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RIO Country Report 2017: Malta

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RIO Country Report 2017

The R&I Observatory country report 2017 provides a brief analysis of the R&I system covering the economic context, main actors, funding trends & human resources, policies to address R&I challenges, and R&I in national and regional smart specialisation strategies. Data is from Eurostat, unless otherwise referenced and is correct as at January 2018. Data used from other international sources is also correct to that date. The report provides a state-of-play and analysis of the national level R&I system and its challenges, to support the European Semester.

Summary

Challenges for R&I policy-making in Malta

Increasing R&I investment in the private sector: Malta's private sector R&I investments have been in decline since 2012. Several funding schemes have been put in place to encourage business R&I activities (e.g., tax incentives and direct funding, Malta Development Bank).

Funding for R&I has been ringfenced from the ERDF operational programme (€72.1), and from the EAFRD programme (€20.2m), while the European Social Fund (ESF) also contributes to the R&I sector through investments in human capital.

Improving the capacity and quality of the science base: the need to further strengthen the knowledge base is duly acknowledged in the National R&I Strategy. In addition to 2020 targets set for PhD students, Malta has heavily invested in research infrastructure (ERDF). In 2017 the University of Malta upgraded its own research programme (UoM Research Fund), which is a breakthrough as it offers high-value grants. First results and progress from all these efforts are already visible.

Strengthening entrepreneurship support and innovation output: Despite the fact that knowledge-intensive services are an important component of the Maltese economy, these represent considerably smaller share of the Maltese exports. Sales of new-to-market innovations as a share of total turnover is also on a downward trend. Novel initiatives implemented or underway in recent years include the Business Start scheme, SME Growth Grant Scheme, Start-Up Investment Grant Scheme, Venture Capital Malta. These contribute to the improved access to finance. Complementary to that are the various initiatives to develop an entrepreneurship culture at all levels of education.

Smart specialisation

Malta's Smart Specialisation Strategy (RIS3) was published as an integral part of the National R&I Strategy 2020 in 2014. The Action Plan governing the implementation of the National Strategy and Smart Specialisation Strategy was approved by the EC at the end of 2016, paving the way for tapping into ESI funds ring fenced for R&I.

Subsequently to the adoption of the S3 strategy, the implementation got under way with the publication of the ERDF call in June 2017. This call targeted research infrastructures and the call documentation states that eligible activities should also be in line with the priorities identified in the RIS3 strategy.

With regards to a monitoring mechanism, the national strategy specifies that such will be established and the Action Plan incorporates an *ex-ante* impact assessment with details of expected outcomes and results. The implantation is not yet in a mature state which would reveal evidence for impact.

Foreword

The R&I Observatory country report 2017 provides a brief analysis of the R&I system covering the economic context, main actors, funding trends & human resources, policies to address R&I challenges, and R&I in national and regional smart specialisation strategies. Data is from Eurostat, unless otherwise referenced and is correct as at January 2018. Data used from other international sources is also correct to that date. The report provides a state-of-play and analysis of the national level R&I system and its challenges, to support the European Semester.

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1 Economic context for R&I

Malta showed strong growth in 2016, with a real GDP growth rate of 5.5% outperforming most other EU Member States (EC, 2017c). Growth was driven primarily by external demand and increase in services' exports. Private consumption expenditure also contributed significantly, fuelled by gains in disposable income and declining unemployment. Following extraordinarily high growth in 2014 (8.2%) and 2015 (7.2%), investment contracted slightly but remains well above the historical average (6.3% in the first half of 2017). This trend is projected to remain robust in 2017 (5.6%) and a bit more moderate in 2018 (4.9%) and 2019 (4.1%), when private consumption is expected to become main driver of growth (EC, 2017e). In 2016 Malta's GDP was €9.94b, with a GDP per capita of €22,700 equivalent to 78% of the EU average.¹

Government debt has been improving and fell to 57.6% of GDP in 2016 and is projected to further decrease to below 50% in 2019. The budget deficit has been successfully controlled, from -3.5% of GDP in 2012 to a surplus of 1.1% in 2016. This result is explained by increases in revenue, in particular income tax revenues as a result of favourable labour market conditions and high corporate profits. Malta's citizenship programme also contributed to the fiscal surplus. Net capital expenditure increased despite a sharp decline in the absorption of EU funds (as a result of the new programming period) and a lower capital injection of funds into the national airline. In 2017, the surplus in the government balance is likely to remain at a similar level (0.9% of GDP), but is expected to decline in 2018 (0.5%) due to the impact of measures (mainly lower proceeds from the citizens scheme) in 2018 budget (EC, 2017e).

Unemployment in 2017 was low and stood at 4% (forecasted to remain unchanged in 2018) compared to an EU average of 7.7% in 2017 (Eurostat). Furthermore, when compared to any other EU Member State, Malta recorded the highest increase in employment in the second quarter of 2017 when compared to the first quarter of the same year (ibid). Employment in manufacturing has been increasing slowly but gradually. The sector is the second most important employer in Malta. The labour participation rate was historically one of the lowest in the EU, but government policy efforts have been paying off and labour participation rate increased by more than 10 percentage points over the last decade to almost reach the 70% target: 69.6% in 2016 (EU28 71.1%). Labour productivity has increased sharply in recent years, and real labour productivity gains have been among the highest in the EU since 2013 (EC, 2017c).

The International Monetary Fund (IMF) reported that the financial system continues to benefit from a favourable macroeconomic environment and prudent business practices, with strengthened capital buffers and stress tests. Banks are characterised by ample liquidity and capitalisation, but there are factors which might pose challenges (IMF, Feb 2017).

Along with this consistent positive performance, reports of the European Commission highlighted a number of challenges affecting Malta, including labour shortages (EC, 2017d), while net immigration flows are helping to offset emerging skill gaps and labour shortages (EC, 2017e).

¹ All quantitative indicators are provided by EUROSTAT if not explicitly referenced differently.

1.1 Structure of the economy

The Maltese economy is characterised by a very strong and growing services sector which in 2016 accounted for 84% of total value added (EU28 74%) and for 81% of employment (EU28 74%). The manufacturing sector has been fluctuating for a number of years, and has been on a positive trend since 2013. Its contribution to the economy stood at 9% of value added (EU28 16%) and 11% of employment (EU28 14%) in 2016. Nevertheless, employment in manufacturing has been increasing gradually and the sector is the second most important employer in Malta.

Policy measures to develop and diversify the services sector over the past decade included both fiscal incentives as well as measures aimed at upskilling the workforce. An economy previously dependent on tourism and manufacturing has evolved to embrace logistics, maritime activity, professional scientific services, back-office administration, information technology, and online gaming. Malta has often demonstrated legislative and regulatory agility to develop new economic sectors as in the case of online gaming, shipping (The Malta Independent, Jan 2015) and more recently aviation (The Malta Independent, May 2015).

The composition of the manufacturing sector has changed substantially over time, with high and medium-tech activity becoming increasingly important (Central Bank of Malta, 2016). Manufacturing output registered a fall of 4.3% in 2016, after registering improved production in 2015. This contraction was partly attributed to lower production by the pharmaceutical sector, where output fell by 14.7%. Output also fell significantly among firms that produce computer, electronic and optical products, those involved in the printing and reproduction of recorded media, as well as in the food sector (Central Bank of Malta, 2017).

In contrast, the services sector continues to flourish. Tourism was and remains an important contributor to the economy, and the number of inbound tourists increased by 10.2%, while tourist spending increased by 4.3% in 2016. In terms of value added, *arts and entertainment* (which includes online gaming) grew by 134% while *professional and scientific services* grew by 77% over the period 2009 – 2016. These were followed closely by *information and communication* and *transportation and storage* which both grew by 62% over the same period.

The share of employment in knowledge-intensive services has risen from 40% in 2009 to almost 46% in 2016, with Malta ranking 6th within the EU on this metric. Similarly, the contribution of knowledge-intensive services as a share of total value added has been rising steadily from 46% to 52% of GVA over the same period (EU28 18% in 2015). Exports of high-tech products accounted for 24.2% of total exports in 2015, the highest within the EU.

The Maltese economy is heavily dependent on SMEs and microenterprises. At face value, the Maltese business demography appears to be similar to that of the EU, with SMEs accounting for 99.8% of Maltese enterprises. However, upon closer examination the prominent role of SMEs becomes very clear with SMEs accounting for 80% of total value added (EU28: 57%) and 81% of employment (EU28 66%) (EC 2017a).

The share of foreign controlled enterprises operating in Malta numbered 282 (0.74%) in 2014, with 56% of these being European companies with the highest number coming from Germany, Italy, the UK and the Netherlands. About 40% of these multinationals operate in the financial and insurance sector, with the rest in the areas of manufacturing, ICT, wholesale & retail, professional & scientific, and administration & support services.

Entrepreneurship performance indicators fluctuate significantly from one year to another, and it is not possible to identify any definite trends. In 2015 the firms' birth rate was 8.4 and the death rate was 2.4. In that year the survival rate of business entities was 95.8% all indicators show considerable improvement.

The European Semester Country Report for Malta 2017 (EC, 2017c) reports a sharp improvement in labour productivity in recent years, with an increase of 15% over the period 2010 – 2016. Furthermore, when compared to any other EU Member State, Malta recorded the highest increase in employment in the second quarter of 2017 when compared to the first quarter of the same year (Eurostat). Malta had the second highest increase in employment in the European Union in the third quarter of 2017, increasing by 1.1% over the second quarter, and 4.9% when compared to that of 2016 (Eurostat). The increase in the Euro area was 1.7% and 1.8% across the 28 EU member states in 2017 when compared to 2016 (Ibid).

Real labour productivity gains have been among the highest in the EU since 2013. This trend is closely linked to the structural evolution of the economy in recent years, with improvements registered across a range of sectors, mainly driven by gaming and IT in 2014, followed by construction and utilities in 2015.

Labour productivity has improved and is closely linked to the structural transformation of the economy in recent years (EC, 2017c). Gains are mainly due sectors such as 'Entertainment and Recreational Activities' and 'Financial Services'. The 'Professional, scientific and technical activities; administrative and support service activities' have more than doubled their contribution to gross value added in 2003-2016. The increased productivity was coupled with job increase thus indicating a positive productivity shock. As productivity outpaced wage increases, the nominal unit labour costs declined in 2014-15 (Ibid). The real effective exchange rate depreciated in 2015, pointing to improvements in price competitiveness.

1.2 Business environment

Various sources report on the positive developments which have taken place over the last few years, showing that the economy is growing fast. Malta received a Global Innovation Index (GII) (Cornell University et al, 2017) score of 50.6 in 2017 ranking 26th out of the 126 countries assessed, and was classified as an innovation achiever for the last three years. It scored in the top 10 in a number of areas including number of new businesses, printing and publishing output, expenditure on education, ICT access, and political stability, but ranked very poorly on the business environment and ease of getting credit.

According to the Global Competitiveness Report 2016-2017 (WEF, 2016) by the World Economic Forum, Malta advanced 8 places over last year and was ranked 40th out of the 138 countries covered in the report. The most problematic factors for doing business were identified as an inadequately educated workforce, inefficient government bureaucracy and access to finance.

Although fluctuating in terms of ranking in the World Bank report on the ease of doing business (Malta ranked 76th in 2017 and 84th in 2018 out of the 190 countries considered) the private sector in Malta is flourishing (World Bank, 2017 and 2018). Malta ranked worst on 'registering property' (147th place) 'getting credit' (142th), and improved considerably in 'starting a business' (102nd from 132nd). The country scored well on 'enforcing contracts' (37th), 'dealing with construction permits' (45th), and 'trading across borders' (41th place). World Bank also reported that Malta ranked in 2nd place in terms of new business density (number of newly registered corporations per 1000 working-age population) (World Bank, 2018).

The DESI report 2017 (EC 2017d) states that Malta is a leader in fast broadband coverage and in the quality of eGovernment services, and Malta was ranked 12th in the EU, slipping one place from last year. One weakness is use of eInvoicing by business with Malta ranking 23rd, but nonetheless this improved from 8% to 9%. A recurring weakness is use of eCommerce by businesses, but government grant schemes appear to be having the desired effect with the number of SMEs selling online increasing from 16% to 20% and SME eCommerce turnover increasing from 4.2% to 7.6%.

One of the weaknesses, which come across clearly, is access to finance, although both the World Bank and the GII reported significant progress in recent years. In 2016 the Government set up a working group to look into the matter, which reported a financing gap of between €2.3b and €3.1b, and a financing shortfall estimated at between €334m and €602m for the SME sector (Finance Malta, October 2016). Policy measures include the launch in 2015 of Venture Capital Malta (Finance Malta, February 2015) and the Prospects Multilateral Trading Facility which is an equity mechanism for smaller companies. The Government is also in the process of setting up the Malta Development Bank with an authorised capital of €200 million, allowing it to leverage this to around €1 billion of loans in due course (Finance Malta, October 2016). The Bank will be fully owned by the Government.

Another area where Malta focused efforts is government bureaucracy, with both the World Bank and GII reporting low ranking in recent years. The Government has appointed a Commissioner for Simplification and Reduction of Bureaucracy (Malta Public Service website, April 2017) with the aim of addressing this issue and in early 2017 the College of Regulators was established with the responsibility to reduce administrative and other barriers to private enterprise. Since then, the country has improved on some of the related indicators.

2 Main R&I actors

Following the general election of June 2017, responsibility for research and innovation was assigned to the **Parliamentary Secretary for Financial Services, Digital Economy and Innovation** within the office of the Prime Minister. Compared to other key economic sectors such as online gaming and financial services, research and development policy is given limited prominence at a political level. In June 2017 the **Malta Chamber of Commerce, Enterprise and Industry** emphasised the importance of research and innovation to give Malta a competitive edge, and called for representation of this subject at cabinet level (Times of Malta, June 2017).

The **Malta Council for Science and Technology** (MCST) has as one of its responsibilities the provision of scientific advice to government. However, positions such as that of chief scientist do not exist, and there are no cabinet committees which deal with the topic of research and innovation.

In 2014 an inter-ministerial core group and a high level technical steering group were set up to oversee the implementation of the national R&I strategy under the stewardship of the Malta Council for Science and Technology.

As a result of Malta's small size, the R&I governance system is highly centralised with a relatively simple and stable structure with well-defined responsibilities. The key public bodies are the following:

- The **Parliamentary Secretary for Financial Services, Digital Economy and Innovation** (within the office of the Prime Minister) is responsible for research

and innovation strategy and policy, delegating this responsibility to the Malta Council for Science and Technology (www.mcst.gov.mt). The MCST also manages the local Fusion Programme, is the national contact organisation for the Horizon 2020 programme, and is responsible for science communication.

- The **Ministry for Economy, Investment and Small Business** is responsible for **Malta Enterprise** (www.maltaenterprise.com) which is the national development agency and is responsible for the growth and development of Maltese enterprise, as well as for promoting and facilitating overseas investment in Malta. It operates a number of schemes promoting R&I in the private sector.
- The **Parliamentary Secretariat for EU Funds** (eufunds.gov.mt) within the Ministry for European Affairs and Equality houses the managing authorities for EU Structural and Investment Funds and is responsible for development of the operational programmes which govern utilisation of such funds. It is also responsible for managing R&I schemes funded through ESIF.

The **National R&I Strategy 2020** (including the National Smart Specialisation Strategy) (MCST 2014) was formally endorsed by the Government in 2013 and the **National R&I Action Plan** became official in 2016. The latter aims to address both the Smart Specialisation Strategy and the National R&I Strategy. It fulfils the first aim admirably, but is a little lacking in detail in relation to the second. It has a strong focus on infrastructures and centres of competence, and only minor consideration is given to other aspects such as human resources. Other key initiatives such as the development of doctorate, post-doctoral funding, and funding for research activities are not addressed in sufficient detail. It would also have benefitted from some degree of assessment of the expected impact of the proposed measures in relation to the objectives of the National R&I Strategy. Additional information about sources of funding, and in particular contributions through national funding, would have been very welcome. Also there is no quantification of operational costs of the proposed initiatives, or indication of how these will be funded.

The public sector is not generally perceived to be a prominent research performer and is rather weak in terms of R&I output. R&D expenditure by government and public research organisations has been increasing in recent years, reaching 0.13% of GDP in 2015 before falling to 0.01% of GDP in 2016 (EU28 0.23%). The fluctuation is due to the capital expenditure on the new **Life Sciences Centre and Digital Hub**, which accounted for 88% of government research expenditure in 2015. The **Life Sciences Centre** became operational in 2016 and now hosts a number of private sector organisations, but is not itself a research performer.

The public research sector is not very dynamic and Malta's only PRO, the **Malta Aquaculture Research Centre**, was set up in 1988 but is still very modest in terms of research activity. A national aquaculture strategy was published in 2014 (Ministry for Sustainable Development, June 2014) advocating more research in this area, but little has changed in the meantime. In 2014 a National Aerospace Centre was formally established as a result of the TEMARA teaming project funded through Horizon2020, but subsequent progress was limited although there is the possibility of ESIF funding in the future. A small degree of scientific research activity is also carried out by a number of government departments such as the Agriculture Directorate.

The R&I Action Plan includes a number of proposals for new public research infrastructures. It is expected that the situation will improve in the near future since the R&I Action Plan (MCST 2016) includes a number of proposals for new public research infrastructures. Which of the proposals will be funded will become clear in the coming months.

In the higher education sector (HES), research expenditure was €21.6m (0.22% of GDP) in 2016, more than twice that of 2009. The increase in overall expenditure was driven

mainly by increases in personnel and infrastructure. Most of the research is conducted in the field of Social Sciences followed by Medical Sciences, Engineering, Humanities and Natural Sciences in that order.

The **University of Malta (UoM)** is the main comprehensive research performer in the higher education (HES) sector and the only local entity offering doctoral degrees and post-doctoral research positions. The University traces its history back to 1592 but is nevertheless a medium university (11,700 students in 2017, 10% foreign). In April 2017 the Ministry for Education and Employment launched a public consultation on the new University of Malta Act (see also chapter 3). The proposed new measures include a requirement for all higher education staff to have pedagogical training, as well as changes to the University of Malta's current governance system (University of Malta, 2017). The Quality Assurance (QA) Committee was set up in May 2015 with the remit of reviewing Levels 7 and 8 qualifications prior to accreditation. During its first two years of operation, as part of the project 'Consolidating Quality Assurance and Validation in Higher Education in Malta', the QA Unit will also update the National Quality Assurance Framework for Further and Higher Education and the External Quality Assurance Manual.

Several initiatives in which the university participates, and which are aimed at fostering the linkages between science and business and human resource, have been launched (see section 3.3).

The Malta College of Arts, Science and Technology (MCAST) has also ventured into applied research and expressed ambitions to increase its level of research output. It has been most active in the Energy and Agricultural sectors and it has identified five focus areas for future activity (Manufacturing, Health & Tourism, Energy, Water & Agriculture, Education). It also established a Water Research Centre within its campus. The Government has also expressed its intention to establish a Centre for Applied Research in collaboration with industry at MCAST (Malta Today, May 2017).

A good percentage of the research at the University of Malta is funded through participation in EU framework programme projects, and much of the research which is undertaken is therefore dictated to some extent by the relevant work programmes rather than by University priorities (UoM, 2016a).

As a consequence of this dependency on short-term project funding, there is a lack of continuity in research activity leading to loss of institutional knowledge, and the research 'team' rarely reaches the critical mass necessary for the development of excellence.

In spite of this, research output has increased significantly over the last decade, with the number of publications increasing fourfold over that period (UoM, 2016b). Publications among the top 10% most cited publications worldwide as a share of total scientific publications (scientific excellence) of the country have increased from 4.2% in 2010 to 9.4% in 2014, and now compares favourably with the EU average of 11%. Similarly the number of international scientific co-publications per million population has risen sharply from 205 in 2010 to 555 in 2016 and now exceeds the EU average (EU28 493). Malta's ranking in terms of the composite research excellence indicator improved from 24th place in 2010 to 20th in 2014.

The business enterprise sector showed strong growth until 2012, with expenditure increasing from 0.33% of GDP in 2009 to 0.48% (€34m) in 2012 and the number of R&D personnel (FTE) doubling over this period. Since then, BERD has decreased as percentage of GDP and as share of total R&D expenditure, as it was outstripped by growth in the public and higher educational R&D sectors which benefitted from a significant injection of structural funds. In 2016, BERD was 0.39% of GDP, a rather modest figure compared to the EU average of 1.32%.

The recent downturn is attributable to the decline in R&D in the manufacturing sector, which peaked in 2012 when it accounted for 47% of BERD. However, in the following two years it decreased by almost 40% in value, declining to 30% of BERD in 2014. This negative trend is largely attributed to the decline of research in the pharmaceutical

sector, which was the main business research performer and where research expenditure declined by almost 70% between 2012 and 2014. The closure in 2013 of a key pharmaceutical R&D centre in Malta following acquisition by another company was a key factor in this decrease (Times of Malta, 2013).

In contrast, R&D expenditure in the services sector has shown strong growth, reflecting the general trends of the broader economy. However, growth in services R&D spending was insufficient to counter the reduction in that of the manufacturing sector, leading to an overall contraction in BERD. The star performer is the Information and Communication sector, whose R&D spending grew by 317% between 2009 and 2014 and accounted for 43% of BERD in that year (Eurostat).

The importance of SMEs in the general economy is also reflected in the research arena, with R&D expenditure by SMEs accounting for 85% of BERD in 2014, up from 55% in 2009 (Eurostat). In comparison, SMEs account for 77% of BERD in Lithuania and for 72% in Cyprus. The R&D share of SME expenditure in Malta is the highest within the EU, while the contribution of large enterprises is one of the lowest.

Malta does not have any significant private non-profit organisations which undertake research. There are, however, a number of independent charitable organisations working in the health arena which occasionally contribute funds towards R&D at the University of Malta. In 2017 the Research and Innovation Development Trust (RIDT) at the University of Malta received funding from, amongst others, the Malta Community Chest Fund (for eye disease research), The Alfred Mizzi Foundation (for stroke research), ALS Malta Foundation (for research into ALS), Lifecycle Malta Foundation (for kidney research) and from the Alive Charity Foundation (breast cancer research). The amounts collected in 2017 amount to approximately €0.6m (RIDT website <http://researchtrustmalta.eu>), which constitute a significant contribution in relation to the level of discretionary research funding available at the University of Malta.

Malta's performance in terms of innovation is generally on a positive trend but still rather weak. The score on the summary innovation index has been improving in recent years from 62.2 in 2012 to 81.6 in 2015, but fell slightly in 2016, with a score of 76.5 ranking 18th within the EU.

According to the Community Innovation Survey 2014, the share of Maltese enterprises having undertaken some form of innovation stood at 41.2% (EU28 49.1%) ranking 19th within the EU (Eurostat). Scores were below the EU average for all categories including product, process, marketing and organisational innovation. This result is strikingly inferior to that of CIS 2012, when the share of innovative enterprises was reported to be 51%, above the EU average of 48.9%. Expenditure on non-R&D innovation also decreased from 1.9% GDP in 2012 to 0.5% GDP in 2014. Most of this decrease is related to expenditure on machinery and equipment, which accounted for 93% of innovation expenditure in 2012.

3 R&I policies, funding trends and human resources

Main R&I policy developments in 2017

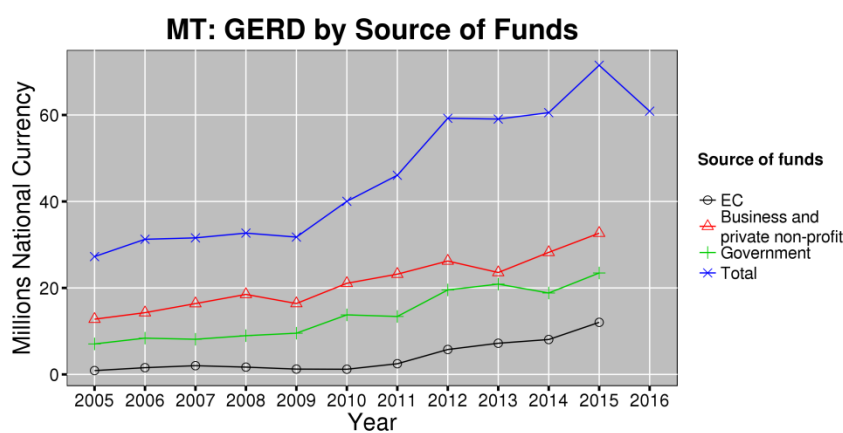
<i>Document title, hyperlink and date of publication/announcement</i>	<i>Short description</i>
Business Enhance ERDF Grant Schemes July 2016	An umbrella initiative with an allocation of €51 million in support to the private sector financed through ESIF and co-financed through National Funds. €20M are earmarked for RD&I, €26m for competitiveness initiatives and €5m for investment in e-Commerce.

<p>Start-up Investment Grant Scheme July 2016</p>	<p>The Start-up Investment Grant Scheme forms part of the Business Enhance ERDF Grant Schemes initiative financed through ESIF. Its objective is to support micro and small start-up enterprises to implement their strategies in bringing to the market new products and services. The scheme has an allocation of €7m with a maximum grant value of €0.3m part-financing 50% of the eligible expenditure.</p>
<p>SME Diversification and Innovation Grant Scheme October 2016</p>	<p>The SME Diversification and Innovation Grant Scheme forms part of the Business Enhance ERDF grant schemes initiative funded through ESIF. Its objective is to incentivise SMEs to become more competitive and finance a number of actions including the development of innovative products and services. It has a financial allocation of €8m with a maximum grant value of €0.2m part-financing 50% of the eligible expenditure</p>
<p>Malta National Research and Innovation Action Plan 2015 – 2020 July 2016</p>	<p>The Action Plan was completed in July 2016 but was only formally endorsed by the European Commission at the end of 2016. The Action Plan lists the measures to be taken to implement the National R&I Strategy 2020 which includes Malta's Smart Specialisation Strategy.</p>
<p>Malta National Space Policy 2017 April 2017</p>	<p>Malta launched its first national space policy document which identifies possible areas of interest and sets out the general way forward to help nourish this upcoming sector. Key policy dimensions highlighted in the document include awareness-raising and capacity-building measures focusing on the downstream space sector.</p>
<p>Proposed University of Malta Act Consultation Paper April 2017</p>	<p>Regulations pertaining to the University of Malta currently form part of the broad Education Act. This new initiative in terms of the Consultation Paper issued by the Government proposes a new dedicated University of Malta Act providing scope for better definition of legal principles, structures and financing mechanisms. The proposed new legislation aims to grant the University greater autonomy and academic freedom, and to extend the funding cycle from the current annual to a three-year term. The Government has obtained feedback on the Consultation Paper from the various stakeholders.</p>
<p>Malta Development Bank May 2017</p>	<p>The Government is in the process of setting up the Malta Development Bank in which it will have total ownership. The authorised capital will be €200 million, allowing it to leverage this to around €1 billion of loans in due course.</p>
<p>University of Malta research fund May 2017</p>	<p>In May 2017 the University upgraded its own funding programme with an annual allocation of €120k, funding 4 projects over a 2-year period.</p>

Research fund for academia May 2017	The government has pledged a €1m research fund for academia.
National Research and Innovation Programme (FUSION) October 2017	The government increased the allocation for the National Research and Innovation Programme from €1.6m to €2.2m with effect from 2018.

R&I funding trends

Figure 1 Trend of GERD by sources of funding



Data source: Eurostat, 2017

The trend in R&D expenditure is subject to different interpretations depending on whether one considers absolute values or expenditure as a share of GDP. In absolute terms, GERD showed a positive trend between 2009 and 2015 before falling sharply in 2016. When expressed as a percentage of GDP, GERD peaked at 0.83% of GDP in 2012 subsequently falling to 0.61% in 2016 (EU28 2.03%). The significant amounts of ESIF funding in the mix play a significant role in the fluctuations, where similar effects were seen in a number of EU10 countries.

Malta's target is to reach an R&D expenditure of 2% of GDP by 2020 (MCST, June 2014). However, despite the adoption of the R&I Action Plan the recent negative trend makes the target seem overly optimistic.

3.1 Public allocation of R&D and R&D expenditure

GBAORD increased from €14.6m in 2010 to €24.3m in 2015, before dropping to €20.3m (0.2% GDP) in 2016. Despite some improvement, the level of funding is only about one-third of the EU28 average of 0.64% GDP in 2016.

The lion's share of GBAORD in 2015 went to the higher education sector (88.4%), while government received 11.2% and private enterprise received an insignificant 0.4%. The share received by the business enterprise sector is among the lowest in the EU, where the average allocation was 12.6% of government funding.

In recent years, EU structural funds have assumed increasing importance in terms of contribution to public funding.

Structural funds were used primarily for infrastructure development, and to a lesser extent to help fund grant schemes for industry R&I, for doctoral scholarship schemes and for promoting technology transfer. Under the new programming period, there is an allocation of €72.1m from ERDF and €20.2m from EAFRD (including national contribution) for R&I, or an average of about €13.2m annually (EC ESIF portal, Malta - <https://cohesiondata.ec.europa.eu/countries/MT>). Planned interventions include national infrastructure, multi-disciplinary research infrastructure, and promotion of R&I in private enterprise (both SMEs as well as large enterprises) (Operational Programme I, March 2015). The European Social Fund (ESF) also contributes to the R&D sector through investments in human capital (EC ESIF portal, Malta)

National funding for government and PROs increased by a factor of four from 2014 to 2015, reaching €2.5m or 0.03% of GDP. The public sector also received €9.2m or 0.1% of GDP from the EC, primarily ESIF funding. Most of this represents one-off capital expenditure on the new Life Sciences Centre and Digital Hub. The funding which is allocated to Malta's only PRO, the Malta Aquaculture Research Centre, constitutes the major portion of non-infrastructure research funding.

Government funding for higher education research increased by 53% over the period 2010 – 2015, reaching €19.9m or 0.23% of GDP in that year. This figure represents a percentage of the university's budget expenditure, on the basis that academic staff is expected to spend about one-third of their time on research activities (UoM, 2014). The University's research fund amounts to €0.5m which is shared out over about 200 projects with each researcher receiving about €2,500 (UoM, 2016c).

In its attempt to increase its research potential, in May 2017 the University upgraded its own funding programme with an annual allocation of €120k, funding 4 projects for a 2-year period (University of Malta, 2017). Funding for a multi-disciplinary research facility is also available from ESIF funds.

R&D funding mechanisms specifically targeting the private sector are operated by Malta Enterprise and are based on a combination of government funding and tax credits. Grant schemes include the R&D Feasibility Study Scheme (max €50k per beneficiary), and the R&D 2014-2020 Scheme which has a maximum grant of €0.5m per applicant. Tax Credit schemes include the Innovation Aid for SMEs Scheme and the Aid for R&D Projects Scheme.

The private sector receives a significant level of funding by virtue of funding schemes financed through ESIF (co-financed through national funds). The Business Enhance ERDF Grant Schemes umbrella initiative launched in 2016 has a total financial allocation of €51m for industry schemes of which €20m is allocated to RTDI, €26m goes to competitiveness initiatives and €5m for investment in e-Commerce (Business Enhance web portal).

The private sector is also eligible for participation in the FUSION Programme. This is the main national funding programme and is open to government, academia and the private sector. It incorporates the Technology Development Programme and the Commercialisation Voucher Programme with a combined annual budget in the region of €1.6m in recent years. This is project-based funding and is disbursed on a competitive basis following an open call. In 2017 the Government approved an increase in the budget to €2.2m with effect from 2018 (Ministry for Finance, Oct 2017).

3.2 Private R&D expenditure

The business enterprise sector (BES) is the largest R&D performer, with an expenditure of €38.6m accounting for 63% of GERD in 2016. At 0.39% of GDP in 2016, it remains modest compared to the EU average of 1.32%.

Private companies rely heavily on their own funds for their research and receive little funding from other sources. In 2014 over 93% of BERD was internal funding whilst the remaining 7% consisted of national funds, structural funds and funding from the EC framework programme. 89% of internal funding came from local sources with the balance coming from abroad (Eurostat).

R&D expenditure sourced from the private sector increased from €23.8m in 2010 to €29.6m in 2015, an increase of 24%.

Business sector funding for academic and public sector research is negligible. The lack of cross-funding between the private and other sectors supports the findings of the Community Innovation Surveys that collaboration between the various sectors is very low.

Information on the spending of individual companies is not available. The Industrial R&D Investment Scoreboard 2016 (EC, 2016) identifies Unibet (registered in Malta) among the top 2,500 companies in terms of R&D expenditure. However the started R&D expenditure of this company alone exceeds the total BERD implying that while the company is registered in Malta, its R&D might in fact be undertaken also elsewhere.

3.3 Supply of R&I human resources

Malta's expenditure on education is relatively high compared to the EU average, both as a share of GDP (5.5 % as compared to 4.8 %) and as a proportion of total public expenditure (13.3 % against 10.3 %) (Eurostat). Public expenditure on tertiary education in 2015 stood at 1% of GDP compared to an EU average of 0.7% (Education and Training Monitor 2017).

In recent years, based on Council Recommendation of 28 June 2011 on policies to reduce early school leaving (2011/C 191/01), the government has introduced a number of measures to address the issue with early school leavers (ESL) (Ministry for Finance 2016). The ESL rate for Malta in 2016 was 19.6% (Source: Education and Training Monitor 2017). Malta is investing its efforts in addressing this target. In 2016, in order to address this, the Early School Leaving Unit (ESLU) carried out an extensive study among 579 students who dropped out of post-secondary education during the academic year 2015-2016. This was further supported by the fact that one of the main goals of the Framework for the Education Strategy for Malta 2014-2024 (MEDE, 2014) focuses on raising the levels of student retention and attainment in further, vocational, and tertiary education and training.

Furthermore, Malta is avidly working on an Early School Leaving Strategy, that is currently being revised on the basis of evidence-based monitoring, assessments and evaluation that have taken place.

The number of STEM graduates per 1000 population was 1.85 in 2016. This represent a decrease from 2.28 in 2015, which was only slightly below the EU average of 2.3 (Eurostat). The percentage of the population aged 25 to 34 which completed tertiary education was 34% in 2016 below the EU average of 38% (ibid). In terms of doctorate graduates (per 1000 population aged 25-34) Malta scores 0.26 in 2016 (Eurostat) which represents considerable increase (see below). Nonetheless it is worth noting that there has been significant improvement over the score of 0.2 in 2013. This is tantamount to the fact that Government is taking active steps to incentivise continued education and training through working life in a bid to aid upskilling and continuous professional development of professional workers and maintain industry-relevant skills (EC, 2017c). The STEPS grant scheme which was introduced in 2009 funded 80 doctoral students over a seven-year period (Ministry for Finance, 2013) and appears to have contributed to the

significant improvement. The rector of the University of Malta has expressed a strong desire to double or triple the number of PhD students over the next five years (Times of Malta, May 2016). In the 2018 budget, Government highlighted its plans for further fiscal incentives to encourage people to pursue post-graduate education. Whilst retaining scholarship programmes, those individuals who are not yet 40 years and who pursue a post-graduate course equivalent to the level of MQF7 and MQF8, that is a Masters or a PhD, will not be subject to any income tax up to a maximum of two years from when they graduate and enter into employment. This benefit will come into force for those who commence their course from this academic year 2017/2018 onwards.

Several other initiatives aim to increase the number of graduates in science subjects. These include the extension of the Material Engineering Lab and the Mathematics and Physics buildings plus a new Transdisciplinary Research and Knowledge Exchange (TRAKE) complex at the University of Malta. A hub for science communication, called 'Esplora', opened to the public in October 2016, with the aim of stimulating interest in science, research and innovation among young people and encouraging them to pursue careers in science and technology. The MCAST Research Framework plans to set up a Research Committee to encourage the transfer of knowledge between academics, students and industry.

The University of Malta continues to promote entrepreneurship through its Centre for Entrepreneurship & Business Incubation (CEBI). The Centre is currently targeting knowledge-intensive sectors such as science, technology, engineering, and creative media and establishing links between the University of Malta and enterprises. Training on product development, business management and other business related topics will be part of a programme targeted at candidates looking to set up their own business. The TAKEOFF Seed Fund Award is again being offered in 2017. This initiative can provide young graduates as well as academics with the necessary financial, legal and management support to develop their ideas and innovations into actual products.

Efforts have been made to increase the number of highly highly-skilled individuals with the launch of postgraduate scholarship schemes in the last 10 years, followed by the Reach High postdoctoral grant scheme in 2015. Sixteen research projects were accepted under this programme and these commenced in the first quarter of 2016 (Ministry for Finance, 2016b). Plans are in hand for the development of a Post-Doctoral Centre at the University of Malta with the aim of housing post-doctoral researchers as well as providing an interim space for business incubation facilities (Ministry for Finance, 2016b). The total researcher population has increased from 595 in 2010 to 818 in 2015, but is still low by EU standards, standing at 3.17 per thousand population in 2014 compared to an EU average of 5.36 (2013). In 2015 58% of researchers worked in the private sector, down from a peak of 67% in 2011. On the other hand, the share of researchers working in higher education increased from 30% in 2011 to 40% in 2015. The government sector is a minor player and only employed 2% of researchers in 2015.

The share of female researchers has shown a positive trend since 2011 with 30% of researchers being female in 2014, only slightly lower than the EU average of 33%. The percentage of female researchers is highest in the higher education sector, with 37% of researchers being female in 2014. The issue of gender equality was not given prominence in the past and is not specifically addressed in the National R&I Strategy 2020. However, Malta hosted the Second Conference celebrating the International Day of Women and Girls in Science in 2017. There have also been occasional efforts to encourage more females to join the IT profession, such as through the organisation of 'Girls in ICT' days, and the need for more females in ICT was recently brought up by the Parliamentary Secretary for Innovation (MaltaToday, July 2017).

Figures regarding the number of researchers in Malta are only available for the higher education sector, with 9% of such researchers being of foreign nationality (Eurostat). Once again the majority of these are from within the EU.

According to the European Semester Country Report Malta 2017, a number of high skilled sectors such as healthcare, finance and ICT are experiencing skills shortages (EC, 2017c). This is also partly due to increasing signs of tightening in the labour market and the high number of new job openings². Labour market participation continues to improve (Education and Training Monitor, 2017), mainly due to long-term structural changes in societal structures, female educational attainment and make-work-pay policies focusing on employment activation, including the free childcare scheme, tapering of benefits when taking up a job and in-work benefits.

Furthermore, Government has embarked on a number of measures to address labour and skills shortages, strengthen initial education, address dropouts and reskilling mechanisms for adults (EC, 2017). The Maltese Public Employment Service (Jobsplus) has in place a number of schemes with the aim of up-skilling. The 'Investing in Skills' Scheme, which started in the first quarter of 2017, seeks to encourage local employers to up-skill their workforce by actively participating in training programmes and courses through financial incentives. The 'Training Pays' scheme which also began in 2017, aims to encourage individuals to enrol in a training programme to develop their skills by participating in further off-the-job training. The 'Traineeship Scheme' which is intended to provide jobseekers with initial vocational training (pre-employment training) helps individuals to obtain the knowledge, skills and competence required to find and retain employment. The 'Work Placement Scheme' is aimed at providing training to participants following a course offered by Jobsplus, which includes a practical component. The 'Work Programme Initiative' which targets long-term unemployed is also providing up-skilling to low-skilled long-term unemployed with the aim of increasing their employability skills. Moreover, Jobsplus administers a number of training courses which vary from manual to digital and foreign language skills.

Furthermore, the Youth Guarantee contributes to the upskilling of young people in Malta. This programme is divided into three initiatives; the NEET Activation Scheme II which started in July 2016 and is targeted towards youths who have been disconnected from the labour market. The participants are provided with training which empowers them to obtain skills that are important for them both as individuals and also as prospective employees; The ICT Summer Course, which aims to equip youths with the necessary ICT knowledge which eventually will lead the successful participants to obtain the ECDL certificate; and the Secondary Education Certificate (SEC) Revision Classes, which target secondary school youths who sat for their SEC exams and obtained a 6, 7, unclassified or absent in one of the mandatory subjects. These classes cover the core subjects in the Maltese educational framework which are Maltese, English language, Mathematics, Physics and Biology.

Furthermore, significant investments and reforms are being carried out in the education sector in a bid to also address the development of relevant skills from a young age. As a result, the share of employed youths with low skills has decreased over the years from 40.7 per cent in 2007 to 27.1 per cent in 2016 (Jobsplus, 2017). The government is working on a reform called '*My Journey; Achieving through different paths*' to be

² The vacancy rate was the highest in the EU at 3.1 per cent during the first quarter of 2016. Furthermore, Malta recorded the highest increase in Employment in the second quarter of 2017, when compared to the first quarter of the same year. Economic forecasts confirm that employment growth is set to continue with an average of 2.9 per cent in 2018 (Jobsplus, 2017).

implemented in lower secondary school in the school year 2019/2020 in order to move from a 'one size fits all' system to more inclusive and equity -oriented programmes catering to pupils' individual aptitudes. In this regard, Malta is set to introduce learning outcomes instead of prescribed syllabi in a bid to enhance skills attainment, reduce skills shortages and foster skills for life. The reform is intended to promote inclusion and to reduce the number of early school leavers by making education relevant to more students and to a changing labour market. In the past few years, a number of vocational subjects were also introduced and learning outcomes developed to be offered at levels 1-3 on the Maltese Qualifications Framework.³ Furthermore, Malta is taking active steps to improve basic and digital skills in schools. Through the 'One Tablet per Child' initiative, children are provided with a free tablet computer during their fourth year of primary school (i.e. nine years old) intended to help improve reading, writing, numeracy and digital literacy skills.

The higher education sector has undergone significant changes in recent years. It evolved from having one state-funded tertiary institution, the University of Malta, to having two additional Bachelor-awarding State institutions, MCAST and ITS. There is a number of other institutions awarding select qualifications, certificates, diplomas, higher diplomas, degrees and/or representing foreign universities through local campuses, which award foreign degrees. A new foreign University, the American University of Malta, has been set up and a new medical school is set to open in Gozo by Barts and the London School of Medicine and Dentistry.

There are some specific measures to promote tertiary education in disadvantaged areas where take-up is low. The University of Malta's Cottonera Resource Centre, set up to act as a bridge between communities in the inner harbour area and the University with the objective of providing information, support and guidance to those interested in furthering their education. The Centre relies mainly on volunteers. Supplementary grants are provided for students from low socio-economic background in order to further encourage take-up of further and higher education. MCAST's Foundation College enables students who left compulsory education without the necessary qualifications to re-engage with education and training. Students who achieve an MQF/EQF 3 qualification from the Foundation College can proceed to MQF/EQF levels 4, 5, 6, and in certain areas level 7, and complete a degree at MCAST's University College.

Malta has the highest employment rate for recent VET graduates in the EU (Education and Training Monitor, 2017). The supply and quality of apprenticeships is increasing. The Ministry for Education and Employment and the MCAST cooperate with national and European stakeholders in developing policies and measures to implement quality apprenticeships in local industry. MCAST has increased the number of vocational pathways offered through apprenticeships and will increase the quality of work-based learning through the formal accreditation of work-based modules. Almost all MQF/EQF 4 courses at MCAST have an apprenticeship component as do a number of MQF/EQF 3 courses. MQF/EQF 5 and 6 students at MCAST are offered internships while other forms of work-based learning are encouraged across the board. Once finalised, the "Work-based Learning and Apprenticeship Act" will provide a harmonised legal framework for work placements, apprenticeships and internships. Government has also launched a skills card initiative which will be made available to 110 trades in the next five years in a bid to combat the skills deficit, give more recognition and awareness about skills necessary to

³ 'My Journey' introduces applied subjects, thus changing the secondary education system (beyond core curriculum) into three main streams: general, which reflects current subjects offered; vocational subjects which build on existing ones; and applied subjects.

workers in the sector, and to credit the skills on an international level (Malta Today, 2017).

A National Skills Council has also been set up aimed at reducing skills shortages and to bring education policies closer to the world of work and labour market needs. The National Skills Council has set itself a strategic direction for the next three years. During 2017, the National Skills Council identified three priorities; work-based learning, digital skills and research and development. For each priority, a sub-committee was established with a specific remit and timelines with clear deliverables. Each sub-committee includes the participation of social partners and stakeholders to further stimulate wider consultation.

The demand for labour is increasing, with not enough persons in the Maltese workforce to fill in the vacancies (Ibid). Thus, Malta is not just experiencing a skills shortage but also a labour supply shortage. The number of notified vacancies to Jobsplus, Malta's Public Employment Services has increased from 14,234 vacancies in 2012 to 22,165 vacancies by September 2017 (Jobsplus, 2017). Employers are increasingly relying on foreign labour to address labour and skill shortages. In this regard, government has taken actions to support the labour market inclusion of non-EU nationals including by tackling irregular forms of employment, precarious work conditions, and by the setting up of Job Brokerage offices for migrants, whereby employers in need of short term casual labour may request in person or by e-mail the service of migrant jobseekers.

4 Policies to address innovation challenges⁴

4.1 Challenge 1 Increasing R&I investment in the private sector

Description

BERD increased sharply over the period 2009 – 2012, but over the next four years this momentum was lost and BERD dropped to 0.39% of GDP compared to 1.32% of GDP in the EU28. National funding for private R&D is one of the lowest in the EU, standing at just 0.01% of GDP compared to an EU average of 0.08% in 2014.

Falling BERD levels are largely attributable to the decline in R&D in the pharmaceutical sector, where research expenditure declined by almost 70% between 2012 and 2014. The closure in 2013 of a key pharmaceutical R&D centre in Malta following acquisition by another company was a key factor in this decrease.

With reference to expenditure on non-R&D innovation, this fell dramatically from 1.9% of GDP in 2012 to 0.5% in 2014. This is largely attributable to a decrease in expenditure on machinery and equipment, which accounted for 93% of innovation expenditure in 2012. The share of Maltese enterprises having undertaken some form of innovation fell from 51.0% in 2012 to 41.2% in 2014 (EU28 49.1%) ranking 19th within the EU (Eurostat).

Policy Response

In recent years numerous funding schemes and tax incentives have been launched with the objective of encouraging private sector R&I (Fusion Technology Development Programme, R&D Grant Scheme, Innovation Actions Grant Scheme, R&D Feasibility Studies, etc.). The SME Diversification and Innovation Grant Scheme was launched in 2016 with a financial allocation of €8m. The financial allocation for the Fusion programme

which had been stagnant for a number of years was increased by 38% (from €1.6m to €2.2m annually) with effect from 2018.

The ERDF operational programme 2014-2020 specifies an allocation of €72.1 (including national contribution) for R&I. The European Social Fund (ESF) also contributes to the R&D sector through investments in human capital (EC ESIF portal, Malta).

The Life Sciences Park opened its doors in 2016 with one of its objectives being to provide state-of-the-art facilities to encourage and attract both local and overseas research-performing organisations, and now hosts a number of private sector organisations.

Assessment

The public R&I funding system has improved dramatically in recent years, both in terms of funding levels as well as in the variety of policy instruments seeking to encourage R&I activity. These developments contributed to a sharp increase in BERD over the period 2009 – 2012.

However, the level of public funding for private R&D remains very low. The R&I funding system is also heavily dependent on EU structural funds, leading to disruption in the availability of funding at the changeover from one programming period to the next. New R&I schemes are generally replacement of earlier schemes which have come to a close and will therefore not lead to further increases in BERD levels.

The dramatic fall in innovation expenditure and share of firms involved in innovation activity between 2012 and 2014 (CIS) is a cause for concern and requires further investigation.

4.2 Challenge 2: Improving the capacity and quality of the science base

Description

The Research Excellence Composite Indicator ranks Malta 20th in the EU28 in 2014, although its score has been improving in recent years. The number of new doctoral graduates (per thousand of population aged 25-34) has doubled over the period 2013 – 2016 but Malta still ranks last in the EU (MT 0.3 in 2016 vs EU28 1.3 in 2015) (Eurostat). International scientific co-publications more than doubled over the years 2011 – 2016 and are now slightly above the EU average (EIS, 2017).

Higher Education sector expenditure on R&D (HERD) was 0.22% of GDP in 2016, down from 0.3% of GDP in 2013 and well below the EU average of 0.46%. The funding allocated to government research bodies was even less (0.01% of GDP, EU28 0.23%). Malta does not have any significant funding programmes targeting academic research.

Policy Response

The government, through the National R&I Strategy 2020, acknowledges the need to further strengthen the "knowledge base" through investment in human capital, in research infrastructures and capacity building for excellence in climate change adaptation.

Malta has set 2020 targets for both number of researchers and doctorate holders. The STEPS postgraduate scholarship scheme was launched in 2009 followed by the launch of the Master It! in 2012 and the Endeavour Scheme in 2015 and subsequent years. The Reach High Post-doctoral Grant Scheme was launched in 2015 but has since not been repeated.

Over the last decade a significant level of ESIF funding was invested in research laboratories at the University of Malta, and in other infrastructures such as the Malta Life

Sciences Park and Digital Hub. The National R&I Action Plan 2015-2020 includes proposals for a sustainable living complex, a transdisciplinary research and knowledge exchange complex and centre of excellence in molecular medicine and biobanking.

In 2017 the University of Malta upgraded its own research programme with an allocation of €0.24m.

Assessment

Overall, things are moving in the right direction with some notable achievements. However, rankings on most indicators are still well below the EU average and efforts need to be stepped up in order to close the gap with other EU countries.

The scholarship schemes succeeded in attracting more doctoral graduates and contributed to the improved score. Nonetheless, the Rector of the University of Malta expressed a strong desire to at least double the number of doctoral students over the coming years. The Reach High post-doctoral grant scheme filled an important void in the funding system, but was only launched once in 2015 due to the take up of all ESF funding available in the project.

Significant progress was made with regards to university laboratory infrastructure in recent years. While the National R&I Action Plan 2015-2020 includes important proposals for 3 new centres at the University, it is not clear how many of these can be funded.

The establishment of an academic research programme in 2017 was a breakthrough, and the acknowledgement of the need for such a fund by the Government is in itself a major step forward. The current funding levels are low and if they are to have a measurable effect on the science base, there is a need to be increased substantially.

4.3 Challenge 3 Strengthening entrepreneurship support and innovation output

Description

International benchmarking exercises such as the World Bank Report, GII and Global Competitiveness Report highlighted the issues of access to finance and inefficient government bureaucracy.

Knowledge-intensive services are an important component of the Maltese economy which in 2016 accounted for 52% of total value added (EU28 18%) and 46% of employment (EU28 37%). Nevertheless, knowledge-intensive services exports as a share of total services exports was only 28.8% compared to an EU average of 69.3% (EIS, 2017). Sales of new-to-market innovations as a share of total turnover is on a downward trend and stood at 4.1% compared to an EU average of 13.4% in 2016.

Policy response

The National R&I Strategy 2020 addresses this structural weakness and highlights the need to create a comprehensive R&I support ecosystem by increasing the effectiveness of the delivery system, strengthening the capacity of entrepreneurial actors to innovate, and ensuring a seamless chain of support.

Novel initiatives implemented or underway in recent years include the Business Start scheme, SME Growth Grant Scheme, Start-Up Investment Grant Scheme, Venture Capital Malta (challenge 2), a crowdfunding platform, the Multilateral Trading Facility and the Malta Development Bank.

Various initiatives are underway to develop an entrepreneurship culture at all levels of education, including the introduction of entrepreneurship as a core subject to students. The Centre for Entrepreneurship and Business Incubation (CEBI) was officially set up at

the University to teach entrepreneurship to students across Faculties and to educate and support graduates in the creation of successful Knowledge-Based business ventures.

Similarly, The MCAST Entrepreneurship Centre (MEC) was officially set up in collaboration with Malta Enterprise and aims to create spin-offs and business ventures. The centre provides entrepreneurship curriculum and possibility to gain practical experience. Apart from the incubation spaces for business development, mentors are assigned to students and alumni who approach MEC with a business idea.

Other initiatives include the TAKEOFF Business Incubator and the ICT Innovation Hub. The Life Sciences Park aims to encourage local start-ups as well as attracting FDI in the biomedical field.

Other measures include the Takeoff Seed Fund Award (€100k per annum), the Maritime Seed Fund Award (€100k) and the ICT Innovation Hub, with ambitious plans to increase the funding for the latter sevenfold from the current value of €30k p.a. to €200k (Ministry for Finance, April 2016). Venture Capital Malta was launched in February 2015 as a public private partnership with the aim of attracting venture capitalists to Malta.

Assessment

Recent years have seen the introduction of a number of measures aimed at improving access to finance for the private sector. These efforts are bearing fruit and Malta's rankings on this indicator are improving in international benchmarking exercises. With reference to bureaucracy, however, the trend is less positive.

Official figures of innovation output paint a confusing picture with the gains of 2015 having been reversed in 2016. A more in-depth assessment of the dynamics is difficult due to the lack of data and of formal evaluation studies.

5 Focus on R&I in National and Regional Smart Specialisation Strategies

New policy developments

Because of Malta's small size, it has a single national Smart Specialisation Strategy which was published as an integral part of the National R&I Strategy 2020 in 2014. The Action Plan governing the implementation of the National Strategy and Smart Specialisation Strategy was approved by the EC towards the end of 2016, paving the way for the utilisation of ESIF funds ring fenced for R&I.

The first call for proposals relating to the use of ESIF funds for R&I infrastructures was published in June 2017.

Progress on implementation

The Smart Specialisation Strategy was developed following an extensive open consultation exercise involving numerous policymakers and stakeholders, including academia and industry representatives. The strategy identified the following seven areas of specialisation:

- tourism product development;
- maritime services;
- aviation and aerospace;
- health, with a focus on healthy living, active ageing and e-health;
- resource-efficient buildings;
- high value-added manufacturing with a focus on process and design, and

- aquaculture.

In addition, ICT was identified both as a horizontal enabler across all identified specialisation areas, as well as a Smart Specialisation niche in itself. R&I opportunities in rural development were also highlighted.

In 2015 a technical steering group incorporating policymakers and key stakeholder representatives was set up to oversee the development of a more detailed Action Plan, once again based on the entrepreneurial discovery process. This involved an in-depth evaluation of the regional strengths and potential of each specialisation area, followed by the articulation of specific ideas for development including preparation of financial requirements. The higher education sector, government ministries and the private sector were all well represented and played a key role in the development of the plan. The Action Plan addresses all areas identified in the RIS3, with the exception of maritime services. The analysis and proposals are well-researched and convincing, and inspire confidence in the potential of the proposed initiatives.

The current approach constitutes a significant improvement over that used in the previous programming period, which was the first time that structural funds were used in Malta and which therefore served a learning experience. The earlier approach suffered from limited coordination and strategic planning, with a substantial share of the funds being used in relatively minor amounts (€1m – 3m) on laboratories at the University of Malta. This time round there was a coordinated planning process at national level involving a broad range of stakeholders who together discussed and agreed on a set of initiatives conforming to the RIS3. The plan is to utilise the funds on a smaller number of more sophisticated initiatives each requiring substantially more budget than previously (generally between €5m – €30m).

The Action Plan includes a number of infrastructure initiatives proposed by the University of Malta, by Malta Enterprise and by government ministries. Funding for these infrastructures will be made available through ESI funds, but it is not clear whether all initiatives can be funded.

Subsequently to the approval of the smart specialisation strategy at the end of 2016, the implementation of the strategy got under way with the publication of the first ESIF call in June 2017. This is targeted at research infrastructures and the call documentation states that eligible activities should also be in line with the priorities identified in the RIS3 strategy.

The Action Plan includes a policy mix of grants, tax credits and scholarships. However, there is no mention of revolving instruments such as off the shelf instruments. The planned initiatives do not involve any inter-regional or cross-border cooperation, and no mention is made of funding for external actors. Participation in the inter-regional and cross-border Smart Specialisation Platforms was not possible due to lack of alignment between existing platforms and the national specialisation areas.

One of the proposed areas of specialisation where progress has been made is the National Aerospace Centre, an initiative which has been underway since 2015 through the TEMARA project funded through the H2020 teaming call. A strategy and business plan which includes short- and long-term goals, services to be offered, operation plan and details of HR requirements has been prepared as part of the project work (http://cordis.europa.eu/result/rcn/190413_en.html, temara.eu).

Another is the area of health, where a biobank was set up at the University of Malta in (<http://www.um.edu.mt/biobank>). The Malta BioBank is already involved in a number of projects with overseas partners and is a founding member of the Biobanking and Biomolecular Research Infrastructure (BBMRI). The Action Plan includes an initiative to build upon previous work in the area and broaden the scope of the current work.

Considering the specific geographical features of Malta, the outward-looking dimension - both in terms of positioning/benchmarking of the national innovation system and interregional cooperation - seems still underdeveloped. Moreover, connections between individual measures could be reinforced.

Monitoring mechanisms and the feedback loop

With reference to the RIS3 monitoring mechanism, the national strategy specifies that such a mechanism will be established to review progress and ensure that the strategy is updated as necessary over time. An initial exercise was funded through the EC's Policy Support Facility (EC, 2016). On the basis of this report, the Malta Council for Science and Technology is leading an exercise in collaboration with stakeholders to establish a set of indicators and define a mechanism for the establishment of the monitoring function.

A main point made in the report is that Smart Specialisation requires both long term and medium/short term impact measures and that therefore short, medium and long-term key performance indicators have to be developed.

Evidence of impact

Implementation of the RIS3 has only just gotten underway and as yet there is no firm evidence or evaluation of actual impact. However, each proposed infrastructure in the Action Plan incorporates an *ex-ante* impact assessment with details of expected outcomes and results.

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Abbreviations

BERD – Business Enterprise R&D
BES – Business Enterprise Sector
CEBI – Centre for Entrepreneurship and Business Incubation
EAFRD – European Agricultural Fund for Rural Development
EC - European Commission
ERDF – European Regional Development Fund
ESIF – European Structural and Investment Funds
EU - European Union
EU28 - European Union including 28 Member States
FTE - Full-time equivalent
GDP – Gross domestic product
GERD – gross domestic expenditure on R&D
HEI – Higher Education Institution
HERD - Higher Education R&D
ICT - Information and Communication Technologies
MCAST – Malta College of Arts, Science and Technology
MCST – Malta Council for Science and Technology
PNP – Private non-Profit Sector
RIDT – Research & Innovation Development Trust
RTDI – Research, technological development and innovation
R&D – Research and development
R&I – Research and innovation

Factsheet

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP per capita (euro per capita)	14900	15900	16400	17100	18000	19800	21500	22700		
Value added of services as share of the total value added (% of total)	78.04	78.24	79.05	81.1	81.72	82.98	83.47	84.1		
Value added of manufacturing as share of the total value added (%)	12.85	12.95	13.2	12.61	10.82	10.04	9.08	8.74		
Employment in manufacturing as share of total employment (%)	13.66	13.53	13.31	12.63	12.34	11.94	11.47	10.92		
Employment in services as share of total employment (%)	74.66	75.38	75.83	76.88	77.69	78.89	80.01	80.76		
Share of Foreign controlled enterprises in the total nb of enterprises (%)	0.29	0.3	0.6	0.6	0.62	0.64	0.74			
Labour productivity (Index, 2010=100)	95.6	100	101.3	102.6	104.5	109.2	113.3	111.4		
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.17	0.07	0.12	0.08	0.2	0.21	0.17	0.26		
Summary Innovation Index (rank)	21	21	22	22	19	16	16	18		
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				51.1		41.2				
Innovation output indicator (Rank, Intra-EU Comparison)			21	21	21	17				
Turnover from innovation as % of total turnover (Eurostat)		7.4		10.2						
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						76	80	76		84
Ease of getting credit (WB GII) (Rank)						133	124	108		
EC Digital Economy & Society Index (DESI) (Rank)						11	12	13	12	
E-Government Development Index Rank		30		35		40		30		
Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)	34	37	37	41	32	40	42	44	45	
GERD (as % of GDP)	0.52	0.61	0.67	0.83	0.77	0.72	0.77	0.61		
GBAORD (as % of GDP)	0.15	0.22	0.21	0.28	0.28	0.23	0.26	0.2		
R&D funded by GOV (% of GDP)	0.16	0.21	0.2	0.27	0.27	0.22	0.25			
BERD (% of GDP)	0.33	0.37	0.44	0.48	0.4	0.4	0.4	0.39		
Research excellence composite indicator (Rank)	24	23	21	23	22	20				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		4.19	6.75	4.77	6.49	9.44				
Public-private co-publications per million population	4.87	7.25	4.82	4.79	4.75	2.35	4.66			
World Share of PCT applications	0.01	0	0	0	0	0	0.01			
Global Innovation Index				24	25	26	26	26		

Data sources: various, including Eurostat, European Commission and International scoreboard data.

List of figures

Figure 1 Trend of GERD by sources of funding15

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