European Commission

Research and Innovation performance in Malta

Country Profile

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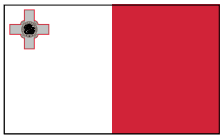


Malta

Building up a knowledge-based economy in a specialisation strategy

Overall performance in research and innovation

The indicators in the table below present a synthesis of research and innovation (R&I) performance in Malta. They relate knowledge investment and input to performance and economic output throughout the innovation cycle. They show thematic strengths in key technologies and also the high-tech and medium-tech contribution to the trade balance. The indicator on excellence in science and technology takes into consideration the quality of scientific production as well as technological development. The Innovation Output Indicator covers technological innovation, skills in knowledge-intensive activities, the competitiveness of knowledge-intensive goods and services, and the innovativeness of fast-growing enterprises, focusing on innovation output. The indicator on knowledge-intensity of the economy focuses on the economy's sectoral composition and specialisation and shows the evolution of the weight of knowledge-intensive sectors and products.

Key indicators of research and innovation performance	
R&D intensity 2012: **0.84 %** (EU: 2.07 %; US: 2.79 %) 2007-2012: **+8.1 %** (EU: 2.4 %; US: 1.2 %)	***Excellence in S&T***[1] 2012: **23.3** (EU: 47.8; US: 58.1) 2007-2012: **+5.6 %** (EU: +2.9 %; US: -0.2)
Innovation Output Indicator 2012: **84.8** (EU: 101.6)	***Knowledge-intensity of the economy***[2] 2012: **55.3** (EU: 51.2; US: 59.9) 2007-2012: **+2.1 %** (EU: +1.0 %; US: +0.5 %)
Areas of marked S&T specialisations: Materials, new production technologies, ICT, health, and environment	***HT + MT contribution to the trade balance*** 2012: **3.4 %** (EU: 4.23 %; US: 1.02 %) 2007-2012: **-18.4 %** (EU: +4.8 %; US: -32.3 %)

In preparation for Malta's accession to the EU in 2004, research was given increased prominence. This is particularly evident through the availability of reporting and monitoring commitments, as well as via the continued upward trend in R&I spending from 2004 onwards. In recent years, the stated aim of the Maltese government has been to place research and innovation (R&I) at the heart of the country's economy in order to stimulate knowledge-driven and value-added growth and to sustain improvements in its citizens' overall quality of life. This can only be achieved in the long term and its success will depend on implementation of the policies outlined in the National Strategic Plan for Research and Innovation 2020 in support of an environment favourable to innovation. In spite of the fact that R&D intensity remained low at only 0.84 % of GDP in 2012, significant progress was made over the period 2007-2012. The business sector is the largest R&D performer, accounting for 60 % of GERD, followed by the higher education sector with 36 % in 2012. The lowest component in R&D expenditure remains from the government and public sector. Performance and economic output indicators show that Malta is a medium-low performer in the European innovation indicator, with a stagnating trend over the period 2007-2012. However, in 2012, high-tech & medium-tech contribution to the trade balance was positive, thanks to the structural changes introduced in the economy towards specialisation in knowledge-intensive sectors, products and services. High growth is also observed in excellence and quality of scientific production; a slight improvement is noted for PCT patent applications while licence and patent revenues from abroad remain an area of weak performance.

It is important to highlight the problem of the volatility of indicators when these are reduced to Malta's micro-scale.

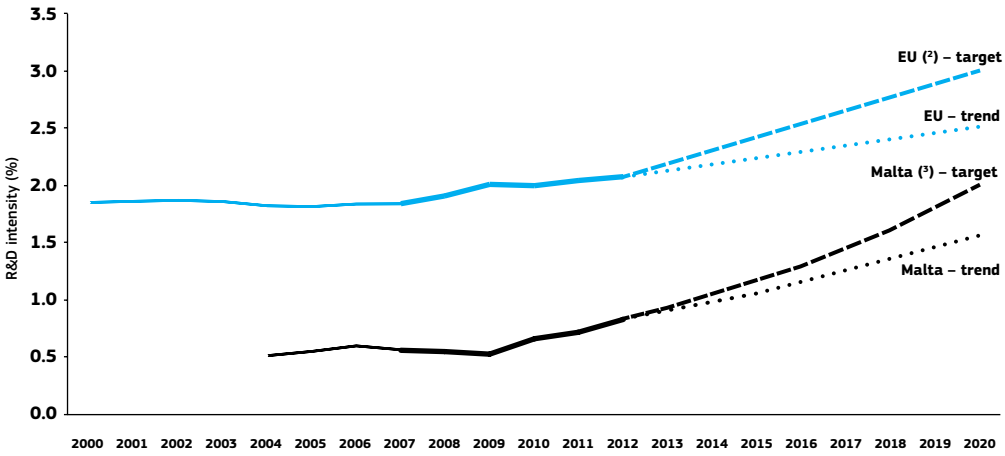
1 Composite indicator that includes PCT per population, ERC grants per public R&D, top universities and research institutes per GERD and highly cited publications per total publications.

2 Composite indicator that includes R&D, skills, sectoral specialization, international specialization and internationalization sub-indicators.

The country's key challenges include building up R&I capacity and to encourage increased investments in R&I, so that it moves closer to the newly fixed national R&D 2020 expenditure target. To meet this, Malta will need to improve its enabling environment considerably to allow for better research-to-market capacity. In this respect, innovation support and entrepreneurship, particularly for small and medium-sized enterprises (SMEs), remain key focal factors. A fundamental challenge for Malta is to stimulate indigenous private-sector R&I. The strategic principles adopted to address these challenges are outlined in Malta's National Strategic Plan for Research and Innovation 2020. This includes greater focus on priority areas, specialisation in a select number of areas of economic importance, coordinating public and private resources, expanding the science, technology, engineering and mathematics human capital base, and building strong links between knowledge institutions and business.

Investing in knowledge

Malta – R&D intensity projections: 2000–2020 (1)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, Member State
Notes: (1) The R&D intensity projections based on trends are derived from the average annual growth in R&D intensity for 2007–2012.
(2) EU: The projection is based on the R&D intensity target of 3.0 % for 2020.
(3) MT: The projection is based on an R&D intensity target of 2.0 % for 2020.

Following a revision in 2013, Malta has set itself an ambitious target at 2 % of GDP by 2020, notably compared to its trend in the overall period of 2007-2012. In 2012, Malta's R&D intensity accounted for only 0.84 % of GDP, one of the lowest figures in the EU-27. However, significant increases in R&D expenditure in recent years may have motivated the country to take this bold step. Nevertheless, Malta has to come forward with details of how the increased R&D intensity will be achieved; its National Reform Programme (NRP) for 2014 will be important in this respect.

The central government allocation for the National R&I Funding Programme was boosted from 0.7 million Euros in 2010 to 1.1million in 2011 and again to 1.6 million in 2012. Government funding of R&D increased steadily between 2007 and 2012 at an average annual real growth rate of 8.2 %. The increased government spending on R&D resulted from greater expenditure on both higher education and business of 36.3 % and 0.50 % respectively.

Malta is also ranked 19th in the EU in terms of business-enterprise expenditure on R&D as a % of GDP with a value of 0.50 % in 2012 compared to an EU average of 1.30 %. R&D financed by business enterprise increased in real terms between 2005 and 2012 at an average annual growth rate of 6.1 %. However, most of Malta's business R&D is carried out by a small cluster of foreign-owned companies. In view of this, continuous and firm commitment from the Maltese government during the upcoming period will be important to generate indigenous R&I, and to remain on the path towards meeting the new RDI intensity target by 2020.

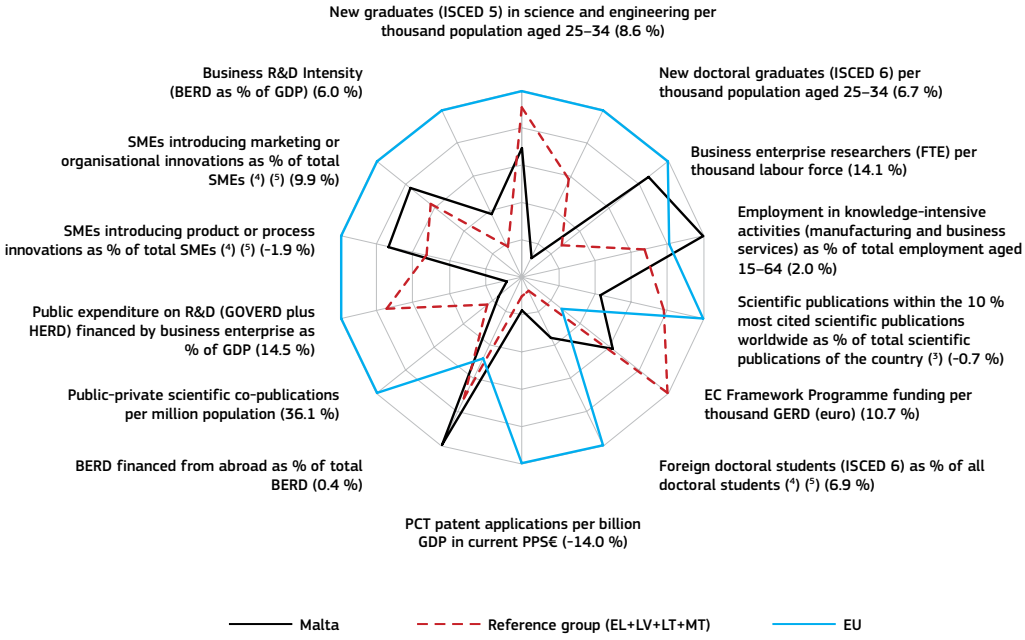
The country relies heavily on support from the EU's Seventh Framework Programme (FP7) and Structural Funds for the achievement of its R&I objectives. In financial terms, up to February 2014, 155 FP7 projects had been approved and awarded around EUR 20 million (Source: E-CORDA). The success rate of Maltese applicants for FP7 funding is 19.1 % compared to the EU average of 22.0 %. Of the EUR 840 million of Structural Funds allocated to Malta over the 2007-2013 programming period, around EUR 72 million (8.5 % of the total) related to RTDI[3]. One of the objectives of the National Strategic Plan for R&I 2020 is to put in place a supporting framework to exploit opportunities for participation in EU R&I funding programmes.

An effective research and innovation system building on the European Research Area

The graph below illustrates the strengths and weaknesses of Malta's R&I system. Reading clockwise, it provides information on human resources, scientific production, technology valorisation and innovation. Average annual growth rates from 2007 to the latest available year are given in brackets.

Malta, 2012 (1)

In brackets: average annual growth for Malta, 2007–2012 (2)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, OECD, Science-Metrix/Scopus (Elsevier), Innovation Union Scoreboard.
Notes: (1) The values refer to 2012 or to the latest available year.
(2) Growth rates which do not refer to 2007–2012 refer to growth between the earliest available year and the latest available year for which comparable data are available over the period 2007–2012.
(3) Fractional counting method.
(4) EL is not included in the reference group.
(5) EU does not include EL.

3 RTDI includes the following sectors: (01) RTD activities in research centres, (02) RTD infrastructures and centres of competence, (03) Technology transfer and improvement of cooperation of networks, (04) Assistance to RTD, particularly in SMEs (and RTD services in research centres), (06) Assistance to SMEs for the promotion of environmentally friendly products and processes, (07) Investment in firms directly linked to research and innovation, (09) Other methods to stimulate research and innovation and entrepreneurship in SMEs, and (74) Developing human potential in the field of research and innovation.

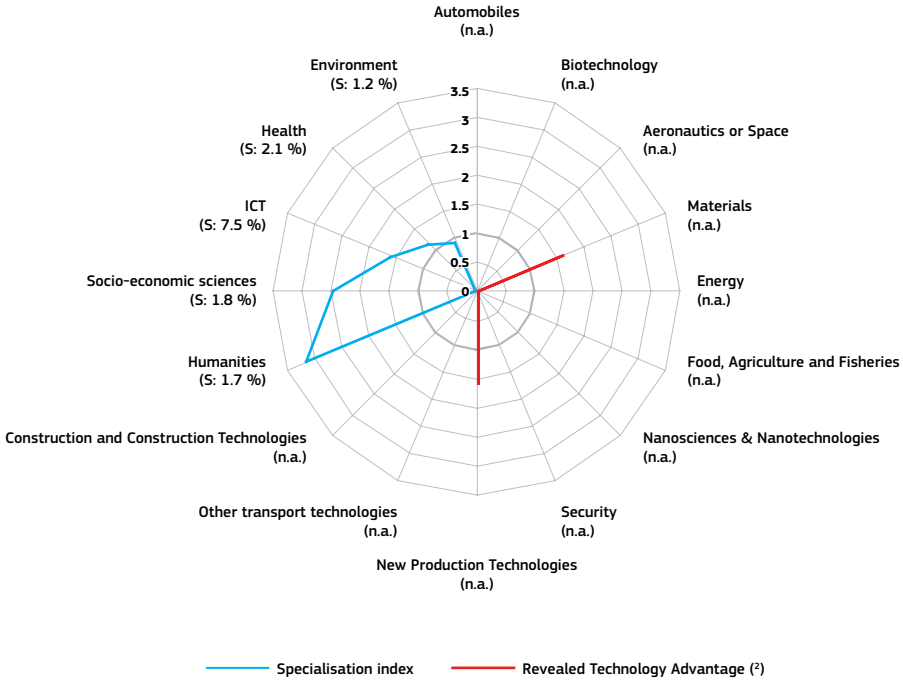
Despite a clear strategy, Malta is still below the EU average for most of its indicators. Nevertheless, its share of employment in knowledge-intensive activities is higher than the EU average, reflecting the dominance of high-tech multinationals in the private sector. Innovation activities by SMEs are also above the reference-group average but below that of the EU. This factor complements the increase in BERD over the period 2007-2012, which also rose above that of both the reference group and the EU average, as the country's economy not only resisted during the financial crisis, but steadily continued to attract business from abroad.

Knowledge creation as reflected in the production of highly cited scientific publications and public-private scientific co-publications remains weak, and the number of PCT patent applications is far below the EU average with a negative growth average, indicating a low scientific base. However, the establishment of the University of Malta Knowledge Transfer Office in 2009 is already contributing to reversing this trend. Malta's reliance on FP7 as a source of funding is shown in its above-average level of EC funding, although it is well below the reference group.

Malta's scientific and technological strengths

The graph below illustrates the areas, based on the Framework Programme thematic priorities, where Malta shows scientific and technological specialisations. Both the specialisation index (SI, based on the number of publications) and the revealed technological advantage (RTA), based on the number of patents) measure the country's scientific (SI) and technological (RTA) capacity compared to that at the world level. For each specialisation field it provides information on the growth rate in the number of publications and patents.

Malta – S&T National Specialisation ([1]) in thematic priorities, 2000–2010
in brackets: growth rate in number of publications ([3]) (S) and in number of patents ([4]) (T)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada; Bocconi University, Italy
Notes: ([1]) Values over 1 show specialisation; values under 1 show a lack of specialisation.
([2]) The Revealed Technology Advantage (RTA) is calculated based on the data corresponding to the WIPO-PCT number of patent applications by country of inventors. For the thematic priorities with fewer than 5 patent applications over 2000–2010, the RTA is not taken into account. Patent applications in 'Aeronautics or Space' refer only to 'Aeronautics' data.
([3]) The growth rate index of the publications (S) refers to the periods 2000–2004 and 2005–2009.
([4]) The growth rate in number of patents (T) refers to the periods 2000–2002 and 2003–2006.

There is very limited ground for comparing Malta's scientific and technological specialisation in selected thematic priorities because of the lack of specific data, which is probably due to the small size of the country and its market. A revealed technological advantage is apparent in only two sectors – materials and new production technologies – but data on trends is missing. No corresponding scientific specialisation seems to exist for these two fields. The materials sector has not been identified in the national strategic documents in the area of research, development and innovation, although the new National R&I Strategy 2020 does identify high-value-added manufacturing, with a focus on 'processes' as a specialisation area.

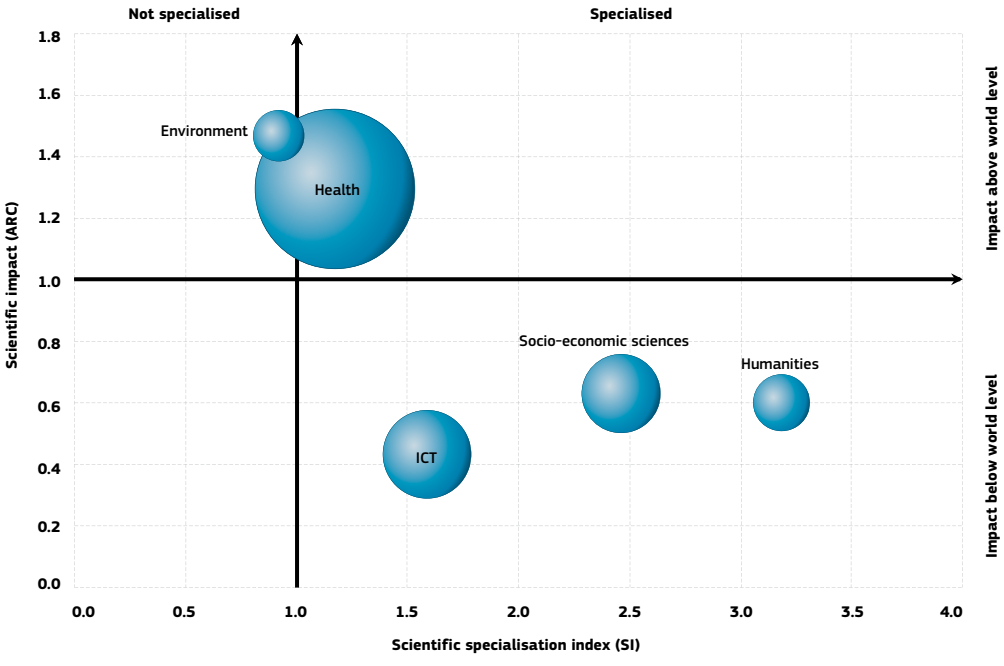
Malta's scientific specialisation indicator shows that the main scientific fields are ICT, health, environment, as well as humanities, and socio-economic sciences. Evidently, these sectors are mainly limited to scientific production, seemingly without corresponding technological production. This may be partly due to the fact that Malta is a small country with increasingly limited manufacturing and often with the research facilities of large multinationals based abroad. The increasing predominance of the services sector should also be considered in this respect.

In Malta, there is only one sector with a relatively high scientific impact, namely the environment, followed by health. An important task would probably be to foster technological specialisation in these two sectors. The three other specialised sectors identified are below average with regard to their impact.

Overall, as regards specialisation, Malta is ranked 25th in the EU-28 group. Because of this very low position, there is an apparent need to develop Malta's scientific and technological sectors in order to further enhance knowledge-based growth.

The graph below illustrates the positional analysis of Malta's publications showing the country's situation in terms of scientific specialisation and scientific impact over the period 2000-2010. The scientific production of the country is reflected by the size of bubbles, which corresponds to the share of scientific publications from a science field in the country's total publications.

Malta – Positional analysis of publications in Scopus (specialisation versus impact), 2000–2010



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada, based on Scopus
Note: Scientific specialisation includes 2000–2010 data; the impact is calculated for publications of 2000–2006, citation window 2007–2009.

Policies and reforms for research and innovation

Malta's National R&I Strategy 2020 responds adequately to the challenges facing the country in R&I. It is strongly business oriented and aims to build up R&I capacity by concentrating efforts on areas of economic importance. Resource concentration and smart flexible specialisation in specific sectors is a key part of the Maltese R&I strategy. The plan proposes an improved tailoring of schemes for enterprises, as well as providing support for particular target groups such as SMEs and start-ups. A new commercialisation programme to help technology owners move their technologies closer to market was piloted in 2012, and was replaced by the Innovation Voucher Scheme in October 2013. Efforts are being made to use government expenditure on R&D to leverage an increase in business R&D expenditure, particularly through a varied set of incentives to promote R&D and innovation in the enterprise sector.

Malta's draft National R&I Strategy 2020 was published for public consultation in September 2013 and the final, updated version was endorsed by the cabinet in February 2014. This strategy is built on the previous strategic plan, but introduces a number of new elements, whilst retaining the same key vision. The strategy articulates three main goals: building a comprehensive R&I ecosystem; developing a stronger knowledge base; and smart, flexible specialisation.

The Strategy proposes to address the serious shortfall in human capital for R&I by investing in human-resource development at all levels of education. Scholarship schemes supporting postgraduate studies in Malta and abroad are in place and are being synchronised with areas of national priority. Malta is also investing in the construction of a new National Interactive Science Centre in order to instil an active interest in science, research and innovation among the country's youth and to encourage them to pursue a career in science and technology, as well as helping to expand the science, engineering and technology human capital base. The Centre will open in 2015.

The European Research Area (ERA) dimension in Malta's national R&I system is limited in the extent of the policies and measures specifically addressing this aspect. This probably arises from the fact that the country's research-relevant policies are still in their infancy, but fuller participation is on track and some success has been achieved by putting in place a legal framework for the inward mobility of third-country researchers, and the very good participation rates in FP6 and FP7. International cooperation is an important cross-cutting element of the National Strategy for R&I, and a number of priority measures have been identified for implementation in the short term. Generally speaking, efforts for the immediate future are mainly focused on building and strengthening internal capacity, hopefully leading to improvements in order to shift the focus to fuller integration in the near future.

The National R&I Strategy 2020 places increased emphasis on the importance of innovation in all its forms. Indeed, Malta aims to support both research-based and non-research-based innovation by identifying key issues and opportunities and providing an appropriate enabling and support framework for potential innovators.

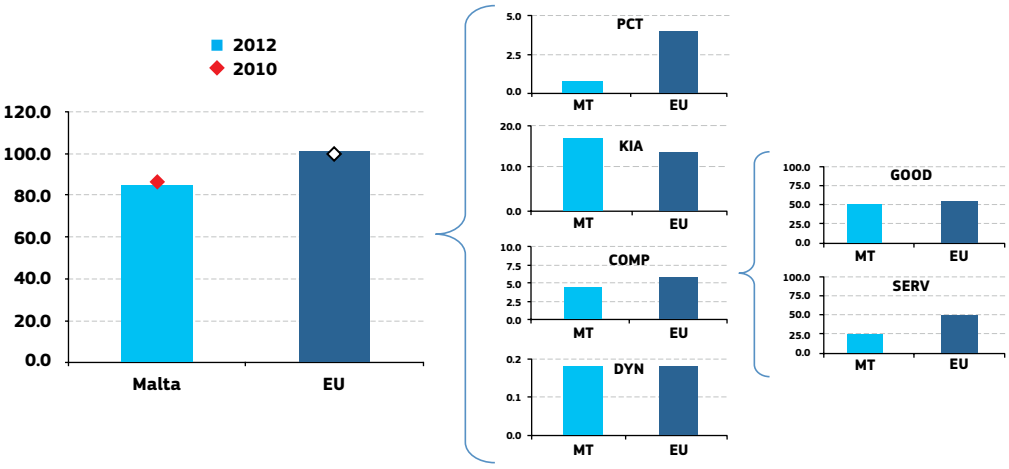
Malta's Smart Specialisation Strategy has been finalised and incorporated into the National R&I Strategy. It identifies seven national smart specialisations which have important innovation potential: tourism product development, maritime services, aviation and aerospace, health (with a focus on e-health as well as active living and healthy ageing), resource-efficient buildings, high-value-added manufacturing (with a focus on processes and design), and aquaculture. ICT was identified as a horizontal enabling technology as well as a source of innovation in itself (especially in health, digital gaming, financial services, and tourism product development). Malta's Smart Specialisation Strategy will be key in guiding R&I investments foreseen to be implemented through the European Structural and Investment Funds (ESIF) towards strategic areas considered to have high potential economic impact.

Innovation Output Indicator

The Innovation Output indicator, launched by the European Commission in 2013, was developed at the request of the European Council to benchmark national innovation policies and to monitor the EU's performance against its main trading partners. It measures the extent to which ideas stemming from innovative sectors are capable of reaching the market, providing better jobs and making Europe more competitive. The indicator on innovation focuses on four policy axes: growth via technology – (patents); jobs (knowledge-intensive employment); long-term global competitiveness (trade in mid/high-tech

commodities); and future business opportunities (jobs in innovative fast-growing firms). The graph below enables a comprehensive comparison of Malta's position regarding the indicator's different components.

Malta – Innovation Output Indicator



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, OECD, Innovation Union Scoreboard 2014, DG JRC
Notes: All data refer to 2012 except PCT data, which refer to 2010.
PCT = Number of PCT patent applications per billion GDP, PPS.
KIA = Employment in knowledge-intensive activities in business industries as % of total employment.
DYN = Innovativeness of high-growth enterprises (employment-weighted average).
COMP = Combination of sub-components GOOD and SERV, using equal weights.
GOOD = High-tech and medium-high-tech products exports as % total exports. EU value refers to EU-28 average (extra-EU = 59.7 %).
SERV = Knowledge-intensive services exports as % of total service exports. EU value refers to EU-28 average (extra-EU = 56 %).

Malta is a medium-low performer in the EU innovation indicator, scoring below the EU average and unable to improve its performance over the period 2010-2012. According to Eurostat data, Malta is positioned at the lowest European ranking in terms of number of patents filed to the European Patent Office at national level. However, other data sourced from the EPO website[4] for 2012 and 2013 indicate that applications filed with the EPO on the basis of per country of residence of the first named applicant increased significantly for Malta (from 23 in 2012 to 43 in 2013). Malta is also a low performer as regards PCT patents. Low performance in patents is seen as being linked to the economic structure of a country with a very small capital goods sector, and a lack of large manufacturing companies, which typically show high patenting activities.

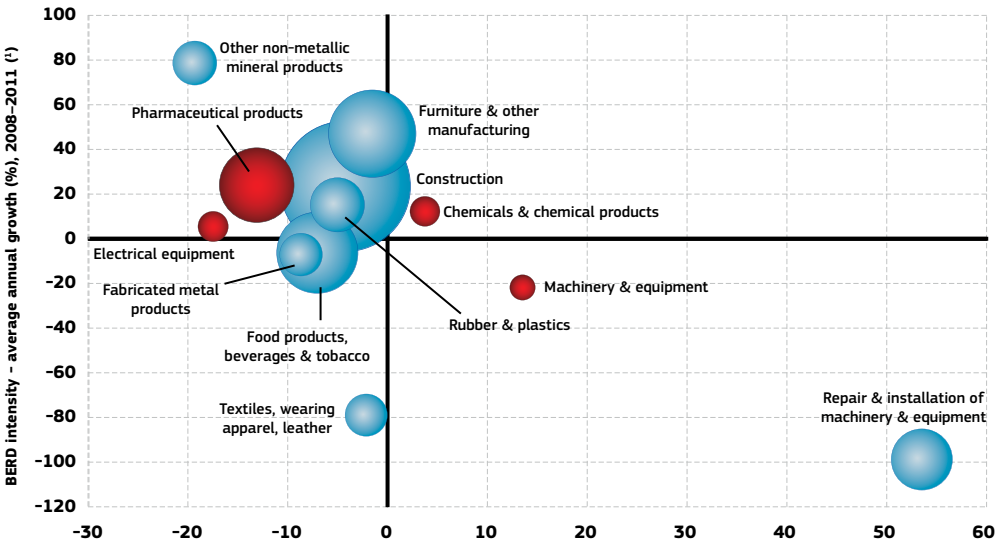
Most of the country's RDI expenditure comes from the business sector, notably from foreign companies with manufacturing plants in Malta; R&D activities, including patenting, tend to be carried out in the headquarter country rather than in Malta. Also, the exportation of knowledge-intensive services is far below the EU average, probably due to the high share of tourism in the Maltese economy. However, on a positive note, MT ranks fifth within the EU for employment in knowledge-intensive activities. Average rankings could also be observed for the other two components: the export share of medium-high and high-tech products (11th within the EU) and the innovativeness of high-growth enterprises (12th within the EU), thanks to a relatively strong financial and insurance sector.

[4] http://www.epo.org/law-practice/legal-texts/official-journal/2014/03/a34.html

Upgrading the manufacturing sector through research and technologies

The graph below illustrates the upgrading of knowledge in different manufacturing industries. The position on the horizontal axis illustrates the changing weight of each industry sector in value added over the period. The general trend of moving to the left-hand side reflects the decline in manufacturing in the overall economy. The sectors above the x-axis are those where research intensity has increased over time. The size of the bubble represents the sector share (in value added) in manufacturing (for all sectors presented in the graph). The red sectors are high-tech or medium-high-tech sectors.

Malta – Share of value added versus BERD intensity: average annual growth, 2008–2011 (1)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat
Notes: (1) 'Chemicals and chemical products'; 'Construction', 'Fabricated metal products', 'Machinery and equipment', 'Other non-metallic mineral products'; 'Repair and installation of machinery and equipment': 'Textiles, wearing apparel, leather': 2010–2011.
(2) High-tech and medium-high-tech sectors (NACE Rev. 2 – two-digit level) are shown in red.

In Malta, the services sector has been gaining in importance, mainly thanks to the emergence of new activities such as remote gaming, financial intermediation, and IT, legal and accounting services, which, in addition to more traditional services such as tourism, account for around 80% of total value added. Professional, scientific and technical activities, administrative and support service activities as well as information and communication and financial and insurance activities exhibited an increase in share of value added over the period 2010-2013. The contribution of manufacturing to the total value added has been in regular decline over the last decade. R&D activity is clustered around a few sectors. Since 2008, the pharmaceutical products and preparations (NACE Code Rev. 2.21) sector has undertaken around 20-22 % of R&D in the enterprise sector. This indicates that overall, and in spite of the progress noted in some of the sectors, as mentioned above, no clear interaction has been observed between R&D and business value added.

Key indicators for Malta

MALTA	2000	2005	2006	2007	2008	2009	2010	2011	2012	Average annual growth 2007–2012 (1) (%)	EU average (2)	Rank within EU
ENABLERS												
Investment in knowledge												
New doctoral graduates (ISCED 6) per thousand population aged 25–34	0.13	0.09	0.07	0.16	0.19	0.31	0.20	0.31	0.21	**6.7**	***1.81***	**28**
Performance in mathematics of 15-year-old students: mean score (PISA study)	:	:	:	:	:	463	:	:	:	:	**495 (3)**	:
Business enterprise expenditure on R&D (BERD) as % of GDP	:	0.37	0.40	0.37	0.36	0.34	0.41	0.47	*0.50*	***6.0***	**1.31**	**19**
Public expenditure on R&D (GOVERD + HERD) as % of GDP	:	0.19	0.20	0.19	0.19	0.20	0.25	0.24	*0.33*	***11.8***	***0.74***	**26**
Venture capital as % of GDP	:	:	:	:	:	:	:	:	:	:	:	:
S&T excellence and cooperation												
Composite indicator on research excellence	:	:	:	17.7	:	:	:	:	23.3	**5.6**	**47.8**	**23**
Scientific publications within the 10% most cited scientific publications worldwide as % of total scientific publications of the country	:	6.0	7.4	4.8	7.7	4.8	:	:	:	**-0.7**	**11.0**	**22**
International scientific co-publications per million population	:	219	200	180	245	219	302	335	400	**17.3**	**343**	**22**
Public–private scientific co-publications per million population	:	:	:	2	1	2	6	8	:	**36.1**	**53**	**24**
FIRM ACTIVITIES AND IMPACT												
Innovation contributing to international competitiveness												
PCT patent applications per billion GDP in current PPS (EUR)	0.4	0.7	0.6	1.1	1.0	0.3	0.7	:	:	**-14.0**	**3.9**	**19**
License and patent revenues from abroad as % of GDP	0.04	0.78	2.19	0.68	0.51	0.56	0.36	0.27	0.21	**-20.9**	**0.59**	**12**
Community trademark (CTM) applications per million population	66	114	183	152	278	297	343	399	565	**30.0**	**152**	**2**
Community design (CD) applications per million population	:	2	7	7	5	10	5	14	19	**21.1**	**29**	**16**
Sales of new-to-market and new-to-firm innovations as % of turnover	:	:	28.6	:	15.2	:	7.4	:	:	**-30.2**	**14.4**	**25**
Knowledge-intensive services exports as % total service exports	:	12.0	15.4	17.8	14.5	13.4	13.7	11.2	:	**-11.0**	**45.3**	**28**
Contribution of high-tech and medium-tech products to the trade balance as % of total exports plus imports of products	5.07	7.72	7.52	9.46	10.73	9.61	3.21	0.92	3.42	-	**4.23 (4)**	**10**
Growth of total factor productivity (total economy): 2007 = 100	100	99	99	100	101	98	99	99	98	**-2 (5)**	**97**	**8**
Factors for structural change and addressing societal challenges												
Composite indicator on structural change	:	:	:	49.7	:	:	:	:	55.3	**2.1**	**51.2**	**10**
Employment in knowledge-intensive activities (manufacturing and business services) as % of total employment aged 15–64	:	:	:	:	15.7	15.7	16.0	16.2	17.0	**2.0**	**13.9**	**5**
SMEs introducing product or process innovations as % of SMEs	:	:	:	:	25.9	:	25.0	:	:	**-1.9**	**33.8**	**22**
Environment-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.00	0.10	0.13	0.19	0.00	0.12	:	:	:	**-19.5**	**0.44**	**16**
Health-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.00	0.00	0.00	0.06	0.00	0.12	:	:	:	**39.5**	**0.53**	**20**
EUROPE 2020 OBJECTIVES FOR GROWTH, JOBS AND SOCIETAL CHALLENGES												
Employment rate of the population aged 20–64 (%)	57.2	57.9	57.6	58.5	59.2	58.8	60.1	61.5	63.1	**1.5**	**68.4**	**22**
R&D intensity (GERD as % of GDP)	:	0.55	0.60	0.57	0.55	0.53	0.66	0.71	*0.84*	***8.1***	***2.07***	**21**
Greenhouse gas emissions: 1990 = 100	130	147	148	154	152	147	150	151	:	**-2 (6)**	**83**	**28 (7)**
Share of renewable energy in gross final energy consumption (%)	:	0.0	0.0	0.0	0.0	0.0	0.2	0.4	:	**100.0**	**35.7**	**28**
Share of population aged 30–34 who have successfully completed tertiary education (%)	7.4	18.3	21.6	21.5	21.1	21.3	21.5	21.4	22.4	**0.8**	**35.7**	**26**
Share of population aged 18–24 with at most lower secondary education and not in further education or training (%)	*54.2*	33 (8)	33.1	32.7	29.3	28.0	25.9	23.6	22.6	**-7.1**	**12.7**	**27 (7)**
Share of population at risk of poverty or social exclusion (%)	:	20.2	19.1	19.4	19.6	20.2	20.3	21.4	22.2	**2.7**	**24.8**	**13 (7)**

Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, DG JRC – Ispra, DG ECFIN, OECD, Science Metrix / Scopus (Elsevier), Innovation Union Scoreboard
Notes: (1) Average annual growth refers to growth between the earliest available year and the latest available year for which compatible data are available over the period 2007–2012.
(2) EU average for the latest available year.
(3) PISA (Programme for Internatonal Student Assessment) score for EU does not include CY and MT. These Member States were not included in the EU ranking.
(4) EU is the weighted average of the values for the Member States.
(5) The value is the difference between 2012 and 2007.
(6) The value is the difference between 2011 and 2007. A negative value means lower emissions.
(7) The values for this indicator were ranked from lowest to highest.
(8) Break in series between 2005 and the previous years.
(9) Values in italics are estimated or provisional.

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