NATIONAL STATISTICS OFFICE • MALTA

NEWS RELEASE

EUROPEAN STATISTICAL SYSTEM

21 July 2020 | 1100 hrs | 120/2020

In 2018, total expenditure on Research and Development amounted to €74.6 million, or 0.6 per cent of GDP.

Research and Development in Malta: 2016-2018

R&D Expenditure

During 2018, an increase in total expenditure on R&D activities of €8.7 million, or 13.2 per cent, was registered. The Business Enterprise sector contributed to 63 per cent of total R&D, whereas the Higher Education and Government sectors contributed to 35.9 and 1.2 per cent respectively (Table 1).

R&D expenditure was primarily dedicated to Basic Research, which accounted for 52.2 per cent of the total in 2018, followed by Applied Research (33.3 per cent) and Experimental Development (14.5 per cent) (Table 2).

In 2018, all three sectors reported an increase in R&D expenditure compared to 2017. The increased expenditure on R&D was triggered by higher outlays on recurrent expenditure of €7.5 million, as well as by an increase in capital expenditure of €1.2 million. Labour costs represented 67.9 per cent of total R&D expenditure, followed by recurrent expenditure (24.3 per cent) and capital projects (7.9 per cent) (Table 3).

In 2018, the highest R&D expenditure was recorded in Engineering and Technology, which accounted for 41.9 per cent of total expenditure, followed by Natural sciences (27.1 per cent) and Medical sciences (13.6 per cent). Year-on-year comparisons show that the highest increase was registered in Natural sciences (€5.7 million), followed by Social sciences (€1.4 million). The majority of the R&D activity in Engineering and Technology and Natural sciences was undertaken by the Business Enterprise sector, whereas research in relation to Medical and Social sciences was mainly carried out by the Higher Education sector (Table 4).

Each sector mostly funded its own research, supplemented by foreign funds, mainly Local business enterprise funds for the Business Enterprise sector, General university funds for the Higher Education sector and EU funds and Direct government funds for the Government sector. Foreign funds for R&D reached €6.6 million, or 8.9 per cent of total funds (Table 5).

R&D Employment

In 2018, 2,502 employees were engaged in R&D work, of whom 1,510 spent a proportion of their time on R&D projects, while 992 employees dedicated their entire working time on R&D. The highest R&D employment was registered in the Higher Education sector, with 1,329 employees, followed by the Business Enterprise sector, with 1,090 employees. Male employment was predominant among researchers and technicians. Females accounted for 35.6 per cent of total R&D employment (Table 6).

With regard to R&D employment by major field of science, in 2018, the highest employment was recorded in Engineering and Technology, with 730 employees, followed by Natural and Social sciences, with 702 and 450 employees respectively (Table 7).

R&D Government Budget Allocations

In 2019, Government budget allocations for R&D (GBARD) amounted to €29.9 million, an increase of €4 million when compared to 2018. The highest GBARD outlays were recorded in the socio-economic activities related to Health (€6.2 million), Industrial production and technology (€5.5 million) and Political and social systems, structures and processes (€5.1 million) ■

Compiled by: **Public Finance Unit**
Contact us: **National Statistics Office, Lascaris, Valletta VLT 2000**
T. +356 25997219, E. nso@gov.mt

Table 1. Total R&D Expenditure as a % of GDP[1]

€000s

	2016	2017	2018
Government Sector (GOV)	764	607	861
Business Enterprise Sector (BES)	36,366	43,072	46,992
Higher Education Sector (HES)	21,571	22,248	26,773
Total R&D expenditure	**58,702**	**65,928**	**74,626**
% of GDP	**0.57**	**0.58**	**0.60**

[1] Gross Domestic Product as published in News Release No. 091/2020

Note: Totals may not add up due to rounding

Chart 1. R&D Expenditure by sector of performance

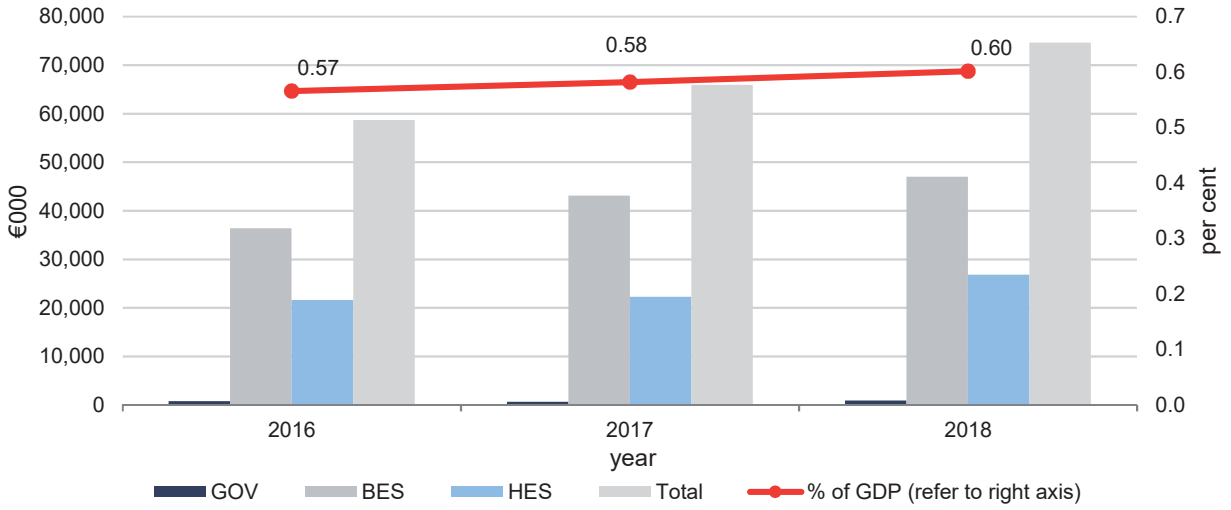

Table 2. Total expenditure on R&D by type of activity

€000s

	GOV	BES	HES	Total
		2016		
Basic Research	182	10,026	21,507	31,715
Applied Research	582	18,532	65	19,179
Experimental Development	0	7,808	0	7,808
Total	**764**	**36,366**	**21,571**	**58,702**
		2017		
Basic Research	457	11,761	22,135	34,353
Applied Research	150	21,245	114	21,509
Experimental Development	0	10,066	0	10,066
Total	**607**	**43,072**	**22,248**	**65,928**
		2018		
Basic Research	456	11,997	26,491	38,945
Applied Research	334	24,268	282	24,884
Experimental Development	71	10,726	0	10,798
Total	**861**	**46,992**	**26,773**	**74,626**

Note: Totals may not add up due to rounding

Table 3. Total expenditure on R&D by type of costs

€000s

	GOV	BES	HES	Total
			2016	
Recurrent Expenditure	**749**	**32,084**	**18,206**	**51,040**
Labour Costs	652	26,158	14,414	**41,225**
Other Recurrent Expenditure	97	5,926	3,792	**9,814**
Capital Expenditure	**15**	**4,282**	**3,365**	**7,662**
Land and Buildings	15	764	1,164	**1,943**
Instruments and Equipment	0	3,517	2,201	**5,719**
Total Expenditure	**764**	**36,366**	**21,571**	**58,702**
			2017	
Recurrent Expenditure	**599**	**39,715**	**20,966**	**61,280**
Labour Costs	496	29,649	17,477	**47,622**
Other Recurrent Expenditure	103	10,066	3,489	**13,657**
Capital Expenditure	**8**	**3,357**	**1,283**	**4,648**
Land and Buildings	6	618	523	**1,147**
Instruments and Equipment	2	2,739	760	**3,501**
Total Expenditure	**607**	**43,072**	**22,248**	**65,928**
			2018	
Recurrent Expenditure	**748**	**42,772**	**25,232**	**68,751**
Labour Costs	665	29,578	20,405	**50,648**
Other Recurrent Expenditure	82	13,194	4,827	**18,104**
Capital Expenditure	**114**	**4,220**	**1,541**	**5,875**
Land and Buildings	107	1,055	195	**1,357**
Instruments and Equipment	6	3,165	1,347	**4,518**
Total Expenditure	**861**	**46,992**	**26,773**	**74,626**

Note: Totals may not add up due to rounding

Chart 2. R&D Expenditure by type of costs: 2018

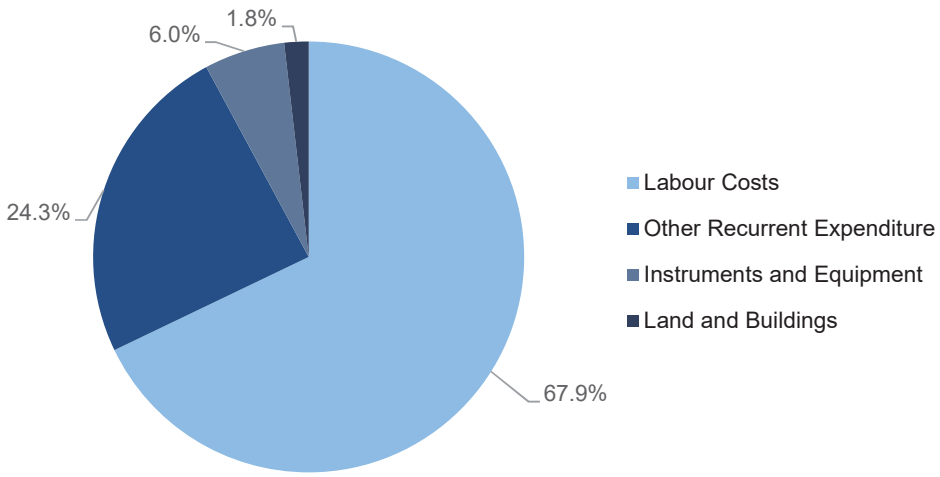

Table 4. Total expenditure on R&D by major field of science

€000s

		Natural sciences	Engineering and Technology	Medical sciences	Agricultural sciences	Social sciences	Humanities	Total
GOV	2016	0	0	172	441	85	67	**764**
	2017	28	0	0	239	290	50	**607**
	2018	0	0	0	413	372	77	**861**
BES	2016	8,638	24,806	2,224	241	315	143	**36,366**
	2017	12,173	25,609	5,104	59	81	46	**43,072**
	2018	16,046	26,892	3,761	168	105	19	**46,992**
HES	2016	2,112	4,294	4,753	247	6,506	3,659	**21,571**
	2017	2,293	4,546	5,421	302	6,404	3,283	**22,248**
	2018	4,159	4,353	6,387	411	7,743	3,720	**26,773**
Total	**2016**	**10,750**	**29,100**	**7,149**	**929**	**6,906**	**3,869**	**58,702**
	2017	**14,493**	**30,155**	**10,525**	**601**	**6,775**	**3,379**	**65,928**
	2018	**20,204**	**31,245**	**10,148**	**993**	**8,219**	**3,816**	**74,626**

Table 5. Source of funds of R&D expenditure

€000s

	GOV			BES			HES			Total		
	2016	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Sources of Funds												
Local Funds	**758**	**600**	**833**	**32,222**	**38,013**	**44,592**	**19,420**	**20,220**	**22,592**	**52,400**	**58,833**	**68,017**
Business Enterprise	160	0	0	31,721	36,994	44,158	93	164	310	31,974	37,158	44,468
Direct Government	598	600	833	501	941	433	1,461	751	1,596	2,559	2,292	2,863
General University Funds	0	0	0	0	0	0	17,023	18,331	19,444	17,023	18,331	19,444
Others	0	0	0	0	78	0	844	974	1,241	844	1,052	1,241
Foreign Funds	**7**	**7**	**28**	**4,143**	**5,059**	**2,400**	**2,152**	**2,028**	**4,181**	**6,302**	**7,094**	**6,609**
Foreign Business Enterprises	0	0	0	2,987	4,005	1,238	0	0	0	2,987	4,005	1,238
European Commission	0	0	21	1,017	1,054	1,162	1,255	1,224	2,539	2,271	2,279	3,722
Others	7	7	7	140	0	0	897	804	1,643	1,044	811	1,650
Total	**764**	**607**	**861**	**36,366**	**43,072**	**46,992**	**21,571**	**22,248**	**26,773**	**58,702**	**65,928**	**74,626**

Table 6. Total employment in R&D by sex and occupation

Headcount

	GOV			BES			HES			Total		
	2016	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Full-time	29	7	12	904	937	880	69	84	100	1,002	1,028	992
Males	26	6	9	718	713	676	42	50	63	786	769	748
Females	3	1	3	186	224	204	27	34	37	216	259	244
Part-Time[1]	50	75	71	207	180	210	1,149	1,196	1,229	1,406	1,451	1,510
Males	37	40	36	158	139	157	666	672	671	861	851	864
Females	13	35	35	49	41	53	483	524	558	545	600	646
Total	**79**	**82**	**83**	**1,111**	**1,117**	**1,090**	**1,218**	**1,280**	**1,329**	**2,408**	**2,479**	**2,502**
Males	63	46	45	876	852	833	708	722	734	1,647	1,620	1,612
Females	16	36	38	235	265	257	510	558	595	761	859	890
Researchers	**33**	**32**	**32**	**584**	**591**	**536**	**853**	**923**	**945**	**1,470**	**1,546**	**1,513**
Males	23	25	21	454	444	398	571	599	607	1,048	1,068	1,026
Females	10	7	11	130	147	138	282	324	338	422	478	487
Technicians	**2**	**1**	**2**	**296**	**352**	**350**	**107**	**106**	**108**	**405**	**459**	**460**
Males	2	1	2	267	287	284	82	77	75	351	365	361
Females	0	0	0	29	65	66	25	29	33	54	94	99
Support staff	**44**	**49**	**49**	**231**	**174**	**204**	**258**	**251**	**276**	**533**	**474**	**529**
Males	38	20	22	155	121	151	55	46	52	248	187	225
Females	6	29	27	76	53	53	203	205	224	285	287	304

[1] Spending a proportion of their working time on R&D activities

Chart 3. R&D Employment: 2018

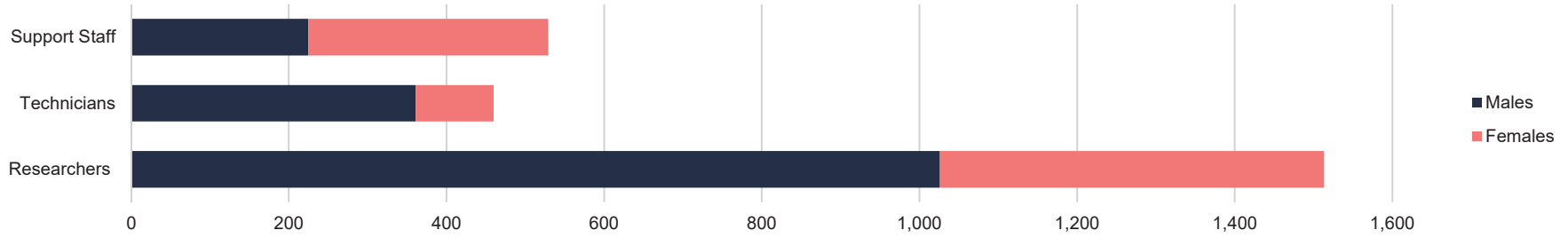

Table 7. R&D employment by major field of science

Headcount

		Natural sciences	Engineering and Technology	Medical sciences	Agricultural sciences	Social sciences	Humanities	Total
GOV	**2016**	0	0	16	49	13	1	**79**
	2017	0	0	3	32	45	2	**82**
	2018	3	0	7	30	40	3	**83**
BES	**2016**	502	508	40	2	24	35	**1,111**
	2017	475	548	66	1	6	21	**1,117**
	2018	488	524	50	10	2	16	**1,090**
HES	**2016**	119	246	272	17	376	188	**1,218**
	2017	132	258	283	16	399	192	**1,280**
	2018	211	206	284	30	408	190	**1,329**
Total	**2016**	**621**	**754**	**328**	**68**	**413**	**224**	**2,408**
	2017	**607**	**806**	**352**	**49**	**450**	**215**	**2,479**
	2018	**702**	**730**	**341**	**70**	**450**	**209**	**2,502**

Table 8. Government Budget Allocations for R&D (GBARD)

€000s

Socio-economic objective	2016	2017	2018	2019
Exploration and exploitation of the earth	0	0	1	48
Environment	1,749	1,848	3,014	3,213
Exploration and exploitation of space	0	0	308	308
Transport, telecommunication and other infrastructures	50	72	64	83
Energy	69	106	31	45
Industrial production and technology	3,825	4,479	4,173	5,465
Health	4,679	5,285	6,051	6,234
Agriculture	515	516	1,398	1,596
Education	2,263	2,404	2,557	3,006
Culture, recreation, religion and media	4,303	3,972	4,354	4,885
Political and social systems, structures and processes	3,385	3,225	4,008	5,059
General advancement of knowledge	0	0	0	0
Defence	0	0	0	0
TOTAL	**20,839**	**21,906**	**25,960**	**29,941**

Methodological Notes

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 activities may be aimed at achieving either specific or general objectives. R&D is always aimed at new findings, based on original concepts (and their interpretation) or hypotheses. It is largely uncertain about its final outcome (or at least about the quantity of time and resources needed to achieve it), it is planned for and budgeted (even when carried out by individuals), and it is aimed at producing results that could be either freely transferred or traded in a marketplace.

3. R&D covers 3 types of activity:
    i. *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.

    ii. *Applied Research* - refers to original investigation undertaken in order to acquire new knowledge.

    iii. *Experimental Development* - refers to systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.

4. If the primary objective of the work is to conduct research on something relevant to the entity or make improvements to products or processes, then the work falls under the definition of R&D. On the other hand, if the product, process or approach is substantially set and the primary objective is to develop markets, do pre-production planning or get a production or control system working smoothly, then the work is no longer R&D.

5. This is a list of activities to be excluded from R&D. However, should the activities below be undertaken as part of an R&D process, they should be included as R&D:
    i. All education and training of personnel in universities and special institutions of higher and post-secondary education.

    ii. Scientific and technical information services such as collecting, coding, recording, classifying, dissemination, translating, analyzing and evaluating by scientific and technical personnel, bibliographic services, patent statistics, scientific and technical information, extension and advisory services and scientific conferences.

    iii. General purpose data collection is undertaken generally by government agencies to record natural, biological or social phenomena that are of general public interest or that only the government has the resource to record. Examples are routine topographical mapping; routine geological, hydrological, and meteorological surveying; astronomical observations. Hence, data collected for other or general purposes and not as part of an R&D process, such as quarterly sampling of unemployment, should be excluded from R&D even if exploited for research. Market surveys should also be excluded.

    iv. Testing and maintenance of national standards, the calibration of secondary standards and routine testing and analysis of materials, components, products, processes, soils, atmosphere, etc.

    v. Feasibility studies, including the investigation of proposed engineering projects, using existing techniques to provide additional information before deciding on implementation.

    vi. Specialised health care concerning routine investigation and normal application of specialised medical knowledge.

    vii. Patent and license work, including all administrative and legal work connected with patents and licenses.

    viii. Policy–related studies cover a range of activities, such as the analysis and assessment of the existing programmes, policies and operations of government departments; the work of units concerned with the continuing analysis and monitoring of external phenomena (e.g. defense and security analysis); and the work of legislative commissions of inquiry with general government or departmental policy or operations.

    ix. Routine software development: software-related activities of a routine nature are not considered to be R&D. Technical problems that have been overcome in previous projects on the same operating systems and computer architecture are also excluded. This also includes routine computer maintenance.

6. The link between the Business R&D and Innovation data is that R&D is just one out of the eight activities that an enterprise can conduct in order to be considered as Innovative. The eight types of innovative activities are the following:
    i. Research and experimental development (R&D) activities.

    ii. Engineering, design and other creative work activities.

iii. Marketing and brand equity activities.

iv. Intellectual Property related activities.

v. Employee training activities.

vi. Software development and database activities.

vii. Activities related to the acquisition or lease of tangible assets.

viii. Innovation management activities.

7. R&D employment includes all persons engaged directly in R&D on a full-time or part-time basis, whether employed by the statistical unit or external contributors fully integrated into the statistical unit's R&D activities, as well as those providing direct services for the R&D activities. Not included in R&D employment, and correspondingly as R&D expenditure, are:
   - Persons performing less than 0.1 FTE of R&D activity i.e. less than 20 working days in a year; and
   - Persons providing indirect support and ancillary services i.e. maintenance, administrative and security staff.

8. R&D is classified under four main sectors:
   i. *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.

   ii. *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.

   iii. *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.

   iv. *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.

9. Data for the Government and Higher Education sectors is captured through an annual questionnaire that is compiled and sent to all the Central Government Ministries and Departments, Extra Budgetary Units, as well as Local Councils. For the Business Enterprise sector, an annual questionnaire is sent to all known active R&D enterprises. The active R&D business population is updated annually through; various schemes that enterprises may apply for research grants, reporting R&D in the Innovation survey and other administrative sources.

10. The data contained in this news release have been drawn up in line with the Frascati Manual (2015 edition). The definitions of the fields of science and technology and their sub-fields are available online: http://nso.gov.mt/en/nso/Sources_and_Methods/Unit_A2/Public_Finance/Pages/Research-and-Development-in-Malta-(Government-Sector).aspx

11. All data in this release should be considered as provisional and therefore subject to revision.

12. More information relating to this news release may be accessed at:

    Statistical Concepts: http://nso.gov.mt/metadata/concepts.aspx
    Metadata: http://nso.gov.mt/metadata/reports.aspx?id=3 (GOV and HES)
    Metadata: http://nso.gov.mt/metadata/reports.aspx?id=26 (BES)

European statistics comparable to data in this News Release are available at:

EUROSTAT Website/Homepage/Statistics Database

Data Navigation Tree
Database by themes
>Science and technology
>Research and development

Tables by themes
>Science and technology
>Research and development

For further assistance send a request from:
http://nso.gov.mt/en/Services/Pages/Request-for-Information.aspx