											

LAF Maquette, December 2009

Comments on data:

There is some confusion regarding the year that each value provided corresponds to. This should be clarified and corrected.

Time coverage: 2002-2006

Geographical coverage: 27MSs

Indicator values for Cyprus:

LAF Maquette INDICATOR 5: E-government online availability

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	45,0	-19	N/A	N/A	- -	N/A
EU15	68,0		N/A			
St.dev.EU15	11,8		#DIV/0!			

LAF Maquette, December 2009

[17] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir120

Comments on score calculations:

The score in changes has been removed from the calculations in this version of the Maquette.

Aggregation weight: 50% (narrow list indicator)

General comments

The online availability of government services is evaluated as poor compared to the EU average. However, we observe an improvement. No score on growth has been calculated.

3.2.6. E-government usage by enterprises

Description: Percentage of enterprises which use the internet for interaction with public authorities (obtaining information, downloading forms, filling-in web-forms, full electronic case handling). The data consists of enterprises with at least 10 full time employees and they are relating to the sectors of Manufacturing, Construction, Distributive trades, Hotels and accommodation, Transport and communication, Real estate, renting and business activities, motion picture and video activities and radio and television activities.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat – STRIND- Innovation and research theme[18]

Data source: National Statistical Institutes based on Eurostat's annual model survey on ICT usage and e-commerce in enterprises.

Data for Cyprus (% of enterprises):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						35,00	40,00	44,00	54,00	65,00	72,00
EU15						50,00	56,00	64,00	66,00	70,00	73,00

LAF Maquette, December 2009

Geographical coverage: 25 MSs

Time coverage: 2003-2009

[18] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir140

Indicator values for Cyprus:

LAF Maquette INDICATOR 6: E-government usage by enterprises

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	72,0	-1	7,40	15	0	++
EU15	73,0		4,60			
St.dev.EU15	8,2		1,88			

LAF Maquette, December 2009

Aggregation weight: 50% (narrow list indicator)

General comments

The online use of government services by enterprises is evaluated as neutral compared to the EU average. However, we observe a significant improvement during the last years. The score on growth is "good" (above the EU15 average).

3.2.7. E- government usage by individuals

Description: Percentage of individuals aged 16-74, using the Internet to interact with public authorities (i.e. having used the Internet for one or more of the following activities; "obtaining information from public authorities web sites", "downloading official forms", "sending filled in forms").

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat – STRIND- Innovation and research theme[19]

Data source: The Community Survey on ICT Usage in Households and by Individuals

Data for Cyprus (% of individuals 16-74):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						11,0	11,0	13,0	20,0	16,0	22,00
EU15							26,0		34,0	32,0	33,00

LAF Maquette, December 2009

Geographical coverage: 27MSs

[19] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir130

Time coverage: 2002-2009

Indicator values for Cyprus:

LAF Maquette INDICATOR 7: E- Government usage by individuals

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	22,0	-10	2,20	6	-	+
EU15	33,0		-0,50			
St.dev.EU15	11,5		4,59			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Redundant- High correlation with the other e-government indicators.

General comments:

The use of internet by individuals to interact with the government is limited and it is evaluated as fairly poor in levels. There is an improvement over time, which makes performance in changes fairly good. This indicator reflects both limited internet access at home by individuals, and limited online government availability.

3.2.8. Broadband penetration rate

Description: The broadband penetration rate describes the number of dedicated, high-speed connections per 100 inhabitants (in percentage of the population).

Broadband lines are defined as those with a capacity of at least 144Kbits/s. Broadband corresponds to fast Internet, and includes several technologies (ADSL, Cable, Dedicated Lines, etc).

This indicator shows how widely broadband access to the internet has spread in the countries on the general level, not specifying by user group.

(+) A high value is desirable

Indicator type: Performance indicator

Indicator Source: Eurostat – STRIND- Innovation and research theme[20]

Data source: Eurostat: DG INFSO survey on "Broadband access in the EU". The data are collected by the National Regulatory Authorities (through the COCOM Communications Committee) for DG INFSO.

Other data info: Data values refer to July of each reference year

Data for Cyprus (% of total population):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY						2,00	2,70	6,60	11,10	16,00	
EU15				2,30	4,50	7,60	12,00	16,50	20,80	24,30	

LAF Maquette, December 2009

Geographical coverage: 27 MSs

Time coverage: 2002-2008

Indicator values for Cyprus:

LAF Maquette INDICATOR 8: Broadband Penetration rate

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	16,0	-16	3,50	-2	--	0
EU15	24,3		3,67			
St.dev.EU15	5,3		0,73			

LAF Maquette, December 2009

Aggregation weight: 100% (narrow list indicator)

General comments

Internet subscriptions in Cyprus are way below the EU15, which results in a poor (double negative) performance in levels. However, an improvement is observed during the last years. The score in changes is evaluated as neutral, which means that this increase was about the same as the EU15 increase.

[20] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir150

3.2. A. Indicator Evaluation for Policy Area "ICT"

In this section, we list all indicators included in the narrow and wider list, along with the relevant aggregation weight used in the Maquette for each of them. In the columns next to each indicator we summarize any problems observed that affect the reliability or the relevance of the indicator for this policy area, focusing on the case of Cyprus. The problems have already been analyzed in detail.

Table 3.2.1: Indicator Evaluation for "ICT"

Indicator	Weight	No data available for Cyprus in the Maquette	Incorrect/ inaccurate data for Cyprus	Not representative/ useful indicator for Cyprus	Insufficient description/ unclear computation procedure	Inappropriate indicator for this policy area	Possible improvements for the indicator
Narrow List Indicators:							
1. ICT expenditure -IT	0,17	No data for CY					
2. ICT expenditure - Telecommunications	0,17	No data for CY					
5. E-government online availability	0,17	No score in changes	Time confusion				
6. E-government usage by enterprises	0,17						
8. Broadband penetration rate	0,33						
Wider List Indicators:							
3. Level of internet access							
4. E- commerce via internet							
7. E- government usage by individuals							

3.2. B. Aggregate Scores on ICT

To calculate the aggregate score in levels we calculate the weighted average of the 5 indicators chosen to be in the narrow list. For Cyprus, we only have 3 indicators and the result is a poor aggregate performance with a score of -13 in levels.

The "level of internet access" indicator can probably substitute the broadband penetration index in the narrow list. In our opinion it is more informative for Cyprus since:

- It is more representative and has a more direct interpretation because it refers to household access percentage which can approximate the percentage of individuals with internet access at home (assuming that the average number of members in a household with internet is the same as the number of members in a household without internet).

- It focuses on households with population 16-74 years old and not the total population.

Using the "level of internet access" instead of the "broadband penetration rate", the aggregate score does not change much. The aggregate score on growth includes only two indicators and the result is a neutral performance. Two or three indicators are not representative enough to evaluate the whole policy area. Hence, the coverage of the ICT policy area for Cyprus should be marked as poor.

Table 3.2.2: ICT Policy area– Aggregate scores

	ICT expenditure - Information Technology as a % of GDP	ICT expenditure- Tele communications as a % of GDP	E-government on-line availability	E-government usage by enterprises - % of enterprises	Broadband penetration rate - Broadband lines subscribed in % of the population	Level of Internet access - % of households with Internet access at home	Aggregate score
Indicator type	performance	performance	policy	performance	performance	performance	
Aggregate score on LEVEL							
weights	0,17	0,17	0,17	0,17	0,33		
CY	N/A	N/A	-19,45	-1,22	-15,63		-13
Weights*	0,17	0,17	0,17	0,17	0	0,33	
CY*	N/A	N/A	-19,45	-1,22	-15,63	-11,76	-11
Aggregate score on GROWTH							
Weights	0,17	0,17	0,17	0,17	0,33		
CY	N/A	N/A	N/A	14,85	-2,27		3
Weights*	0,17	0,17	0,17	0,17	0	0,33	
CY*	N/A	N/A	N/A	14,85	-2,27	0,00	5

* denotes the suggested alternative combination of aggregation weights and the corresponding aggregate score

Source: LAF Maquette, December 2009

3.2.C. General evaluation of the policy area

Information and Communication technology expenditure data is not available for Cyprus which indicates that the amount is small and probably included in the R&D expenditure. The rest of the indicators concerning online services and shopping confirm that this sector is not much developed in Cyprus. Private domestic store online sales and purchases are not available because of the very small size of the country and the very small size of most companies. However, online government services and real estate, renting, transport, hotel and accommodation services are convenient and even necessary for the development of the economy. If all government services can be done online, people will save valuable time and avoid part of the bureaucratic procedures needed during work hours. Moreover, online transportation and accommodation services will help the development of tourism.

Improvements in this sector can easily be done. The government should create more IT units responsible for the creation and support of online services in all the basic public services. We could also promote the online services offered by hotels and private companies through seminars and advising offices if necessary.

It should be noted that, there was a big increase in this sector over the last two years which is not yet reflected in the data. The University of Cyprus, for example, recently upgraded its online services with the online registration possibility, starting January 2009. Other private companies such as real estate and electronics stores now provide their services online and the government keeps increasing the online possibilities. It is expected that, in the following years, online services will be available in most government departments and big private companies.

3.3. Education and Lifelong Learning

Education and lifelong learning include all activities that aim to improve the volume and quality of human capital. Human capital is associated with the knowledge and skills embodied in people and accumulated through schooling, training and experience that are useful in the production of goods, services and further knowledge. Skills and knowledge can be acquired by formal initial education (pre-primary, primary, secondary and tertiary) as well as during professional life (through further vocational training or specific courses).

This policy area is important since human capital quality improvement contributes to a higher level of productivity and increases the adjustment capacity of the labour market. Moreover, a highly qualified labour force can follow the fast technological progress that is occuring and use new technologies more efficiently.

Sub-category I: Education

3.3.1. Graduates (tertiary education) aged 20-29 per 1000 of the corresponding age population

Description: Tertiary graduates (IECD 5-6) aged 20-29 per 1000 of the corresponding age population.

(+) A high value is desirable

Indicator type: Policy indicator

Indicator source: Eurostat

Data source: (perhaps EU LFS)

Data for Cyprus (individuals per 1000):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY		19,7	22,2	22,7	22,3	25,4	25,6	26	29,3		
EU15											

LAF Maquette, December 2009

Comments on data:

The number of graduates over the population aged 20-29 is estimated to be much higher than the numbers provided in the Maquette. The difference is perhaps due to the fact

that graduates abroad are not included in the calculations, as discussed for the indicator 3.1.6. Below we provide our estimates for the correct numbers. Please see Appendix C2 for more details.

Corrected data for Cyprus (individuals per 1000):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY				53,3	57,1	61,0	61,8	60,5	59,1		
EU15									37,8		

LAF Maquette, December 2009

Geographical coverage: 24 MSs

Time coverage: 1999-2007

Indicator values for Cyprus:

LAF Maquette INDICATOR 1: Graduates (Tertiary education) aged 20-29 per 1000 of the corresponding age population

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	29,3	-7	1,37	-2	-	0
CY*	59,1	17	1,1	-4	++	0
EU15	37,8		1,62			
St.dev.EU15	12,6		1,14			

LAF Maquette, December 2009

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Redundancy: highly correlated with other indicators in the narrow list.

General comments

Cyprus is expected to have a good performance in terms of tertiary graduates. In the Maquette, however, this indicator is fairly poor in levels and neutral in growth. This evaluation is misleading and this is probably due to the fact that the statistics on the number of tertiary graduates in Cyprus do not include graduates abroad. Based on our estimates the score on levels is closer to 17 instead of -7, which turns the performance into good. Please see Appendix C2 for more information.

3.3.2. Annual expenditure on public and private educational institutions per tertiary student, compared to GDP per capita.

Description: "Annual expenditure on public and private educational institutions per student compared to GDP per capita, at tertiary level of education (ISCED 5-6), based on full-time equivalents. It relates the resources (e.g. expenditure for personnel, other current and capital expenditure) being devoted to education in public and private educational institutions to the overall economic welfare of a country. It is based on full-time equivalent enrolment. The use of GDP per capita allows the comparison of levels of economic activity of different sized economies (per capita) irrespective of their price levels (in PPS)".

(+) A high value is desirable

Indicator type: Policy indicator

Indicator source: EUROSTAT, Populations and Social Conditions theme, Education and training[21]

Data source: The main source of data is the joint UIS (UNESCO Institute of Statistics) /OECD /Eurostat (UOE) questionnaires on education statistics, which constitute the core database on education.

Data for Cyprus (expenditure per individual):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	45,5	47,9	47,3	47,6	40,7	37,6	42,5	44,7			
EU15											

LAF Maquette, December 2009

Geographical coverage: 25 MSs

Time coverage: 1999-2006

[21] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00069&plugin=1

Indicator values for Cyprus:

LAF Maquette INDICATOR 2: Annual expenditure on public and private educational institutions per student compared to GDP per capita, at tertiary level of education (ISCED 5-6)

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	44,7	10	N/A	N/A	+	N/A
EU15	38,8		N/A			
St.dev.EU15	5,7		#DIV/0!			

LAF Maquette, December 2009

Comments on score calculations:

Data are available in the Maquette for 1999-2004 for most of the countries. However, the change score is not calculated.

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Redundancy: highly correlated with other indicators in the narrow list

General Comments:

The score on levels is evaluated as fairly good since the indicator value is above the EU15 average. This indicator equals the ratio of expenditure to GDP (as in the "Spending on Human Recourses" indicator) multiplied by the ratio of the population to the number of students in tertiary education. Hence, this indicator is very clearly influenced by the age structure of the population.

3.3.3. Spending on Human Resources

Description: Total public expenditure on education as a percentage of GDP. The public sector funds education either by bearing directly the current and capital expenses of educational institutions or by supporting students and their families with scholarships and public loans as well as by making subsidies for educational activities to private firms or non-profit organizations.

(+) A high value is desirable

Indicator type: Policy indicator

Indicator source: EMCO, STRIND[22]

Data source[23]: The joint UIS/ECD/Eurostat (UOE) questionnaires on education statistics. Data on regional enrolments and foreign language learning are collected additionally by Eurostat. Countries provide data, coming from administrative records, on the basis of commonly agreed definitions.

Data for Cyprus (% GDP):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	5,45	5,44	5,93	6,55	7,29	6,70	6,92	7,02			
EU15	4,80	4,73	4,98	5,00	5,03	4,95	4,88	5,07			

LAF Maquette, December 2009

Geographical coverage: 27 MSs

Time coverage: 1999-2006

Indicator values for Cyprus:

LAF Maquette INDICATOR 3: Spending on human resources

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	7,0	26	N/A	N/A	++	N/A
EU15	5,1		N/A			
St.dev.EU15	0,7		#DIV/0!			

LAF Maquette, December 2009

[22] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsiir010
[23] http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/tsiir010_esms.htm

Comments on calculations:

In the Maquette, the change and the total score on growth is not calculated for any of the MSs even though values are available for all years 1999-2004. The corresponding formula needs to be corrected.

Aggregation weight: 0% (wider list indicator)

Reason excluded from narrow list: Redundancy: highly correlated with other indicators in the narrow list

General comments:

Public expenditure on education is above the EU15 average. This total is growing. This is largely explained by the foundation of the Cyprus University of Technology and the construction of the new campus area for the University of Cyprus.

It should be noted that, the age structure of a country's population will influence public expenditure as a proportion to GDP; young societies will, other things equal, have a higher proportion.

3.3.4. Youth education attainment level – females

Description: Percentage of the female population aged 20-24 having completed at least upper secondary education.

(+) A high value is desirable

Indicator Type: Policy indicator

Indicator source: EMCO / STRIND, Innovation and research theme[24]

Data source: EU LFS

Data Info: From 27 October 2006, this indicator is based on annual averages of quarterly data instead of one unique reference quarter in spring.

[24] http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&init=1&pcode=tsiir110&language=en

Data values for Cyprus (%):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	85,6	82,8	84,9	89,5	87	83,8	89,1	90,7	91,0	89,50	
EU15	75,00	76,80	76,60	76,60	76,80	77,50	77,70	78,40	78,30	79,10	

LAF Maquette, December 2009

Time coverage: 1999-2008

Geographical coverage: 27 MSs

Indicator value for Cyprus:

LAF Maquette INDICATOR 4: Youth education attainment levels- females

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	89,5	17	0,43	-1	++	0
EU15	79,1		0,46			
St.dev.EU15	6,2		0,42			

LAF Maquette, December 2009

Aggregation weight: 50% (narrow list indicator)

General comments

The percentage of female youth in Cyprus that has attained at least upper secondary education level is considered among the highest in the EU. The performance of this indicator is evaluated as good in levels and, given its high level, neutral in growth.

3.3.5. Youth education attainment level – males

Description: Percentage of the male population aged 20-24 having completed at least upper secondary education.

(+) A high value is desirable

Indicator Type: Policy indicator

Indicator source: EMCO / STRIND, Innovation and research theme[25]

[25] http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&init=1&pcode=tsiir110&language=en

Data source: EU LFS

Data Info: From 27 October 2006, this indicator is based on annual averages of quarterly data instead of one unique reference quarter in spring.

Data values for Cyprus (%):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	75,1	74,4	75,4	76,7	71,3	70,7	71,1	76,1	79,8	80,1	
EU15	69,60	70,70	70,50	70,90	71,30	71,20	71,80	71,80	72,20	72,60	

LAF Maquette, December 2009

Time coverage: 1999-2008

Geographical coverage: 27 MSs

Indicator value for Cyprus:

LAF Maquette INDICATOR 5: Youth education attainment levels- males

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	80,1	8	0,56	4	+	+
EU15	72,6		0,33			
St.dev.EU15	9,2		0,61			

LAF Maquette, December 2009

Aggregation weight: 50% (narrow list indicator)

General comments

The percentage of male youth in Cyprus that has attained at least the upper secondary education level is considerably lower than the corresponding female percentage but still higher than the EU15 average. The performance of this indicator is evaluated as good both in levels and in growth.

3.3.6. Early school-leavers – females

Description: Percentage of the female population aged 18-24 with at most lower secondary education and not being involved in further education or training.

The numerator of the indicator refers to persons aged 18 to 24 who meet the following two conditions: (a) the highest level of education or training they have attained is preprimary, primary and lower secondary education (ISCED 0, 1, 2) or secondary education programmes which are not designed to lead to tertiary education and are shorter than 2 years (ISCED 3c short) and (b) they have not received any education or training in the four weeks preceding the survey. The denominator in the total population consists of the same age group, excluding no answers to the questions "highest level of education or training attained" and "participation to education and training".

(-) A low value is desirable

Indicator Type: Performance indicator

Indicator source: EMCO / STRIND, Social cohesion theme[26]

Data source: EU LFS

Other Data info[27]: In DK, LU, IS, NO, EE, LV, LT, CY, MT and SI, the high degree of variation of results over time is partly influenced by a low sample size. Students living abroad for one year or more and conscripts on compulsory military service are not covered by the EU LFS, which may imply higher rates than those available at the national level. This is especially relevant for CY. The indicator covers non-nationals who have stayed or intend to stay in the country for one year or more.

Data values for Cyprus (%):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	12,3	13,9	13,10	11,00	11,80	14,90	10,60	9,20	6,80	9,50	
EU15	18,50	17,20	16,60	16,20	16,10	14,80	14,80	14,40	14,00	14,30	

LAF Maquette, December 2009

[26] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsisc060
[27] http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/lfsi_edu_a_esms_an2.htm

Comments on data:

Data values seem particularly high for Cyprus. As mentioned in the data information above, this is probably explained by the fact that students abroad are excluded from the sample, which makes the indicator biased upwards. However, the majority of foreign workers in Cyprus are young and low-skilled, which might also affect this indicator in the opposite direction.

Time coverage: 1999-2008

Geographical coverage: 27 MSs

Indicator Values for Cyprus:

LAF Maquette INDICATOR 6: Early school leavers- females

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	9,5	9	-0,31	-5	+	-
EU15	14,3		-0,47			
St.dev.EU15	5,4		0,33			

LAF Maquette, December 2009

Aggregation weight: 50% (narrow list indicator)

General comments

The performance of female early school leavers in Cyprus is evaluated as good. However, the score is believed to be unreliable due to the nature of the selected data sample (excludes Cypriots studying abroad and includes the large number of unskilled foreign workers in Cyprus). For policy purposes, an indicator with only national early school leavers would be desirable.

3.3.7. Early school-leavers – males

Description: Percentage of the male population aged 18-24 with at most lower secondary education and not in further education or training.

The numerator of the indicator refers to persons aged 18 to 24 who meet the following two conditions: (a) the highest level of education or training they have attained is preprimary, primary and lower secondary education (ISCED 0, 1, 2) or secondary education programmes which are not designed to lead to tertiary education and are shorter than 2 years (ISCED 3c short) and (b) they have not received any education or training in the four weeks preceding the survey. The denominator in the total population consists of the same age group, excluding no answers to the questions "highest level of education or training attained" and "participation to education and training".

(-) A low value is desirable

Indicator Type: Performance indicator

Indicator source: EMCO / STRIND, Social cohesion theme[28]

Data source: EU LFS

Other Data info[29]: There are changes in survey characteristics due to the implementation of harmonised concepts and definitions in the survey[30]. Students living abroad for one year or more and conscripts on compulsory military service are not covered by the EU LFS, which may imply higher rates than those available at national level. This is

[28] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsisc060
[29] http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/lfsi_edu_a_esms_an2.htm
[30] . From 2005 in SE due to changes in the reference period (formerly 4 weeks preceding the survey instead of one week from 2005),
- From 2003 in CZ, DK, EL, IE, CY, HU, NL, AT, SI, FI, SE, NO, CH, from 2004 in BE, LT, IT, IS, MT, PL, PT, UK and RO, and from 2005 in ES due to wider coverage of taught activities
- from 2003 in SK due to restrictions for self-learning
- in 2003 and 2004 in DE due to the exclusion of personal interest courses
- in 2001 and 2002 in SI due to the exclusion of certain vocational training
- 1999 in NL, 2000 in PT, 2003 in FR and CH due to changes in the reference period (formerly one week preceding the survey; additionally in CH: 12 months for vocational training instead of 4 weeks),
- LU (1999) due to a new definition of lower secondary education level
- EU15, euro area, EU25, consequently.

Due to changes in the survey characteristics, data lack comparability with former years in IT (from 1993), PT (from 1998), BE and UK (from 1999), FI (from 2000), SE and BG (from 2001), IE, LV and LT (from 2002), HU (from 2003), FI (quarter 1 from 2003) and AT (quarter 2 from 2003; from 2004 continuous survey covering all weeks of the reference quarter).

especially relevant for CY. The indicator covers non-nationals who have stayed or intend to stay in the country for one year or more.

Data values for Cyprus (%):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	24,6	25,0	23,9	22,3	24,2	27,2	26,6	23,5	19,5	19,0	
EU15	22,6	21,8	21,4	21,1	20,5	20,1	19,4	19,3	18,8	19,0	

LAF Maquette, December 2009

Comments on data:

Data values seem particularly high for Cyprus. As mentioned in the data information above, this is probably explained by the fact that soldiers and students abroad are excluded from the sample, which makes the indicator biased upwards. This is especially true for the males since a two-year military service is obligatory for males aged 18-20; this group is one third of the sample population of this age group. The indicator values are based on a sample of the in-Cyprus male population aged 20-24. Moreover, the majority of foreign workers in Cyprus are young and low-skilled, which might also affect this indicator, since non-nationals are included in the sample.

Time coverage: 1999-2008

Geographical coverage: 27 MSs

Indicator Values for Cyprus:

LAF Maquette INDICATOR 7: Early school leavers- males

	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	19,0	0	-0,62	6	0	+
EU15	19,0		-0,40			
St.dev.EU15	8,4		0,37			

LAF Maquette, December 2009

Aggregation weight: 50% (narrow list indicator)

General comments

The performance of male early school leavers in Cyprus is evaluated as neutral. However, the score on level (0 immediately above) is believed to be much higher than

the true value due to the selected data sample. In particular, the male students abroad are excluded from the survey, which is an important part of the population of the age group 20-24. Moreover, the males in military service are also excluded from the survey, which is the whole male population between 18-20 years of age. On the other hand, the indicator might be influenced downwards due to the low-skilled foreign workers, the majority of whom are young. For policy purposes, it would be useful to have the indicator with only national early-school leavers.

3.3.8. Share of graduates over working age population

Description: Share of graduates over working age population. The denominator is the working age population, which is the total population aged 15-64 and consists of high-school students, soldiers, university or college students, unemployed individuals, the inactive and people in gainful employment.

(+) A high value is desirable

Indicator Type: Performance indicator

Indicator source: EUROSTAT, ECFIN calculation

Data source: N/A

Data values for Cyprus (%):

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CY	0,6%	0,6%	0,6%	0,7%	0,7%	0,8%	0,7%	0,8%	0,9%		
EU15											

LAF Maquette, December 2009

Comments:

The data values seem low. By looking at the indicator values for all countries, this share is low for all (varying between 0.4%- 2.1%), and seems to be calculated using data on the flow of tertiary graduates for each specific year and not the stock of graduates in the working age population. Therefore it is also plagued by the problem in the measurement of graduates for Cyprus that excludes graduates from abroad. This applies not only to this indicator, but all indicators in LAF that concern tertiary education graduates[31].

[31] See Indicator 3.1.6. - Science and Technology Graduates indicator in R&D policy area.

Following the same method used for the Science and Technology graduates indicator in the R&D area, we correct the values, though the stock flow problem remains.

Corrected data values for Cyprus:

	1999	2000	2001	2002	2003	2004	2005	2006	2007
CY*				1,3%	1,4%	1,5%	1,6%	1,6%	1,7%
EU15									
* These are the data values based on the corrections made									

Source: LAF Maquette, June 2008

Time coverage: 1999-2007

Geographical coverage: 27 MSs

Indicator values for Cyprus:

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	Level		Growth-change		Qualification	
	Rate	Score on level	Change	Total score on growth rate	Level	Growth rate
CY	0,009	-8	0,000	0	-	0
CY*	0,016	14	0,001	15	++	++
EU15	0,011		0,000			
St.dev.EU15	0,004		0,000			

LAF Maquette, December 2009

Aggregation weight: 100% (narrow list indicator)

Comments:

This indicator calculates the number of graduates in a given year as a percentage of the working age population at the time. The low value of the indicator for Cyprus is misleading, since it excludes people graduating from universities abroad. This has serious implications both for the level and growth scores of the indicator, as well as for the aggregate score. The score becomes good in levels and fairly good in growth, when graduates from abroad are taken into account.

The measurement of tertiary education graduates, not only in this indicator but in all indicators in LAF concerning tertiary education graduates, suffers from excluding from