Peer Review
Maltese Research and Innovation System

Horizon 2020 Policy Support Facility
Peer Review - Maltese Research and Innovation System

European Commission
Directorate-General for Research and Innovation
Directorate DG — RTD
Unit A4 — Reforms and economic impact - country Intelligence

Contact: Anca DUMITRESCU GORANOV and Petra KENNEDY, Coordinators of the Peer Review of the Maltese Research and Innovation System, Unit A4.
Anca.DUMITRESCU@ec.europa.eu; Petra.KENNEDY@ec.europa.eu

Contact (H2020 PSF coordination team):
Román ARJONA, Chief Economist and Head of Unit A4 - Roman.ARJONA-GRACIA@ec.europa.eu
Stéphane VANKALCK, PSF Head of Sector, Unit A4 - Stephane.VANKALCK@ec.europa.eu
Marta Truco Calbet, PSF Team Leader, Unit A4 - Marta.TRUCO-CALBET@ec.europa.eu

European Commission
BE-1049 Brussels

Manuscript completed in June 2019.

This document has been prepared for the European Commission however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.


Luxembourg: Publications Office of the European Union, 2019


Reuse is authorised provided the source is acknowledged. The reuse policy of European Commission documents is regulated by Decision 2011/833/EU (OJ L 330, 14.12.2011, p. 39).

For any use or reproduction of photos or other material that is not under the EU copyright, permission must be sought directly from the copyright holders.
Cover image © Eurotop.be 2017
Peer Review

Maltese Research and Innovation System

Prepared by the independent experts and national peers:

Independent experts

Dieter Imboden, Chair (Switzerland)
Claire Nauwelaers, Rapporteur (Belgium)
Maja Bučar (Slovenia)
Ana Costa Freitas (Portugal)
Jan van den Biesen (Netherlands)

National Peers

Dermot Mulligan (Ireland)
Tiago Santos Pereira (Portugal)
# Table of Contents

ABSTRACT: PROPOSED ACTIONS ................................................................. 7

1 KEY POLICY MESSAGES ........................................................................ 9

2 THE PSF PEER REVIEW: AIM AND METHODOLOGY .......................... 17
   2.1 POLICY SUPPORT FACILITY ............................................................ 17
   2.2 AIM AND FOCUS AREAS .................................................................. 17
   2.3 METHODOLOGY .............................................................................. 18
   2.4 STRUCTURE OF THE REPORT ......................................................... 19

3 THE ECONOMIC, RESEARCH AND INNOVATION CONTEXT IN MALTA ... 20
   3.1 INTRODUCTION .................................................................................. 20
   3.2 THE SOCIO-ECONOMIC SITUATION IN MALTA ............................... 20
   3.3 MALTA’S RESEARCH AND INNOVATION SYSTEM AND PERFORMANCE ................................................. 26
   3.4 GOVERNANCE OF THE RESEARCH AND INNOVATION SYSTEM AND KEY ACTORS ........................................ 29

4 EMBEDDING RESEARCH AND INNOVATION IN MALTA’S DEVELOPMENT STRATEGIES ................................................................. 33
   4.1 GOVERNANCE OF THE MALTESE RESEARCH AND INNOVATION SYSTEM ......................................................... 33
       4.1.1 The current situation ................................................................. 33
       4.1.2 The way forward ..................................................................... 35
   4.2 PUBLIC FUNDING FOR RESEARCH AND INNOVATION AND THE ROLE OF EUROPEAN STRUCTURAL AND INVESTMENT FUNDS ................................................. 40
       4.2.1 The current situation ................................................................. 40
       4.2.2 The way forward ..................................................................... 43
   4.3 MALTA’S SMART SPECIALISATION STRATEGY .................................. 45
       4.3.1 The current situation ................................................................. 45
       4.3.2 The way forward ..................................................................... 46
   4.4 THE POLICY MIX AND THE ABSORPTION CAPACITY OF THE RESEARCH AND INNOVATION SYSTEM ................................................................. 47
       4.4.1 The current situation ................................................................. 47
       4.4.2 The way forward ..................................................................... 49
   4.5 POLICY INTELLIGENCE, MONITORING, EVALUATION AND COMMUNICATION ......................................................................................... 50
       4.5.1 The current situation ................................................................. 50
       4.5.2 The way forward ..................................................................... 51

5 IMPROVING FRAMEWORK CONDITIONS FOR PUBLIC RESEARCH .................. 57
   5.1 INCENTIVES AND BARRIERS TO HEIS AND PUBLIC RESEARCH ORGANISATIONS TO CONDUCT HIGH-QUALITY RESEARCH ........................................ 57
       5.1.1 The current situation ................................................................. 57
5.1.2 The way forward ............................................................... 58
5.2 RESPECTIVE ROLES OF MALTA’S HEIS .......................... 59
  5.2.1 The current situation ...................................................... 59
  5.2.2 The way forward ............................................................ 61
5.3 THIRD MISSION IN HEIS AND PUBLIC RESEARCH ORGANISATIONS ........................................... 61
  5.3.1 The current situation ...................................................... 61
  5.3.2 The way forward ............................................................ 63
5.4 THE ROLE OF PUBLIC RESEARCH INFRASTRUCTURES ........... 65
  5.4.1 The current situation ...................................................... 65
  5.4.2 The way forward ............................................................ 66
5.5 INVESTMENT IN HUMAN RESOURCES FOR RESEARCH AND INNOVATION IN MALTA ......................... 68
  5.5.1 The current situation ...................................................... 68
  5.5.2 The way forward ............................................................ 71
6 INCENTIVISING RESEARCH AND INNOVATION IN THE PRIVATE SECTOR AND STIMULATING PUBLIC-PRIVATE COOPERATION ............... 75
  6.1 SUPPORT FOR RESEARCH AND INNOVATION IN THE PRIVATE SECTOR ..................................................... 75
    6.1.1 The current situation .................................................... 75
    6.1.2 The way forward .......................................................... 78
  6.2 INSTRUMENTS FOR THE PROMOTION OF PUBLIC-PRIVATE COOPERATION IN RESEARCH AND INNOVATION ............. 80
    6.2.1 The current situation .................................................... 80
    6.2.2 The way forward .......................................................... 81
  6.3 SUPPORT TO START-UPS AND ACCESS TO FINANCE FOR SMES ....... 85
    6.3.1 The current situation .................................................... 85
    6.3.2 The way forward .......................................................... 86
7 FOSTERING INTERNATIONALISATION OF THE MALTESE RESEARCH AND INNOVATION SYSTEM ........................................ 88
  7.1 PARTICIPATION OF MALTA IN EU-LEVEL PROGRAMMES .......... 88
    7.1.1 The current situation .................................................... 88
    7.1.2 The way forward .......................................................... 91
REFERENCES .................................................................................... 95
ANNEX 1: THE PSF PANEL .......................................................... 98
ANNEX 2: ADDITIONAL INFORMATION ........................................ 102
ANNEX 3: DEFINITIONS OF R&D AND INNOVATION .................... 114
ANNEX 4: PSF PANEL SURVEY ON DOCTORAL STUDIES ............ 116
ANNEX 5: LIST OF MEETINGS AND INTERVIEWS ...................... 134
ANNEX 6: LIST OF ACRONYMS .................................................... 136
List of Tables

Table 1 Population, GDP, GERD and GBAORD in two micro-state islands: Malta and Iceland (2017) ................................................................. 41

Table 2 Publications with a Maltese author, 2010-2017 ................................. 60

List of Figures

Figure 1 Malta real GDP growth and contributions from 2010 to 2019 ............... 21

Figure 2 Malta key performance indicators under EU2020 indicators: change since 2008 ................................................................................. 22

Figure 3 Most problematic factors for doing business ........................................ 24

Figure 4 Unemployment rates, 2017, EU-28 .......................................................... 25

Figure 5 Share of employers reporting labour shortages in Malta and EU-28, 2013, 2016, 2017 ................................................................................. 25

Figure 6 R&D intensity (GERD as % of GDP) in EU-28, 2007, 2012, 2017 ............ 26

Figure 7 Business sector expenditures on R&D as a % of GDP – Malta and EU-28, 2000-2017 ................................................................................. 27

Figure 8 Government budget appropriations and outlays for R&D as a % of GDP Malta and EU-28, ................................................................................. 27

Figure 9 Share of top 10 % most cited publications – Malta and EU-28, 2000-2015 ................................................................................. 28

Figure 10 Innovation performance of EU Member States – 2010, 2016 and 2017 .. 28

Figure 11 The National R&I Governance Framework in Malta ............................... 30

Figure 12 Malta National R&I Strategy – Overall structure ................................. 31

Figure 13 Governance bodies for Malta’s National R&I Strategy ............................ 33

Figure 14 Total government budget allocations for R&D (GBARD) as % of general government expenditures EU-28, 2007, 2016, 2017 .......................... 40

Figure 15 GERD as % of GDP vs GBAORD as % of total government expenditures in 2017 ................................................................................. 41

Figure 16 R&D financing and expenditures in Malta, 2016 ................................. 42
Figure 17 The policy mix for RDI in Malta (2018 data, yearly budgetary allocations) .................................................................48

Figure 18 The stage reached in implementing the monitoring system for the R&I strategy in Malta ........................................................51

Figure 19 Factors of attractiveness for R&D location..............................................62

Figure 20 Direct government funding and tax support for business R&D as a percentage of GDP, 2016 .................................................................76

Figure 21 Annual EU investment through Horizon 2020 per euro of national gross expenditures in R&D (GERD) by country of beneficiary.................................89

Figure 22: Horizon 2020 investment per country of beneficiary, in signed grants, compared to national investments in R&D (intramural R&D expenditures – GERD) per country, in EUR per inhabitant .........................................................91

List of Boxes

Box 1 Malta’s economic strengths according to Malta Enterprise .....................23

Box 2 Consultative bodies for research and innovation: the Dutch AWTI and the Danish Council for Research and Innovation Policy ..........................36

Box 3 Agencies supporting research and innovation in Ireland .........................39

Box 4 Ireland’s journey from an FDI-dependent to an innovation-driven economy 43

Box 5 Slovenia: a new form of public-private partnership to implement RIS3 ......47

Box 6 Diffusing information on RIS3 in Catalonia .............................................52

Box 7 Programmes to raise awareness on science, research and innovation in: Austria – Sparkling Science; Belgium – Science Mundi in Brussels-Capital; Portugal – Ciência Viva; Ireland – Science Foundation Ireland Discover Programme and Smart Futures .........................................................53

Box 8 Evaluation of cooperative R&I programmes and lessons from EU experience and LINK in the UK for the FUSION programme .................................................55

Box 9 Competitive research funds in a small country: The Icelandic Research Fund ..............................................................................................58

Box 10 Rewarding work with industry in academic careers and salaries in Spain...64

Box 11 FabLabs in the Netherlands .................................................................65
Box 12 Good practices in establishing public-private partnerships for R&I and Swedish Competence Centres

Box 13 Main insights from the PSF Panel survey

Box 14 Supporting PhD students and qualified doctors in Portugal

Box 15 Incentive to attract and retain talent in a small country, Luxembourg

Box 16 Raising awareness of innovation in companies through proactive support: the Enterprise Development Programme in Estonia

Box 17 Lessons from Knowledge Transfer Partnership (KTP) programmes

Box 18 Slovenia's Young Researchers from Industry Programme

Box 19 Example from Slovenia with the 'Start-up Manifest' and a follow-up scheme of support for start-ups

Box 20 Four routes to widen participation in EU FPs

Box 21 Support to the participation in EU FPs in Portugal

Box 22 Benefitting from the H2020 programme Teaming in Cyprus
ABSTRACT: PROPOSED ACTIONS

1. If Malta is to continue its current economic success into the future knowledge-based economy, then both the public and private sectors need to invest significantly more in research, development and innovation (RDI). (I.2)

2. Government needs to play a leadership role in this by placing clearer priority on research and innovation: one minister should lead on these matters (‘R&I champion’). The minister should chair the Core Group, ensuring cross-governmental coordination. The Core Group should be reflected at ministerial level by an existing or new Government sub-committee to address RDI issues. (I.1, I.3)

3. To advise the ‘R&I champion’ and the Government, an independent Consultative Forum should be created that represents all relevant stakeholders of the research and innovation system, including companies, higher education institutions (HEIs), public research organisations and society. (I.5)

4. The Malta Council for Science and Technology (MCST) should be upgraded towards an ‘MCST+’ that expands its function of a research funding agency. It should be responsible for the National R&I Strategy, including the Smart Specialisation Strategy (RIS3). (I.6, I.7, I.10)

5. Malta should establish a new Maltese Research Fund for competitive funding of basic and applied research, to be managed by MCST. (II.1)

6. The FUSION programme, also managed by MCST, should be upgraded, with a significantly increased budget for the existing funding line for cooperative projects, as well as a new funding line for research projects in higher education institutions and public research organisations in selected fields corresponding to RIS3 priorities. (II.2)

7. More cooperation should be achieved between Malta Enterprise (ME) and MCST. In the next funding period, instruments primarily delivering direct support to companies, possibly funded by the European Structural and Investment Funds (ESIF), should be concentrated with ME, while instruments mainly aiming at public research should be coordinated and funded through MCST, with cross-agency referral in case of public-private collaboration. (I.8; III.2)

8. Malta should significantly streamline, simplify and clarify its landscape of funding schemes available to innovative enterprises, and deliver them in a more proactive mode and with a clear account management. Support schemes for start-ups should be fully integrated into an ‘easy-to-navigate’ innovation support system. (III.1 to III.5)
9. Applied research with mandatory university-enterprise collaboration needs to be reinforced, notably through intersectoral mobility schemes, such as the Knowledge Transfer Partnership. (III.4)

10. To facilitate more synergies in the policy mix, the monitoring system is of central importance. It requires cooperation from all actors involved in funding R&I and should be led by MCST+, expanding its role of a ‘policy intelligence unit’. Policy evaluation should also become regular practice. (I.12)

11. University of Malta (UoM) and the Malta College of Arts, Science and Technology (MCAST) should develop a clear concept of cooperation and division of work in teaching, research and third mission. Together with the Government they should develop an efficient system to support (and retain) scientifically talented individuals from school up to the highest university level, while attracting scientific talents worldwide. (II.3 to II.8)

12. International cooperation in RDI is vital for the Maltese research and innovation system: there is room for further reinforcement of support to internationalisation of RDI activities, including in the field of digital innovation. (IV.1 to IV.3)
1  KEY POLICY MESSAGES

In spite of its publicly stated ambition and different efforts undertaken during recent years, Malta has not yet fully embraced the need to evolve towards a knowledge-based society. While this may seem not necessary in times of high growth and low unemployment, such a situation is not sustainable in the medium to long-term. More research contributes to more innovation, which will nurture existing and future sectors of the Maltese economy. There is a need to invest today in the creation of the foundations for this knowledge-based society. This investment takes time to bear fruit: tomorrow will be too late, and without investment now Malta risks seeing indigenous enterprises struggling to compete in a knowledge-based market and multinational enterprise activity relocating abroad. Reaching this ambitious goal calls for reforms in many important areas of society: education at all levels; fundamental and application-oriented research; innovation in all its forms; as well as effective structures at governmental level.

The following key policy messages, grouped under four main themes, summarise the results of the review described in more detail below in Chapters 4 to 7.

I. Embedding research and innovation in Malta’s development strategy

(Chapter 4)

I.1. Malta should give a higher profile to research and innovation as the basis for future sustainable growth. Research and innovation are formally part of a larger portfolio of the parliamentary secretary for Financial Services, Digital Economy and Innovation, yet innovation-oriented activities in other ministries, some of them with much larger financial allocations, are uncoordinated. The Policy Support Facility (PSF) Panel recommends that, at the highest governmental level, one minister leads on research and innovation (R&I). This minister would be an ‘R&I champion’, ensuring greater ownership, coordination and transparency at governmental and agency level, as well as higher public investment to implement Malta’s National Research and Innovation Strategy.

I.2. Malta should maintain one comprehensive national strategy, covering both research and innovation. This will help create the required connections between research and innovation, for the benefit of Maltese society. Keeping RIS3, funded under the ESIF, as a separate pillar within the national strategy will help to maintain the necessary flexibility for using (increasing) national funds for complementary purposes. This strategy should be linked to Malta’s economic and enterprise development strategy. The lack of ownership of R&I at the highest governmental level is reflected in a salient under-investment by Malta in research and development, at odds with its stated objective of reaching 2 % of gross domestic product (GDP) to be spent on R&D by 2020 (contrasting with a current performance of 0.55 %, on a downward trend). If Malta is to stand any chance of
reaching its innovation targets and of sustaining its current levels of enterprise activity into the future, both the public and private sectors need to invest significantly more in research, development and innovation activity. Public money is not scarce in Malta, which has a high budget surplus: investing in R&D and innovation is the best way to secure the country’s future.

I.3. For R&I to play a more central role in Malta, a cross-departmental coordination mechanism between various relevant ministries, including those in charge of priority domains such as the economy, business, education, tourism and health, as well as the Ministry of Finance, needs to be developed. In addition, efficient synergies should be developed with the Ministry of European Affairs and Equality, since currently the European Structural and Investment Funds dominate the flow of money into the public R&I system of the country. The existing Core Group, if chaired by the minister acting as the R&I champion, could take on this role. The Core Group should be supported by working committees, which prepare and implement its decisions. The Core Group should be reflected at ministerial level by an existing or new Government sub-committee to address RDI issues.

I.4. As an additional measure to support the importance of R&I at governmental level, R&I matters should be assigned to a parliamentary committee.

I.5. Malta should establish a Consultative Forum, acting independently, ensuring the participation of stakeholders at both the policy design and policy implementation stages. This body should be established on a permanent basis to advise the Government and agencies, on request and at its own initiative, and provide the views of stakeholders of the research and innovation system, including companies, higher education institutions, public research organisations and society generally.

I.6. The position of the Malta Council for Science and Technology (MCST) in the system should be reinforced and clarified. The PSF Panel considers that the presence of MCST is an asset of the Maltese research and innovation system, and recommends upgrading this agency towards an ‘MCST+’. MCST should expand its function of a research-funding agency (see Key Message II) and remain the key agency supporting internationalisation of the Maltese R&I system. MCST will also continue to represent the country in external fora. MCST should have an active Board, which also includes international academic members, and should report to the government minister playing the lead role on research and innovation (the R&I champion).

I.7. With the advisory function being allocated to the Consultative Forum, MCST could have as its key role the preparation and the coordination of the implementation of the National R&I Strategy. In addition, MCST’s role as a ‘policy intelligence unit’ for the Maltese R&I system should be strengthened too: it should act as a central hub for information, analyses, data (in cooperation with the National Statistics Office of Malta, NSO), studies and evaluations. This policy intelligence should be made available to decision-makers and key stakeholders in the system. MCST should be in charge of
the Secretariat of both the Core Group and the new Consultative Forum, and this will help to carry out its mission of central intelligence hub. MCST should also contribute to the imperative of raising overall awareness of the importance of R&I in Malta. Efforts to promote the value of science amongst the population, including through the Esplora Centre, should be further reinforced. Beyond Esplora, wider and ambitious events, such as Innovation Summits or Innovator of the Year events for the promotion of Malta as an innovative and knowledge-driven society should also take place, in cooperation with Malta Enterprise (ME). Appropriate human and financial resources and skills should be made available for MCST to carry out its whole range of duties.

I.8. Cooperation and a clear division of work should be achieved between ME and MCST. The two agencies should be represented on each other’s Boards in order to improve cooperation and synergies. MCST should be in charge of all instruments promoting R&D and innovation in the public sector, including the FUSION programme, as well as other programmes for funding public research. ME should manage all instruments supporting business development and innovation, in all forms, in the business sector. Both MCST and ME should have account managers to help their respective ‘clients’ to access schemes from the other agency (see Message III.2). In the present ESIF programming period, the Measure and Support Division (MSD), in charge of ESIF-supported schemes, should coordinate its actions with ME and MCST. However, in the next funding period, the delivery of all direct support to companies, funded by the ESIF or not, should be concentrated with ME, while public research infrastructure should be coordinated and funded through MCST.

I.9. Due to the dominant role of the ESIF in funding research infrastructure, it is important that future sustainability of these investments is ensured by the appropriate national policies, particularly in the post-2020 period, where ESIF funds allocated to Malta are likely to decrease.

I.10. Malta has adopted a Smart Specialisation Strategy (RIS3), through an intense consultation process. It is an integral part of its National R&I Strategy, which is a positive feature. The definition of priority areas of specialisation influences policy implementation in various ways. However, the RIS3 is insufficiently known by many actors in research and innovation, nor is it evaluated on its achievements. The updated RIS3 to be developed by MCST for the Core Group for the next programming period should rely on a continuous consultation process, in which the newly established Consultative Forum would play a key role (see Key Message I.6). This process needs to keep up with rapid developments in the digital world and draw lessons from the achievements of the current RIS3. The updated strategy would benefit from focusing on areas where Malta has research strengths that can be developed into innovative products or services. Wider publicity on the concrete actions implemented in RIS3 and their contribution to the overall goals of the National R&I Strategy should be made.

I.11. The funding instruments for research and innovation are dispersed across several funding bodies. As a result, there is neither an overall view nor a
clear responsibility over the policy mix. Agencies and funding bodies are designing their instruments separately, without a clear view on complementarity with others in the system. They seem to have few incentives to monitor/evaluate them and eventually change them for the higher efficiency of the system as a whole. More synergies should be achieved (see Key Policy Message III.2).

I.12. Led by MCST, the monitoring system, which requires the cooperation of all actors involved in funding R&I, is a key instrument to facilitate more synergies in the policy mix. Monitoring is also necessary (and part of the conditionality) for the development of the new RIS3 in the next ESIF programming period. Ensuring a fully-fledged implementation of this monitoring system, which is in its final preparation phase, should become a priority. Evaluations of Maltese programmes and support schemes should be carried out on a systematic basis by independent entities, with their results shared at the highest level and fed into the policy cycle. This would help to redress the current lack of an overall view on the policy mix’s effectiveness.

I.13. More transparency should be achieved with respect to the various actions put in place to implement the (current and next) National R&I Strategy: the Action Plan and its implementation should become public, with its objectives fully shared across Government and all other relevant actors. This should also be the case for data referring to the use of public money for instruments supporting R&I as, for instance, is done for the FUSION programme by publishing information on all funded projects.

II. **Improving framework conditions for public research**

(Chapter 5)

II. 1. On the public research side, Malta lacks a funding channel for competitive funding of basic and applied research, aimed at the potential of researchers at University of Malta (UoM), the Malta College of Arts, Science and Technology (MCAST) and other public sector institutions. This deficiency is a serious competitive disadvantage for public research organisations in Malta, compared to most other European public research actors. A new Maltese Research Fund should be established to target bottom-up applications in any field of research, by applicants from HEIs and other public sector institutions (funding multi-year projects of a typical size of EUR 100 000/year). The fund should support curiosity-driven research of international quality that has the potential to open unexpected new fields of research and innovation, with two types of grants: project grants and personal grants. This new Maltese Research Fund should be managed by MCST and the money only allocated through an international, quality-driven peer review process.

II. 2. Alongside the new Maltese Research Fund, MCST should continue to manage the FUSION programme, but the PSF Panel sees a need to transform this programme into two different funding lines with significantly increased budgets. A first line, funded with additional money, would be...
directed to HEIs and public sector institutions only, with no requirement for industry participation, and would fund research projects in oriented programmes in top-down selected fields (corresponding to the RIS3 priorities); in addition to the quality of research, the main criterion for this funding line is a contribution to socio-economic development. A second part would correspond to the existing programme, i.e. a cooperative programme with compulsory participation by companies and HEIs, which would increase its current budget. The outcomes of those two funding lines would differ, according to their objectives.

II. 3. Both UoM (with respect especially to the research dimension) and MCAST (with respect especially to the education dimension) have undergone a remarkable evolution of research and education activities, which are highly complementary. They should develop a clear concept of cooperation and division of work in teaching and research while both keeping their distinctive areas of strength. More cooperation between UoM and MCAST will be beneficial for both institutions and their students, and this will also create an attractive environment for companies, which value different types of research and education outputs from the two institutions. Further exploiting the opportunities from participating in international networks (such as the recent bid by UoM for participating in European University networks) and supporting exchanges of students should stand high on their strategic agendas.

II. 4. Both UoM and MCAST need to develop – and ideally align – their specific and complementary strategies regarding their ‘third mission’, namely service to society, including cooperation with industry, knowledge transfer, commercialisation, consulting, public outreach and others. Dialogue with industry – both on an informal and formal basis through e.g. participation on boards of HEIs – will also help the HEIs to adapt their education activities so that they become more ‘innovation-oriented’. Open Fab Lab-types of platforms for open innovation could be considered as well.

II. 5. To ensure that investments in research infrastructure bear fruit, it is necessary to secure funding for the personnel involved in teaching and research activities, as well as for the maintenance of their equipment and facilities, in the long term. Malta should also aim to use public research infrastructure for the support of public-private partnerships in domains of key interest for the Maltese economy and science, especially in domains identified within RIS3. It is also necessary to map research infrastructure in order to achieve transparency and enhance its use by researchers in both the public and private sector; this mapping task should be placed under the responsibility of MCST.

II. 6. Malta should develop an attractive system to support talented individuals from primary school up to the highest university level. At present, there is little incentive for highly educated Maltese people to stay in research, for foreign students to remain in Malta after studying, or for foreign researchers to come to Malta. The UoM and MCAST should be able to regularly recruit to positions for researchers/academic staff (with PhDs), with the aim of
rejuvenating the staff, developing new research projects, attracting researchers from abroad and reinforcing international networks.

II. 7. To increase research capacity in public research, the first step should be to increase the human resources. The lack of attractiveness of doctoral studies suggests that schemes to support doctoral students should receive increased long-term support. Doctoral candidates should be also more systematically associated with research activities at the university.

II. 8. Given the shortages in the domestic labour force, Malta is importing talent that needs to be retained. A more proactive policy to attract global talent can have positive impacts on the availability of qualified human resources for the business sector, as well as for the public research sector.

III. Incentivising research and innovation in the private sector and stimulating public-private partnerships

(Chapter 6)

III. 1. In spite of Malta’s present excellent economic situation, the country may soon be facing the ‘middle-income trap’, since it does not yet host the hotspots of innovation found in high-cost countries. Multinational enterprises tend to conduct R&D abroad rather than in Malta. In order to change this trend, Malta should develop an attractive R&D ecosystem that includes the availability of a skilled workforce, including at the level of technicians, with foreign experience, attractive public incentives, and an effective fabric of R&D collaboration between and within public and private sectors.

III. 2. Malta should significantly streamline, simplify and clarify its landscape of funding schemes available to innovative enterprises: mismatches are reported between needs, target groups and intervention modes; several instruments display a too low take-up rate; in particular, R&D support schemes funded by ME and ESIF are significantly underused. A range of shortcomings has been identified by the PSF Panel, which need to be rectified. A more coordinated and simplified set of instruments targeting companies will allow for a clearer message to users about the objectives and differences between instruments, facilitate the increase in volume, improve their visibility, and eventual take-up, with management efficiency gains, and will improve the effectiveness of each scheme. In addition, support to non-technological and other types of innovation (marketing, organisational, design, etc.) should be enhanced. More proactive management modes in the form of account management within ME and MCST could help in raising awareness and provide guidance to potential beneficiaries. Cross-agency referral of companies also needs to be developed.

III. 3. The respective roles of direct grants and R&D tax credits for companies need clarification, with a particular focus on small and medium-sized enterprise (SME) requirements, both in terms of target audience as well as type of activity they aim to support. Where possible, grants are preferable as these may better suit the needs of SMEs.
III. 4. Evidence suggests that Malta is performing poorly in terms of public-private partnerships in research and innovation. Other countries have found that applied Research Competitive Funding calls that include a requirement for university/enterprise collaboration yield results. The budget and reach of the corresponding key instrument, the FUSION programme, is limited, whereas other schemes for collaborative R&D are left largely unused. It is important to further investigate the suitability and relevance of these instruments and address shortcomings similar to those in the funding schemes for innovative enterprises. An intersectoral mobility scheme, such as the Knowledge Transfer Partnership (KTP), if properly designed, appears as a relevant option in the Maltese context.

III. 5. Malta has several schemes supporting start-ups as well as the growth of SMEs, yet the information is scattered, the comprehensive start-up ecosystem seems underdeveloped and the support provided is neither transparent nor user-friendly. The aim should be to create a fully integrated and easy-to-navigate support system for start-ups. This would involve the following: re-assessing the available start-up support schemes of ME and MSD, as well as of other agencies and authorities; supporting the design of a clear and coordinated start-up platform for entrepreneurs, potential investors and other interested parties; and further streamlining regulations and improving access to finance for SMEs.

IV. Fostering internationalisation of the Maltese research and innovation system

(Chapter 7)

IV.1 As a small and open economy, Malta relies on competing in the global marketplace for exports, investment, talent, innovation and even research. Hence it is crucial that Malta further reinforces international, multilateral and bilateral collaboration as a key element of its research and innovation strategy. Malta has already gained many benefits from Horizon 2020 (H2020) and defined priorities for participating in EU-level networks. Investing more in R&D and reinforcing its national R&I system is the first step to further enhance this participation and meet its goals in the European Research Area (ERA) roadmap.

IV.2 Malta can tap more into opportunities for international R&D collaboration. This can be enhanced through several types of incentives: further promoting and facilitating participation in the EU Framework Programmes (including to Spreading Excellence and Widening Participation programmes) and in other international partnerships (e.g. PRIMA) by means of a dedicated budget for internationalisation; reinforcing its Internationalisation Partnership Award Scheme (IPAS); creating a dedicated budget in the next Operational Programme for financing Maltese research groups’ participation in project proposals with a Seal of Excellence from Horizon Europe; tapping into the diaspora; evaluating the return from participation in different initiatives; and ensuring continued support of strategic research lines after the end of the period of international support.
IV.3 Malta’s efforts on promoting digitalisation are remarkable: the country is proud to be the first Member State having a regulatory framework for blockchain. The new opportunities in the EUR 9 billion Digital Europe programme of the EU, which include blockchain, artificial intelligence, cyber security and other topics, are highly relevant for Malta’s service economy and e-gaming in particular. Malta could also consider strengthening its Digital Innovation Hubs, to facilitate the move of its high value-added manufacturing sector (one of Malta’s RIS3 priorities) towards Industry 4.0.
2 THE PSF PEER REVIEW: AIM AND METHODOLOGY

2.1 Policy Support Facility

The Policy Support Facility (PSF) is a tool set up by the European Commission – DG Research & Innovation – under Horizon 2020, the EU’s funding programme for research and innovation (R&I), to support EU Member States and countries associated with Horizon 2020 in improving the design, implementation and evaluation of national R&I policies.

The PSF is demand-driven (generated by a demand from the country’s highest authorities) and is geared towards policy practice. The PSF activities are evidence-based and take into consideration the perceptions of the national R&I stakeholders. Robust quantitative and qualitative evidence supports the PSF policy recommendations. The PSF activities are tailor-made and flexible, and adapt to the specific features of each country, including the political cycle. Experts and peers take an in-depth look at the national situation and provide recommendations based on a process of ‘de-contextualisation’ of lessons from their own experience.

The peer reviews of national R&I systems are one of the main services offered by the PSF. Peer reviews constitute an in-depth assessment of a country’s R&I system carried out by a panel of international experts and policy practitioners at the country’s demand. The PSF Panel formulates recommendations to the national authorities on the reforms, which are necessary to improve and strengthen the quality of the national R&I system.

2.2 Aim and focus areas

On 21 November 2017, the parliamentary secretary for Financial Services, Digital Economy and Innovation of Malta addressed a letter to the commissioner for Science, Research and Innovation in which he requested the support of PSF for an independent peer review of Malta’s R&I system in 2018. DG Research and Innovation’s director general replied to this request on 29 January 2018 and agreed to launch preparations in 2018. The peer review was kicked off in July 2018.

Although reviews of the Maltese R&I system have been carried out in the past, they have been partial in scope. The role of this peer review is to tackle the entire R&I system and, as such, it constitutes the first exercise of its kind.

The key objective of this peer review of Malta’s R&I system is to feed into the preparation of Malta’s national strategy for R&D and innovation post 2020. The focus of the analysis is on the current National R&I Strategy 2020 and the policy mix, i.e. policies, measures and instruments supporting the public science base, public-private cooperation and business innovation dynamics. The peer review aims at supporting Malta’s efforts: 1) to continue R&I capacity building, 2) to improve the dynamics of the R&I system, and 3) to improve the efficiency of current public investments in R&I.
The main questions addressed to the PSF Panel are the following:

1) To what extent does Malta have adequate and appropriate policies in place to achieve the above-stated goals?

2) To what extent does Malta have adequate and appropriate structures and resources in place to achieve the above-stated goals?

3) To what extent does Malta have adequate and appropriate measures and instruments (including monitoring and evaluation) in place to achieve the above-stated goals?

2.3 Methodology

The peer review was carried out by the PSF Panel, composed of five independent experts and two peer reviewers, policy-makers or funding agency representatives, all acting in their personal capacity (see Annex 1).

The PSF Panel carried out its work from July 2018 until June 2019. It conducted two field visits in Malta from 16 to 19 October 2018 and from 17 to 18 January 2019. In addition to the in-depth discussions with various stakeholders and experts during these field visits, the PSF Panel exploited a background report prepared specifically for this project (Restall 2019), as well as all available documents from national or EU origin.

The PSF Panel interviewed altogether 72 representatives of 25 organisations (hereafter referred to as stakeholders), suggested by MCST, including R&I performers from both the public and private sectors, intermediary organisations in the R&I system, ministers, a parliamentary secretary and public administration bodies, which together cover all components of the Maltese research and innovation system (see list in Annex 5).

Besides drawing on the extensive set of interviews, the PSF Panel analysed quantitative data and qualitative information from national and international sources, relevant previous reports, strategies, legal documents and news releases. The references section at the end of the report lists the documents that are cited in the report or were analysed during the process.

In addition, the PSF Panel carried out an online survey with PhD and MPhil students at the University of Malta during the month of February 2019. Of the 360 students\(^1\) contacted, 66 responded to the enquiry, hence the survey had a response rate of 18\%. The results were analysed by Technopolis and the main findings are integrated in the core of this report (see details in Annex 4).

\(^1\) 126 doctoral students; 24 students in professional doctorate in Pharmacy and 210 MPhil students.
2.4 Structure of the report

The main policy messages from the PSF Panel to the Maltese authorities are compiled in Chapter 1, which acts as an executive summary of the report. Each Key Policy Message is substantiated by an analysis found in the relevant chapters of this report.

Chapter 2 (this Chapter) presents the aim and methodology used for the peer review.

Chapter 3 presents a snapshot of the economic and R&I situation of the country, providing a backdrop for the PSF Panel’s analyses.

Chapter 4 provides an assessment of the governance and overall funding for R&I at governmental and agency levels. It incorporates the views of the PSF Panel on Malta’s strategies and the role of the various stakeholders in charge of policy design and implementation, and on the overall policy mix for R&I, covering also the questions of policy monitoring, evaluation and communication. This chapter provides the rationale and justifications for our Key Policy Message I.

Chapter 5 deals with the challenges and options for R&I in the public sector, covering the role, strategies and funding for actors in the higher education and public research organisations sector. It assesses the situation with respect to research infrastructure and the availability of skills for the research and knowledge-based development of Malta. It provides the basis on which the PSF Panel developed its Key Policy Message II.

Chapter 6 turns to R&I in the private sector, examining the key issues faced by various types of companies, including start-ups, willing to perform such activities in Malta, and the adequacy of support provided in the Maltese system. It also looks at conditions and incentives for engaging in public-private cooperation in R&I. This assessment led the PSF Panel to propose its Key Policy Message III.

Chapter 7 examines the issue of internationalisation of the R&I system and actors and how this is promoted in Malta. The PSF Panel’s Key Policy Message IV builds on this assessment.
3 THE ECONOMIC, RESEARCH AND INNOVATION CONTEXT IN MALTA

3.1 Introduction
This chapter provides a brief overview of the socio-economic situation in Malta (section 3.2), Malta’s research and innovation performance (section 3.3), and the governance and key actors of the country’s research and innovation system (section 3.4).

In this report we adhere to the definitions of research and development (R&D) and innovation, as employed by the National Statistics Office (NSO) of Malta, which are in line with the conventional definitions of Eurostat and the Organisation for Economic Cooperation and Development (OECD) (see Annex 3).

3.2 The socio-economic situation in Malta
Malta has been a Member State (MS) of the EU since 2004 and a member of the Eurozone since 2008. The country held the revolving presidency of the Council of the EU for the first time in 2017. With a size of 315 km², and a population of about 476 000 inhabitants, it is the smallest EU MS. Malta is also the most densely populated Member State (density is 1 450 inhabitants/km², compared to 117 for the EU average); this creates intense pressures, notably on the environment, the infrastructure and housing prices in the country. Malta’s micro size has implications for many development aspects and governance domains.

The country is characterised by stable macroeconomic, fiscal and monetary policy institutions.

Malta’s GDP per capita was EUR 24 100 in 2017, and is catching up the EU average level of EUR 30 000.\(^3\)

Malta has a booming economy. GDP growth is high and reached a peak in 2014-2015 (Figure 1). Investments and exports are fluctuating heavily on a yearly basis, as a consequence of the small economic basis and limited number of enterprises. This growth has taken place mostly in services: during recent years, Malta has transformed quickly into a service economy. The services sector – and in particular tourism, gaming, financial and business services – has grown tremendously: in 2017 this sector became nine times bigger than the goods sector, and five times bigger than in 2011.\(^4\)

---

\(^4\) Borg (2018).
Stronger and weaker aspects of the Maltese socio-economic situation are highlighted in the country’s achievements in reaching its targets under the EU2020 headline indicators (Figure 2). On the positive side, Malta meets its national targets in terms of employment rate and primary energy consumption. Besides, the country does not stand far from its targets in terms of tertiary educational attainment, people at risk of poverty or social exclusion and greenhouse gas emissions (although on the latter indicator Malta has moved backwards compared to its situation in 2008). Clear areas of weaknesses continue to be: the very high rate of early school leavers (with only little progress achieved since 2008); the low share of renewable energy in gross final energy consumption; and low R&D expenditures. The latter indicator is of particular relevance to this peer review: the country is stagnating on R&D intensity, far away from its national objective of gross domestic expenditure of R&D (GERD), reaching an intensity of 2 % of GDP (see section 4.2).

Overall the picture is that of a wealthy economy, with full employment and an increasing number of economic migrants. Its evolution towards a knowledge-driven economy – due to weaknesses on the human resources side and low investments in R&D – and a more environment-friendly society are both lagging behind.

The Maltese economic fabric is composed of a vast majority of micro-firms (97.3 % of companies employed less than 10 persons in 2017). The country is also home to foreign direct investments (FDI). Net inflows of FDI account for 17.4 % of GDP (compared to the EU average of 3.6 %). Malta hosts over 200 FDI operations in diversified areas, such as precision engineering, electronic components, automotive components, medical devices, pharmaceuticals, plastics and rubber. These products are manufactured in Malta, mostly focused on low volume but high value operations. The main contributors to FDI flows are financial and insurance activities, with a contribution of 65 % of total flows

---

in 2017. Remarkable recent advances in digital technologies have attracted blockchain and crypto businesses.

Figure 2 Malta key performance indicators under EU2020 indicators: change since 2008

Source: EC (2018a) European Semester: Malta

As a consequence of Malta’s past as a ‘place for factories’, multinational companies (MNCs) tend to conduct R&D abroad rather than in Malta. However, Malta is now facing the ‘middle-income trap’: its workforce is more expensive than in low-cost countries, but it does not yet host the hotspots of innovation found in high-cost countries, nor are the human resources being prepared for that opportunity.

According to Malta Enterprise, despite its small size, Malta has developed many expertise and vibrant economic activities, notably in life sciences and medical services, ICT and digital media, and aviation (Box 1).

---

7 Restall (2019).
Life sciences and medical services
- Quality production of medical devices and pharmaceuticals
- Scope for further development in R&D activities in areas such as bioinformatics, genetics and other contract research activities
- Supporting infrastructure for life sciences including nuclear medicine
- Life Sciences Centre near university, Malta’s main hospital and the specialised oncology hospital

ICT and digital media
- Robust ICT infrastructure with broadband connection across entire territory
- Strong iGaming sector, with a globally reputable regulator
- A fast-growing digital content and software development industry
- Sector expanded to cover wide range of specific activities, including:
  - ICT and digital media
  - Data hosting services
  - Payment gateway services
  - Cybersecurity
  - Cloud-based applications
  - Fintech and blockchain technologies

Aviation
- Strong maintenance, repair and overhaul (MRO) sector for both fixed wing and rotary aircraft
- Manufacture of aviation components
- Flight operations and charter, management and aircraft handling
- ICT and software development for aviation industry
- Unmanned aerial vehicle (UAV) testing
- Flight simulation and crew training
- Aircraft registration

Other upcoming growth sectors include:
- Maritime services which offer a range of maintenance and repair services.
- Logistics services specifically targeting the EU and Africa
- Healthcare services focusing on medical tourism services in specific fields


Concerning ICT, Malta has seized the opportunity of recent developments to develop new activities based on exploitation of disruptive technologies in several sectors such as finance, gaming, cybersecurity, etc. Notably:
Malta is the first Member State to adopt a regulatory framework for blockchain;\(^8\)

Malta is signatory to several of the partnership agreements (e.g. on artificial intelligence and blockchain) signed on Digital Day,\(^9\) 10 April 2018;

Malta recently hosted a huge blockchain summit\(^{10}\) with 5 000 people;

Malta has two digital innovation hubs\(^{11}\) in preparation.

According to companies, after ‘government bureaucracy’, ‘insufficient capacity to innovate’ was singled out as the second most problematic factor for doing business in Malta (International Monetary Fund World Economic Outlook enquiry) (Figure 3).

![Figure 3 Most problematic factors for doing business](image)

Source: International Monetary Fund; World Economic Outlook Database (April 2017).

Note: From the list of factors, respondents to the World Economic Forum’s Executive Opinion Survey were asked to select the five most problematic factors for doing business in their country and to rank them between 1 (most problematic) and 5. The score corresponds to the responses weighted according to their rankings.

Malta’s labour force is 235 000, of which 55 000 are foreigners. The labour market is characterised by very low unemployment rates (Figure 4).

---


\(^10\) [https://maltablockchainsummit.com](https://maltablockchainsummit.com)

The booming economy absorbs the available manpower, and the growing shortages of labour and skills in recent years create challenges for companies\(^ \text{12} \) (Figure 5). According to Jobsplus, Malta’s employment agency, in 2018 the Maltese economy created more than 11 000 new jobs; 7 000 of them had to be filled by foreign workers.\(^ \text{13} \) The high fluctuation in foreign labour force (36 % turnover on a yearly basis, according to Jobsplus) generates a disincentive for employers to invest in training their employees.

\(^{12}\) EC (2018a), and PSF Panel interviews.

\(^{13}\) PSF Panel interview, 18 January 2019.
### 3.3 Malta’s research and innovation system and performance

Malta is one of the EU Member States investing least in R&D, relatively (Figure 6). According to Eurostat, the R&D intensity (GERD as % of GDP) for 2017 is 0.55 %. The target of 2 % by 2020 set by the country for these investments is still a long way off.

![Figure 6: R&D intensity (GERD as % of GDP) in EU-28, 2007, 2012, 2017](image)

Source: Eurostat, published on 19 November 2018

Expenditures on R&D in Malta (relative to GDP) are low, both for the private sector (Figure 7) and for the public sector side (Figure 8), and have followed a downward trend since 2012. In 2016, the business sector funded 54.5 % of total R&D with government providing 33.4 % while 10.7 % came from abroad.\(^\text{14}\)

The total number of persons engaged in R&D in 2016 was 2 408 employees (1 505 FTE), of which 1 349 (896 FTE) were researchers. A share of 60 % of those researchers was employed in the higher education sector, while 40 % were employed in the business enterprise sector.\(^\text{15}\)

\(^\text{14}\) Eurostat: Intramural R&D expenditure (GERD) by source of funds – % of total GERD.

\(^\text{15}\) The share of researchers employed in the government sector in Malta is minimal (less than 1 %).
Malta has been catching up in terms of scientific publications: in 2015 the share of the top 10% most cited publications almost equalled the EU average (Figure 9); in 2017, Malta exceeded the EU average in terms of international scientific co-publications per million population (MT: 597.4; EU-28: 517.45. See Table A1 in Annex 2).
According to the European Innovation Scoreboard 2018, Malta is a moderate innovator, but its relative performance increases over time (its Summary Innovation Index was 69.3 in 2010 and reached 79.9 in 2017, EU=100 for both years) (Figure 10) (see details in Annex 2, A.2.3).

The value of the indicators standing behind the Summary Innovation Index indicates Malta’s strengths and weaknesses in terms of research and innovation (see data and details in Annex 2, A.2.3):

Malta is strongest (above 120 % of EU average) in: trademark and design applications; employment in knowledge-intensive activities; employment in
fast-growing enterprises; enterprises providing ICT training; and broadband penetration.\textsuperscript{16}

Malta is weakest (below 50\% of EU average) in: public-private co-publications; venture capital expenditures; private co-funding of public research; sales of new-to-market/firm innovations; R&D expenditures in the public sector; R&D expenditures in the business sector; new doctorate graduates; innovative SMEs collaborating with others; knowledge-intensive service exports; Patent Cooperation Treaty (PCT) patent applications; and non-R&D innovation expenditures.

Strengths related to ICT as well as employment in knowledge-intensive activities appear clearly as distinctive characteristics of Malta. Weaknesses are present with research and innovation-performing actors in both the public and private sectors, as well as in linkages between the two.

3.4 Governance of the research and innovation system and key actors

Malta’s R&I governance is centralised around a few actors (Figure 11):

- The Parliamentary Secretary for Financial Services, Digital Economy and Innovation within the office of the prime minister has research and innovation in its portfolio.

- The Malta Council for Science and Technology (MCST), under the authority of the above Parliamentary Secretary and the prime minister, is in charge of preparing and overseeing the implementation and monitoring the National R&I Strategy 2020 (see below). MCST advises the government on science and technology policy, runs the Esplora Interactive Science Centre (dedicated to science popularisation); manages the FUSION R&D programme and a few other R&D schemes; represents Malta in international and EU fora and networks dedicated to R&I; and acts as the National Contact Point for H2020.

- The Ministry for Economy, Investment and Small Business is responsible for Malta Enterprise (ME), the agency in charge of supporting Maltese businesses’ growth in addition to promoting and facilitating overseas investment in Malta. ME provides assistance to research and development efforts, as well as innovation in industry.

- The Ministry for Education and Employment is responsible for education at all levels, and in particular for higher education institutions, and for employment policy.

\textsuperscript{16} Malta also shows figures above the EU average in terms of share of foreign doctoral students. However the absolute numbers are very small, making comparisons not very meaningful.
- The two main research performers on the public side\textsuperscript{17} are: 1) the University of Malta (UoM), with circa 11 500 students, the most prominent research performer in the higher education sector (HES) and the only university offering Maltese doctoral and post-doctoral research positions; and 2) the Malta College for Arts, Science and Technology (MCAST), with circa 6 000 students, which has recently introduced a Research Framework and set up a Research Committee with the aim to improve the level of teaching through relevant research;

- The Parliamentary Secretariat for EU Funds within the Ministry for European Affairs and Equality houses the managing authorities for EU Structural and Investment Funds (ESIF) and is responsible for the operational programmes which govern the utilisation of such funds. It is also responsible for managing R&I schemes; its Measures and Support Division (MSD) delivers R&D support to businesses, co-funded by the ESIF.

Figure 11 The National R&I Governance Framework in Malta


\textsuperscript{17} Malta also hosts the Malta Aquaculture Research Centre (MARC), the only public research organisation in the country, and the Institute of Tourism Studies, an institution of higher education.
The National Research and Innovation Strategy 2014-2020\textsuperscript{18} is the framework guiding the government on matters relating to research and innovation at both national, EU and international levels (Figure 12). This is the third such strategy for the island: the first strategy was launched in 2003 and a second one in 2007. The strategy also integrates the Smart Specialisation Strategy (RIS3), and reiterates Malta’s commitment to the achievement of a well-functioning European Research Area. The ultimate goal of this strategy is that of embedding research and innovation at the heart of the Maltese economy to spur knowledge-driven and value-added growth, and to sustain improvements in the quality of life. It aims to achieve these goals by establishing the necessary building blocks for a R&I framework. It is built around three pillars: a comprehensive R&I support ecosystem, a stronger knowledge base, and smart and flexible specialisation.

![Figure 12 Malta National R&I Strategy – Overall structure\textsuperscript{19}](image)


Following an extensive consultation exercise, seven priority areas were identified in RIS3 (see section 4.3). An Action Plan has been subsequently adopted in 2016, which provides the list of measures and actions, as well as responsibilities for implementing the National Research and Innovation Strategy 2020. In this Action Plan, only five priority areas are retained (tourism product


development and maritime services do not appear anymore in the priority areas).

Malta hosts a range of other strategies that are relevant for building a knowledge-based society. These are listed in Annex 2 (A.2.2).
4 EMBEDDING RESEARCH AND INNOVATION IN MALTA’S DEVELOPMENT STRATEGIES

4.1 Governance of the Maltese research and innovation system

4.1.1 The current situation

The Parliamentary Secretariat for Financial Services, Digital Economy and Innovation has research and innovation formally in its portfolio; however policy attention is mainly placed on digital innovation, a topic that stands high on the Maltese Government’s agenda. Digital innovation has strongly contributed to the economic dynamism of Malta in recent years. Despite the existence of the National Research and Innovation Strategy 2014-2020, research and other types of innovation are not at the forefront of the national policy agenda. Notably, they are absent from the narrative of the state budget’s documents 2018.20

The governance of the Maltese R&I system is made up of three layers. The top two ones are the Core Group (decision-making body, headed by the Chairman of MCST) and the Steering Group (advisory, high-level technical body, with the Chairmanship currently held by the vice-rector for research of UoM). The third level is provided by focus groups and thematic networks, which are representative of the quadruple helix and feed the strategy from the bottom-up (Figure 13).

Figure 13 Governance bodies for Malta’s National R&I Strategy

In principle, this governance structure could promote cross-governmental and cross-agency cooperation and coordination on research and innovation. The Core Group, in which the key ministries are represented, defines the broader

goals, sets priorities and decides on budget allocations. MCST chairs it and provides its permanent secretariat. It meets a minimum of twice a year. The Steering Group, in which the relevant agencies are present, is in charge of the implementation of the decisions taken by the Core Group, coordinates actions and suggests new initiatives.

Yet, based on several discussions with R&I stakeholders, the PSF Panel found that:

- the governance structure does not lead to a coherent R&I strategy that would be fully supported by the various relevant ministries and agencies. This is yet accentuated by the fact that the financial power of MCST is small compared to the financial resources going into R&I from other ministries, e.g. the Ministry for European Affairs and Equality;

- there was little evidence that cooperation is actually taking place between ministries in terms of strategic decisions with respect to research, development and innovation, and information does not flow well between ministries and agencies;

- some innovative sectors (ICT, blockchain, etc.) are followed by other agencies/ministries (Malta Information Technology Agency, etc.) so in fact, several bodies address the issue of innovation within a sectoral logic;

- the system is not transparent for actors. Notably the Action Plan for the implementation of the strategy is not made public, which hampers the understanding of the key actors on the substance of the strategy;

- the position of MCST in the system is unclear. Formally, it has received a central role in preparing and overseeing the National R&I Strategy. However, it is not an overarching advisory board with the ability to act independently. The current absence of a Board in the governance of MCST further limits its role;

- the agencies in charge of implementing the various parts of the strategy work in parallel, with little incentives and no active forum to search for synergies across instruments and initiatives. The link between instruments and overall strategic directions does not translate into a clear intervention logic shared across agencies (see section 4.4 on policy mix);

- Malta lacks an independent advisory body, advising the government and agencies in a permanent manner, providing the voices of stakeholders of the research and innovation system – including companies – and of society.
4.1.2 The way forward

First, for research and development and innovation to play a more central role in Malta’s economic and societal development, major changes are needed at governmental level:

- Research and innovation should be assigned to one minister, the ‘R&I champion’, who would be clearly in charge of promoting these activities widely into the Maltese system, placing them higher on the government’s agenda, ensuring that the right framework conditions are in place for research and innovation to flourish, and that the opportunities are grasped for moving the country forward as a sustainable knowledge-driven economy;

- To reach these goals, cooperation between various relevant ministries, including those in charge of priority domains such as tourism and health, need to be further developed, as well as the Ministry of Finance. Also, good synergies have to be put in place with the Ministry of EU Affairs in charge of European Structural and Investment Funds. The Core Group could form the basis for such a cross-governmental body with a mission to create such synergies. It should be chaired by the minister who is the R&I champion. The Core Group should be supported by working committees, which prepare and implement its decisions. MCST should ensure the Secretariat of the Core Group;

- As an additional measure to support the importance of R&I at governmental level, R&I matters should be assigned to a parliamentary committee;

- More transparency should be achieved with respect to the various actions put in place to implement the strategy: the Action Plan should become a public document, with its objectives fully shared across government and all other relevant actors.

Second, and in line with the above, the PSF Panel believes that Malta has made the right choice in designing a joint research and innovation strategy, rather than separate strategies. The latter option would create gaps and mismatches between research and innovation activities, while all current knowledge and experience in other countries point towards the need for creating better connections between research and innovation. The PSF Panel recommends maintaining this design for the future research and innovation strategy; the national strategy is the overall long-term strategy, covering all aspects of the research and innovation system, and RIS3 should continue to be a part of this strategy. However, it is important to distinguish between strategies and funding sources. Keeping RIS3 as a separate funding pillar within the national strategy will help to ensure the necessary flexibility in the implementation of the strategy. While RIS3 will be set in the more rigid frame of ESIF for the period 2021-2027, national funds can be used more flexibly, within annual budgeting frame, for newly emerging needs of the R&I system and for funding actions outside of the RIS3 perimeter (basic research, other research infrastructure, research activities and maintenance of ESIF-funded infrastructure beyond the ESIF period, etc.).
Third, bottom-up participation by stakeholders at policy design but also at policy implementation stages, is a necessary component of well-functioning research and innovation systems. To achieve this, Malta needs a Consultative Forum, which provides advice to the Government. It should be able to act independently and provide advice on request or upon its own initiative. It would be composed of representatives of all key stakeholders that are part of the (public and private) research and innovation system (see examples from the Netherlands and Denmark in Box 2). Experience from other countries point towards the importance of ensuring a voice for companies. MCST could ensure the Secretariat of this Consultative Forum, to help create good links with the Core Group. The valuable work that is provided by thematic networks or focus groups at certain times should be capitalised upon in this permanent Consultative Forum.

Box 2 Consultative bodies for research and innovation: the Dutch AWTI and the Danish Council for Research and Innovation Policy

<table>
<thead>
<tr>
<th><strong>The Dutch</strong> Advisory Council for Science, Technology and Innovation (AWTI) advises the Government and the Parliament on policies related to scientific research, technological developments and innovation. The AWTI mainly targets the areas under the responsibility of the ministers of Education, Culture and Science (science policy) and Economic Affairs (innovation policy). The Council pays special attention to the connection between science, technology and innovation, and its impact on economy and society. The AWTI advises on policy headlines in the mid and long-term, and provides advice when it is applied for or when the Council deems it necessary. It enjoys an independent position towards ministers and their departments, as well as towards the other parties involved. The AWTI consists of a maximum of 10 members, each originating from different sectors of society, such as research institutes and trade and industry. The members do not represent any special interests.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Danish</strong> Council for Research and Innovation Policy (DFiR) holds the responsibility of providing the minister of Higher Education and Science and others with independent and expert advice on research, technological development and innovation at system level. The responsibility comprises both research policy and innovation policy advice. The DFiR's work and advice are always based on three working principles: 1) a holistic approach, 2) an international approach, and 3) an evidence-based approach. The DFiR consists of a chairman and eight members appointed by the minister of Higher Education and Science. The members represent experience from research, technological development and innovation: 1) in the public sector, including public-private research and innovation partnerships; 2) in the private sector, including SMEs; 3) at an international level; and 4) application and commercialisation of research results.</td>
</tr>
</tbody>
</table>

Fourth, the position and missions of MCST should be clarified and reinforced. The PSF Panel considers the presence of MCST as an asset for the Maltese research and innovation system and sees that this agency has the potential to take up a more central and powerful role in the governance of this system. While MCST focuses mainly on R&I in the public sector, this role should be deployed in good coordination with ME focusing on R&I in the private sector. MCST should be solidified and upgraded towards a ‘MCST+'. To achieve this, several changes are needed:

- MCST should have an active Board, which includes international members such as academics and researchers with knowledge and experience of assessment procedures;
- MCST should report to the government minister in the lead role on research and innovation issues (the R&I champion);
- MCST should expand its function of research funding agency (see section 5.1.2) and remain the key agency supporting the internationalisation of the Maltese R&I system;
- The independent advisory function, which MCST cannot carry out since it is a governmental agency, is moved to the Consultative Forum;
- MCST should keep its role of external representation of the Maltese R&I community in EU and international fora;
- MCST should play a key role as a central hub for policy intelligence to feed the strategic decisions with robust evidence and new ideas (this role is further elaborated in section 4.5). As MCST acts as the Secretariat of both the Core Group and the new Consultative Forum, it is well placed to gather and diffuse all relevant information on the R&I system;
- MCST should also contribute to the imperative of raising overall awareness of the importance of R&I in Malta (this role is further elaborated in section 4.5);
- Appropriate human and financial resources and skills should be made available for MCST staff to carry out all its duties.

Fifth, more synergies should be achieved between the work of the agencies dealing with research and innovation. ME and MCST should be represented on each other’s Boards in order to improve cooperation and mutual exchange of information. Their portfolios of instruments should be revised and further streamlined (see section 4.4 on policy mix) along their respective responsibilities (see Box 3):

- MCST should be in charge of all instruments promoting R&D and innovation in the public sector, including the FUSION programme. Starting from the new programming period, public research infrastructure should be coordinated and funded through MCST;
• ME should manage all instruments supporting business development and innovation, in all forms, in the business sector;

• The Measure and Support Division (MSD), in charge of ESIF-supported schemes, should coordinate its actions with ME and MCST, in the short term, and in the next ESIF programming period, the delivery of all direct support to companies, whether funded by ESIF or not, should be concentrated with ME (see justification in section 6.1).
The Irish Research Council (IRC) funds basic research in the public sector. The IRC is an associated agency of the Department of Education and Skills and operates under the aegis of the Higher Education Authority. The IRC manages a suite of interlinked research schemes, funding scholars at various career stages, from postgraduate study to senior research project-based awards. In 2018, the IRC launched its inaugural Laureate Awards with EUR 29.6 million allocated to the initiative. This will fund 18 'Starting' Laureate Awards to support early-stage researchers at the outset of their careers, 18 'Consolidator' Laureate Awards to researchers with an established track record and a number of Advanced Grants for senior researchers. The Research Project Grants Scheme allows researchers and research teams to expand their activities into new research areas by way of stimulus project grants and knowledge transfer initiatives. In delivering on its mandate, the Council's core value is excellence, determined on the basis of independent peer review, in an open, objective, transparent and trusted way.

Science Foundation Ireland (SFI) invests in enterprise-oriented academic researchers and research teams who are most likely to generate new knowledge, leading-edge technologies and competitive enterprises. The SFI programmes form a key element of the drive to boost Ireland’s international competitiveness and attract foreign direct investment. With a budget of over EUR 180 million in 2018, the SFI now has 17 world-leading research centres located throughout Ireland, which are focused on RDI projects for specific key industry sectors, ranging from ICT to nanotechnology and marine science. Examples include INSIGHT, Ireland’s Big Data and Analytics Research Centre and CúRAM, the Centre for Research in Medical Devices. The new EUR 100 million SFI Centres for Research Training initiatives will provide training for 600 postgraduate students in areas of nationally and internationally identified future skills needs of digital and data technology and ICT.

Enterprise Ireland: Enterprise Ireland (EI) works with companies to help them to innovate new products, processes and services by supporting them to do in-company RDI, helping them to access international sources of funding and expertise, and to collaborate with each other and the higher education system. EI’s High Potential Start-Up (HPSU) team provides hands-on support and advice to entrepreneurs and early-stage companies that are considered by EI to have an innovative product, service or technology, and have the potential to achieve international sales and create employment. The Innovative HPSU Fund allows EI to offer equity investment to HPSU clients on a co-funded basis. This investment goes towards the achievement of an overall business plan, rather than funding towards discrete elements of a business plan, such as R&D or employment creation. The funding of a business plan in this way is similar to a venture capital (VC) approach.

IDA Ireland is Ireland's inward investment promotion agency. It plays a leading role in RDI development by providing funding support to suitable projects, and by identifying other supports available from partner organisations such as EI, SFI and Sustainable Energy Authority Ireland. IDA Ireland works closely with companies to ensure they have the facilities, resources and support they need to establish and expand their RDI operations. This helps ensure these progressive companies continue to flourish as key drivers of Ireland’s future economic success. Over half of IDA Ireland grants to multinational companies were for R&D projects. Multinationals invest significantly in RDI projects in Ireland; 22 % of all investments made in 2018 were for RDI projects. FDI plays a significant role in Ireland’s overall business expenditure on R&D – in 2015 64 % of private investment was from abroad.

4.2 Public funding for research and innovation and the role of European Structural and Investment Funds

4.2.1 The current situation

Malta is one of the EU Member States with the lowest investments in R&D measured as GERD/GDP (0.55 % in 2017, see section 3.3), whereas its investments in education are above the EU average (see section 5.5). In addition, in 2017, Malta was the Member State with the lowest share of its total government expenditure going to R&D (0.53 % in 2017), which is not a credible level in line with its stated objective of becoming a knowledge-based economy (Figure 14).

Figure 14 Total government budget allocations for R&D (GBARD) as % of general government expenditures EU-28, 2007, 2016, 2017

As R&D intensities are clearly correlated with the share of government expenditure devoted to R&D, it is an illusion that Malta with such a low share of government expenditure devoted to R&D will get close to the target of 2 % for R&D intensity (Figure 15).


As R&D intensities are clearly correlated with the share of government expenditure devoted to R&D, it is an illusion that Malta with such a low share of government expenditure devoted to R&D will get close to the target of 2 % for R&D intensity (Figure 15).

22 All data in this section are from Eurostat.

23 The figure of 0.53 % is calculated with government budget appropriations or outlays on R&D (GBAORD) on the numerator. In Figure 14, the numerator is government budget allocations for R&D (GBARD). The definition of the two indicators differ slightly.
Taking Iceland, an island with a similar sized population to Malta, as a benchmark, the small amounts of public funds invested in R&D in Malta (GBAORD) are striking, both in absolute and relative values (Table 1).

Table 1 Population, GDP, GERD and GBAORD in two micro-state islands: Malta and Iceland (2017)

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>GDP current prices mPPS(^{24})</th>
<th>GERD</th>
<th>GERD/GDP</th>
<th>GBAORD</th>
<th>GBAORD/total government expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malta</td>
<td>475 701</td>
<td>13 729</td>
<td>€61 m</td>
<td>0.55 %</td>
<td>€21.5 m</td>
<td>0.53 %</td>
</tr>
<tr>
<td>Iceland</td>
<td>338 349</td>
<td>13 414</td>
<td>€462 m</td>
<td>2.13 %</td>
<td>€131 m</td>
<td>1.42 %</td>
</tr>
</tbody>
</table>

Source: Eurostat

\(^{24}\) Expressing GDP in mPPS (million purchasing power standards) eliminates differences in price levels between countries.
Other characteristic features of the Maltese system are that: 1) there is remarkably little cross-sectoral funding for R&D (Figure 16); and 2) a sizeable portion of funding for R&D comes from abroad, including private funding from multinational companies (MNCs), and public funding from the ESIF and H2020. It should be noted that funding from abroad is by essence particularly volatile (e.g. in 2016 there was a drop of ESIF funding according to the cycle of investments from this funding source).

The low investment of national public funds in R&D is partly compensated by the use of European and Structural Investment Funds (ESIF). In the current programming period (2014-2020), EUR 61 million are dedicated to research and innovation for the whole period (EUR 56 million to Thematic Objective 1: Research and Innovation and EUR 5 million to Thematic Objective 3: SME competitiveness)\(^{25}\). A large share (60 %, EUR 37 million) of ESIF funding is dedicated to research infrastructure in the public sector.

**Figure 16 R&D financing and expenditures in Malta, 2016**

![Figure 16 R&D financing and expenditures in Malta, 2016](image)

Data: Eurostat; compilation: J. v.d. Biesen
Note: R&D financing and expenditure by the Private Non-Profit sector are negligible in Malta

*Source: Jan van den Biesen, based on Eurostat data. Figures in €m/year*

\(^{25}\) ESIF viewer (http://s3platform.jrc.ec.europa.eu/esif-viewer). Note that these amounts also include innovation expenditures that are not considered as R&D in the sense of the Frascati manual.
4.2.2 The way forward

If Malta wants to secure its future, the country needs to invest more in R&D and innovation, just like it is doing in education (see example of Ireland in Box 4). Malta is the EU MS with the highest budget surplus, hence it does not face the same situation as many other MS, which are forced to reduce public expenses across the board.

The current high dependency of the R&I system on the ESIF makes the system extremely vulnerable since this funding source lacks continuity. With some of the research infrastructure in place (largely funded by the ESIF), this raises a concern about their sustainable use, and the availability of funding for human resources, research activities, equipment and maintenance beyond this ESIF funding. This by itself calls for new (national) investment in R&D, in particular in human resources, to put the infrastructure to use. Furthermore, national R&D funding will be needed to compensate for decreasing ESIF funding in the post-2020 period.

Financial benefits from participation in EU Framework Programmes (as a % of total R&D) are clearly linked to the level of national investments in R&D; therefore Malta could expect to benefit more from H2020 and the forthcoming Horizon Europe if Malta itself were to invest more in R&D (see Chapter 7).

Box 4 Ireland’s journey from an FDI-dependent to an innovation-driven economy

Over the past 30 years, Ireland has built a growing reputation for scientific excellence, and is a world leader in generating and using new knowledge for economic and social progress. Today, Ireland is ranked the 9th most innovative country in the EU as a strong innovator. Ireland is first for innovative SMEs, employment impacts and sales impacts. Ireland is also ranked 10th in the Global Innovation Index, up from 21st place in 2007 – and 1st in the world for knowledge diffusion. Ireland is also 11th in global scientific ranking for overall quality of scientific research, an impressive upward trajectory from a position of 48th place just 13 years ago.

Ireland is one of the leading RDI locations in the world. It offers the ideal commercial, political and social environment for companies to carry out successful and profitable RDI activities. This has attracted global leaders in key high-tech industries to undertake RDI projects in areas such as pharmaceuticals, biotechnology, medical devices, ICT and financial services.
**Policy** found that Ireland’s industrial policy was unbalanced in favour of inward investment over indigenous enterprise development. The high-quality jobs, including those in RDI, were mostly located back in the parent company’s country. The report found that Ireland needed to encourage an indigenous high-skilled sector and support RDI activity in both multinational and indigenous companies, and increase investment in RDI, which was just EUR 142 million in 1982. With the advent of EU structural funding through the 1989-1993 Community Support Framework, substantive resources became available for investment in RDI. The Operational Programme for Industrial Development facilitated enhancement of industrial RDI and higher education/industry collaboration. 

Following this, the development of Irish RDI policy has been driven by three key phases.

**Phase 1 1999-2006: Technology foresight report, National Development Plan & Programme for Research in Third-level Institutions (PRTLI):** Established in 1999 as a mechanism to utilise funding from Atlantic Philanthropies, PRTLI supported the provision of top-class research infrastructure and provided significant investment in human capital development across Ireland’s higher education institutes (HEIs). PRTLI became integral to the transformation of Ireland to an innovation-driven economy. By this time state investment had increased significantly to EUR 1 068 million in 1999. A decisive shift in public policy and funding was initiated under the National Development Plan (NDP), 2000-2006, for which the Government earmarked EUR 2.48 billion for investment in RDI activities. A key lasting initiative from this time was the foundation of Science Foundation Ireland (SFI) to administer EUR 711 million. Both SFI and PRTLI have been the subject for review by panels of international experts, with very positive findings in regard to the rapid progress in building a base of world-class research in Ireland. Additional sources of funding also supported the R&D capacity and capability building in the HEIs. To further increase enterprise engagement in RDI, the R&D tax credit was introduced in 2004.

**Phase 2 2006-2015: The Strategy for Science Technology and Innovation (SSTI)** aimed to make Ireland internationally renowned for the excellence of its research and at the forefront in generating and using new knowledge for economic and social progress within an innovation-driven culture. The strategy focused on enterprise capacity building by providing a pipeline, building the science base and driving collaboration and output of researchers. Investment reached EUR 2 217 million in 2006 and continued to rise, but the economic crisis sharpened the focus of public research investment on economic return. A new emphasis was placed on consolidation of resources in units of scale and scientific excellence, commercialisation of knowledge gained through publicly funded research, and greater collaboration between academia, industry and international groups to maximise success under EU framework programmes. Despite this great obstacle, yearly investment in R&D did not decrease significantly. Expanding on the lessons learned from the crisis, 2012 saw the launch of Research Prioritisation. The Government recognised that a country of Ireland’s size can only excel in a limited number of fields of research. The majority of competitively awarded funding would be within 14 priority areas most likely to generate the greatest economic and societal impact. These areas would later be updated in 2018 to reflect policy developments, in particular the Sustainable Development Goals.

**Phase 3 2015-2020: Innovation 2020,** Ireland’s strategy for research and development, science and technology, was launched in December 2015 and articulates Ireland’s ambition to become a global innovation leader. The strategy aims to build on the significant successes that have seen Ireland dramatically improve its innovation performance globally, driving a strong, sustainable economy and a better society, with a focus on excellence, talent and impact. Ireland invested EUR 3 108 million on RDI in 2015.
4.3 Malta’s Smart Specialisation Strategy

4.3.1 The current situation

Malta has a single national Smart Specialisation Strategy (RIS3), which is an integral part (one of the three pillars) of the National R&I Strategy 2020 (see section 3.4).

According to official sources, the RIS3 was developed following an extensive open consultation exercise involving numerous policy-makers and stakeholders, including academia and industry representatives. The participation of stakeholders under the quadruple helix was organised through regular focus group sessions that brought together all stakeholders and thematic networks, which are industry-driven. These groups and networks are ad hoc bodies, which have not been established as permanent groups. Several amendments were made to the draft smart specialisation areas following the public consultation.

The smart specialisation strategy identified seven areas of specialisation; in addition, ICT was identified both as a horizontal enabler across all specialisation areas and as a smart specialisation niche in itself, i.e. digital innovation. According to the Research and Innovation Observatory (RIO) Report, the analysis and proposals for the priority areas were well researched and convincing, and inspired confidence in the potential of the proposed initiatives. The Action Plan addresses all areas identified in the RIS3, with the exception of maritime and tourism development services. Narrowing down the range of priority areas corresponds well to the idea of RIS3, i.e. concentrating efforts on those most promising areas where the value-added of support is likely to be highest.

The definition of priority areas of specialisation influences policy implementation in various ways: financing a number of research infrastructure projects, including TRAKE and Sustainable Living Complex (SLC) at the UoM (see section 5.4); introducing selection criteria linked to RIS3 in the implementation of the FUSION programme, and of the R&D grant schemes funded by MSD.

28 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.
29 The latter is addressed in the Action Plan as an area to be developed further under the auspices of the Ministry of Tourism.
30 MCST monitors the split of funded projects by RIS3 areas.
31 According to this agency, however, this is difficult to judge since no company grants have been allocated so far and the rejections of submissions were not based on RIS3 compliance (see section 6.1).
Although the public consultation has been intense during the design of RIS3, the PSF Panel, however, found little evidence that 2 years down the road, RIS3 remains a living strategy. While some of the stakeholders acknowledged their participation in the entrepreneurial discovery process, they did not associate the measures or the instruments in the R&I area with the objectives of RIS3. Others only remembered the name, but could not identify any follow-up activity, despite the fact that further consultation activities were organised by MCST at the end of 2018. The PSF Panel also heard that the Action Plan associated with the implementation of RIS3 was insufficiently publicised or promoted. Some interviewees were of the opinion that the priorities set by RIS3 were too broad, while others found the selection of sectors limiting.

4.3.2 The way forward

The PSF Panel found that RIS3 being formally an integral part of the National R&I Strategy, rather than a separate strategy, is a pertinent choice. While other countries are struggling to reconcile RIS3 with other R&D or innovation strategies, Malta is in a favourable position with RIS3 being clearly articulated within the broader strategy. The PSF Panel recommends that this integration is maintained and further developed for the next programming period. This option ensures that Malta combines horizontal priorities (in the first two pillars of the strategy, aiming at building capacity and creating a solid R&I ecosystem), with vertical priorities of the RIS3, which are likely to evolve over time. The subcritical size of Malta calls for flexibility in specialisation, as any chosen area relies on activity of a small number of actors, and hence entry or exit of only some of them may change the picture of strengths of the whole country. In particular, the RIS3 process needs to keep up with rapid developments in the digital world. It does not seem relevant yet to change the RIS3 priorities fundamentally, especially in the absence of evidence on its implementation from the monitoring system. Those current priority areas, which have been beneficiaries of new research infrastructure, should continue to be supported.

The lack of awareness of the current RIS3 is in line with the PSF Panel assessment that R&D policy is not of central importance for the Maltese Government (see Section 4.1). This should be corrected by ensuring wider publicity on the concrete actions implemented under RIS3 and their contribution to the overall goals of the strategy (see section 4.5).

RIS3 will continue to be a conditionality for the ESIF in the next programming period, and its main components (the Entrepreneurial Discovery Process or EDP, governance, monitoring and evaluation, actions to improve research and innovation systems and manage industrial transition, etc.) will be even reinforced. The consultations for the next period have started in Malta (notably with an online survey and stakeholder meetings), and the PSF Panel recommends that a sustained and wide EDP process is put in place in order to confirm or revise the priorities (see example from Slovenia in Box 5). This is a good opportunity to establish a new Consultative Forum (see section 4.1.2), which should play an important role in the EDP. During the discussions, several sectors were mentioned, other than those that were explicitly prioritised in the RIS3 (digitalisation and cryptocurrency, block-chain technologies, gaming).
These may have appeared after the initial design period of RIS3, and the process should include established as well as emerging strong sectors.

Box 5 Slovenia: a new form of public-private partnership to implement RIS3

The Strategic Research & Innovation Partnerships (SRIPs) promote long-term collaboration in all relevant areas of Slovenian Smart Specialisation (RIS3). A partnership was established for each of the nine RIS3 areas by the end of 2016. More than 500 stakeholders joined the initiative, which is open and other actors can therefore join in the future. The partners are enterprises (a mixture of SMEs and large companies) as well as public research organisations, civil society organisations and various associations. The cooperation between stakeholders in SRIPs is focused on coordination of R&D activities, sharing research capacities and human resources, exchange of knowledge and experience, networking and collective representation of interest abroad. Each SRIP developed its action plan, which gets revised each year. The functioning of the SRIPs is partly supported by grants from the Government Office for Development and European Cohesion Policy, and partly through the partners’ own contributions. Some of the results so far are joint projects of partners within SRIPs, both at home and at EU level, including a joint platform for the development of human resources for a particular field of RIS3 as well as success in joint activities abroad.

Reference:

4.4 The policy mix and the absorption capacity of the research and innovation system

4.4.1 The current situation

The PSF Panel found it difficult to acquire an overview of the instruments in Malta's highly fragmented policy mix. This suggests that Maltese beneficiaries might also be at a loss in finding their way, and that even policy-makers and institutional players in the Maltese R&I system may lack such an overview.

After investigation, the PSF Panel came up with the overview below, which depicts national instruments available to research performers in the public and private sectors, according to the type of research funded32 (Figure 17). The instruments in this figure are discussed in more detail elsewhere in this report (Chapters 5 and 6).

32 The overview does not include support schemes for individual researchers and students, which are covered in Annex 2, nor for internationalisation (covered in Chapter 7).
Figure 17 The policy mix for RDI in Malta (2018 data, yearly budgetary allocations)

Source: PSF Panel based on data received from MCST, ME and MSD
The figure depicts national funding schemes dedicated to RDI and does not include: public research organisations and HEIs (UoM, MCAST, MARC); basic funding (block grants) for these public research organisations and HEIs; the Esplora science centre. It also excludes funding for business operations and SME competitiveness without a specific focus on innovation (i.e. several Malta Enterprise schemes; all schemes under European Regional Development Fund (ERDF) business grant schemes except for the Business Enhance RDI grant scheme, see Tables A2 and A3 in Annex 2). It should be noted that several support schemes for start-ups, which are included in the figure, are not specific for knowledge-based or technology start-ups.

Three lessons can be drawn from the examination of the Maltese policy mix.

First, the funding instruments for research and innovation are dispersed across several ministries, agencies and funding bodies. This concerns mainly the instruments owned by MCST, ME and MSD. While it is not uncommon to have separate agencies for research on the one hand and for business support on the other, the additional role taken by MSD is less common. As a result, there is neither an overall view nor a clear responsibility over the policy mix. Agencies and funding bodies are designing their instruments separately, without a clear view on complementarity with others in the system and seem to have little incentive to change them for a higher efficiency of the system as a whole. The degree of cooperation between agencies is insufficient. These agencies do not assess the effectiveness either of their own instruments or of the policy mix as a whole, from an outcome-based perspective. There might also be problems of competition between schemes, within and across agencies, which need to be investigated.

Second, as articulated in more detail in Chapter 5, the main missing piece in the funding system is a funding instrument for bottom-up research in the public research sector (the far left side of Figure 17). This deficiency is a serious competitive disadvantage, especially for UoM, when compared to most other European universities, and it severely reduces its attractiveness for academic positions.

Third, the landscape of funding schemes available to enterprises, delivered by MCST, ME and MSD, is confusing for the beneficiaries. The available schemes do not appear to be designed effectively for Maltese SMEs; this is reflected in low uptake of several instruments on one side, and an opinion of lack of support among SMEs on the other (see discussion in Chapter 6).

4.4.2 The way forward

A more coordinated and simplified set of instruments targeting companies will allow for a clearer message to users about the objectives and differences between instruments, will facilitate the increase in volume, improve their visibility, and eventual take-up, with management efficiency gains, and will improve the effectiveness of each individual scheme and the overall policy mix (see Chapter 6).
This would require changes in governance, with MCST, ME and MSD working in a more cooperative mode and assessing the joint effectiveness of their action (see section 4.1). Having account managers at ME and MCST (see section 6.1.2) will help to create such connections and move towards a more effective handling of instruments, in particular for promoting cooperation between companies and HEIs. The mode of delivery of instruments will also need to be reviewed in order to better reach the target groups. On the public research side, as argued in Chapter 5, MCST should manage new funding channels for public research, both fundamental and applied, including those projects at a stage where cooperation with industry is not yet possible.

4.5 **Policy intelligence, monitoring, evaluation and communication**

4.5.1 **The current situation**

Bringing policy intelligence into the Maltese research and innovation system is the role of MCST, but so far this has been insufficiently developed. A positive exception is the Academia Survey on Internationalisation carried out by MCST in 2015, which has been influential in improving the internationalisation strategy, as explained in Chapter 7. However such examples are not numerous.

Malta has benefited from the PSF Specific Support for developing a system of indicators to monitor and subsequently evaluate the implementation of the National R&I Strategy (Specific Support to Malta on Monitoring the National Research and Innovation Strategy, November 2015 to June 2016). The final report of the specific support includes practical recommendations for setting up a monitoring system, which MCST has started to implement (Figure 18). The background work has been finalised and the online tool for data collection has been set up, but the stumbling block resides in obtaining data from the relevant stakeholders. Hence, currently this system is not yet fully operational.

According to information communicated to the PSF Panel, there is a lack of evaluations of R&I programmes and infrastructures in Malta. One exception stands out: the plans by MCST to carry out an external evaluation of the FUSION programme. This is to be commended.

Concerning communication for the R&I system and policy, MCST has launched the initiative of the PluMTRi Portal, which would gather all relevant information on R&I strategy, policy, initiatives and actors in the system. The aim is to facilitate access to information and promote opportunities for networking amongst Maltese researchers. The portal was developed and launched in 2016 and is currently being upgraded and revamped, bringing other stakeholders on board.

---

33 MCST (2015), *Academia Survey on Internationalisation*.


35 http://plumtri.org/
A major effort in terms of communication about science and research, targeting the large public and in particular the youth, is the Interactive Science Centre Esplora,\(^{36}\) managed by MCST staff and located close to MCST offices.

Figure 18 The stage reached in implementing the monitoring system for the R&I strategy in Malta

4.5.2 The way forward

As already stated in section 4.1, there is a need for more transparency in the Maltese R&I system. MCST could ensure more visibility for strategies and policies, provide evidence on the types of research funded by public money and produce the information needed for the governance of the research and innovation system. For the Action Plan to really become the envisaged 'living document', MCST should communicate about it and provide data and analyses that are useful for policy design (see example from Catalonia in Box 6).

Transparency should also be achieved for data referring to the use of public money for all instruments supporting R&I as, for instance, done for the FUSION programme by publishing information on all funded projects.

\(^{36}\) http://esplora.org.mt/
Box 6 Diffusing information on RIS3 in Catalonia

The website of the RIS3 in Catalonia (RIS3CAT) provides not only details on the strategy but also of the Action Plan. All the measures funded by the Government to support the RIS3CAT are described and the allocated funding is mentioned, clarifying the intervention logic (the way the instruments are expected to contribute to the objectives of the strategy).

The monitoring system collects data at four levels: projects, programmes (tools), smart specialisation domains and overall impact of the strategy. Project implementation indicators include: innovation and knowledge indicators, sustainable growth indicators and smart specialisation indicators (by leading sector and by technology). In addition, result indicators show the evolution of the main variables established under the RIS3CAT and are based on official statistics, administrative information and specific surveys. Key data collected through this monitoring system are available publicly on the RIS3CAT website.

Reference:

In this view, MCST’s role as a ‘policy intelligence unit’ for the Maltese R&I system should be reinforced. Intelligence refers to a situation where the collected data are analysed and go through a sense-making process. This should also be an interactive process involving all the relevant stakeholders. While it is coordinated/facilitated by MCST, policy intelligence should be spread throughout the whole system. Appropriate human and financial resources and skills should be made available for MCST staff to carry out its duties as a central hub for information, analyses, data (in cooperation with the National Statistics Office of Malta or NSO), studies and evaluations.

As MCST provides the Secretariat for the Core Group and would also provide the Secretariat of the new Consultative Forum, it is well placed to collect, digest and diffuse all relevant information, and make it available to decision-makers and key stakeholders in the system, in the right format.

First steps in terms of collection and diffusion of relevant information are: 1) resuming the web publication of the MCST Annual Report, discontinued since 2015, with information about its own actions as well as other developments in the system (to be used as an evidence base for policy actions), 2) opening and populating the PlumTRI portal (experiences from other countries can give inspiration in terms of good communication models) and 3) implementing the monitoring system for the strategy.

A key instrument to facilitate more synergies in the policy mix is the monitoring system, which requires the cooperation of all actors involved in funding R&I. MCST is the coordinating body in charge of implementing this system: authorities and stakeholders should respond to its demands in order to speed up its implementation. Not only is monitoring a necessity to better understand the direction of ongoing efforts to support R&I in Malta, but in addition it will be part of the conditionality for the upcoming RIS3 in the period 2021-2027 (see section 4.3). Of course the willingness of stakeholders to contribute with quality material to this monitoring system will depend on their expectation regarding its use. Putting a sound participative process in place, in which monitoring is well integrated, and with clear connection with policymaking processes, as
recommended under section 4.1, is therefore a pre-condition for their contribution.

MCST should also maintain and reinforce its important role in raising overall awareness of the importance of R&I in Malta. Esplora is one important action, but wider and bold events, such as ‘Innovation Summits’ for the promotion of Malta as an innovative and knowledge-driven society should also take place, in cooperation with ME (possibly in the frame of this PSF Review). Other types of events such as ‘Innovator of the year award’, as well as promotional events for potential foreign investors, could also be added, led by ME with the participation of MCST. It is essential to make society aware of the importance of evolving towards a knowledge-based society (see examples of promotion actions in Austria, Belgium, Portugal and Ireland in Box 7). The assignment of R&I matters to an existing parliamentary committee could be an additional mechanism to raise the awareness of society of the importance of R&I for the country.

Box 7 Programmes to raise awareness on science, research and innovation in: Austria – Sparkling Science; Belgium - Science Mundi in Brussels-Capital; Portugal – Ciência Viva; Ireland – Science Foundation Ireland Discover Programme and Smart Futures

Sparkling Science is a research programme of the Federal Ministry of Education, Science and Research (BMBWF) in Austria. It started in 2007 and adopts an unconventional way to promote young scientists, which is unique in Europe. The initiative’s vision is to break down structural barriers between secondary school education and the academic system in Austria. At the heart is the question of how the interface between school and university can be improved and which basic conditions need to be created so that success models of institutional collaboration can be adopted into the standard system of service agreements, research promotion, school profile development and teacher training. So far in 299 projects (257 of them have already been finished), scientists worked side by side with young people on current research questions. The research method applied is also known as ‘Citizen Science’. Sparkling Science is set to run for 10 years, which enables a staged adoption of successful pilot projects and cooperation models into the standard system.

With Science Mundi, Innoviris, the innovation agency of the Brussels-Capital Region in Belgium, is launching a call for projects to promote sciences by emphasising the relationship between arts and sciences. This call for projects stimulates the creativity based on the complementarity between arts and sciences, the contribution of sciences to arts as well as the opposite, and science as an inspiration for artists. The relation between arts and sciences expresses itself through the role of the artist-scholar in history and the role of the current scientist-artist. The call is intended to provide financial support to micro-projects aimed at raising awareness among the inhabitants of Brussels about the sciences and technology, the studies that lead to these and the possibilities they offer.

The Portuguese Ciência Viva (Living Science) programme combines two dimensions: the diffusion of experimental science teaching and the promotion of scientific culture. In the framework of this programme, a new role is assigned to museums and science centres. The Ciência Viva programme includes three main areas of action:
1. A programme to support experimental teaching of the sciences and the promotion of scientific education in schools. The Ciência Viva Competition is a national competition for project funding to implement experimental teaching in schools, which took place six times. At the end of each competition a Science Living Forum was established: a meeting to present and share experiences, which was attended by members of the International Evaluation Commission. In addition, initiatives such as the Scientific occupation of young people on vacation, Open labs on vacation for teachers, and Parents with science and science choices have been developed.
2. National campaigns for scientific dissemination: these include activities such as Ciência Viva in the summer, Science and technology week, and the collaboration and stimulation of national and international projects and competitions.

3. A national network of Centros Ciência Viva, which aim to decentralise access to scientific information. It currently includes 21 Centros Ciência Viva, well spread across the country, which have contributed decisively to the dissemination of science and scientific culture among the population.

The Science Foundation Ireland (SFI) Discover Programme aims to support and develop the STEM education and public engagement in science by investing in developing and extending capacity in this area, and exploring and encouraging novel means of public engagement and communication. Science Foundation Ireland has invested in over 240 public engagement projects through the Discover Programme since 2013. In 2019 EUR 3.6 million will be invested in 41 projects to Promote science, technology, engineering and maths (STEM) in Ireland. The aim is to improve public understanding of STEM and to support education initiatives for under-represented groups with successful awardees being carefully selected through international peer-review. This year’s funded initiatives are estimated to reach over 2 million people.

Smart Futures in Ireland is a collaborative Government-industry-education programme promoting science, technology, engineering and maths (STEM) careers to secondary school students, parents, guidance councillors and teachers in Ireland. It provides careers information via www.SmartFutures.ie and access to role models through its STEM volunteer programme. It is managed by Science Foundation Ireland, and in association with IBEC, IDA Ireland and other representative bodies. Smart Futures has achieved the following since 2013:

- Directly engaged approx. 120 000 secondary students through school visits and outreach activities;
- Over 1 600 STEM volunteers from industry and research centres are registered through Smart Futures around the country. These volunteers deliver career talks to approx. 300 secondary schools per year; and donated over 6 000 hours to supporting the programme this past academic year;
- Smart Futures was present at 80+ career and STEM outreach events during the 2017/2018 academic year;
- A Smart Futures ad was shown in cinemas across the country during national Science Week to encourage young people to consider STEM careers;
- Smart Futures is working with groups such as Connecting Women in Technology (CWIT), iWish Cork and the Ada Lovelace initiative to encourage more young females to consider STEM options.


Last but not least, Malta should organise regular external evaluations of its main R&I programmes and structures, in order to improve their effectiveness. The planned evaluation of the FUSION programme is a good step forward. Key questions and methodological approaches to carry out this evaluation can take inspiration from lessons learned in implementing and evaluating foreign programmes (Box 8).
The design of evaluations of cooperative research and innovation programmes should take on board success factors for these instruments, as identified in a recent PSF Mutual Learning Exercise for the EC (EC 2018, based on Cunningham and Gök, 2012): 37

1) Long-term and stable commitment of government funding and support;
2) Clarity of the rationale and objectives set at inception stage and adequate introduction of changes according to the evolution of needs by beneficiaries;
3) Flexibility in the implementation of programmes at the individual project level;
4) Equity in sharing workloads and benefits of collaborative research;
5) Minimisation of bureaucracy;
6) Strength of the brand image, enhancing further cooperation beyond the supported projects;
7) Good articulation with other programmes or schemes that aim to exploit the results of collaborative research.

These factors should provide the basis for evaluation questions on the FUSION programme.

An evaluation 38 of the long-standing collaborative research programme LINK in the United Kingdom, which targeted pre-commercial joint research activities, concluded that LINK brought substantial economic benefits to participating companies. The evaluation estimated that the programme, since its inception in 1986 through to 2002, had raised employment levels by 15 000 to 25 000 positions, and generated between GBP 700 million and GBP 2 400 million in terms of increased turnover, and between GBP 250 million and GBP 500 million in terms of increased profit. From an academic point of view, the programme helped to strengthen research capabilities, diversify the knowledge base and upgrade researcher training. The programme also helped to deepen existing collaborations and create new ones, which were expected to last until after the end of the supported projects. The quantity and quality of scientific outputs produced by the programme were found to be similar to those acquired through other funding programmes.

Another important consideration for collaborative research programmes aiming at broadening the base of companies that develop partnerships with the public research sector, as is the case with the FUSION programme in Malta, is the balance to be struck between support to strong and regular clients on the one hand, and openness to newcomers on the other.

Impacts should be evaluated along two strands, incorporating both the measurement of expected effects and behavioural additionality: 1) impacts on the public research sector, not only in terms of scientific publications but also in terms of spin-offs and further collaborative practices with industry, such as staff mobility, contracted research, new research projects, and in terms of developing new avenues for academic research; and 2) impacts on the business sector in terms of innovative products, services or processes resulting from the projects, and ultimately in terms of turnover, employment (in particular of highly qualified staff), exports and profits, and in terms of new collaborative links with the public research sector. Patents and co-publications are outcomes that should be measured for both public and private actors.

Concerning the FUSION programme, a fundamental question to which the evaluation should respond is the following: is it promoting public-private cooperation or public research oriented towards the needs of the country’s economy and society? This question should be raised in view of the limited private sector and MCAST participation to the scheme.

Other questions on the design of the FUSION programme could be:

37 Cunningham and Gök (2012).
38 Smith et al. (2003).
• Are the two steps (with a voucher as a first step) a good and necessary design feature?
• Are the amounts allocated appropriate for the different types of support?
• Is the total budget appropriate, notably in view of success rates?
• Is the budget divided appropriately over the two steps?
• Is the time-to-contract appropriate?
• What are the benefits and drawbacks of bi-yearly calls versus a permanently open programme procedure?
• Is there an adequate balance put in practice between the criteria of scientific quality and merit, on the one hand and economic and social impact on the other?
• Which RIS3 priority areas are served by FUSION and in which proportion?
• What is the visibility of the programme for its target groups?
• What is the potential for simplification?

The evaluation methods should combine analyses of project and programme data and a survey of beneficiaries, rejected applicants and the control group.


IMPROVING FRAMEWORK CONDITIONS FOR PUBLIC RESEARCH

5.1 Incentives and barriers to HEIs and public research organisations to conduct high-quality research

5.1.1 The current situation

The concept that depicts research and innovation as a linear process from basic to applied research and finally to economically useful products as long been proven wrong. In fact, successful innovation is based on multiple interactions between basic ('blue sky') research, applied research, product development and market introduction. As mentioned in section 4.4, Malta’s funding system lacks an instrument to fund research in the public sector and thus deprives itself from the true innovation potential of the researchers at UoM and other HEIs.

In most European countries, public research is funded by an agency (or agencies) independent of public administration on a competitive basis with specified evaluation criteria. In Austria, for example, the Austrian Science Fund (Fonds zur Förderung der wissenschaftlichen Forschung, FWF) supports research at universities and public research institutions without explicit cooperation with private industry, while the Austrian Research Promotion Agency (Forschungsförderungsgesellschaft, FFG) promotes public-private cooperation in applied and industrial research and innovation (a similar situation is found in Ireland, see Box 3). Research funding instruments are commonly designed as a mix between bottom-up and top-down research in areas of special interest to the public and/or industrial needs of the country. However, in all such schemes, the quality and efficiency of research is ascertained by agencies that are to a large extent independent from public administration and allocate the funds by competitive schemes.

Compared to this standard, public research funding in Malta falls short in one important aspect. Although Malta has, in principle, an instrument that supports research and development in cooperation with private industry, it misses a channel that funds research at universities without industrial cooperation. While the Maltese research statistics lists EUR 17 million per year as university research money, this is mostly a cost-accounting artefact representing 30% of the salaries for professors at UoM. In fact, funding for blue-sky and applied academic research is largely absent (in the form of a permanent source of funding). UoM's own dedicated resources for research are much too small to

---

40 This is the FUSION programme of MCST, see however discussion on the limitations of this programme in section 5.3 and Box 8 in section 4.5.

41 Out of its budget, through the Academic Research Fund, UoM finances annually approximately 200 small projects of no more than EUR 2 000 and four 2-year-projects of EUR 60 000. UoM estimates that high-quality proposals received internally could easily reach more than EUR 6 million annually. In addition, all members of UoM receive, through the Academic Resources Fund, an annual funding for academic expenses (books, attendance at conferences, computer and IT equipment). This money is given independently of research outputs or quality.
substitute for a stable national scheme for funding basic and applied research. This deficiency severely hits Malta’s only university, UoM, as well as MCAST and any other research institution that might appear in the future. It constitutes a major obstacle to attract excellent researchers from abroad, and to retain excellent national researchers. It also prevents big companies from establishing research labs in Malta due to a lack of competitive and outstanding researchers in academia.

For Malta’s researchers at HEIs the only ways to get research money are: applying to the internal Academic Research Fund at UoM with very limited resources; applying to the European funding schemes (including the ERC, a very competitive scheme which has the drawback that a successful European Research Council (ERC) grantee can move to any other country); getting ad hoc funding directly from ministries, or by designing applied research projects in cooperation with the industry. Yet, these sources are clearly insufficient: in size (UoM Academic Research Fund), in cases where the research subject is not (or not yet) suitable for seeking an industrial partner (FUSION), or the project does not (or not yet) fit the highly competitive European schemes. In most countries, success at the European level is preceded by funding from a national funding agency. EU funding instruments have been designed as a complement rather than a substitute for a national funding system.

5.1.2 The way forward

Malta needs a competitive fund for basic and applied research at HEIs and public research organisations in order to make use of the innovative potential of researchers at these institutions, and to build up its R&D capacity. A new ’Malta Research Fund’ should be established for this purpose (see example from Iceland in Box 9).

**Box 9 Competitive research funds in a small country: The Icelandic Research Fund**

| The Icelandic Research Fund (IRF) is an open competitive fund that provides research grants and is based on peer reviews of proposals. It has a budget of ca. EUR 18.5 million in 2019. The role of the IRF is to enhance scientific research (basic and applied) and research education in Iceland. For this purpose the IRF awards funding to research projects led by individuals, research teams, universities, research institutes and companies, and to research students. There are four grant types: project grants, grants of excellence, postdoctoral fellowship grants and doctoral student grants. Expert Panel members are appointed by the Science Committee of the Icelandic Science and Technology Policy Council. Up to seven individuals with qualifications at associate professor level or higher, who have extensive experience in research, are appointed to each Expert Panel. At least two members of each Expert Panel shall be predominantly active professionally outside of Iceland. |

Reference: [https://en.rannis.is/funding/research/icelandic-research-fund](https://en.rannis.is/funding/research/icelandic-research-fund)

This ’Malta Research Fund’ should be managed by MCST, using international, quality-driven peer review procedures, following good practice standards (as is

---

42 Given the small size of Malta, it is necessary to use foreign evaluators to avoid conflicts of interests. Malta is in a more favourable situation than other countries since there are no language barriers for this task.
already the case for the management of the FUSION programme). This is important to guarantee fair competition and equal opportunities in getting the funds. MCST should get full responsibility and autonomy for the allocation of R&I funding.

The ‘Malta Research Fund’ should target bottom-up applications in any field of research. Projects should be selected only with respect to scientific quality. Two types of grants should be distributed: project grants and personal grants (PhDs could be funded through both types of grants). Projects should typically be multi-year projects and funded with grants in the range of EUR 100 000/year (depending on the field).

Alongside the above fund, MCST should continue to run the FUSION programme, which aims at supporting research of value to Maltese society. However, the PSF Panel sees a need to expand this programme into two different funding lines:

- **FUSION-PUBLIC**: A new funding line, created with additional funds, would fund research projects in oriented programmes in top-down selected fields (corresponding to RIS3 priorities) for researchers in HEIs and public sector institutions only, with no requirement of industry participation. In addition to research excellence, its relevance, namely its potential contribution to socio-economic development in Malta, is the main criterion for this funding line. Relevance should not merely be judged through economic value (research commercialisation potential) but also through wider societal benefits;

- **FUSION-COOPERATION**: A second part would correspond to the existing programme, i.e. a cooperative programme with compulsory participation by companies and HEIs or public sector institutions. It would receive a larger budget.

This will help to clarify the goals and intervention logic of FUSION (see Box 8 above).

### 5.2 Respective roles of Malta’s HEIs

#### 5.2.1 The current situation

Malta shows a remarkable catch-up trend in terms of research excellence indicators. The average annual growth rate of peer reviewed journal articles or reviews with a Maltese affiliation was 14.7 % over the period 2010-2017 (Table 2). This is very high, but it can be explained by very small numbers at the start of the period. The majority of publications (articles, reviews) originate from the University of Malta.
Traditionally, universities are the institutions where teaching and research meet. Research at universities is strongly linked to the elaboration of a thesis by doctoral students. Given Malta’s extremely good employment situation in combination with the fact that research money is scarce, the number of doctoral degrees granted by UoM is rather small (academic year 2016/2017: about 150)\(^\text{43}\) compared to its total number of students (over 11 000). Compared to the number of researchers (896 FTE) this number is however relatively high (see discussion on doctoral studies in section 5.5). The number of doctoral theses in faculties of natural sciences is small, typically not more than 5 degrees per faculty per year or less. As a consequence, in these faculties the establishment of a critical mass necessary for doing research can hardly be achieved.

In turn, the PSF Panel was told that students with a doctoral degree do not find the appropriate job opportunities as industry is not hiring them; they either have to leave the country or take positions for which they are overqualified.

In the past, UoM has been the only institution where all academic degrees, from Bachelor and Master to the Doctoral degree could be obtained. A few years ago, MCAST initiated undergoing a change from an institution of applied sciences to a university-like institution which grants Bachelor and Master degrees. This change is accompanied by a gradual development of MCAST’s research activity. In principle, the applied character of the research done by MCAST would make it easier to apply for the FUSION programme of MCST, but in practice almost all the FUSION money goes to UoM, and to a lesser extent to industry (see section 5.3). This reflects the fact that MCAST is still far from being a university-like HEI. Experience from other countries shows that this process takes time. In the short term, MCAST is better placed to serve the needs of Maltese companies, most of which are not prepared to hire staff with a doctoral degree, but are in great need of professionals at the technician level. Such a situation provides the ground for a natural complementarity between the missions of the two institutions.

Given the fact that Malta requested an in-depth study and advice concerning Open Access\(^\text{44}\) from the Commission’s Policy Support Facility, the PSF Panel has not investigated this topic in the frame of its present mission.


\(^{44}\) In 2009 and 2010, Malta’s share of Open Access output was higher than the EU-28. However, since 2012 the EU-28 has surpassed Malta. Malta’s share of Open Access fluctuated and shows a declining trend since 2015 (Restall 2019).
5.2.2 The way forward

The new developments in the HEI sector in Malta show good opportunities due to the complementarity of MCAST and UoM missions. If properly managed, these new developments can lead to synergies from which both institutions can benefit in teaching, as well as in research. MCAST’s efforts to ease access to higher education may be perceived as bearing the risk to erode the level of academic degrees, a process that may spill over to UoM. To avoid this risk, a concept of cooperation between the two institutions is needed that clearly defines the standard of the various degrees, and defines the similarities and differences between the institutions.

From its discussion with representatives from both institutions, UoM and MCAST, the PSF Panel concluded that there is little coordination regarding their respective strategies in teaching as well as in research. The lack of coordination in combination with the scarce funds for basic and applied research impedes a full development of the potential of these organisations.

Cooperation could include, for example, bridging courses to allow students from MCAST to follow up studies at UoM; development of joint ‘professional’ master degrees in pre-selected areas, mainly oriented and in accordance to the strategic plans of the two institutions; the development in UoM of specific conditions for MCAST teaching staff to gain qualifications; joint research projects in key areas (which can be favoured by funding schemes); and tripartite cooperation of both HEIs with industry. More cooperation between UoM and MCAST will be beneficial for both institutions and their students, and this will also create an attractive environment for companies that value different types of research and education outputs from the two institutions.

The PSF Panel is convinced that the two institutions, if funded properly and incentivised to conduct excellent research, are sufficient to cover the landscape of public research in Malta. Inviting foreign institutions to establish campuses in the country is not an adequate response to the current needs (see, however, recommendations about Teaming, Twinning and ERA-Chairs in section 7.1.2). Many countries are today struggling to merge and create more bridges within a too fragmented public research institution landscape; Malta should keep its advantage of having a concentrated HEIs system. Developing strong external linkages with foreign HEIs, within the framework of ‘European university networks’ or others, and fostering exchanges of students is the way forward for both HEIs.

5.3 Third mission in HEIs and public research organisations

5.3.1 The current situation

To attract innovation-oriented FDI and R&D funding from foreign companies, there is a need for a vibrant ecosystem for research, development and innovation that includes the availability of a skilled workforce, the right public incentives, regulations conducive to innovation, and an effective fabric of R&D collaboration between and within public and private sectors. Well performing
HEIs and public research organisations (PROs) are part of the ecosystem that those companies are looking for in their investment decisions.

The 2017 EU survey of industrial R&D trends found the following factors to matter most in assessing the attractiveness of locations for R&D (Figure 19). MNCs value ‘Quality and availability of researchers’ and ‘Access to specialised R&D knowledge and results’ highest. This highlights the positive role played by HEIs and PROs, when they are well organised to cooperate with businesses, as well as effectively responding to their needs.

![Figure 19 Factors of attractiveness for R&D location](source: European Commission (2017). Note: The figure refers to 141 out of the 151 companies in the sample of the 2017 EU Survey on Industrial R&D Investment Trends.)

During the interviews, the PSF Panel learned that, in line with official figures (see section 6.2), cooperation between industry and UoM or MCAST occurs sporadically, on a person-to-person and ad hoc basis, rather than in an organised way. Several activities take place on a voluntary basis, such as student placements, participation of companies to students’ dissertations, dedicated training and small development projects or services to companies by public labs. While the small size of the country helps in finding partners, there are opportunities lost due to the lack of mutual information on needs and opportunities for cooperation. Interviewed companies expressed the view that UoM does not promote activity with industry amongst its academic staff, and their perception is that the only incentive system at UoM rests on the production of scientific papers.
This perception stands in contrast with the formal criteria used for career promotion at UoM, which do cover the three missions: quality in teaching; research outputs (including projects with industry); and commitment to the university and society, which includes in particular the commercialisation of Intellectual Property (IP) in collaboration with the Knowledge Transfer Office (KTO).

To promote public-private cooperation in research, MCST provides the FUSION programme. FUSION funds a preliminary assessment of the commercial and market potential of projects through commercialisation vouchers of a maximum of EUR 20,000 for public entities (and EUR 12,750 for companies), and cooperative RDI projects with total grants of max. EUR 195,000 (shared between public and private entities). In practice, the large majority of FUSION funds goes to public research entities and principally to UoM, as evidenced below.

1. Commercialisation voucher programme. The majority (61%) of applicants to this programme are public research entities and 82% of funds go to the public sector (75% of the total funds are allocated to UoM). A success rate of 43% for commercialisation vouchers seems an adequate rate.

2. Technology development programme. This programme is dominated by public research entities too: 78% of the lead applicants and of leaders of funded projects are public research entities; 68% of the allocated budget goes to public research entities, the vast majority of this being UoM (91%). MCAST receives only 3% of these funds. The overall success rate of applications is 55%.

From these figures, it appears that FUSION attracts only a few companies and is mainly funding research at UoM. Cases of conflict of interest might exist when projects are carried out with companies in which academics have commercial interests (a situation that was mentioned to the PSF Panel during its second visit).

5.3.2 The way forward

Despite the recognition of the third mission (service to society including cooperation with industry) in career promotion, and the presence of the KTO and entrepreneurship and incubation support at UoM (see section 6.3), the actual implementation of results from academic research in cooperation with industry is facing barriers. This happens on a too ad hoc basis and missed opportunities are likely to result from this situation.

---

45 Optional commercialisation vouchers of EUR 18,000 and EUR 28,320 are available. They are used for patent application, trademark protection, business plans and investor’s plans.

46 https://thirdmission.univie.ac.at/en/
Both UoM and MCAST need to develop – and ideally align – explicit strategies and concrete operational procedures, including clear and transparent internal promotion rules, regarding their third mission, in particular for cooperation with industry (Box 10). Third-mission activities cover: consulting activities; IP licensing and tech transfer; a liaison office for collaboration; access to public research infrastructure for companies; provision of lab services; collaborative/contract research, etc. Guidelines to avoid conflicts of interest also need to be established.

**Box 10 Rewarding work with industry in academic careers and salaries in Spain**

In Spain, cooperation with industry is encouraged at the highest level in the University Law (article 83). Based on that law, faculty members who participate in R&D and innovation projects with industry through the university can top-up their annual salaries by up to three times the salary of a full professor (distribution depends on the budget and decisions made by the principal investigator of the project). The amounts received are not consolidated in the salaries and depend on the signature of specific agreements with industry. This possibility has been used since the 1980s as a powerful incentive to promote cooperation with industry and also to better align the research agenda to industry interests. Nowadays, all Spanish public universities are applying it through internal regulations.


The preparation of third-mission strategies with action plans and targets can be established as a condition for receiving earmarked funding allocated for the development of these activities at UoM and MCAST.

Dialogue with industry – both on an informal and a formal basis through, for example, participation on HEIs’ Boards – also helps the HEIs to adapt their education activities so that they become more innovation-oriented. Open FabLab-type concepts or other open innovation platforms or innovation spaces for multiple users could be considered here as well. These can lower the barriers for companies to collaborate with HEI, integrate the third mission with education and training activities, increase interaction between academic staff, students and companies, bring industrially relevant local cases to education, allow industry experts to participate in education, and act as experimental platforms for prototyping potential new products or business ideas, which might later develop into start-ups (see Box 11). The Sustainable Living Complex (SLC) could possibly evolve in this direction (see section 5.4).

---


48 https://en.wikipedia.org/wiki/Fab_lab
The **FabLab concept** was developed by Professor Neil Gershenfeld, director of the Centre for Bits and Atoms (CBA) at MIT (Massachusetts Institute of Technology). A FabLab is a working place equipped with the most advanced computer controlled machines (such as laser cutters, 3D printers, etc.) for the design, development and production of highly innovative products, and for training on new production possibilities.

FabLabs provide easy and multidisciplinary access to a large variety of people, from university researchers to pupils, artists and entrepreneurs. All can get experience in using FabLab machines and software. The digital development process facilitates the sharing and diffusion of knowledge. FabLabs act as open-source hardware platforms.

The **FabLab Arnhem (NL)** opened in 2010 and is closely linked to the Faculties of Technology, Economy and Management of the High Schools of Arnhem and Nijmegen. Experts and volunteers act as coaches for the visitors of the FabLab, who use the facilities to develop their ideas during its opening times. Workshops and training are also available, tailored to different target groups.

**References:** [http://stichtingfablab.nl/about/](http://stichtingfablab.nl/about/)  [https://specials.han.nl/sites/fablab/](https://specials.han.nl/sites/fablab/)

### 5.4 The role of public research infrastructures

#### 5.4.1 The current situation

The Maltese Government has been investing heavily in buildings and equipment for research in the public sector in recent years, with strong support from the ESIF. UoM and MCAST have benefitted from such investments, aiming to build their teaching and research capacity. Major examples include, in the last funding period, the Life Science Park, and in the current period the Sustainable Living Complex (SLC) and the Transdisciplinary Knowledge and Exchange centre (TRAKE), both located at UoM.

The SLC, under construction, focuses on interdisciplinary research and innovation in sustainable buildings (one of the RIS3 priority areas). It will serve the purpose of teaching and act as a regional research centre for cooperation in the Mediterranean area. UoM has already committed itself to provide funds for the employment of research staff and running costs. The ‘living lab’ project will extend from the construction of the building itself to the investigation of various techniques, materials, training and teaching options incorporated in the concept of the building itself. There is no involvement of industry yet in SLC as the Steering Committee consists of UoM academics from all relevant disciplines. It is, however, UoM’s stated intention (included in the project applications) to involve industry in SLC projects.

Similar is the situation with the Competence Centre TRAKE at UoM, which will operate in four thematic areas related to RIS3 (health, transport including maritime transport, high value-added manufacturing, climate change and sustainable energy). It will consist of some 25 different labs, to be used both for teaching and research. The research component – hiring staff – will be
covered by UoM. UoM has also stated its intention to involve industry in TRAKE projects.

Another centre, the National Aerospace Centre (NAC) was planned as a Centre of Excellence to boost competitiveness in the Maltese aviation industry. It had been selected in the highly competitive EU Teaming programme – Phase 1, and got funded for the preparation of a sound business plan for the Centre of Excellence, in cooperation with the Dutch National Aerospace Laboratory. However it did not proceed to Phase 2 (establishing the Centre) and changed its orientations towards becoming an advisory body, assisting the Ministry for Tourism in strategy and policy aspects from an aviation perspective. Hence the plan for establishing a Centre of Excellence in this sector in Malta is halted.

5.4.2 The way forward

Malta, which has a young public research system, is building up its teaching and research capacity. Positive elements in the current investments in research infrastructure are the promotion of interdisciplinary research and the efforts to create critical masses of teaching and research in dedicated areas of strength. To ensure that these investments bear fruit, it is necessary to secure funding for the personnel involved in teaching and research activities as well as for the maintenance of equipment and facilities, in the long term. The current lack of regular funding sources for research activity in the public sector (see section 5.1) needs to be corrected to avoid a situation of 'cathedrals in the desert’, which has occurred in other MS using large ESIF funds for buildings and research infrastructure.

Another development consists of the use of such public research infrastructure for the support of public-private partnerships in domains of key interest for the Maltese economy, i.e. those that are prioritised in the RIS3. Good examples of public-private cooperation on a small scale have been reported at MCAST. The large, current developments at UoM do not seem to involve industry yet (although this is reported to be planned). These investments in infrastructure provide a good opportunity to develop partnerships with the business sector by sharing some of the research infrastructure, as well as providing 'living labs’ to test some of the business solutions. The participation of industry, e.g. in the SLC infrastructure, is one way forward to be pursued. Public-private partnerships for R&I, created around large and modern infrastructure, represent a promising avenue for fostering cooperation between public research institutes and companies on the island, while also involving foreign partners. Thanks to their size, and due to their long-term character, they have the potential to create a critical mass of R&I activities and to influence the direction of technology and innovation efforts in a significant and durable way. Sharing costly infrastructure and equipment creates economies of scale of benefit to both the public and private sector (see lessons from public-private partnerships in the form of competence centres in Box 12).

Of course, strong governance mechanisms should be put in place that ensure that the public financial management of such public-private partnerships remains effective. There is a need to monitor outcomes achieved by such centres, using clear performance indicators capturing results in terms of
education, research and innovation–oriented cooperative projects. Such indicators will form part of the overall monitoring system for the Maltese Research and Innovation Strategy (see section 4.5).

While the Maltese research infrastructure is growing in size and diversity, it will become important to map it and diffuse information about it, in order to achieve transparency and enhance its use by researchers in both the public and private sector. This task should be placed under the responsibility of MCST.

Box 12 Good practices in establishing public-private partnerships for R&I and Swedish Competence Centres

A mutual learning exercise under the PSF examined the topic of evaluation of complex public-private partnership (PPP) programmes in science, technology and innovation (STI). PPPs carry out research and innovation activities in partnership between the knowledge infrastructure (universities and research institutes) and producers (mainly companies, but increasingly also state agencies and organisations such as hospitals, welfare services, etc.). Different models of PPPs exist. The competence centre (CC) model has a long history: such centres are strongly based in academia but have industry on their boards (e.g. Swedish Competence Centres or Austrian K+ Centres). Some lessons from the literature on CCs are:

• CCs have big economic impacts, over extended periods of time;
• CCs help to change research culture in universities and companies;
• Key effects result from integrating and changing education;
• CCs produce more industrially usable holders of PhDs;
• Governance and balance of power are key to the success of CCs;
• Integrated programmes and centres work best (compared to networked centres);
• Establishing fair Intellectual Property Rights (IPR) arrangements is a key success factor;
• Sustainability after the public funding period is generally hard to achieve.

**Swedish Competence Centres** aim to generate and support strong hubs of excellence in key competence areas, attract talent and capital, companies of high international level and HEIs. Their aim is to influence strategies and the behaviour of firms and HEIs and their overall patterns of relationships, as well as stimulate innovative HEI research agendas. Their core rationale is to systematically twin industry and HEI research agendas, and research competence and personnel through direct cooperation and project-based mobility, in order to solve research issues of innovation relevance. The activities are located and steered in HEIs. The first CC started in 1995. Each centre status is awarded for 10 years. There have been nearly 30 centres in the programme so far. The evaluations conducted on the programme indicate that the research has been longer term and has tackled more fundamental problems than normal public-private research relationships funded by the innovation agency Vinnova. These PPP initiatives have generally served these purposes and have had a significant systemic impact. A strong emphasis has been put on incentivising HEIs to strategically integrate and mainstream Competence Centre mechanisms, as part of their strategies of excelling in third-mission performance.

5.5 Investment in human resources for research and innovation in Malta

5.5.1 The current situation

Malta is investing heavily in educating its population; fostering human development is one of the priority areas for the Maltese Government.

Malta's expenditure on education is relatively high compared to the EU average, both as a share of GDP (5.4 % as compared to 4.7 % for the EU-28 in 2017) and as a proportion of total public expenditure (14.1 % against 10.2 %). Public expenditure on tertiary education in 2015 stood at 1 % of GDP compared to an EU average of 0.7 %.\(^49\) In 2016, there were 13 800 students\(^50\) involved in various tertiary programmes, of which 3 600 were at Masters level, and only 100 at doctoral level. In 2019 there were 366 doctoral students enrolled.\(^51\) 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 on this indicator (MT: 0.3 in 2016 vs EU-28: 1.3 in 2015).

Given the high demand from the labour market, the decision to continue education, in particular towards a Master or doctoral degree, often tips the balance in favour of employment. The salary difference does not provide an incentive to stay in education, not providing sufficient economic return vis-à-vis the first degree in higher education: 35 % of the cohort finish higher education, and most who continue to a second and third cycle of higher education do it part time. To address this, the Maltese Government has developed several support schemes\(^52\) for students at various levels. The government even channelled some of the EU funds (European Social Fund, ESF) in providing scholarships for master and doctoral studies, both in previous as well as during the current financial perspective, along with fiscal incentives. The Government also issued a scheme for post-doctoral research and 16 scholars have benefitted under the Reach High project (see Table A4 in Annex 2). The fields of intervention are numerous as well: from addressing the issue of early school leavers\(^53\) to the promotion of doctoral studies. Undergraduate level studies are free of charge and full-time registered students receive Students' Maintenance Grants. Indirectly, the popularisation of science and thus also of researcher as a

\(^{49}\)EC (2018c), Education and training Monitor 2018.
\(^{51}\)Figure supplied by the UoM.
\(^{52}\)https://education.gov.mt/en/education/myScholarship/Pages/default.aspx
\(^{53}\)The early school leavers rate for Malta in 2017 was 18.6 %. It seems that the Maltese labour market offers opportunities for people with low educational attainment — especially for men, where the share of employed early leavers of education or training is even higher (83 %).(Source: EC (2018c) Education and Training Monitor 2018). https://education.gov.mt/en/studentsgrants/Pages/About%20Us/Overview.aspx
profession is the objective of the Esplora, Malta’s Interactive Science Centre (see section 4.5).

A National Skills Council\textsuperscript{54} has also been set up by the Ministry of Education and Employment. It is aimed at reducing skills shortages and bringing education policies closer to the world of work and labour market needs. 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 and includes the participation of social partners and stakeholders to further stimulate wider consultation.

The PSF Panel heard many concerns from companies in view of shortage of skills in ICT (software development, general digital skills); hence the priorities set by the National Skills are very relevant. Another gap on the companies’ side lies in the availability of skilled people at technician level. Today the business world is not absorbing staff with doctorates due to the lack of high-level research activities in the business sector of the country. Internal company training is offered by MCAST, which is seen as one adequate response to the difficulty in recruiting and retaining skilled staff in companies. The companies interviewed by the PSF Panel also highly valued foreign experience for their staff.

The above efforts indicate that strong support for human resource development, related to the needs of the Maltese economy, is put in place. The various support schemes seem to address these needs, even though full results are still to be expected. The National Employee Skills Survey carried out by the National Commission for Further and Higher Education, Jobsplus and Malta Enterprise had identified several recommendations for education providers and policy-makers, most of them related to increased cooperation of all stakeholders in the decision-making process, more attention to training and skill-upgrading of employees, and more career guidance for young people.

On the public sector side, Malta is faring well in terms of the recruitment process: a high and rising proportion of Maltese researchers showed satisfaction that academic hiring processes were open, transparent and merit-based. With a share of 77\%, this level was above the EU-28 score of 65\%.\textsuperscript{55} However the international dimension of recruitment is not well developed: Malta has a score of 3 academic ads on the EURAXESS portal, compared to 42 for the EU-28.

In order to learn more precisely about the situation with doctoral students in Malta as a source of human resources for RDI, the PSF Panel implemented a dedicated survey in February 2019 (Box 13, see full report in Annex 4). The key highlights from the survey are that: 1) the main motivation to undertake doctoral studies is linked to pursuing an academic career, in particular at the beginning of the studies; 2) an attraction factor is the quality of research in Malta and also the cost of study; 3) half of the students declare that funding for


\textsuperscript{55} Data in this paragraph are from EC (2019b) \textit{ERA progress report country profile Malta}. 

69
The career ambition is foremost to stay in academia but in second position, many students consider working for industry or going abroad.

Box 13 Main insights from the PSF Panel survey

In February 2019, 366 students (amongst which 214 enrolled in MPhil and 152 in doctoral studies) were contacted by the University of Malta and received an online survey that looked at information on their studies and future plans. Foreign students represented 19.3% of the total student body (71 out of 366). Sixty-seven responses were obtained (18.3% response rate). A higher percentage of foreign students (31% of them) responded to the survey. The share of full-time doctoral students is slightly higher than for part-time students (55.2% vs 44.8%).

The main fields of study, based on the survey data, are represented by humanities (32%) and engineering and technology (27%). The latter category is more often represented by full-time students. Foreign doctoral students are mostly following a full-time doctoral training (19 students out of 21).

A multiple-choice question on the motivation for doctoral studies revealed that two reasons, a personal interest in pursuing advanced education (mentioned 46 times) and a plan to pursue academic career (mentioned 42 times), dominate the decision to continue studies. Another interesting response is that the most common reason among full-time students to choose Malta as their place of studies is the quality of advanced research in Malta in the field of study (40.7%). For the part-time students, the costs of studying in Malta are an important factor as well as the quality. Both groups find their previous collaboration with a supervisor a strong motive as well as the possibility to receive funding for their studies. The Maltese students in particular plan to pursue an academic career (74.8%), but this is the most important reason for the foreign students as well (63.6%). For this group, the cost of studying and the quality of advanced research in Malta in the field of study were the two main reasons to come and study there.

In view of the high level of Maltese support for education, it is surprising that as many as 31% of part-time doctoral students do not have any external funds to obtain their doctoral studies. This indicator is only slightly lower among the full-time doctoral students. In general, full-time doctoral students indicate higher shares of obtaining fully or partially funded scholarships, yet most of the students are not satisfied with the support scheme. Half of them find it insufficient/fully insufficient, while only 25% find it sufficient/fully sufficient. This suggests that further scholarship funds for the tertiary level should be considered.

Asked about their level of independence, most of the doctoral students indicate that they are mostly or fully independent in their research activities. The independence is felt more strongly by the part-time students. Their overall satisfaction with the studies is high.

Doctoral students were asked whether they were involved in research activities at the universities. It is possible that this question was not sufficiently clear since a surprisingly high number of responses (40, or 60%) indicate a clear ‘no’. On the other hand, involvement in research activities, once broken down by field of study, shows a different picture: for example, 72% of students of engineering and technology studies do take part in university research.

According to the survey, students’ career ambitions change through their studies: if during the first year their predominant desire is to stay with the university, later on a percentage of those seeing their future in the private sector increases. Overall, the first choice for most doctoral students is to stay with the university. Yet, seeking business employment is often the second
choice for a significant number of students in the E&T area, as well as for medical students. What deserves attention is that a high number of those doctoral students, who indicated going abroad as their second choice, reflecting on the fact that if employment opportunities at higher education institutions (pursuing research, in our view) are not there, several of them may decide to leave Malta, which would no doubt be a significant loss for the future of research, but also for the overall development of the country.


5.5.2 The way forward

To increase the research capacity, especially in public research, the first step should be to increase the human resources. The lack of attractiveness of the longer studies suggests that schemes to support doctoral studies should receive a longer and more generous support, both during the studies as well as upon obtaining the PhD. With the establishment of a new funding channel for public research run by MCST (see section 5.1), funding sources, in the form of both individual grants provided to doctoral candidates and project grants provided to the leaders of the group in which the doctoral candidates are doing their research, would become available to support doctoral students. Integrating doctoral candidates into research activities in UoM (beyond their thesis) should be set as a condition in the grant allocation.

The proposal to establish a Knowledge Transfer Programme (see section 6.2) is another step in this direction. According to the preliminary information obtained, the programme will finance the Master and doctoral students, working on projects relevant for the industry during their studies. This is likely to provide greater attractiveness for those studies as well as bridging education and the needs of industry.

UoM and MCAST should be able to regularly open positions for researchers/academic staff (with PhDs), both in view of rejuvenating the staff and to develop new research projects. Portugal has developed major efforts to support PhD students and qualified doctors, as well as improve their employment conditions, resulting in a greater attraction in the public research system, both internally and for foreigners (Box 14).

Box 14 Supporting PhD students and qualified doctors in Portugal

Support to advanced training in Portugal

Portugal has been consistently supporting the advanced training of qualified human resources through the support to PhD and post-Doc scholarships, awarded following national competitive calls. Recognising the wide gap in advanced human resources with doctorate training, Portugal included a relevant line of funding in the national EU funded structural programmes for the development of human capital. While the first calls, in the 1990s, focused on MSc and PhD training, the programme later progressed to support only PhD and post-doctoral training.

This initiative was particularly important to qualify the Portuguese research and innovation system internationally. The Foundation for Science and Technology (FCT) has supported some 22,500 new PhD students since 2000, with almost 1,000/year in the most recent years. Initially, a large share of the PhD scholarships was awarded for PhD training abroad (35% in 2000). With the corresponding international qualification of the system, namely through the
return of foreign trained researchers, the capacity to provide local advanced training of excellence improved and PhD scholarships are now mainly awarded for training in Portugal.

The support to post-doctoral scholarships has been an important instrument in supporting early-career researchers, and in maintaining and attracting young researchers to Portugal. Over 500 post-doctoral scholarships were awarded annually, which guaranteed the career development of young researchers.

**Employment conditions**

One of the main challenges in this policy has been the employment of new doctors, in particular by the business sector. In this regard, specific instruments have been implemented to support PhD training in a business environment, involving academic and business-based supervision, to support the employment of new doctors by firms.

Recent policy discussions in this area have also focused strongly on reducing the insecurity of research careers. The doctoral and post-doctoral scholarships have been anchored for some time on a specific Statute for Research Scholarships (not constituting a labour contract), which define the specific conditions regulating its award, namely social security conditions and the full-time dedication of young researchers.

A recent initiative has focused on stimulating scientific employment, which involves a number of measures, including the replacement of post-doctoral scholarships with new scientific employment contracts, promoting a national competition for positions at different levels of the research career, promoting the employment by research centres and private firms or through support to CoLabs (collaborative laboratories between the public and private sectors) with public support specifically dedicated to human resources and in particular the employment of young researchers.

**Sustained scientific growth**

A central result of the policy for advanced training has been in the increase of qualified personnel in the research and innovation system. The number of holders of PhDs has broadly doubled in 10 years, from 18,500 in 2007 to 35,000 in 2017 (Scopus data, published by DGEEC). While a number of Portuguese doctors have moved abroad, some 20% of holders of PhDs in Portugal are foreign nationals, revealing the circulation of human capital and the attractiveness of the system. Nevertheless, the number of doctors in the active population is still about half of the OECD average, although this gap is much shorter in the early-career stages.

The scientific output of the system has increased consistently. Between 2007 and 2017, Portugal had the 6th highest growth in scientific output per million population, with an average growth of 8.2%. While the employment of doctors by private firms still represents a small share, this has been consistently growing, revealing a potential change in culture. Additionally, the country has seen an increase in the growth of technology-based start-ups and in attracting multinational investment in R&I activities.

*Reference: www.fct.pt; www.dgeec.mec.pt*

Given the shortages in domestic labour force, Malta is importing talent. A more proactive policy to attract – and retain – global talent can have a positive impact on the availability of qualified human resources for research (see an example of an effective incentive to attract talent in Luxembourg in Box 15).
Luxembourg, a small country with limited research capacity and tradition, faces the need to provide incentives to attract researchers to the country.

It launched the ATTRACT programme, which is designed for researchers not yet established in Luxembourg but who demonstrate the potential to become leaders in their field of research. The scheme offers promising junior researchers the opportunity to set up their own research team within one of the country’s research institutions. Host institutions offer candidates the prospect of developing their own research line. ATTRACT research fellows are offered individual coaching and a career track towards a tenured position. Applicants can be either ‘Starting Investigators’ (early-career post-doc researchers) or ‘Consolidating Investigators’ (experienced post-doc researchers). Researchers are eligible if there is between 2 and 8 years following their PhD and they must have an outstanding track record in their field, which has to fit strategically with the research agenda of the Luxembourg host institution. ATTRACT fellowships have a lifespan of 5 years. The financial contribution can be up to EUR 1.5 million for Starting Investigators or EUR 2 million for Consolidating Investigators.

ATTRACT was evaluated in 2016. The evaluators praised the scheme, particularly the tenure track, which is a unique characteristic of ATTRACT when it’s compared with similar funding programmes in other countries, making it a very attractive, internationally competitive funding scheme. The lack of visibility of the scheme outside of the country was, however, found to be a weakness. The evaluation concludes that ATTRACT is a suitable instrument to generate knowledge transfer to Luxembourg and to boost the visibility of Luxembourg as a research location. The long-term sustainability of the impacts, though, could not be ascertained.


A recent Mutual Learning Exercise carried out by the PSF generated conclusions on policies to attract and retain talent. The following ones are of particular relevance to Malta (European Commission 2018):

- Closed and low-performing systems would benefit from short-term outgoing mobility schemes with a view to gaining experience abroad and bringing back new ideas for system changes, without creating too high a risk of ‘brain drain’;
- ‘Shuttle’ incoming mobility schemes (alternating stays outside and in the home country) are appropriate for countries with less attractive research systems that are unable to compete with stronger ones in terms of attracting star scientists;
- Outgoing schemes incorporating a return phase are also seen as good practice in order to avoid a situation of ‘brain loss’;

---

Attracting and/or connecting with researchers from the diaspora is another relevant goal for countries with less attractive research systems. More generally, students and members of the diaspora are useful actors to target when the aim is to build bridges between the domestic research system and foreign ones;

‘Star scientist’ mobility schemes aiming to attract and retain high calibre researchers from abroad (foreigners or nationals returning to the home country) require bold and long-term incentives, covering not only salaries but also funding for research, infrastructure and team building.
6 INCENTIVISING RESEARCH AND INNOVATION IN THE PRIVATE SECTOR AND STIMULATING PUBLIC-PRIVATE COOPERATION

6.1 Support for research and innovation in the private sector

6.1.1 The current situation

Business expenditure on R&D is very low in the country: BERD stands at 0.34 %\textsuperscript{57} of GDP in 2017, which places Malta in 24th position within the EU-28. R&D in the manufacturing sector is mostly carried out in establishments of multinational companies outside of the country. Building and maintaining factories in Malta is not a sustainable option, hence there is a need to create more capacity for research and innovation activities within Maltese businesses and support all types of companies to move up the value chain.

The level of public support for private R&D in the form of national subsidies is very low in Malta:\textsuperscript{58} government funding of business R&D amounted to EUR 1.066 million or 0.01 % of GDP in 2015, which is far below the EU average of 0.08 % in 2015. In 2016, government funding dropped to less than half the 2015 value: EUR 0.501 million. Also the share of GBAORD going to the private sector was only 0.4 %, among the lowest in the EU, and far below the EU average of 12.6 % of government R&D funding going to enterprises.\textsuperscript{59}

OECD figures, covering both direct and indirect support through R&D tax credits, expressed in percentage of GDP, confirm the extremely low level of support in Malta, as the country appears at the lower tail end of this indicator (Figure 20). The OECD has no data on tax support for R&D in Malta (see the note in the OECD figure below\textsuperscript{60}). The PSF Panel has not managed to get consolidated information on the level of public support in the form of R&D tax credits either. However, according to figures gathered for some of the tax credit schemes\textsuperscript{61}, the penetration of this type of instrument seems to be very low. At the same time, indications were received from ME that part of the tax credits for investments may actually pertain to R&D. This makes it impossible to compare the level of support for R&D through tax credits in Malta with other countries.

\textsuperscript{57} All data in this section are from Eurostat, unless otherwise stated.

\textsuperscript{58} See Figure 16 in section 4.2.


\textsuperscript{60} [http://www.oecd.org/sti/rd-tax-stats.htm](http://www.oecd.org/sti/rd-tax-stats.htm)

\textsuperscript{61} See Figure 17 on policy mix in section 4.4 and Table A2 in Annex 2.
The public sector schemes available to companies engaged in RDI in Malta are managed by ME, MSD and MCST (see section 4.4 on policy mix), and include both direct grants and tax incentives. Based on its investigations, the PSF Panel came up with a list of available funding instruments, together with an indication of their reach to companies.62

- ME has an overall budget for its schemes, which includes schemes dedicated to RDI as well as other schemes to support businesses. There is no ex ante allocation to RDI schemes. There is an extremely low application rate from companies to all ME schemes dedicated to RDI: several of them receive no applications; others only one or two per year, which are all accepted. Hence there is a problem of absorption of ME schemes dedicated to RDI.

- MSD, the Measures and Support Division of the Ministry of European Affairs and Equality, manages grants for businesses using money from the ESIF. These are gathered into the umbrella scheme ‘ERDF Business Enhance Grant Schemes’63, with an allocation of EUR 51 million over the period 2014-2020. As for ME, this scheme also includes several incentives dedicated to business development, without a focus on RDI. Within this umbrella scheme, the ‘Business Enhance RDI Grant Scheme’, with a budget of EUR 20 million for 2014-2020, is dedicated to research and innovation. An even worse situation is noted for this scheme than for the ME scheme: no budget has been allocated under it so far, as all applications (7 from the last call) have been rejected.

- MCST manages the FUSION programme supporting R&D for the benefit of the Maltese economy (already mentioned in section 5.3 as it mainly funds

---

62 See Figure 17 on policy mix in section 4.4 and details in Tables A2 and A3 Annex 2.

63 https://businessenhance.gov.mt/en/schemes/Pages/General-Information-.aspx
research performers in the public sector). Between 2 and 4 companies apply to the FUSION technology development programme on a yearly basis as lead partners (and 1 or 2 are funded annually); companies get about one-third of the funds of this programme.

From this overview it can be concluded that, due to a critically low take-up of schemes, the actual public support to companies for research and innovation activities in Malta is extremely low and that none of the programmes in place succeeds in meeting a demand from businesses.

The following factors play a role in this low absorption.

The first group of factors concerns the general business environment in Malta.

- The vast majority of non-innovating companies sees no compelling reason to innovate.\textsuperscript{64} In innovation enquiries, lack of funding is hardly mentioned by any respondent as an obstacle to innovate. That would imply that subsidies or tax incentives from MCST, ME or MSD will not convince them either to begin innovating and would also explain the low absorption.

- Malta’s R&D statistics may underestimate actual R&D expenditure. Many companies may even not be aware that they are conducting R&D and innovation, and that those RDI activities could qualify for public funding.

- Malta’s economic activities and FDI are extremely concentrated in the financial and insurance sector. This service sector needs ICT and financial experts, rather than traditional R&D activities targeting technological and product innovation. This suggests a need to develop and promote specific measures to support non-technological innovation within the restrictions of EU state aid rules.

- Companies seem to lack the capacity and competences to make good use of funding opportunities and prepare successful applications for funding.

The second group of factors relates more directly to the schemes themselves.

- Some schemes suffer from flaws in their design or implementation, and this can be addressed in the short term (see details in the ‘way forward’ section 6.1.2 below).

- Competition between tax incentives targeting R&D and other tax credit schemes is at play. For example, those companies that are eligible for the R&D tax incentives scheme may consider their R&D costs as investments and hence apply for Investment Aid Tax Credits instead, in particular as the latter are easier to access than the former.

Some funding schemes have been put in place only recently, so it is too early to expect significant uptake.

Many schemes are considered ‘not worth the hassle’ due to lots of red tape and paperwork, limited success rates, long application and selection processes, and meagre amounts of funding.

The landscape of the funding schemes available to enterprise is insufficiently clear for the beneficiaries and as a result, many companies are insufficiently aware of the support opportunities. There are too many rather than too few schemes, and a company may have a hard time finding its way to the most appropriate scheme.

6.1.2 The way forward

The PSF Panel recommends to address first a range of shortcomings in support schemes for RDI in companies. When these issues are solved, changes in demand for the schemes should be observed and public budgets for the Maltese instruments aiming at promoting RDI in business adapted accordingly.

- Efforts should be devoted by both ME and MCST to radically simplify the application and selection processes and reduce red tape, for example by using much shorter, less detailed and more user-friendly application forms, fewer mandatory annexes, no requests for information already available to Maltese authorities, more focus on substantive content and quality than on formalities and eligibility requirements, faster cycles by means of continuously open calls with quarterly cut-off dates, and more extensive feedback on rejected project proposals. Moving towards fully electronic procedures is one way to help achieve those goals.

- A systematic promotion of a more transparent and coordinated support system should be done, where all the available instruments offered by the government and its agencies are listed.

- A particular disadvantage of R&D tax incentives implemented as credits on corporate income tax (as is the case in Malta) is that financial benefits will, in principle, not materialise until profit is made. This makes such schemes less attractive for small firms short of cash and start-ups. An alternative particularly worth considering in the case of Malta is a R&D tax incentive in the form of a deduction on the payroll taxes due for R&D staff, as in place in for example the Netherlands (WBSO65) and Belgium. This would allow companies – even if not (yet) making any profits – to immediately benefit from lower net R&D costs.

- A peculiar feature in the ME Research and Development 2014-2020 scheme is that cash grants are only given for the wage costs; other costs can benefit from credits on corporate income tax. As explained above, such tax credit may come in many years later, or even never where no profit is

65 https://english.rvo.nl/subsidies-programmes/wbso
made. For that reason, and for the sake of simplification, it would be preferable to adapt the ME R&D grant scheme by providing cash grants for all eligible costs, or at least giving firms the option to claim subsidies on all eligible costs.

- Malta could consider abolishing its patent box because, according to international studies, patent boxes have a less sound economic rationale, do not stimulate R&D and may rather be used as a profit-shifting instrument, leading to high tax revenue losses.\(^{66}\)

- Regarding EU state aid rules, funding schemes should provide the option of making use of the General Block Exemption Regulation, rather than the de minimis Regulation, in order to avoid companies being constrained by the aid ceiling of EUR 200 000 per undertaking over a 3-year period. In particular, this ceiling is likely to limit the effectiveness of the technology development programme in FUSION.

- Obliging enterprises to complete a commercialisation voucher stage before applying to the technology development programme under FUSION may be seen as an unnecessary burden, as it delays the start of the technology development project. It is probably relevant to incentivise the use of the voucher scheme rather than making its use compulsory.

- Higher penetration of support schemes can be obtained through more proactive delivery methods in a client-centred approach. A key account management system, which focuses on clients instead of funding programmes, could be put in place at both MCST and ME. Key account managers in ME (as the ‘home’ agency for businesses) help companies in participating not only in all ME schemes, but also in FUSION, managed by MCST, and the schemes of MSD. Vice versa, key account managers at MCST (the ‘home’ agency for HEIs) should help UoM and MCAST in participating not only in FUSION, but also in the collaborative R&D schemes of ME and MSD. At MCST, each account manager could cater to one or several of the UoM faculties and MCAST institutes. The approach should aim also at raising the awareness of companies regarding benefits they can get out of R&D and innovation. Offering diagnosis of innovation potential is one way forward in this respect (see example from Estonia in Box 16). This should be accompanied by coaching companies in writing successful project proposals.

- Since the support schemes run by MSD are similar in goals and target groups to the ME schemes, the PSF Panel advises concentrating on the

---

\(^{66}\) A study of R&D tax incentives made in 2014 for the European Commission put Malta’s patent box and R&D tax credit scheme in last and second last positions in the overall ranking of all 83 schemes assessed. Overall, Malta got the lowest average benchmark score of all countries surveyed.  
delivery of them in the next period with ME, ensuring proper training of ME staff on EU rules.

Box 16 Raising awareness of innovation in companies through proactive support: the Enterprise Development Programme in Estonia

Established in 2000, Enterprise Estonia (EAS) promotes business and regional policy in Estonia. It is one of the largest institutions within the national support system for entrepreneurship; it provides financial assistance, counselling, cooperation opportunities and training for entrepreneurs, research institutions, the public and non-profit sectors.

EAS’s Enterprise Development Programme aims to support well-thought-out development, improved action planning, innovation implementation and product development. Participation in the programme is not limited to applying for and receiving financial aid: EAS is also focused on determining the enterprise’s strategic views and compiling a long-term plan. EAS approaches each enterprise individually. It can help in the implementation stage of the development plan by providing any services from a wide range and combining them in accordance with the company’s needs. Any participant can use the services of an EAS personal client manager and mentor, who are knowledgeable of the company’s path, and can open the necessary doors and find expert advice.

The Enterprise Development Programme consists of three stages:
1. Identifying the enterprise’s ambition and readiness for change;
2. Preparing the development plan;
3. Implementing the development plan.


6.2 Instruments for the promotion of public-private cooperation in research and innovation

6.2.1 The current situation

For companies, cooperation with other companies, universities and research institutes, and participation in public-private partnerships or public programmes for collaborative R&D have many advantages, as these allow them to leverage their own efforts in R&D and innovation with external resources, and may serve as stepping stones for participation in similar schemes at the European level (see Chapter 7).

Evidence suggests that Malta is performing poorly in terms of public-private cooperation in R&D and innovation (see European Innovation Scoreboard\(^{67}\) figures in Annex 2):

- Malta ranked 24th within the EU in the share of innovative SMEs involved in any type of cooperation – Index 29.7 in the 2018 European Innovation Scoreboard (EU=100);

---

\(^{67}\) EC (2018b).
Malta ranked lowest in the EU in terms of public-private co-authored scientific publications – Index 0 in 2018 European Innovation Scoreboard (EU=100);

Together with Cyprus, Malta was lowest in the EU in private co-funding of public R&D expenditures – Index 6.6 in 2018 European Innovation Scoreboard (EU=100).

The main instruments that can be used for collaborative R&D in Malta are:

- FUSION (MCST), (launched in 2014 with various budgets, EUR 2.2 million as of 2018), see section 5.3;
- The Space Research Fund (EUR 2 million, launched in 2018);
- Research and Development 2014-2020 (ME), see section 6.1;
- Business Enhance RD&I Grant Scheme (MSD), see section 6.1.

However, except for FUSION, cooperation between science and industry are not mandatory features of these schemes, which are anyway not (yet) taken up on a significant scale. Within FUSION, the difficulty to engage businesses has been mentioned already, and the hypothesis (to be verified through evaluation, see section 4.5) is that this programme is funding public research oriented toward the needs of the country, rather than collaborative research per se.

Altogether Malta seems to be lacking effective public-private promotion programmes.

6.2.2 The way forward

The PSF Panel sees five ways forward to promote public-private collaboration in research and innovation in Malta, some of which have already been proposed here.

First, as a pre-condition, there is a need to adapt the framework and strategies at HEIs with respect to working with industry (see section 5.3 on HEI’s third mission).

Second, the opportunity for developing public-private partnerships around large research infrastructure such as the SLC, as already argued in section 5.4, is an appropriate option to bridge the two worlds.

Note: The initiative of a Research Trust Fund at UoM, gathering funding from private sector investors and aiming at funding research at the university, is a very positive one. Nevertheless, while it might be seen as a sign that private investors are aware of the impact of investing in science, it cannot replace a proper funding system for public research (see Chapter 5).
Third, the suitability and relevance of existing business support schemes (see section 6.1) should be investigated, from the point of view of their contribution to cooperative research:

- The quest for grants may generate ‘fake’ partnerships just for the sake of getting proposals accepted and meeting requirements;
- IP conditions in public-private collaborative R&D need to be clarified in line with state aid rules; joint IP should be avoided, as, in general, it is unworkable for companies;
- Overlaps need to be assessed and possibilities of merging instruments explored;
- Budgets may need to be increased and processes simplified (see section 6.1).

Fourth, shortcomings in the existing support schemes for public-private collaboration need to be addressed in line with the recommendations in section 6.1.2.

Fifth, the PSF Panel recommends going forward with the plans for establishing the intersectoral mobility/exchange scheme KTP (Knowledge Transfer Partnerships), taking into account lessons from foreign experiences (Box 17). Such a scheme is likely to help in bringing together the worlds of science and business and fostering industrial talents. It is unfortunate that it is taking 7 years to get this scheme implemented since initial discussions began in 2012.

Box 17 Lessons from Knowledge Transfer Partnership (KTP) programmes

The United Kingdom has a long-standing Knowledge Transfer Partnerships (KTP) Programme (formerly Teaching Company Scheme). This programme supports the placement of a graduate in a company, responding to the research and innovation needs of the company and at the same time facilitating access to knowledge resources in the public research sector. A 2010 evaluation of the scheme points to a high degree of satisfaction, both from the side of academia, which gains new insights for teaching and for the identification of new research themes thanks to the connection with industry, and from the side of businesses. A more recent evaluation (2015) of the scheme in Scotland is also highly positive and notes that businesses invest additional money, besides the agreed co-funding, to further exploit the results of KTP projects. It concludes that successful, innovative collaboration relies on two factors: 1) the strength of the relationship between the partners; and 2) the absorptive capacity of the business partner.

---


Another European Commission study (2018b) on Fostering Industrial Talents in Research at European Level indicates the following success factors for these mobility schemes: integrating virtual and physical mobility, co-location, interaction and collaboration. Those schemes that have appointed liaison officers to coordinate supervision arrangements for researchers or have involved intermediaries appear to be successful. A further key finding was that there need to be sufficient funding incentives put in place to make schemes attractive to researchers, academic institutions and industry. For example, some schemes offer not only a salary but also a package of support to include relocation for themselves and if necessary, due to physical relocation to another city, also for family relocation.

A Science Europe study (2017) concludes its comparative analysis with the following five recommendations:

**Recommendation 1.** To maximise the success of intersectoral mobility schemes, the industrial or non-academic sector should be involved early in the process, for example when designing new schemes or for review and selection processes.

**Recommendation 2.** Organisations running intersectoral mobility schemes should consider developing transparent IP rules; those with limited experience can learn from those who already have substantial experience in the domain.

**Recommendation 3.** Organisations should prepare researchers for intersectoral mobility and the cultural change it involves through adequate training, in particular regarding 'soft skills', communication, the handling of IPR and entrepreneurship.

**Recommendation 4.** Research organisations should introduce policies to consider intersectoral mobility in researchers’ careers as something positive, so that researchers are not disadvantaged if they publish less due to their mobility in the private sector, where instead they gain a lot of other experience useful for the research system, such as the handling of IPR and knowledge concerning the valorisation of research results for industrial or other commercial purposes.

**Recommendation 5.** It should be common practice to systematically monitor gender statistics in all support schemes; this will help in developing appropriate measures in the future to enhance participation in specific types of schemes where a gender is underrepresented.


Another interesting possibility is the Young Researchers from Industry scheme, as experimented with in Slovenia (Box 18). Rather than targeting students at university, these schemes target potential PhD students coming from a

---

company to a university to do their studies. The thesis has to be relevant for the company and upon completion of the PhD, students have to return to the company. This scheme proved to be an important incentive for promoting science-industry cooperation.

Box 18 Slovenia’s Young Researchers from Industry Programme

The Young Researchers Programme is one of the most successful activities in the area of education and training for R&D and innovation in Slovenia. The programme was already set up in 1985 and has, over the years, worked successfully in bringing young people into research. During their doctoral studies the young researchers have a supervisor in this institution and take part in the research as junior assistants. The Slovenian Research Agency pays for their salary, tuition fees and mentorship costs. At peak times the programme received over EUR 30 million annually; in 2015 it dropped to EUR 17.8 million, but still provided for 178 new young researchers to be selected for funding every year. All together, approximately 900 young researchers have been funded.

Based on this measure, in 2001, a special window exclusively for young researchers from the business sector was introduced. This programme was implemented by the Technology Agency (TIA) and supplemented with resources from the ESF. Young researchers from the business sector participated in research work during their postgraduate studies, both within basic research or R&D applied research projects, related to the needs of their company. What was specific in the case of the young researchers from the business sector was the fact that the candidates for PhDs worked with two mentors: one from the company and one from the HEI where the studies took place. This assured the relevance of the research for the company and thus contributed to the further employability of the young researcher. The TIA covered the salary, social contributions, material and non-material costs for research and doctoral studies. The funds for the training of young researchers were allocated for a fixed term, up to a maximum of 4 years and 6 months for a PhD programme (doctorate). The expansion of the programme had been significant (up to 140 candidates annually) once the additional funds from the ESF had been channelled towards this measure, in spite of cited administrative difficulties with the implementation.

The measure had received several positive reviews, not only as a direct contribution of new highly skilled human resources to the business R&D but also indirectly as a very good channel for developing the contacts between the business R&D and the public sector R&D units (HEI primarily). During their studies the young researchers got familiar with the research potential of the HEI and could initiate joint projects with their employer. In a separate analysis on industry and science cooperation (Bučar and Rojec, 2014), the role of young researchers from business enterprises was singled out as the most important instrument in promoting/ initiating the cooperation of business enterprises with HEIs and PROs.

References: www.arrs.si/en/mr/
6.3 Support to start-ups and access to finance for SMEs

6.3.1 The current situation

Maltese SMEs make a very high contribution to the economy: they generate 81 % (compared to 56.8 % for the EU average) of value added and also 81 % (compared to 66.34 % for the EU average) of employment in the country's 'non-financial business economy'. Access to finance has been the subject of numerous initiatives in recent years, including the JEREMIE, MicroInvest, MicroCredit, MicroGuarantee and ERDF Start-up Grant schemes, which use various instruments such as tax credits, grants and financial guarantees to improve financing options for SMEs.

Two separate platforms exist for the support of start-ups, one provided by the ME and another by MSD; seed funding and grants are allocated to start-ups by both agencies (see details in Table A5 in Annex 2).

In addition to the above funding schemes, the two public research institutions in Malta, UoM and MCAST, also support start-ups, either through promoting entrepreneurship in education or through providing direct support to start-ups, including the TAKEOFF incubator and the TOSFA and MARSA funds (see details in Table A6 in Annex 2).

The Malta Information Technology Agency (MITA) Innovation Hub, set up in 2014, launched the first accelerator programme branded YouStartIT, which aims to support up to 45 start-ups during the period 2016-2020. It provides seed investment to start-ups (in 2017, 11 received funding). Also, the Malta Communications Authority (MCA) is a Start-up Genome Member, which in its 2018 report highlighted Malta as a favourable location for start-ups in financial services, gaming and blockchain-related activities.

Other novel initiatives implemented or underway in recent years include a crowdfunding platform, the Multilateral Trading Facility, as well as:

- Venture Capital Malta, launched in February 2015, is a public-private partnership with the aim of attracting venture capitalists to Malta. It was expected that this initiative would help bridge the gap in the provision and availability of funding for start-ups;

- The Government also set up the Malta Development Bank (MDB) in 2017, with an authorised capital of EUR 200 million, allowing it to leverage this to around EUR 1 billion of loans in due course. The MDB’s financing operations consist mainly of facilities extended through intermediaries, mainly credit

74 See Figure 17 on policy mix in section 4.4 and details in Table A5 in Annex 2.
institutions – the so-called second-tier operations. The bank is fully owned by the Government.

6.3.2 The way forward

Malta has several schemes supporting start-ups as well as the growth of SMEs, yet the information is scattered and thus the comprehensive start-up ecosystem seems underdeveloped and the support provided neither transparent nor user-friendly. According to the Small Business Act Europe 2018, Malta has made great efforts to improve the business climate for SMEs, with mixed results. More coordination and a clearer framework of the different schemes would be welcome.

The PSF Panel suggests the following directions for the way forward, in view of creating a fully integrated and transparent support system for start-ups (see the example from Slovenia in Box 19):

- Re-assessing the available schemes of ME and MSD as well as of other agencies and authorities that support start-ups;
- Supporting the design of a clear and coordinated start-up platform for entrepreneurs, potential investors and other interested parties;
- Further streamlining of regulations and improving access to finance for SMEs.

‘The country performs above the EU average in single market and internationalisation. However, it lagged behind the other EU Member States in addressing the "second chance" and state aid & public procurement principles. Since 2008, the country has progressed significantly in single market and responsive administration. However, the lack of information on indicators for entrepreneurship and access to finance does not allow for a consistent evaluation of Malta’s profile.’ (Small Business Act Europe 2018).
The main characteristics of the Slovenian innovation system were its fragmentation and uncertainty, which contributed to mixed effectiveness of intermediary institutions and lack of systematic support for young entrepreneurs. This has changed significantly with the start-up initiative, resulting from the document Start-up Manifest (Rebernik and Jaklič, 2014), prepared by a couple of professors and a team of like-minded people from various organisations across Slovenia. In the Manifest, they set themselves a set of very ambitious goals until 2020:

- Create 1 000 new jobs in start-up companies in Slovenia;
- Connect at least 50 start-up companies with the most important start-up ecosystems in the world;
- Create or attract at least 150 start-up companies with global potential.

These goals are to be achieved through Start-up Initiative, where all of the relevant stakeholders should cooperate and contribute, from governmental institutions to knowledge institutions, enterprises and other actors in the innovative environment. The ambition of the partners in Start-up Initiative is to cover the whole spectrum of support activities, from helping to develop the initial idea and turning it into a business proposal to establishing an enterprise and finding an appropriate form of financial support for a particular stage of the enterprise. The cooperation of a wide range of complementary partners has resulted in an effective support system. The core programmes of the initiative are:

a) programmes for talent activation (motivational meetings, student competitions, start-up weekends, accelerators for idea development);

b) programmes for accelerated launch (GeekHouse accelerator, start-up roadshow events: a competition for ‘Start-up of the year’ as well as other workshops and events);

c) programmes for global growth (Go:Global accelerator, 1:1 mentorship events, entering accelerators abroad, other programmes for global growth).

The annual competition for start-ups provides a platform for the selection of the best, which can apply for the financial support from the Slovenian Enterprise Fund (SEF). The instrument is designed so that a start-up can receive a grant of EUR 54 000 to be distributed over a period of 3 years (EUR 10 000 during the first year, EUR 12 000 in the second evaluation period and EUR 32 000 during the last) and spend it on pre-described activities. These include participation in the start-up programmes, selection of a mentor from the Start-up Initiative database and implementation of the business plan. So a start-up gets money to pay for some of the services it needs on the way to success, and support organisations receive funds for the work they do and are not covered by the government grant.

Should a start-up successfully complete this phase, they can apply further for greater funding, for what is called a convertible loan (up to EUR 250 000), provided by the SEF. Since the partners in Start-up Initiative are also accelerators, business angels and investors, some of the start-ups can be invited by them into their programmes and funding.

7 FOSTERING INTERNATIONALISATION OF THE MALTESE RESEARCH AND INNOVATION SYSTEM

7.1 Participation of Malta in EU-level programmes

7.1.1 The current situation

For research as well as for innovation, and for small countries with limited natural resources and an open economy in particular, strong participation in international networks is crucial. A detailed overview of Malta’s involvement in EU-level R&D programmes and its internationalisation efforts can be found elsewhere. However, the limited critical mass of resources available in Malta creates entry barriers to participate in many EU-level initiatives. This is visible in the following comparative figures:

- Malta is lowest of all Member States (in terms of % of GBAORD) in national public funding for transnationally coordinated R&D; however the gap with the EU-level average is reducing,

- Malta is second lowest of all Member States (in terms of % GBAORD) in national contributions to Europe-wide transnational public R&D programmes;

- Although Malta is a member of EUREKA, it is the only Member State with no project in the database for 2013-2017.

Nevertheless, although due partly to its size, ranking lowest among Member States in the absolute amount of EU funding received through H2020, in relative terms Malta is performing quite well in H2020. For every euro Malta invests in R&D, it gets EUR 0.07 in funding from H2020 and this is well above the European average of EUR 0.02 from H2020 per euro of national R&D investment (Figure 21). Furthermore, in proportion to its size (as measured by population), Malta is punching above its weight by being central to the H2020 collaboration network of EU-15 countries. In addition, Malta is – again in

78 Section 3.3.1 and Annex 1-4, Background Report (Restall 2019).
80 Malta is lowest at 0.67 %; Belgium highest at 9.93 % in 2016. https://ec.europa.eu/eurostat/web/science-technology-innovation/data/database
82 Bulgaria is lowest at 0.51 %, Malta is next at 0.52 %, Belgium is highest at 7.97 %. https://ec.europa.eu/eurostat/web/science-technology-innovation/data/database
83 http://www.eurekanetwork.org/data-interactive
relative terms – very actively networking in COST;\textsuperscript{86} one out of three Maltese researchers is involved in COST actions.

Figure 21 Annual EU investment through Horizon 2020 per euro of national gross expenditures in R&D (GERD) by country of beneficiary

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{horizon_investment_graph.png}
\caption{Horizon 2020 investment per euro of national gross expenditures in R&D (GERD) by country of beneficiary.}
\end{figure}

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Within the H2020 Widening programme targeting EU-13 countries, Maltese actors have applied successfully in 2 out of the 3 funding schemes: Teaming (one project,\textsuperscript{87} however limited to Phase 1), Twinning (3 projects by MCAST and 1 by UoM) and ERA-Chair (no project).

Malta is involved in a number of EU-level joint initiatives and partnerships, in fields that are relevant for Malta’s research strengths and societal needs: management of sea, water and food resources and cooperation in the Mediterranean environment (the PRIMA joint research and innovation programme; the Joint Programming Initiative Oceans; several ERA-NET Co-funds); the aeronautic sector (Clean Sky Joint Undertaking) and the electronic components & systems sector (ECSEL Joint Undertaking).The University of Malta represents the country in the BioBanking and BioMolecular Research Infrastructure\textsuperscript{88} partnership, the aim of which is the harmonisation and interoperability of bio-banks and life science research across Europe. Malta participates in the ESFRI Forum and ERIC Committee, DARIAH and BBMRI, and collaborates in SHARE.

In addition Malta is engaged in bilateral and multilateral cooperation schemes, such as the International bilaterals with China, a framework for collaboration with the Ministry of Science and Technology in China, mainly in the field of aquaculture, which is one of Malta’s smart specialisation areas.

\textsuperscript{86} https://www.cost.eu/who-we-are/members/MT/

\textsuperscript{87} TEMARA project was obtained by the Ministry of Tourism to develop a business plan (Teaming phase 1) for a centre of excellence in the aerospace sector, the NAC (see section S.4), which failed to proceed towards actual establishment of the Centres of Excellence (CoE).

\textsuperscript{88} www.bbmri-eric.eu
Worth mentioning is also the adoption of the National Space Policy in 2017, and the establishment of the Space Research Fund and the Space Educational Programme, opening up opportunities for international cooperation in this field.\(^8^9\)

UoM is part of the (many) consortia competing for the European universities initiative, and participates in a wide international network involving, in particular, exchanges of students.

With the kENUP Foundation,\(^9^0\) Malta is also taking proactive actions to enhance international collaboration of Maltese stakeholders in one RIS3 area (health) and one transversal technology (ICT). It focuses on large-scale highly innovative and high-risk ventures. Since 2018, kENUP became a Core Partner of EIT Health Knowledge and Innovation Community (KIC) and is fostering Maltese participation in this KIC. It is also spearheading a pan-European initiative aimed at creating a fair and transparent compensation system for the digital exploitation of content.

The 2015 survey\(^9^1\) on internationalisation in Malta’s academia found the low political priority for R&I and the low government expenditure on R&I to be the key general barriers. Some of the main constraining factors affecting researchers were financial constraints (including post-doctoral funding), time constraints due to teaching commitments, bureaucracy and administrative challenges, insufficient support, design and priorities of national R&I funding, and a lack of IP policy. The support requested included tangible political support, a range of local funding schemes, specific support for international collaboration (e.g. dedicated research posts and post-doc positions, proper research grants), support for industry-academia collaboration, administrative support and training for writing and vetting proposals, and enabling structures for more cross-disciplinary work.

Most of the above criticisms relate to more general weaknesses in the Maltese R&I system, which have been dealt with in previous chapters (i.e. weak priority for R&D at governmental level in Chapter 4, lack of national funding for research activities and insufficient incentives to pursue a research career in Chapter 5, insufficient incentives for public-private cooperation in Chapter 6). A specific response to the criticism of insufficient support for internationalisation has been provided by MCST in 2015, with the launch of the Internationalisation Partnership Award Scheme (IPAS)\(^9^2\). This scheme provides funding for 1) the development of joint teaching curricula, 2) placements for local researchers in foreign institutions, 3) the arrangement of strategic and targeted visits to foreign entities, 4) the organisation of seminars or workshops with the participation of foreign experts, and 5) the development of transnational R&I

---

\(^8^9\) It was not possible to investigate this field during the work of the PSF Panel.

\(^9^0\) [www.kenup.eu](http://www.kenup.eu).

\(^9^1\) MCST (2015), *Academia Survey on Internationalisation*.

proposals for submission to third-party funders, e.g. H2020, etc. The scheme, initially open to academia only, has been subsequently opened to industry as well.

7.1.2 The way forward

Benefits from H2020 correlate with national R&D expenditure (Figure 22). Therefore to avoid losing opportunities to be gained from participation in EU-level initiatives and programmes, the number one priority for Malta should be investing more in R&D (see section 4.2).

Figure 22: Horizon 2020 investment per country of beneficiary, in signed grants, compared to national investments in R&D (intramural R&D expenditures – GERD) per country, in EUR per inhabitant

Reinforcing the national research and innovation system should be number two priority if Malta wants to upgrade its capacity to benefit from EU opportunities. The PSF Mutual Learning Exercise on Widening Participation and Strengthening Synergies provides a rich toolbox, based on good practices developed in EU MS, with four routes for widening participation in the Framework Programme for R&D (FP) in EU-13 countries (Box 20).

---

1. Attracting qualified R&D staff from abroad to work in the public and private sectors, thereby enhancing institutional capabilities and putting potential participants in a better place to link with foreign actors and participate in successful H2020 proposals;

2. Encouraging science-business cooperation in national contexts, thus familiarising potential participants in H2020 with the type of collaboration between public and private sector actors that is expected within most H2020 projects;

3. Improving networking through participation in other EU-level initiatives, thereby gaining experience of collaboration on an international basis;

4. Rectifying information, communication and skills deficits, enabling R&I performers to become better informed about FP possibilities, more visible on an international stage, and better equipped in terms of skill sets and resources to formulate FP proposals and participate in FP projects.


Considering the fourth route in Box 20, namely the provision of specific information and resources for preparing proposals and accessing EU-level initiatives, the PSF Panel definitely welcomes the introduction of IPAS. However it has doubts about the effectiveness of the support provided: funding is capped at EUR 5 000, is mainly intended for travel and subsistence costs, and requires substantial paperwork. To strengthen the scheme and make it more attractive, the costs of external consultants hired for drafting proposals should also be made eligible and the budget should be increased. Furthermore, in view of the limited amount of funding, the PSF Panel sees no need for having each proposal reviewed by three independent experts; an eligibility check should be sufficient. Furthermore, in addition to IPAS, Malta should establish a more substantial budget dedicated to facilitating active participation of researchers in internationalisation initiatives, in particular for boosting Malta’s low participation in the FP. The example of investment in supporting participation in FP in Portugal is proposed in Box 21.

Worth considering also is creating a budget (e.g. with ERDF money) for rewarding Seal of Excellence projects (i.e. high-quality projects submitted to H2020 that were deemed to deserve EU funding but did not receive it due to budget limits). Apparently, MCST has requested a budget for that purpose in 2019. It would be good to foresee a structural budget for funding Seal of Excellence projects in the new Operational Programme for the period beyond 2020.
Following Portugal’s early participation in the Framework Programmes, after entering the EU, the international dimension became a central part of Portuguese S&T policy. With the onset of a Ministry for Science and Technology in 1995 came a new Institute for International Scientific and Technological Cooperation, which dealt with bilateral, multilateral and European cooperation, supporting the early internationalisation of the system and the participation in the Framework Programmes.

As the system became more robust, a dedicated Office to Promote the Framework Programmes (GPPQ) was set up. GPPQ hosts the Network of National Contact Points, both to support national policy positions in coordination with the National Delegates and Experts, and to support the research and innovation community towards a successful participation in the Framework Programme (FP). GPPQ organises events throughout the country promoting the FP and disseminating information of the future calls. In doing so, and relying on the experience of prior successful submissions as well as on the experience of individual evaluators, it guides proponents in highlighting central issues of successful proposals, provides recommendations on proposal development and management, and can also intermediate partner search.

This experience of support to the R&I actors has been reflected in an increasing success in Portuguese participation in the FPs. Proposals with Portuguese participation have had a success rate so far in H2020 of 14.1%, which is higher than the overall success rate of the programme (standing at 12.45%). The overall financial return has improved; while the overall funding share awarded to Portuguese participants during FP6 represented 1.01% of total FP6 funding, during H2020 Portuguese participants attracted 1.58% of total H2020 FP funding, which is above the Portuguese overall contribution share to the EU.

The success of this approach, and the importance placed on participation in European collaborative initiatives, has led the Government to strengthen this strategy. The support network is being extended both at the national level, with contact points at universities, polytechnics and research centres, and at the international level, with liaison officers to be placed with European and international cooperative programmes.

Prioritisation between the huge variety of EU-level and international programmes is a key issue for countries the size of Malta. As mentioned in the previous section, Malta is participating in initiatives that show a clear relationship with its key strengths and main societal challenges. The PSF Panel recommends continuing with clear prioritisation along these lines. In addition:

- The details of the return on the participation of Malta in several joint research programmes or EU-level networks for research should be examined through monitoring and evaluation; this would help refine and further expand these participations in similar or different networks.

- The H2020 Widening programme, including the Teaming, Twinning and ERA-Chair schemes, are particularly relevant to build critical mass and attract researchers to Malta, and should be given priority (Box 22). Developing joint research groups or institutes focusing on specific research themes in collaboration between UoM (and possibly also MCAST) and suitable foreign universities is a good opportunity for Malta. This could help make the public research sector more lively and active by bringing in foreign teaching staff (specific courses, summer courses, virtual courses,
etc.), researchers and students. Accessing foreign research infrastructure is also a benefit to be gained from such collaborations.

- Tapping into the power of the Maltese diaspora is another option to be further explored.

Box 22 Benefitting from the H2020 programme Teaming in Cyprus

In Cyprus, the Research Centre on Interactive Media Smart Systems and Emerging Technologies (RISE) has been established to contribute to the grand vision of turning Nicosia into a regional Innovation, Technology and Creativity Hub. Co-funded by the EU Teaming programme and aligned with the Smart Specialisation Areas of Cyprus, it brings research, technology and innovation under one roof. RISE conducts primarily applied research, but also invests in promising basic research. It supports around 25 multidisciplinary research teams (120 staff) and works directly with industry. RISE provides technical and scientific know-how to support innovative ideas emerging from the city ecosystem, and fulfils an important social mission of culture change and encourages new business creation. The key ingredients of success for RISE are: its excellent location in a creative neighbourhood of the city; its good connection with expert partners, both national and international; and the use of synergistic funding sources (H2020 Widening – Teaming; co-funding by the Government; funding from partners and the ESIF; and third party financing for services).

Reference: www.rise.org.cy

One area which deserves particular attention in Malta, given its strengths in ICT applications in several domains, are the new opportunities emerging at the European level in this field, in particular the new EUR 9.2 billion Digital Europe programme of the EU (2021-2027). It will include blockchain, artificial intelligence, cybersecurity and other topics highly relevant for Malta’s service economy and e-gaming in particular. Thanks to its focus on the digital domain, Malta is very well positioned to capitalise on these developments. In particular, the country may want to consider strengthening its Digital Innovation Hubs, for example to facilitate the move of its high value-added manufacturing sector (one of Malta’s RIS3 priorities) towards Industry 4.0. Digital Innovation Hubs are intended to contribute to develop new IT skills and more efficiently share the scarce IT skills, with a focus on helping SMEs in addressing digitalisation challenges. These act as one-stop-shops for companies to get access to technology-testing, financing advice, market intelligence and networking opportunities, showing some similarity with the FabLab initiatives. Furthermore, all Digital Innovation Hubs are internationally linked in a pan-European network.

Finally, with respect to meeting the ERA objectives, Malta needs to work out solutions and reforms necessary for its national R&I system. For this, our report provides the key recommendations; little additional action is needed on the ERA objectives per se.

REFERENCES


Malta Council for Science and Technology (2015), Academia survey on internationalisation.


ANNEX 1: THE PSF PANEL

Dieter IMBODEN, Chair, is professor emeritus at ETH Zurich. He was full professor of Environmental Physics in the Department of Environmental Sciences from 1988 to 2012. He served as head of the department from 1992 to 1996. From 2005 to 2012 he was president of the Research Council of the Swiss National Science Foundation (SNSF). In this function, he chaired the association of the heads of European research councils (EUROHORCs) for 3 years (2009-2011). He was the initiator and founding president of the new organisation Science Europe. In 2014, the German Gemeinsame Wissenschaftskonferenz (GWK) mandated Dieter Imboden to chair an international expert panel for the evaluation of the Exzellenzinitiative, initiated to foster excellence in research at German universities. The report delivered in January 2016 formed the basis for the design of the continuation of the programme. Prof. Imboden was born in Zurich on 22 August 1943. He studied theoretical physics in Berlin and Basel and in 1971 received his doctorate at the ETH Zurich following a dissertation on theoretical solid-state physics. His interest in the environment, particularly water, brought him to the Swiss Federal Institute for Environmental Sciences and Technology (EAWAG) and to the Scripps Institution of Oceanography, California. Since 1974 he has been teaching at the ETH Zurich. In 1982 he completed his habilitation requirements in the field of mathematical modelling and environmental physics. In 1987 he was one of the co-founders of the new curriculum in environmental sciences at the ETH Zurich. From 1998 to 1999 he was the director of novatlantis, an interdisciplinary project on sustainable development within the domain of the Swiss Federal Institutes of Technology, where he initiated the pilot project '2000 Watt Society'. He has been visiting professor at various universities such as MIT and Caltech. For many years Prof. Imboden's main research concerned the physics and chemistry of natural water bodies, especially the large lakes of the earth (Lake Baikal, Caspian Sea, etc.). One of his central aims in research as well as in teaching is to combine the methods of physics with other disciplines in order to tackle the complex environmental problems. His textbook, Environmental Organic Chemistry, which he wrote together with two chemists, René Schwarzenbach from ETHZ and Phil Gschwend from MIT, won the Chemistry Book of the Year Award of the Association of American Publishers in 1994 (revised and expanded editions were published in 2003 and 2017).

Claire NAUWELAERS, Rapporteur, is an independent policy analyst and governmental adviser. During the last 30 years, Claire has been working on policy advice for regional, national and European authorities in the domain of science, research, technology and innovation policies. She performed this work in an academic environment (Universities of Louvain, Belgium and Maastricht, Netherlands) and at the OECD (in the Innovation unit of the Regional Development Policy division of the Governance Directorate), and as an independent expert. Her primary areas of research and expertise revolve around the analysis and policy advice about the functioning of research and innovation systems. She is working on policy development, analysis and evaluation in the areas of research, technological development and innovation. She is one of the leading experts in Europe on Smart Specialisation Strategies. She is a member of the scientific steering committees of several research
networks, part of the policy review teams, and is regularly invited as an expert in high-level expert groups for the European Commission or the Member States. She has published numerous books and articles on policy aspects of research, technology and innovation.

**Maja BUčAR, expert,** is a professor in the Centre of International Relations and the Faculty of Social Sciences of the University of Ljubljana. She is also a member of the Scientific Council for Social Science at the Slovenian Research Agency (SRA). As a member of the National Science and Technology Council, Maja has been a member of expert teams preparing RDI strategies, as well as in a team drafting the law on R&D. She worked as an advisor of the Ministry of Higher Education, Science and Technology of Slovenia for the preparation of the National Research and Development Programme 2006-2010, 2010-2020, the Slovenian presidency programme for EUREKA 2007-2008, and the preparation of the background report on the National System of Innovation for the OECD’s Evaluation of Slovenian Innovation System. For some years, she has been involved in projects addressing public policy mix for R&D and innovation policies, from Trendchart (Country correspondent 2004-2013), ERAWATCH (2006-2014) and currently RIO Country Reports on Slovenia 2016, 2017, 2018. She has also been involved in several expert groups at EU level assessing the policy mix, the implementation of Lisbon Strategy II, Member and co-rapporteur of the Panel of Independent Experts, appointed by the European Commission for the Interim evaluation of the EUROSTARS programme, and on the Expert Panel for the evaluation of the COST programme, 2013-2014. Maja has been involved in several evaluations and monitoring studies, both at the level of the system and at the level of specific measures, adopted by the Government of Slovenia over the past 20 years.

**Ana COSTA FREITAS, expert,** is rector at the University of Evora, Portugal since 2014. In the period 2010-2014 she was an adviser at EC BEPA – Bureau of European Policy Advisers with the dossier for Higher Education; at the same time she was a member of the Chief Scientific Adviser team. During the period 2006-2010 Ana Costa was vice-rector at the University of Evora. She has also served in other leading positions at the University of Evora. She is a member of the High Level Group for Higher Education of DG RTD. In addition to her academic work, she has given lectures and presentations, and has participated in publications on the modernisation of higher education and the future of higher education in Europe and the world. Her scientific field of expertise is food science and technology, mainly related to Mediterranean agriculture, and the preservation and sustainability of the Mediterranean ecosystem. She is also a member of the PRIMA Foundation Steering Committee and the General Assembly.

**Jan VAN DEN BIESEN, expert,** was educated as a physicist at Leiden University, spent 1 year as a post-doc at the University of California in Berkeley then joined Philips in 1983 to work on semiconductor research. Three years later, he was seconded for 1 year to Hitachi’s Central Research Laboratory in Tokyo. From 1990 to 1992 he was responsible for liaising with the Dutch public authorities on Philips’ participation in national R&D programmes. In that period, he also complemented his education with a joint Executive MBA from the University of Rochester, NY, and Erasmus University Rotterdam. As a special
assistant to Philips’ chief technology officer, he took part in a major corporate strategy study on multimedia from 1994 to 1996. In 1997, Jan van den Biesen became responsible for developing Philips’ policy regarding public R&D and coordinating Philips’ worldwide participation in such programmes. A vice-president of Philips Research since 2000, he became Head of Public R&D Programmes in 2007. Until his retirement from Philips as of 1 April 2017, he was a vice-president of the Steering Board of the ARTEMIS Industry Association and a member of the Management Committee of the AENEAS Industry Association, the Research and Innovation Working Groups of BUSINESSEUROPE and DIGITALEUROPE and the Technology & Innovation Committee of VNO-NCW. From April 2008 to February 2012 he was advising the European Commission as a member of the European Research Area Board (ERAB), and from May 2016 to January 2018 as a member of the Open Science Policy Platform (OSPP). He is a member of the Governing Board of the ECSEL Joint Undertaking. As a thought leader on European research policy from the industrial perspective, Jan van den Biesen is a regular speaker at conferences, hearings and expert panels. In May 2017 he established himself as an independent adviser under the business name EUROPOLARIS — European Policy Advice and Research & Innovation Strategies.

Dermot MULLIGAN, national peer, is assistant secretary general/head of the Innovation and Investment Division of the Department of Business, Enterprise and Innovation in Ireland. His areas of responsibility include formulation and implementation of government policy on innovation, research and development, foreign direct investment, north/south trade and business development programmes, and Ireland’s involvement in a range of international research and technology programmes involving the European Union and the European Space Agency. He is a member of the IDA Ireland and Science Foundation Ireland boards. He has played a lead role in formulating and coordinating the implementation of Ireland’s science & technology, research and development national strategy called Innovation 2020. He has previously worked in a range of government departments including the departments of Health, Finance and Education & Skills. He holds a first degree in Law and an MSc (Economics) in Policy Studies from Trinity College Dublin and an MBA from the University of Warwick.

Tiago SANTOS PEREIRA, national peer, is currently the head of the Studies and Strategy Office of the Foundation for Science and Technology (FCT), the main national research-funding agency in Portugal, and on leave from his position as senior research fellow of the Centre for Social Studies (CES) of the University of Coimbra. In his current function he is the national delegate to the Committee on Science and Technology Policy (CSTP) from the OECD, and to its Working Party on Innovation and Technology Policy (TIP), of which he is currently vice-chair. He was recently chair of the ERAC ad-hoc Working Group on ‘Measuring the Impact of EU Framework Programmes for Research and Innovation at National Level’, and was part of the national coordinating committee in support to the OECD Review of the Tertiary Education, Research and Innovation System in Portugal (2018). He has collaborated with diverse organisations in the S&T policy area, in the area of evaluation and of policy studies, namely with the European Commission, UNESCO, FCT, CYTED and the ESF.
The project was overseen by the PSF Team in the EC’s Directorate-General for Research and Innovation (Unit A4 – ‘Reforms and economic impact – country intelligence’). Anca DUMITRESCU GORANOV and Petra KENNEDY coordinated the exercise and ensured liaison with the Maltese authorities. The PSF contractor supported the EC’s PSF Team in this activity. This involved work by Viola PETER, deputy director, Valentina PARZIALE, deputy project manager, Jari ROMANAINEN, who acted as the quality reviewer, and Brian RESTALL (Projects in Motion Ltd), an independent expert who prepared the background report.
ANNEX 2: ADDITIONAL INFORMATION

A2.1. H2020 participation and key scientific and innovation performance indicators

Table A1 - Horizon 2020 participations per country of beneficiary compared to overall performance of EU countries in key scientific and innovation performance indicators

<table>
<thead>
<tr>
<th>Country Code</th>
<th>Nr of participations in signed grants per thousands scientists and engineers in the country</th>
<th>Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country, 2015</th>
<th>International scientific co-publications per million population, 2017</th>
<th>Public-private co-publications per million population, 2017</th>
<th>PCT patent applications per billion GDP (in PPP), 2015</th>
<th>Employment in knowledge-intensive activities (% of total employment, 2017)</th>
<th>European Innovation Scoreboard Country Group 2018</th>
<th>EU15/ EU13 Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY</td>
<td>153</td>
<td>9.0</td>
<td>1283</td>
<td>21.1</td>
<td>0.8</td>
<td>17.0</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>LU</td>
<td>108</td>
<td>13.1</td>
<td>1713.0</td>
<td>25.4</td>
<td>1.8</td>
<td>22.0</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>MT</td>
<td>96</td>
<td>10.7</td>
<td>597.4</td>
<td>0.0</td>
<td>1.3</td>
<td>18.4</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>EL</td>
<td>97</td>
<td>9.0</td>
<td>608.3</td>
<td>10.5</td>
<td>0.7</td>
<td>12.1</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>SI</td>
<td>96</td>
<td>8.6</td>
<td>1134.6</td>
<td>56.1</td>
<td>1.6</td>
<td>13.7</td>
<td>STRONG</td>
<td>EU13</td>
</tr>
<tr>
<td>AT</td>
<td>8.7</td>
<td>11.1</td>
<td>1375.8</td>
<td>82.3</td>
<td>4.7</td>
<td>15.0</td>
<td>STRONG</td>
<td>EU15</td>
</tr>
<tr>
<td>EE</td>
<td>8.5</td>
<td>8.2</td>
<td>1077.8</td>
<td>10.6</td>
<td>1.0</td>
<td>13.5</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>BE</td>
<td>8.0</td>
<td>12.6</td>
<td>1467.6</td>
<td>80.0</td>
<td>3.2</td>
<td>15.6</td>
<td>STRONG</td>
<td>EU15</td>
</tr>
<tr>
<td>IT</td>
<td>7.9</td>
<td>10.4</td>
<td>631.9</td>
<td>22.2</td>
<td>2.2</td>
<td>13.7</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>DK</td>
<td>7.0</td>
<td>13.4</td>
<td>2345.9</td>
<td>162.8</td>
<td>6.7</td>
<td>15.1</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>ES</td>
<td>6.6</td>
<td>9.3</td>
<td>732.1</td>
<td>21.1</td>
<td>1.4</td>
<td>12.5</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>NL</td>
<td>6.6</td>
<td>14.6</td>
<td>1688.1</td>
<td>99.3</td>
<td>5.8</td>
<td>17.1</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>FI</td>
<td>6.1</td>
<td>10.8</td>
<td>1858.8</td>
<td>85.4</td>
<td>7.4</td>
<td>16.2</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>IE</td>
<td>6.2</td>
<td>12.6</td>
<td>1249.3</td>
<td>48.4</td>
<td>1.8</td>
<td>20.6</td>
<td>STRONG</td>
<td>EU15</td>
</tr>
<tr>
<td>PT</td>
<td>5.4</td>
<td>9.0</td>
<td>918.9</td>
<td>13.2</td>
<td>0.9</td>
<td>10.6</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>LV</td>
<td>4.9</td>
<td>6.2</td>
<td>315.4</td>
<td>1.0</td>
<td>0.8</td>
<td>12.1</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>FR</td>
<td>4.8</td>
<td>11.0</td>
<td>726.2</td>
<td>42.8</td>
<td>4.0</td>
<td>14.5</td>
<td>STRONG</td>
<td>EU15</td>
</tr>
<tr>
<td>SE</td>
<td>4.6</td>
<td>12.1</td>
<td>2018.0</td>
<td>130.6</td>
<td>9.1</td>
<td>18.5</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>HR</td>
<td>4.3</td>
<td>4.6</td>
<td>492.3</td>
<td>17.3</td>
<td>0.6</td>
<td>11.6</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>SK</td>
<td>3.7</td>
<td>6.2</td>
<td>438.8</td>
<td>10.3</td>
<td>0.5</td>
<td>10.6</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>DE</td>
<td>3.3</td>
<td>11.3</td>
<td>812.2</td>
<td>62.4</td>
<td>6.1</td>
<td>14.8</td>
<td>STRONG</td>
<td>EU15</td>
</tr>
<tr>
<td>HU</td>
<td>3.1</td>
<td>6.9</td>
<td>456.3</td>
<td>29.6</td>
<td>1.3</td>
<td>11.6</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>UK</td>
<td>3.0</td>
<td>15.0</td>
<td>1223.5</td>
<td>65.1</td>
<td>3.1</td>
<td>18.5</td>
<td>LEADER</td>
<td>EU15</td>
</tr>
<tr>
<td>LT</td>
<td>2.9</td>
<td>4.3</td>
<td>450.5</td>
<td>3.9</td>
<td>0.8</td>
<td>9.7</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>CZ</td>
<td>2.7</td>
<td>6.6</td>
<td>754.8</td>
<td>21.0</td>
<td>0.9</td>
<td>12.9</td>
<td>MODERATE</td>
<td>EU15</td>
</tr>
<tr>
<td>BG</td>
<td>2.1</td>
<td>4.2</td>
<td>226.6</td>
<td>3.0</td>
<td>0.6</td>
<td>10.2</td>
<td>MODEREST</td>
<td>EU13</td>
</tr>
<tr>
<td>RO</td>
<td>1.4</td>
<td>4.8</td>
<td>181.8</td>
<td>3.7</td>
<td>0.2</td>
<td>7.7</td>
<td>MODEREST</td>
<td>EU13</td>
</tr>
<tr>
<td>PL</td>
<td>1.1</td>
<td>5.1</td>
<td>296.6</td>
<td>5.4</td>
<td>0.7</td>
<td>10.3</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
<tr>
<td>EU28</td>
<td>na</td>
<td>10.57</td>
<td>517.45</td>
<td>40.93</td>
<td>3.53</td>
<td>14.20</td>
<td>MODERATE</td>
<td>EU13</td>
</tr>
</tbody>
</table>

A2.2. Malta’s national strategies of importance for research and innovation

- National Research and Innovation Strategy 2014-2020
- National European Research Area Roadmap Malta 2016-2020
- Malta National Reform Programme (2018)
- Operational Programmes for European Regional Development Fund and Cohesion Fund 2014-2020 Malta
- National Digital Strategy 2014-2020
- Green Public Procurement Action Plan
- National Environment Policy
- A Strategic Plan for the Prevention of Early School Leaving (2014)

- Framework for the Education Strategy for Malta 2015-2024
- A National Health Systems Strategy for Malta 2014-2020
- Malta National Lifelong Learning Strategy 2020
- A National Curriculum Framework for All (2012)
- National Employment Policy (2014)
- National Vocational Education & Training Policy (2015)

• National Strategic Policy for Poverty Reduction & for Social Inclusion (2015)\textsuperscript{113}

A2.3. European Innovation Scoreboard Malta 2018

Malta is a Moderate Innovator. Over time, performance has increased relative to that of the EU in 2010.

Provisional CIS 2016 data show improved performance for the two expenditure indicators and reduced performance for four indicators.

Structural differences with the EU are shown in the table below. The turnover share of large enterprises is well below the EU average.

### Performance and structure of the economy

<table>
<thead>
<tr>
<th>Metric</th>
<th>MT</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (US$)</td>
<td>26,500</td>
<td>28,600</td>
</tr>
<tr>
<td>Average annual GDP growth (%)</td>
<td>6.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Employment share Manufacturing (NACE C) (%)</td>
<td>12.6</td>
<td>13.5</td>
</tr>
<tr>
<td>of which High and Medium High-tech (%)</td>
<td>30.0</td>
<td>37.2</td>
</tr>
<tr>
<td>Employment share Services (NACE G-N) (%)</td>
<td>46.4</td>
<td>41.6</td>
</tr>
<tr>
<td>of which Knowledge-intensive services (%)</td>
<td>35.2</td>
<td>35.0</td>
</tr>
<tr>
<td>Turnover share SMEs (%)</td>
<td>45.0</td>
<td>38.0</td>
</tr>
<tr>
<td>Turnover share large enterprises (%)</td>
<td>17.6</td>
<td>44.4</td>
</tr>
<tr>
<td>Foreign-controlled enterprises - share of value added (%)</td>
<td>13.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>

### Business and entrepreneurship

<table>
<thead>
<tr>
<th>Indicator</th>
<th>MT</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise births (100 employees) (%)</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Total Entrepreneurial Activity (TEA) (%)</td>
<td>n/a</td>
<td>6.6</td>
</tr>
<tr>
<td>FDI net inflows (% GDP)</td>
<td>17.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Top R&amp;D spending enterprises per 10 mth population</td>
<td>22.7</td>
<td>19.7</td>
</tr>
<tr>
<td>Inward sensitisation (1 to 7 best)</td>
<td>55.5</td>
<td>57</td>
</tr>
</tbody>
</table>

### Governance and policy framework

<table>
<thead>
<tr>
<th>Indicator</th>
<th>MT</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of starting a business (1 to 10 best)</td>
<td>63.8</td>
<td>76.9</td>
</tr>
<tr>
<td>Basic school enrolment, education and training (1 to 7 best)</td>
<td>n/a</td>
<td>1.9</td>
</tr>
<tr>
<td>Govt. procurement of advanced tech products (1 to 7 best)</td>
<td>3.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Rule of law (2.5 to 2.5 best)</td>
<td>1.1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

### Demography

<table>
<thead>
<tr>
<th>Indicator</th>
<th>MT</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population size (millions)</td>
<td>0.5</td>
<td>5.103</td>
</tr>
<tr>
<td>Average annual population growth (%)</td>
<td>2.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Population density (inhabitants/km²)</td>
<td>1477.8</td>
<td>117.1</td>
</tr>
</tbody>
</table>

### EU targets for 2020

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2013</th>
<th>Latest</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross domestic expenditure on R&amp;D (% of GDP)</td>
<td>0.77</td>
<td>0.61</td>
<td>2.0</td>
</tr>
<tr>
<td>Tertiary educational attainment</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of population aged 50-54</td>
<td>26.0</td>
<td>30.5</td>
<td>33.0</td>
</tr>
</tbody>
</table>

### Sources

1. Sources are provided in the introduction to the country profiles.

### RIO country report

## A2.4. Public support for companies in Malta

Table A2 provides a summary of funding schemes for RDI in companies.

### Table A2: Funding schemes for R&D and innovation available to companies in Malta

<table>
<thead>
<tr>
<th>Scheme (by owner)</th>
<th>Scheme consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ME schemes</strong></td>
<td></td>
</tr>
<tr>
<td>Innovation aid for SMEs (tax credit) for hiring personnel</td>
<td>For each of the five schemes: between 0 and 2 applications/year, all applications accepted</td>
</tr>
<tr>
<td>Research and Development 2014-2020 (tax credit and cash grant on wage costs)</td>
<td></td>
</tr>
<tr>
<td>R&amp;D Feasibility studies (grants)</td>
<td></td>
</tr>
<tr>
<td>Aid for R&amp;D (tax credits) for R&amp;D projects</td>
<td></td>
</tr>
<tr>
<td>Aid for R&amp;D&amp;I (tax credit) for hiring personnel</td>
<td></td>
</tr>
<tr>
<td><strong>MCST schemes targeting all types of companies as well as public research actors</strong></td>
<td></td>
</tr>
<tr>
<td>FUSION (Grants) Commercialisation vouchers</td>
<td>209 applications over 2014-2018 (39% by companies)</td>
</tr>
<tr>
<td></td>
<td>89 projects over 2014-2018 (27% by companies). Companies get 18% of funds</td>
</tr>
<tr>
<td>FUSION programme consortia Technology (Grants) for Development public-private</td>
<td>58 applications over 2015-2018 (22% led by companies)</td>
</tr>
<tr>
<td></td>
<td>32 projects over 2015-2018 (22% led by companies). Companies get 32% of funds</td>
</tr>
<tr>
<td><strong>MSD schemes targeting all companies</strong></td>
<td></td>
</tr>
<tr>
<td>Business Enhance RD&amp;I Grant Scheme: Feasibility Studies, Research and Development Projects, Investment in Research Infrastructures, Process Innovation</td>
<td>7 applications in 2018, all rejected</td>
</tr>
</tbody>
</table>

*Sources: PSF Panel based on data from MCST and ME*
Table A3 provides details on the range of schemes provided by MSD, which support business development in general (thus not specifically geared towards RDI activities). The table is followed by the list of general schemes delivered by ME and the Ministry for Education and Employment.

### Table A3: MSD grants schemes for business development 2014-2020 (excluding Business Enhance RD&I Grant Scheme)

<table>
<thead>
<tr>
<th>MSD ERDF Business Enhance Grant Schemes</th>
<th>Allocated budget and size of grants</th>
<th>Scheme consumption (status mid 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME Diversification and Innovation Grant Scheme</td>
<td>€8 m foreseen over 2014-2020</td>
<td>26 projects (majority of investments in new equipment)</td>
</tr>
<tr>
<td></td>
<td>Maximum grant: €200 000</td>
<td></td>
</tr>
<tr>
<td>Start-up Investment Grant Scheme</td>
<td>€7 m foreseen over 2014-2020</td>
<td>15 projects (majority of investments in tourism)</td>
</tr>
<tr>
<td></td>
<td>Maximum grant: €300 000</td>
<td></td>
</tr>
<tr>
<td>SME Growth Grant Scheme</td>
<td>Maximum grant: €500 000</td>
<td>24 projects</td>
</tr>
<tr>
<td>SME Internationalisation Grant Scheme</td>
<td>Maximum grant: €10 000</td>
<td>2 projects</td>
</tr>
<tr>
<td>e-Commerce Grant Scheme</td>
<td>€5 m foreseen over 2014-2020</td>
<td>48 projects</td>
</tr>
<tr>
<td></td>
<td>Maximum grant: €5 000</td>
<td></td>
</tr>
<tr>
<td>SME Consultancy Services Grant Scheme</td>
<td>Maximum grant: €4k</td>
<td>83 projects</td>
</tr>
</tbody>
</table>

Source: [https://businessenhance.gov.mt/en/schemes/Pages/General-Information-.aspx](https://businessenhance.gov.mt/en/schemes/Pages/General-Information-.aspx)

ME delivers general schemes, which target all companies and not specifically RDI active companies. These schemes include:

- the Micro Guarantee Scheme, which has the objective to accelerate growth by facilitating access to debt finance for SMEs;
- Loan guarantees which provide access to finance to assist enterprises in the acquisition of capital assets;
- the Micro Invest scheme, which aims at encouraging undertakings to invest in their business, innovate and expand;
• Certify (tax credits), which provides financial support to help undertakings improve the quality of their products, services and processes through the attainment of industry-recognised certifications;

• Cooperate for Growth, which assists undertakings to build capacity to compete in different markets;

• Schemes supporting start-ups;

• Scheme supporting qualifications and training in companies: Skills Development Scheme.

The Ministry for Education and Employment delivers the Get Qualified scheme, supporting the upgrade of qualifications in companies.
## A2.5. Support schemes for students in Malta

### Table A4: Support schemes for students in Malta

<table>
<thead>
<tr>
<th>Support scheme and owner</th>
<th>Description: target, funding MQF7=Masters; MQF8=Doctorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholarships and traineeships (MCST): France-Malta scholarships, ESA scholarships, etc.</td>
<td></td>
</tr>
<tr>
<td>STEPS (Strategic Educational Pathways Scholarships) – 2007-2013 (Ministry Education &amp; Employment)</td>
<td>8 Calls for Applications disbursed around €10 m, supported 82 doctoral students and 781 scholarships for Masters degree.</td>
</tr>
<tr>
<td>MGSS (Malta Government Scholarships Post-Graduate Scheme) 2006-2014 (Ministry Education &amp; Employment)</td>
<td>Promotes further specialisation at MQF7 and MQF8 levels. 235 scholarships were awarded for doctoral students and 228 for Masters degrees.</td>
</tr>
<tr>
<td>Master it (Ministry Education &amp; Employment)</td>
<td>Promotes the increase of MQF7 students. 651 individuals supported.</td>
</tr>
<tr>
<td>ENDEAVOUR Scholarships Scheme (Ministry Education &amp; Employment)</td>
<td>Assists people to pursue further levels of academic research (MQF7 and MQF8). Grants of appr. €8 000 (MQF7) and €10 500 (MQF8) per annum are available, with additional grants to full-time doctoral students, as well as for studying abroad.</td>
</tr>
<tr>
<td>TESS (Tertiary Education Scholarships Scheme) (Ministry Education &amp; Employment)</td>
<td>Supports quality tertiary education from MQF7 upwards. Grants to post-graduate and doctoral students, with amounts similar to ENDEAVOUR.</td>
</tr>
<tr>
<td>Reach High post-doc scholarships (2015) (Ministry Education &amp; Employment)</td>
<td>Post-doctoral research programmes. Max. grant per research project €200 000, for max. 3 years (+4 yr extension). Portable grant. 16 scholars selected and €2.7 million disbursed.</td>
</tr>
</tbody>
</table>

---

114 The considerably lower number of individuals supported by STEPS to undertake a doctoral programme was due to STEPS being a European Social Fund project with a specific time schedule for the disbursement of funds and therefore supporting only full-time doctoral studies.

115 Scholarships at postgraduate level – A tracer study amongst beneficiaries, December 2015.


118 Information from National Skills Council. Web page shows rankings of 36 candidates.
| Support scheme and owner | Description: target, funding
MQF7=Masters;
MQF8=Doctorate |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Call planned at end of 2018: research projects will have to be linked to the needs of industry.</td>
<td></td>
</tr>
<tr>
<td>Fiscal incentives to encourage people to pursue post-graduate education (from academic year 2017-2018) (Ministry Education &amp; Employment)</td>
<td>Individuals who are not yet 40 years old and who pursue a post-graduate course at level MQF7 and MQF8 will not be subject to any income tax up to a maximum of 2 years from when they graduate and enter into employment.</td>
</tr>
<tr>
<td>Get Qualified Scheme for MQF levels 3 to 8 (Ministry Education &amp; Employment)</td>
<td>Supports studies by giving tax credits covering 70% of costs subject to capping of €15 000 for Masters and €25 000 for doctorates.</td>
</tr>
</tbody>
</table>
## A2.6. Support for start-ups in Malta

### Table A5: Main support schemes for start-ups in Malta

<table>
<thead>
<tr>
<th>Support scheme and owner</th>
<th>Description: target, funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business START ME</td>
<td>ME(^{119}) is offering a seed funding for start-ups via Business START(^{120}) with an initial grant of up to €10 000 and quarterly funding of up to €10 000 during their start-up period, in total up to €25 000 per beneficiary; the Start-up Finance measure, where assistance may be up to €100 000 if linked to crowdfunding campaigns and up to €200 000 when the support is linked to private equity as well as Startup Advance supporting small start-ups that are in the process of consolidating a business operation(^{121}).</td>
</tr>
<tr>
<td>Support for Start-ups under Business Enhance ERDF Grant Schemes MSD</td>
<td>Under the Business Enhance ERDF Grant Schemes, the measure that is directly relevant to the support of start-ups is the Start-up Investment Grant Scheme with an allocation of €7 m of the total €51 million of grants available to support enterprises. The scheme provides for a maximum grant of €300 000, part-financing 50 % of eligible expenditures. It seeks to assist start-ups engaged in activities that are associated with RIS3.</td>
</tr>
</tbody>
</table>

---

\(^{119}\) [https://www.maltaenterprise.com/sites/default/files/ME%20presentation.pdf](https://www.maltaenterprise.com/sites/default/files/ME%20presentation.pdf)

\(^{120}\) Texts on measures are compiled from the Malta Enterprise web page: [https://www.maltaenterprise.com/](https://www.maltaenterprise.com/)

\(^{121}\) To be complete, one should add the ME LEAP2ENTERPRISE Scheme, which is designed to assist vulnerable individuals in setting up their own sustainable, income-generating business activities.
Table A6: Support to entrepreneurship and start-ups in HEIs in Malta

<table>
<thead>
<tr>
<th>HEI</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UoM</td>
<td>UoM hosts the Centre for Entrepreneurship and Business Incubation (CEBI) which helps strengthen the concept of entrepreneurship. So far 100 students have obtained a Masters in Entrepreneurship, with a substantial number of students actually managing to set up their own business. CEBI also hosts the TAKEOFF incubator, specifically designed to help create successful STEAM (science, technology, engineering, arts and media), and knowledge-based start-up enterprises. In 2017, TAKEOFF managed the Maritime Seed Fund Award (MARSA) and the TAKEOFF Seed Fund Award (TOSFA) on behalf of the Ministry for Economy, Investment and Small Business (MEIB) and Malta Marittima Agency. Furthermore the Malta Marittima Agency, together with the University of Malta, launched the Maritime Proof of Concept in 2017, which aims to aid and financially support researchers and entrepreneurs to take their maritime-related technology or business innovative idea one step further towards commercialisation. In 2017, 7 researchers and entrepreneurs were awarded seed funds under the Maritime Proof of Concept and further calls are planned for 2018 (NRP, 2018).</td>
</tr>
<tr>
<td>MCAST</td>
<td>MCAST has also introduced entrepreneurship as a key skill across the Foundation, Technical and University Colleges with the intention that ideas are turned into business proposals, and then funded. Any promising ideas and proposals are subsequently developed within the MCAST Entrepreneurship Centre (MEC), which provides students and alumni with the opportunity to transform creative and innovative ideas into profitable and sustainable business ventures.</td>
</tr>
</tbody>
</table>
ANNEX 3: DEFINITIONS OF R&D AND INNOVATION

In this report we adhere to the definitions for research and development (R&D) and innovation, as employed by the National Statistics Office (NSO) of Malta, which are basically in line with the conventional definitions of Eurostat and OECD:

1. **Research and development** is defined as creative work undertaken on a systematic basis to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

2. **R&D is classified in four main performing sectors:**
   - Government sector (GOV): includes all government ministries and departments, offices and other bodies, which furnish, but normally do not sell to the community, those services, other than higher education, which cannot otherwise be conveniently and economically provided, as well as those that administer the state and the economic and social policy of the community.
   - Business enterprise sector (BES): includes all firms, organisations and institutions whose primary activity is the market production of goods and services (other than higher education) for sale to the general public at economically significant prices.
   - Higher education sector (HES): includes all universities, colleges of technology and other institutions of post-secondary education, whatever their source of finance or legal status.
   - Private non-profit sector (PNP) – includes non-market, private non-profit institutions serving households and private individuals or households. This sector is not captured as it is considered to be negligible in Malta.

3. **R&D covers three types of activity:**
   - Basic research: refers to experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.
   - Applied research: refers to original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
   - Experimental development: refers to systematic work, drawing on knowledge gained from research and practical experience, which is directed to producing new products or processes or to improving existing products or processes.
4. An **innovation** is a new or significantly improved product (goods or services) brought to market by an enterprise or a new or significantly improved process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations implemented by an enterprise.

More specifically:

- A product innovation is the market introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components or sub-systems.

- A process innovation is the implementation of a new or significantly improved production process, distribution method or supporting activity.

- A marketing innovation is the implementation of a new marketing concept or strategy that differs significantly from the enterprise’s existing marketing methods and which has not been used before.

- An organisational innovation is a new organisational method in the enterprise business practices (including knowledge management), workplace organisation or external relations that has not been previously used by the enterprise.

5. **Technological innovation** refers to product innovation and/or process innovation; non-technological innovation refers to marketing innovation and/or organisational innovation.
ANNEX 4: PSF PANEL SURVEY ON DOCTORAL STUDIES

BACKGROUND

In order to obtain a better picture about the situation of Maltese doctoral students, a small survey was launched. The current doctoral students were contacted by the university and a link to an online survey provided. By February 2019, a total of 366 doctoral students were listed by the university. They are broken down into the various categories shown in Table 1 below.

<table>
<thead>
<tr>
<th>Course</th>
<th>Maltese citizens</th>
<th>Foreign citizens</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Philosophy</td>
<td>171</td>
<td>43</td>
<td>214</td>
</tr>
<tr>
<td>Doctor of Philosophy</td>
<td>111</td>
<td>16</td>
<td>127</td>
</tr>
<tr>
<td>Doctorate in Pharmacy</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Doctor of Sacred Theology</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>295</td>
<td>71</td>
<td>366</td>
</tr>
</tbody>
</table>

*Source: University of Malta*

Foreign students represent 19.3 % of the total (71 out of 366).

By 4 March 2019, 67 responses had been obtained (18.3 %). The following analysis is limited to these 67 responses. It should be noted that the small number of responses (both as an absolute and relative figure) means that the quantitative value of the survey is limited, although it provides a valuable qualitative insight. It should also be borne in mind that foreign students are over-represented; 21 foreign students responded to the survey and represent 31 % of the total responses.
THE RESPONDENTS

The share of full-time doctoral students is slightly higher than for part-time students (55.2% vs 44.8%).

Full-time doctoral students seem to finish their doctorate in the 4th year, while for part-time students this process requires more time.

Source: PSF Panel Survey

Figure 1: Share of doctoral students by year and type, in %

Source: PSF Panel Survey

Figure 2: Share of respondents by fields of study

Source: PSF Panel Survey
The main fields of study, based on the survey data, are represented by humanities (32%) and engineering and technology (27%).

Figure 3: Share of doctoral students by field of study, type of doctorate (FT/PT), and year of study

Source: PSF Panel Survey; Note: FT-Full-time, PT-Part-time

There is no real discernible pattern with 67 responses, but one may note that in the humanities, there are by and large as many part-time as full-time PhD students, whereas in engineering and technology, there seem to be by far more full-time versus part-time doctoral students.

If students need more than 4 years, they tend to continue part-time.

Figure 4 indicates whether part-time and full-time doctoral students are Maltese or foreign citizens. In contrast to Maltese ones, foreign doctoral students are mostly following a full-time doctoral training (19 students out of 21).
A further breakdown by field of study suggests a clearer preference of Maltese students to take *engineering and technology and humanities*, while foreign students are more equally distributed. *Medical and health science* and *natural sciences* fields of study represent the lowest share of foreign doctoral students.

**Source: PSF Panel Survey**

**Figure 5: Distribution of Maltese versus foreign doctoral students by field of study (in %)**

Source: PSF Panel Survey. Note: 1.5 % – missing data
WHAT MADE YOU DECIDE TO PURSUE DOCTORAL STUDIES?

The survey asked about the reasons why doctoral students pursue doctoral studies. Nine different reasons were provided as answer categories, namely:

1. Plan to pursue an academic career
2. Expectations of international career
3. Personal interest in advanced education
4. Plan to pursue research or innovation activities in the private sector
5. Incentive from former professor
6. Expectations of improved future salaries
7. Private sector (it is asked from my current employer)
8. Public sector (it is asked from my current employer)
9. Other

While two-thirds of the respondents chose two to four reasons, 31 % chose one reason. The majority was clearly on ‘Plan to pursue an academic career’ (10 responses) and ‘Personal interest in advanced education’ (9 responses).

Among the other reasons the answer ‘Plan to pursue research or innovation activities in the private sector’ was mentioned by 25 % of the respondents; however, as a single reason, it was mentioned only twice.

The following table provides the number of mentions in absolute numbers as well as a share of the responding doctoral students. Here, we can see that about 70 % chose ‘Personal interest in advanced education’, followed by 63 % choosing ‘Plan to pursue an academic career’.
<table>
<thead>
<tr>
<th>Reasons</th>
<th>Number of mentions</th>
<th>Share of doctoral students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan to pursue an academic career</td>
<td>42</td>
<td>63</td>
</tr>
<tr>
<td>Expectations of international career</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td>Personal interest in advanced education</td>
<td>46</td>
<td>69</td>
</tr>
<tr>
<td>Plan to pursue research or innovation activities in the private sector</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td>Incentive from former professor</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Expectations of improved future salaries</td>
<td>21</td>
<td>31</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Private sector (it is asked from my current employer)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Public sector (it is asked from my current employer)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

The following tables provide details about the distribution of the preferences among part-time and full-time students, and among Maltese and foreign citizens.

Table 3: Reasons for pursuing doctoral studies by full-time/part-time, % calculated as total number of responses

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Full-time doctoral student</th>
<th>Part-time doctoral student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family or personal reasons</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Quality of advanced research in Malta in the field of study</td>
<td>20.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Costs of studying in Malta vs abroad</td>
<td>3.7</td>
<td>13.0</td>
</tr>
<tr>
<td>Already working in Malta</td>
<td>2.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Opportunity to have funded doctoral training</td>
<td>8.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Previous research collaboration with supervisor</td>
<td>11.2</td>
<td>8.7</td>
</tr>
<tr>
<td>Intend to pursue future career in Malta</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Other</td>
<td>0.6</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>50.3</td>
<td>49.7</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey
Table 4: Reasons for pursuing doctoral studies by full-time/part-time, % calculated on the total number of answers for full-time and part-time students

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Full-time doctoral student</th>
<th>Part-time doctoral student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family or personal reasons</td>
<td>2.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Quality of advanced research in Malta in the field of study</td>
<td>40.7</td>
<td>23.8</td>
</tr>
<tr>
<td>Costs of studying in Malta vs abroad</td>
<td>7.4</td>
<td>26.3</td>
</tr>
<tr>
<td>Already working in Malta</td>
<td>4.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Opportunity to have funded doctoral training</td>
<td>16.0</td>
<td>17.5</td>
</tr>
<tr>
<td>Previous research collaboration with supervisor</td>
<td>22.2</td>
<td>17.5</td>
</tr>
<tr>
<td>Intend to pursue future career in Malta</td>
<td>4.9</td>
<td>5.0</td>
</tr>
<tr>
<td>Other</td>
<td>1.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

Table 5: Reasons for pursuing doctoral studies, % calculated as total number of responses

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Citizen of Malta</th>
<th>Foreign citizen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan to pursue an academic career</td>
<td>54.6</td>
<td>17.2</td>
</tr>
<tr>
<td>Expectations of international career</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Personal interest in advanced education</td>
<td>4.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Plan to pursue research or innovation activities in the private sector</td>
<td>7.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Incentive from former professor</td>
<td>1.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Expectations of improved future salaries</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Private sector (it is asked from my current employer)</td>
<td>0.6</td>
<td>0.0</td>
</tr>
<tr>
<td>Public sector (it is asked from my current employer)</td>
<td>0.0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey (calculated based on total number of answers 163)
Table 6: Reasons for pursuing doctoral studies, % calculated on the total number of answers for citizens of Malta and foreign citizens

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Citizen of Malta</th>
<th>Foreign citizen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan to pursue an academic career</td>
<td>74.8</td>
<td>63.6</td>
</tr>
<tr>
<td>Expectations of international career</td>
<td>3.4</td>
<td>9.1</td>
</tr>
<tr>
<td>Personal interest in advanced education</td>
<td>6.7</td>
<td>4.5</td>
</tr>
<tr>
<td>Plan to pursue research or innovation activities in the private sector</td>
<td>10.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Incentive from former professor</td>
<td>2.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Expectations of improved future salaries</td>
<td>1.7</td>
<td>6.8</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Private sector (it is asked from my current employer)</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Public sector (it is asked from my current employer)</td>
<td>0.0</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: PSF Panel Survey (calculated based on total number of answers for citizens of Malta (119 responses) and foreign citizens (44 responses))*

**WHAT MADE YOU DECIDE TO PURSUE DOCTORAL STUDIES IN MALTA RATHER THAN ELSEWHERE?**

The tables below present the feedback of students on the reasons to pursue doctoral studies in Malta, rather than somewhere else.

Table 7: Decision to pursue doctoral studies in Malta, in %

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Full-time doctoral student</th>
<th>Part-time doctoral student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family or personal reasons</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Quality of advanced research in Malta in the field of study</td>
<td>20.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Costs of studying in Malta vs abroad</td>
<td>3.7</td>
<td>13.0</td>
</tr>
<tr>
<td>Already working in Malta</td>
<td>2.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Opportunity to have funded doctoral training</td>
<td>8.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Previous research collaboration with supervisor</td>
<td>11.2</td>
<td>8.7</td>
</tr>
<tr>
<td>Intend to pursue future career in Malta</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Other</td>
<td>0.6</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50.3</strong></td>
<td><strong>49.7</strong></td>
</tr>
</tbody>
</table>

*Source: PSF Panel Survey*
Table 8: Decision to pursue doctoral studies in Malta, in %

<table>
<thead>
<tr>
<th>Reason</th>
<th>Full-time doctoral student</th>
<th>Part-time doctoral student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family or personal reasons</td>
<td>2.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Quality of advanced research in Malta in the field of study</td>
<td>40.7</td>
<td>23.8</td>
</tr>
<tr>
<td>Costs of studying in Malta vs abroad</td>
<td>7.4</td>
<td>26.3</td>
</tr>
<tr>
<td>Already working in Malta</td>
<td>4.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Opportunity to have funded doctoral training</td>
<td>16</td>
<td>17.5</td>
</tr>
<tr>
<td>Previous research collaboration with supervisor</td>
<td>22.2</td>
<td>17.5</td>
</tr>
<tr>
<td>Intend to pursue future career in Malta</td>
<td>4.9</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>1.2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

As shown in Table 7, 20.5% and 11.8% of full and part-time doctoral students respectively (out of total students) pursue their doctorate in Malta due to the ‘quality of advanced research in Malta in the field of study’.

Table 8 shows that 40.7% and 23.8% of full and part-time doctoral students respectively pursue their doctoral studies in Malta due to the ‘quality of advanced research in Malta in the field of study’.

‘Previous research collaborations with supervisor’ positively influences the students to pursue a doctoral degree. However, part-time doctoral students tend to mention less frequently this reason in comparison with full-time doctoral students.

A remarkable difference between part-time and full-time doctoral students concerns the cost of studying in Malta. In particular, part-time PhD students indicate this reason.

Only a small share of doctoral students start their doctoral studies in Malta and intend to pursue a career in Malta.

Table 9 presents the results taking into account the citizenship of the respondents.
Table 9: Decision to pursue doctoral studies in Malta, in %

<table>
<thead>
<tr>
<th>Reason</th>
<th>Citizen of Malta</th>
<th>Foreign citizen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family or personal reasons</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Quality of advanced research in Malta in the field of study</td>
<td>26.5</td>
<td>52.5</td>
</tr>
<tr>
<td>Costs of studying in Malta vs abroad</td>
<td>21.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Already working in Malta</td>
<td>7.7</td>
<td>5.0</td>
</tr>
<tr>
<td>Opportunity to have funded doctoral training</td>
<td>18.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Previous research collaboration with supervisor</td>
<td>23.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Intend to pursue future career in Malta</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

As can be seen, 26.5% of Maltese doctoral students pursue their doctoral studies in Malta due to the ‘quality of advanced research in Malta in the field of study’. However, more than half of foreign students (52%) chose the same decision to pursue their doctoral training. 23.1% and 12.5% of Maltese and foreign doctoral students respectively pursue their doctoral studies in Malta due to the ‘previous research collaboration with supervisor’. A significant difference between Maltese and foreign doctoral students concerns the cost of studying in Malta. In particular, Maltese doctoral students indicate this reason. A very small share of foreign doctoral students start their doctoral training in Malta and intend to pursue a career in Malta.

**FUNDING**

Figure 6 shows that 31% of part-time doctoral students do not have any funds to obtain their doctoral studies. This indicator is slightly lower among full-time doctoral students. In general, full-time doctoral students indicate higher shares of obtaining fully or partially funded scholarships.
The majority of humanities doctoral students obtain no funding while in medical and health sciences as well as social sciences, the share of partly and fully funded doctoral students is higher than the ones receiving no funding.
Among 47 PhD students who responded to this question, Table 10 suggests that most of the students are not satisfied with the support scheme; 50% find it insufficient/fully insufficient while only one-quarter finds it sufficient/fully sufficient.

Table 10: Satisfaction level of support scheme for doctoral students to cover their cost of living, in %

<table>
<thead>
<tr>
<th>Level of sufficiency</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>38.3</td>
<td>12.8</td>
<td>23.4</td>
<td>14.9</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey, n=47; Note: 1 not being sufficient to 5 – fully sufficient

Table 11 suggests that citizens of Malta especially are not satisfied with the support scheme (50%).

Table 11: Satisfaction level of support scheme for doctoral students to cover their cost of living by citizenship, in %

<table>
<thead>
<tr>
<th>Level of sufficiency</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen of Malta</td>
<td>44.4</td>
<td>11.1</td>
<td>29.6</td>
<td>11.1</td>
<td>3.7</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey, n=47; Note: 1 not being sufficient to 5 – fully sufficient

INDEPENDENCE AND SATISFACTION

The tables below show the level of independence of the students and of satisfaction with their studies.

When asked about their level of independence, most of the doctoral students indicate that they are mostly or fully independent in their research activities. Interesting to note is the difference between full-time and part-time doctoral students – the latter feeling more often fully independent (doctoral students with more years of experience – 3 to 5 – tend to be more independent than the students of the 1st and the 2nd years). A similar pattern is noted for the breakdown between Maltese and foreign students, with the latter more satisfied about the level of independence.

Table 12: Level of independence in research work of doctoral students, presented as %

<table>
<thead>
<tr>
<th>Level of independence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time doctoral student</td>
<td>0</td>
<td>5.4</td>
<td>27.0</td>
<td>48.6</td>
<td>18.9</td>
</tr>
<tr>
<td>Part-time doctoral student</td>
<td>0</td>
<td>14.3</td>
<td>3.6</td>
<td>32.1</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey; Note: 1 not being independent to 5 – fully independent
Table 13: Level of independence in research work of doctoral students, presented as %

<table>
<thead>
<tr>
<th>Level of independence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen of Malta</td>
<td>0</td>
<td>13.6</td>
<td>15.9</td>
<td>31.8</td>
<td>38.6</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td>0</td>
<td>0.0</td>
<td>19.0</td>
<td>61.9</td>
<td>19.0</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey; Note: 1 not being independent to 5 – fully independent

When asked about their overall satisfaction, the majority of responding doctoral students is highly satisfied.

Table 14: Satisfaction level of doctoral students with their studies by full-time/part-time, in %

<table>
<thead>
<tr>
<th>Satisfaction level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time doctoral student</td>
<td>5.4</td>
<td>8.1</td>
<td>21.6</td>
<td>48.6</td>
<td>16.2</td>
</tr>
<tr>
<td>Part-time doctoral student</td>
<td>0.0</td>
<td>10.0</td>
<td>23.3</td>
<td>50.0</td>
<td>16.7</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey, Note: from 1 (lowest) to 5 (highest)

Table 15: Satisfaction level of doctoral students with their studies by Maltese/foreign citizens, in %

<table>
<thead>
<tr>
<th>Satisfaction level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen of Malta</td>
<td>2.2</td>
<td>13.0</td>
<td>23.9</td>
<td>47.8</td>
<td>13.0</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td>4.8</td>
<td>0.0</td>
<td>19.0</td>
<td>52.4</td>
<td>23.8</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey, Note: from 1 (lowest) to 5 (highest)

TEACHING, RESEARCH AND CAREER AMBITION

The doctoral students were asked whether they were involved in research activities at the universities. Possibly, this question was not sufficiently clear since a surprisingly high number of responses (40 or 60 %) indicate a clear ‘no’.

Table 16 indicates that the involvement in research activities (full-time and part-time) is especially high among students in the field of humanities. In contrast, the engineering and technology field of study involve the lowest share of doctoral students participating in research activities.
Table 16: Involvement in research activities of doctoral students, in %

<table>
<thead>
<tr>
<th>Field of study</th>
<th>yes</th>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full-time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>10.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Humanities</td>
<td>18.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>10.8</td>
<td>13.5</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>5.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Social sciences</td>
<td>8.1</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Part-time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>3.4</td>
<td>20.7</td>
</tr>
<tr>
<td>Humanities</td>
<td>41.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>6.9</td>
<td>0.0</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>3.4</td>
<td>6.9</td>
</tr>
<tr>
<td>Social sciences</td>
<td>10.3</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

Tables 17 and 18 indicate that, in most of the cases, full-time or part-time doctoral students, both Maltese or foreign students, who are involved in research activities do not receive compensation.

Table 17: Compensation for research activities of doctoral students, by full-time/part-time students, in %

<table>
<thead>
<tr>
<th>Field of study</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full-time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>25.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Humanities</td>
<td>14.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>20.0</td>
<td>5.7</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>14.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Social sciences</td>
<td>8.6</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Part-time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>26.1</td>
<td>4.3</td>
</tr>
<tr>
<td>Humanities</td>
<td>34.8</td>
<td>4.3</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>8.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>8.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Social sciences</td>
<td>8.7</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey. N=58, where full-time students=35 and part-time students=23
Table 18: Compensation for research activities of doctoral students, by full-time/part-time students, in %

<table>
<thead>
<tr>
<th>Field of study</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen of Malta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>31.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Humanities</td>
<td>21.1</td>
<td>2.6</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>15.8</td>
<td>5.3</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>10.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Social sciences</td>
<td>5.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering and technology</td>
<td>15.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Humanities</td>
<td>25.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Medical and health science</td>
<td>15.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>15.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Social sciences</td>
<td>15.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey. N=58, where citizens of Malta students=38 and foreign students=20.

Table 19 reveals that most of the doctoral students (part-time and full-time) do not have any contact with industry. However, we can notice that those doctoral students who are involved in research activity with industry are mostly citizens of Malta.

Table 19: Does the research of doctoral students include any contact with industry, in %

<table>
<thead>
<tr>
<th>Citizenship</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizen of Malta</td>
<td>37.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td>43.2</td>
<td>8.1</td>
</tr>
<tr>
<td>Part-time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizen of Malta</td>
<td>66.7</td>
<td>25.9</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td>7.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

Figure 8 looks at their involvement in teaching. Out of the 67 responses, 37 (55 %) answered with a ‘no’ while the remaining 30 (45 %) mentioned that they are teaching. Here we can see that full-time doctoral students are often less involved in teaching than part-time doctoral students. In another question we asked if they are remunerated for teaching activities. Only 3 of the teaching doctoral students do not receive any remuneration for their teaching activity.
Finally, the following tables look at career ambition.

The results in Table 20 indicate that most of the students would like to stay within the university, however the share is dropping with the years of experience gained over the doctoral studies. Employment in the private sector raises some interest among doctoral students. Interestingly, the doctoral students are less enthusiastic about going abroad to continue their career. Part-time doctoral students do not consider employment in the business sector.
Table 20: Career ambition of doctoral students, as % on total per year

<table>
<thead>
<tr>
<th>Study year</th>
<th>Stay within the university</th>
<th>Employment in public sector</th>
<th>Going abroad</th>
<th>Employment in business sector</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full-time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>93.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Year 2</td>
<td>34.6</td>
<td>19.2</td>
<td>7.7</td>
<td>34.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Year 3</td>
<td>81.5</td>
<td>0.0</td>
<td>0.0</td>
<td>7.4</td>
<td>11.1</td>
</tr>
<tr>
<td>Year 4</td>
<td>62.5</td>
<td>0.0</td>
<td>12.5</td>
<td>25.0</td>
<td>0.0</td>
</tr>
<tr>
<td>More than 4 years</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Part-time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Year 2</td>
<td>87.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Year 3</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Year 4</td>
<td>40.0</td>
<td>40.0</td>
<td>0.0</td>
<td>0.0</td>
<td>20.0</td>
</tr>
<tr>
<td>More than 4 years</td>
<td>82.4</td>
<td>11.8</td>
<td>0.0</td>
<td>0.0</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey

The results in Table 21 indicate that most of the students (foreign and Maltese citizens) would like to stay within the university, however the share is dropping with the years of experience gained over the doctoral studies. Employment in the private sector raises some interest, mostly among Maltese doctoral students. Interestingly, the doctoral students are less enthusiastic about going abroad to continue their career. Only 7% of foreign students consider employment in the business sector.
Table 21: Career ambition of doctoral students by citizenship, as % on total per year

<table>
<thead>
<tr>
<th>Study year</th>
<th>Stay within the university</th>
<th>Employment in public sector</th>
<th>Going abroad</th>
<th>Employment in business sector</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen of Malta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Year 2</td>
<td>52.4</td>
<td>4.8</td>
<td>9.5</td>
<td>28.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Year 3</td>
<td>90.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Year 4</td>
<td>44.4</td>
<td>22.2</td>
<td>0.0</td>
<td>22.2</td>
<td>11.1</td>
</tr>
<tr>
<td>More than 4 years</td>
<td>82.4</td>
<td>11.8</td>
<td>0.0</td>
<td>0.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Foreign citizen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>93.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Year 2</td>
<td>38.5</td>
<td>30.8</td>
<td>0.0</td>
<td>23.1</td>
<td>7.7</td>
</tr>
<tr>
<td>Year 3</td>
<td>66.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Year 4</td>
<td>75.0</td>
<td>0.0</td>
<td>25.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>More than 4 years</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: PSF Panel Survey
ANNEX 5: LIST OF MEETINGS AND INTERVIEWS

GENERAL SCHEDULE OF MALTA PEER REVIEW

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Venue and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kick-off meeting</td>
<td>Brussels, 24 July 2018</td>
</tr>
<tr>
<td>First country visit</td>
<td>Malta, 16 to 19 October 2018</td>
</tr>
<tr>
<td>PSF Panel Meeting</td>
<td>Brussels, 26 November 2018</td>
</tr>
<tr>
<td>Second country visit</td>
<td>Malta, 17 to 18 January 2019</td>
</tr>
<tr>
<td>PSF Panel Meeting</td>
<td>Brussels, 11 March 2019</td>
</tr>
<tr>
<td>Final meeting</td>
<td>Malta, 12 June 2019</td>
</tr>
</tbody>
</table>

FIRST COUNTRY VISIT 16 to 19 OCTOBER 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 October 2018</td>
<td>5.00 MCST chairman and heads</td>
<td>MCST, Villa Bighi, Kalkara</td>
</tr>
<tr>
<td></td>
<td>7.30 Welcome reception with heads of organisations</td>
<td></td>
</tr>
<tr>
<td>17 October 2018</td>
<td>9.00 Malta Chamber of Commerce, Enterprise and Industry heads and heads of relevant sector/sections</td>
<td>Malta Chamber of Commerce, Enterprise and Industry, Valletta</td>
</tr>
<tr>
<td></td>
<td>10.00 R&amp;D performing firms' CEOs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.00 Research, Innovation and Development Trust</td>
<td>University of Malta, Valletta</td>
</tr>
<tr>
<td></td>
<td>13.00 Malta Hotels and Restaurants Association</td>
<td>MHRA, Kappara, San Gwann</td>
</tr>
<tr>
<td></td>
<td>15.00 Esplora</td>
<td>Kalkara</td>
</tr>
<tr>
<td></td>
<td>16.15 MCAST heads</td>
<td>MCAST, Rahal Gdid</td>
</tr>
<tr>
<td>18 October 2018</td>
<td>9.00 Malta Enterprise</td>
<td>Malta Enterprise, San Gwann</td>
</tr>
<tr>
<td></td>
<td>11.00 Malta Life Sciences Park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.00 Scholarships Unit (MEDE) and National Skills Council</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.00 Rector, pro-rector and TTO head University of Malta</td>
<td>University of Malta, Msida</td>
</tr>
<tr>
<td></td>
<td>16.00 University of Malta researchers</td>
<td></td>
</tr>
<tr>
<td>19 October 2018</td>
<td>9.00 Breakfast briefing with Hon. Silvio Schembri, parliamentary secretary for Financial Services, Digital Economy and Innovation</td>
<td>Auberge de Castille, Valletta</td>
</tr>
</tbody>
</table>
## SECOND COUNTRY VISIT 17 to 18 JANUARY 2019

### 17 January 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00</td>
<td>Minister of Education and Employment</td>
<td>Ministry of Education and Employment, Floriana</td>
</tr>
<tr>
<td>11.00</td>
<td>Minister of European Affairs and Equality</td>
<td>Auberge D'Aragon, Misrah Indipendenza, Valletta</td>
</tr>
<tr>
<td>12.00</td>
<td>ERDF Measures and Support Unit</td>
<td></td>
</tr>
<tr>
<td>13.30</td>
<td>MCST staff</td>
<td>EC Representation, Valletta</td>
</tr>
<tr>
<td>15.00</td>
<td>Permanent secretary, Ministry for the Economy, Investment and Small Businesses</td>
<td>Ministry for the Economy, Investment and Small Businesses, Valletta</td>
</tr>
<tr>
<td>16.15</td>
<td>Permanent secretary (Budget and Finance), Ministry for Finance</td>
<td>Ministry for Finance, Valletta</td>
</tr>
</tbody>
</table>

### 18 January 2019

#### Sub-group 1

9.00 Jobsplus Chairperson

10.00 Rector, pro-rector and project leaders, University of Malta

**Sub-group 2**

8.30 Meeting with large companies
ST Microelectronics, Trelleborg

10.30 Meeting with SMEs
SEASUS, Aquabiotec, Acrosslimits, ICP

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sub-group 1</td>
<td>University Valletta Campus, St Paul Street, Valletta</td>
</tr>
<tr>
<td></td>
<td>Sub-group 2</td>
<td>EC Representation Office Valletta</td>
</tr>
</tbody>
</table>
## ANNEX 6: LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBMRI</td>
<td>European research infrastructure for biobanking</td>
</tr>
<tr>
<td>BERD</td>
<td>Business Expenditure on Research and Development</td>
</tr>
<tr>
<td>BES</td>
<td>business enterprise sector</td>
</tr>
<tr>
<td>CEBI</td>
<td>Centre for Entrepreneurship and Business Incubation at UoM</td>
</tr>
<tr>
<td>CoE</td>
<td>Centres of Excellence</td>
</tr>
<tr>
<td>COST</td>
<td>Cooperation in Science and Technology</td>
</tr>
<tr>
<td>DARIAH</td>
<td>Digital Research Infrastructure for the Arts and Humanities</td>
</tr>
<tr>
<td>DG</td>
<td>Directorate-General</td>
</tr>
<tr>
<td>DG RTD</td>
<td>Directorate-General for Research and Innovation</td>
</tr>
<tr>
<td>EDP</td>
<td>Entrepreneurial Discovery Process</td>
</tr>
<tr>
<td>EIT</td>
<td>European Institute of Technology</td>
</tr>
<tr>
<td>ERDF</td>
<td>European Regional Development Fund</td>
</tr>
<tr>
<td>ESF</td>
<td>European Social Fund</td>
</tr>
<tr>
<td>ERA</td>
<td>European Research Area</td>
</tr>
<tr>
<td>ERA-NET</td>
<td>European Research Area Network</td>
</tr>
<tr>
<td>ERC</td>
<td>European Research Council</td>
</tr>
<tr>
<td>ERIC</td>
<td>European Research Infrastructure Consortium</td>
</tr>
<tr>
<td>ESF</td>
<td>European Social Fund</td>
</tr>
<tr>
<td>ESFRI</td>
<td>European Strategy Forum on Research Infrastructures</td>
</tr>
<tr>
<td>ESIF</td>
<td>European Structural and Investment Funds</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EU-13</td>
<td>MS joining the EU since 2004: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Remaining EU MS are not listed under EU-13</td>
</tr>
<tr>
<td>EU-15</td>
<td>EUREKA Intergovernmental organisation for pan-European research and development funding and coordination</td>
</tr>
<tr>
<td>FDI</td>
<td>foreign direct investment</td>
</tr>
<tr>
<td>FFG</td>
<td>Austrian Research Promotion Agency</td>
</tr>
<tr>
<td>FP</td>
<td>Framework Programme for R&amp;D in the EU</td>
</tr>
<tr>
<td>FTE</td>
<td>full-time equivalent</td>
</tr>
<tr>
<td>FWF</td>
<td>Austrian Science Fund</td>
</tr>
<tr>
<td>GBARD</td>
<td>Government budget allocations for R&amp;D</td>
</tr>
<tr>
<td>GBAORD</td>
<td>Government budget appropriations and outlays for R&amp;D</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GERD</td>
<td>gross domestic expenditures on R&amp;D</td>
</tr>
<tr>
<td>GOV</td>
<td>government sector</td>
</tr>
<tr>
<td>HERD</td>
<td>higher education expenditure on R&amp;D (HERD)</td>
</tr>
<tr>
<td>HEI</td>
<td>higher education institutions</td>
</tr>
<tr>
<td>HES</td>
<td>higher education sector</td>
</tr>
<tr>
<td>H2020</td>
<td>HORIZON 2020 European Framework Programme for R&amp;I</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communication technology</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>IPAS</td>
<td>Internationalisation Partnership Award Scheme</td>
</tr>
<tr>
<td>IPR</td>
<td>Intellectual Property Rights</td>
</tr>
<tr>
<td>JRC</td>
<td>Joint Research Centre of the European Commission</td>
</tr>
<tr>
<td>KIC</td>
<td>Knowledge and Innovation Community</td>
</tr>
<tr>
<td>KTO</td>
<td>Knowledge Transfer Office</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>KTP</td>
<td>Knowledge Transfer Partnership</td>
</tr>
<tr>
<td>MARC</td>
<td>Malta Aquaculture Research Centre</td>
</tr>
<tr>
<td>MARSA</td>
<td>Maritime Seed Fund Award</td>
</tr>
<tr>
<td>MCA</td>
<td>Malta Communications Authority</td>
</tr>
<tr>
<td>MCAST</td>
<td>Malta College of Arts, Science and Technology</td>
</tr>
<tr>
<td>MCST</td>
<td>Malta Council For Science and Technology</td>
</tr>
<tr>
<td>MDB</td>
<td>Malta Development Bank</td>
</tr>
<tr>
<td>ME</td>
<td>Malta Enterprise</td>
</tr>
<tr>
<td>MEC</td>
<td>MCAST Entrepreneurship Centre</td>
</tr>
<tr>
<td>MEIB</td>
<td>Ministry for Economy, Investment and Small Business</td>
</tr>
<tr>
<td>MGSS</td>
<td>Malta Government Scholarships Post-Graduate Scheme</td>
</tr>
<tr>
<td>MITA</td>
<td>Malta Information Technology Agency</td>
</tr>
<tr>
<td>MNC</td>
<td>multinational company</td>
</tr>
<tr>
<td>mPPS</td>
<td>million pounds purchasing standards</td>
</tr>
<tr>
<td>MS</td>
<td>Member State/s of the European Union</td>
</tr>
<tr>
<td>MSD</td>
<td>Measure and Support Division of the Ministry of European Affairs and Equality</td>
</tr>
<tr>
<td>NAC</td>
<td>National Aerospace Centre</td>
</tr>
<tr>
<td>NSO</td>
<td>National Statistics Office of Malta</td>
</tr>
<tr>
<td>NRP</td>
<td>National Reform Programme</td>
</tr>
<tr>
<td>NSO</td>
<td>National Statistics Office of Malta</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
</tr>
<tr>
<td>PCT</td>
<td>Patent Cooperation Treaty</td>
</tr>
<tr>
<td>PNP</td>
<td>private non-profit sector</td>
</tr>
<tr>
<td>PRO</td>
<td>public research organisation</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>PPP</td>
<td>public-private partnership</td>
</tr>
<tr>
<td>PSF</td>
<td>Horizon 2020 Policy Support Facility</td>
</tr>
<tr>
<td>RIO</td>
<td>Research and Innovation Observatory</td>
</tr>
<tr>
<td>RIS3</td>
<td>Smart Specialisation Strategy</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>R&amp;I</td>
<td>research and innovation</td>
</tr>
<tr>
<td>RDI</td>
<td>research, development and innovation</td>
</tr>
<tr>
<td>SEF</td>
<td>Slovenian Enterprise Fund</td>
</tr>
<tr>
<td>SHARE</td>
<td>Survey of Health, Ageing and Retirement in Europe</td>
</tr>
<tr>
<td>SLC</td>
<td>Sustainable Living Complex</td>
</tr>
<tr>
<td>STI</td>
<td>science, technology and innovation</td>
</tr>
<tr>
<td>SME</td>
<td>small and medium-sized enterprise</td>
</tr>
<tr>
<td>STEAM</td>
<td>science, technology, engineering, arts and media</td>
</tr>
<tr>
<td>TEAMING</td>
<td>funding instrument from H2020 (Widening) to create CoE</td>
</tr>
<tr>
<td>TOFSA</td>
<td>TAKEOFF Seed Fund Award</td>
</tr>
<tr>
<td>TRAKE</td>
<td>Transdisciplinary Knowledge and Exchange</td>
</tr>
<tr>
<td>TTO</td>
<td>Technology Transfer Office</td>
</tr>
<tr>
<td>UoM</td>
<td>University of Malta</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organisation</td>
</tr>
<tr>
<td>WBSO</td>
<td>Dutch R&amp;D tax credit scheme: Wet Bevordering Speur &amp; Ontwikkelingswerk/ Act for the Stimulation of Research &amp; Development</td>
</tr>
</tbody>
</table>
Getting in touch with the EU

IN PERSON
All over the European Union there are hundreds of Europe Direct Information Centres. You can find the address of the centre nearest you at: http://europa.eu/contact

ON THE PHONE OR BY E-MAIL
Europe Direct is a service that answers your questions about the European Union. You can contact this service
– by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
– at the following standard number: +32 22999696 or
– by electronic mail via: http://europa.eu/contact

Finding information about the EU

ONLINE
Information about the European Union in all the official languages of the EU is available on the Europa website at: http://europa.eu

EU PUBLICATIONS
You can download or order free and priced EU publications from EU Bookshop at: http://bookshop.europa.eu. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see http://europa.eu/contact)

EU LAW AND RELATED DOCUMENTS
For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

OPEN DATA FROM THE EU
The EU Open Data Portal (http://data.europa.eu/euodp/en/data) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.
The Horizon 2020 Policy Support Facility (PSF) has been set up by the Directorate-General for Research & Innovation (DG RTD) of the European Commission under the EU Framework Programme for Research & Innovation ‘Horizon 2020’. It supports Member States and countries associated to Horizon 2020 in reforming their national science, technology and innovation systems.

The Peer Review of the Maltese Research and Innovation system, which forms the basis of this report was carried out between July 2018 and May 2019 by a dedicated PSF panel, consisting of seven independent experts and national peers.

The aim of the Peer Review of Malta’s R&I system is to feed into the preparation of Malta’s national strategy for R&D and innovation post 2020. The focus of the analysis is on the current National R&I Strategy 2020 and the policy mix, i.e. policies, measures and instruments supporting the public science base, public-private cooperation and business innovation dynamics. The Peer Review aims at supporting Malta’s efforts: 1) to continue R&I capacity building; 2) to improve the dynamics of the R&I system and 3) to improve the efficiency of current public investments in R&I.

The PSF panel arrived at a compact set of Key Policy Messages highlighted upfront in the report, each one supported by detailed recommendations. The core of the report outlines the rationale supporting each of these policy statements and discusses the specific recommendations proposed by the panel.