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In 2020, total expenditure on Research and Development amounted to €86.2 million, or 0.7 per cent of GDP.

# Research and Development in Malta: 2020

### R&D Expenditure

During 2020, an increase in total expenditure on R&D activities of €6.2 million, or 7.7 per cent, was registered. The Business Enterprise sector contributed 63.5 per cent to total R&D, whereas the Higher Education and Government sectors contributed 35.6 and 0.9 per cent respectively (Table 1).

The R&D expenditure was primarily dedicated to Basic Research, which accounted for 48.5 per cent of total R&D in 2020, followed by Applied Research (27.6 per cent) and Experimental Development (23.9 per cent) (Table 2).

In 2020, both the Business Enterprise and the Higher Education sectors reported an increase in R&D expenditure compared to 2019. The higher R&D expenditure was mainly triggered by higher outlays on recurrent expenditure by the Business Enterprise sector of €5.8 million, while capital expenditure for this sector decreased by €0.7 million. On the other hand, R&D expenditure by the Government sector remained virtually unchanged. Labour costs represented 70.8 per cent of total R&D expenditure, followed by Other recurrent expenditure (18.3 per cent) and Capital expenditure (10.9 per cent) (Table 3).

In 2020, the highest R&D expenditure was recorded in Engineering and technology, which accounted for 54.4 per cent of total expenditure, followed by Natural sciences (14.4 per cent) and Medical sciences (13.6 per cent). The majority of the R&D activity in Engineering and technology and Natural sciences was undertaken in the Business Enterprise sector, whereas research in relation to Medical and Social sciences was mainly carried out by the Higher Education sector. Year-on-year comparisons show that the highest increase was registered in Engineering and technology (€11.8 million), followed by Social sciences (€1.3 million) and Medical sciences (€0.7 million). These increases were partly offset by a decrease of €7.8 million in Natural sciences (Table 4).

Each sector mostly funds its own research, supplemented by foreign funds. R&D in the Business Enterprise sector is mainly funded by local business enterprise funds, General university funds are directed to the Higher Education sector and Direct government funds service the Government sector. Foreign funds for R&D reached €7.1 million, or 8.2 per cent, of total funds (Table 5).

### R&D Employment

In 2020, 2,868 employees were engaged in R&D work, of whom 1,622 spent a portion of their time on R&D projects, while the remaining 1,246 employees dedicated their entire working time on R&D projects. The highest R&D employment was registered in the Higher Education sector, at 1,448 employees, followed by the Business Enterprise sector, with 1,369 employees. Male employment was predominant among researchers and technicians. Females accounted for 34.0 per cent of total R&D employment (Table 6).

With regard to R&D employment by major field of science, in 2020, the highest employment was recorded in Engineering and technology with 1,045 employees, followed by Natural and Social sciences, with 637 and 511 employees respectively (Table 7).

### R&D Government Budget Allocations

The Government Budget Allocations for R&D (GBARD) for 2021 amounted to €35.3 million, an increase of €1.5 million when compared to 2020. The highest GBARD outlay was recorded in General advancement of knowledge: R&D financed from General University Funds of €29.8 million (Table 8) ■

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**Table 1. Total R&D expenditure as a % of GDP by year and sector [1]**

€000s

| | 2018 | 2019 | 2020 |
|---|---|---|---|
| Government (GOV) | 861 | 761 | 755 |
| Business Enterprise (BES) | 46,992 | 49,600 | 54,714 |
| Higher Education (HES) | 26,773 | 29,689 | 30,736 |
| **Total R&D expenditure** | **74,626** | **80,050** | **86,205** |
| **% of GDP** | **0.58** | **0.57** | **0.66** |

[1] Gross Domestic Product as published in News Release No. 095/2022

Note: Totals may not add up due to rounding

**Chart 1. R&D expenditure by sector**

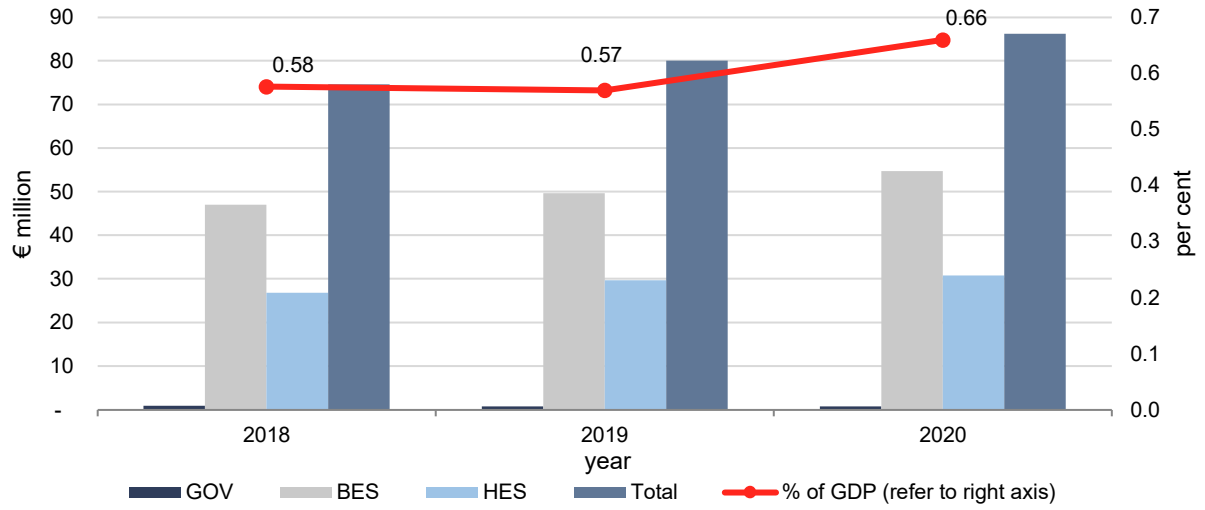


**Table 2. Total expenditure on R&D by sector, year and type of activity**

€000s

| | GOV | BES | HES | Total |
|---|---|---|---|---|
| | | **2018** | | |
| Basic Research | 456 | 11,997 | 26,491 | 38,945 |
| Applied Research | 334 | 24,268 | 282 | 24,884 |
| Experimental Development | 71 | 10,726 | - | 10,798 |
| **Total** | **861** | **46,992** | **26,773** | **74,626** |
| | | **2019** | | |
| Basic Research | 24 | 11,767 | 29,269 | 41,059 |
| Applied Research | 737 | 26,394 | 421 | 27,551 |
| Experimental Development | - | 11,440 | - | 11,440 |
| **Total** | **761** | **49,600** | **29,689** | **80,050** |
| | | **2020** | | |
| Basic Research | 100 | 11,406 | 30,270 | 41,775 |
| Applied Research | 612 | 22,733 | 467 | 23,812 |
| Experimental Development | 43 | 20,575 | - | 20,618 |
| **Total** | **755** | **54,714** | **30,736** | **86,205** |

Note: Totals may not add up due to rounding

**Table 3. Total expenditure on R&D by sector, year and type of costs**

€000s

| | GOV | BES | HES | Total |
|---|---|---|---|---|
| | | | 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** |
| | | | 2019 | |
| **Recurrent expenditure** | **507** | **42,609** | **27,056** | **70,172** |
| Labour costs | 450 | 29,457 | 19,994 | **49,900** |
| Other recurrent expenditure | 57 | 13,152 | 7,062 | **20,272** |
| | | | | |
| **Capital expenditure** | **254** | **6,990** | **2,633** | **9,877** |
| Land and buildings | 196 | 1,272 | 371 | **1,839** |
| Instruments and equipment | 58 | 5,718 | 2,263 | **8,038** |
| **Total expenditure** | **761** | **49,600** | **29,689** | **80,050** |
| | | | 2020 | |
| **Recurrent expenditure** | **726** | **48,386** | **27,695** | **76,807** |
| Labour costs | 624 | 38,827 | 21,612 | **61,063** |
| Other recurrent expenditure | 102 | 9,560 | 6,083 | **15,744** |
| | | | | |
| **Capital expenditure** | **29** | **6,328** | **3,041** | **9,399** |
| Land and buildings | 19 | 415 | 296 | **730** |
| Instruments and equipment | 10 | 5,913 | 2,746 | **8,668** |
| **Total expenditure** | **755** | **54,714** | **30,736** | **86,205** |

Note: Totals may not add up due to rounding

**Chart 2. R&D expenditure by type of costs in 2020**

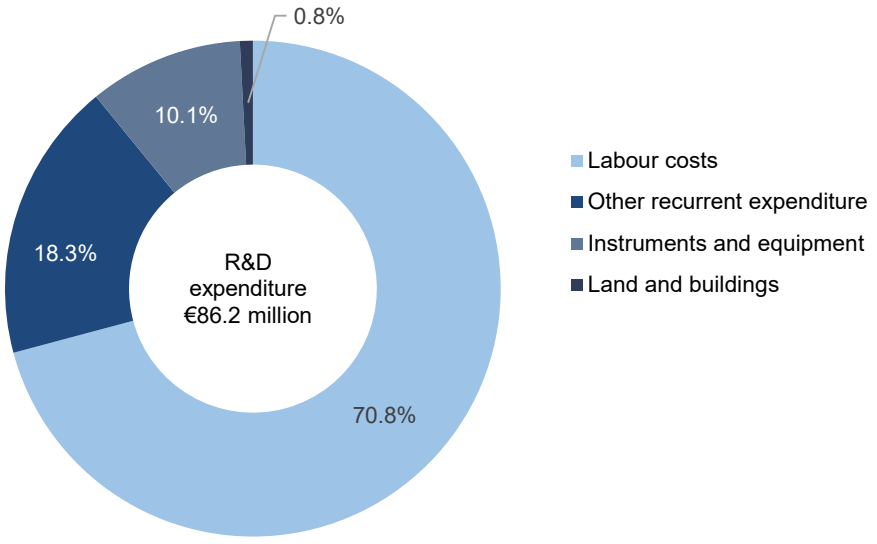

**Table 4. Total expenditure on R&D by major field of science, sector and year**

€000s

| | | Natural sciences | Engineering and technology | Medical sciences | Agricultural sciences | Social sciences | Humanities | Total |
|---|---|---|---|---|---|---|---|---|
| GOV | 2018 | - | - | - | 413 | 372 | 77 | **861** |
| | 2019 | - | 108 | 52 | 517 | - | 85 | **761** |
| | 2020 | - | 162 | 29 | 349 | 70 | 145 | **755** |
| BES | 2018 | 16,046 | 26,892 | 3,761 | 168 | 105 | 19 | **46,992** |
| | 2019 | 14,902 | 29,572 | 4,851 | 119 | 130 | 26 | **49,600** |
| | 2020 | 7,292 | 41,204 | 5,131 | 386 | 701 | - | **54,714** |
| HES | 2018 | 4,159 | 4,353 | 6,387 | 411 | 7,743 | 3,720 | **26,773** |
| | 2019 | 5,336 | 5,396 | 6,146 | 469 | 8,197 | 4,146 | **29,689** |
| | 2020 | 5,126 | 5,512 | 6,559 | 443 | 8,840 | 4,257 | **30,736** |
| **Total** | **2018** | **20,204** | **31,245** | **10,148** | **993** | **8,219** | **3,816** | **74,626** |
| | **2019** | **20,238** | **35,076** | **11,048** | **1,104** | **8,328** | **4,256** | **80,050** |
| | **2020** | **12,418** | **46,878** | **11,718** | **1,178** | **9,611** | **4,402** | **86,205** |

**Table 5. Source of funds of R&D expenditure by sector and year**

€000s

| | GOV | | | BES | | | HES | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2018** | **2019** | **2020** | **2018** | **2019** | **2020** | **2018** | **2019** | **2020** | **2018** | **2019** | **2020** |
| **Sources of funds** | | | | | | | | | | | | |
| **Local funds** | **833** | **761** | **755** | **44,592** | **47,089** | **51,978** | **22,592** | **25,208** | **26,394** | **68,017** | **73,057** | **79,126** |
| Business enterprise | - | - | - | 44,158 | 46,544 | 51,417 | 310 | 411 | 521 | 44,468 | 46,956 | 51,938 |
| Direct government | 833 | 761 | 755 | 433 | 545 | 544 | 1,596 | 2,968 | 3,820 | 2,863 | 4,273 | 5,118 |
| General university funds | - | - | - | - | - | - | 19,444 | 20,683 | 21,014 | 19,444 | 20,683 | 21,014 |
| Others | - | - | - | - | - | 17 | 1,241 | 1,146 | 1,039 | 1,241 | 1,146 | 1,056 |
| **Foreign funds** | **28** | **-** | **-** | **2,400** | **2,511** | **2,737** | **4,181** | **4,482** | **4,343** | **6,609** | **6,992** | **7,079** |
| Foreign business enterprises | - | - | - | 1,238 | 1,605 | 1,894 | - | - | - | 1,238 | 1,605 | 1,894 |
| European Commission | 21 | - | - | 1,162 | 895 | 843 | 2,539 | 2,780 | 2,655 | 3,722 | 3,675 | 3,497 |
| Others | 7 | - | - | - | 10 | - | 1,643 | 1,702 | 1,688 | 1,650 | 1,712 | 1,688 |
| **Total** | **861** | **761** | **755** | **46,992** | **49,600** | **54,714** | **26,773** | **29,689** | **30,736** | **74,626** | **80,050** | **86,205** |

**Table 6. Total employment in R&D by sector, year, occupation and sex**

Headcount

| | GOV | | | BES | | | HES | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 |
| **Full-time** | **12** | **12** | **27** | **880** | **872** | **1,049** | **100** | **148** | **170** | **992** | **1,032** | **1,246** |
| Males | 9 | 11 | 20 | 676 | 655 | 818 | 63 | 96 | 114 | 748 | 762 | 952 |
| Females | 3 | 1 | 7 | 204 | 217 | 231 | 37 | 52 | 56 | 244 | 270 | 294 |
| **Part-Time**[1] | **71** | **21** | **24** | **210** | **257** | **320** | **1,229** | **1,260** | **1,278** | **1,510** | **1,538** | **1,622** |
| Males | 36 | 16 | 12 | 157 | 183 | 233 | 671 | 691 | 696 | 864 | 890 | 941 |
| Females | 35 | 5 | 12 | 53 | 74 | 87 | 558 | 569 | 582 | 646 | 648 | 681 |
| **Total** | **83** | **33** | **51** | **1,090** | **1,129** | **1,369** | **1,329** | **1,408** | **1,448** | **2,502** | **2,570** | **2,868** |
| Males | 45 | 27 | 32 | 833 | 838 | 1,051 | 734 | 787 | 810 | 1,612 | 1,652 | 1,893 |
| Females | 38 | 6 | 19 | 257 | 291 | 318 | 595 | 621 | 638 | 890 | 918 | 975 |
| **Researchers** | **32** | **17** | **29** | **536** | **525** | **558** | **945** | **1,017** | **1,060** | **1,513** | **1,559** | **1,647** |
| Males | 21 | 12 | 15 | 398 | 377 | 417 | 607 | 650 | 671 | 1,026 | 1,039 | 1,103 |
| Females | 11 | 5 | 14 | 138 | 148 | 141 | 338 | 367 | 389 | 487 | 520 | 544 |
| **Technicians** | **2** | **5** | **5** | **350** | **382** | **545** | **108** | **105** | **109** | **460** | **492** | **659** |
| Males | 2 | 4 | 4 | 284 | 319 | 448 | 75 | 81 | 82 | 361 | 404 | 534 |
| Females | - | 1 | 1 | 66 | 63 | 97 | 33 | 24 | 27 | 99 | 88 | 125 |
| **Support staff** | **49** | **11** | **17** | **204** | **222** | **266** | **276** | **286** | **279** | **529** | **519** | **562** |
| Males | 22 | 11 | 13 | 151 | 142 | 186 | 52 | 56 | 57 | 225 | 209 | 256 |
| Females | 27 | - | 4 | 53 | 80 | 80 | 224 | 230 | 222 | 304 | 310 | 306 |

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

**Chart 3. R&D employment in 2020**

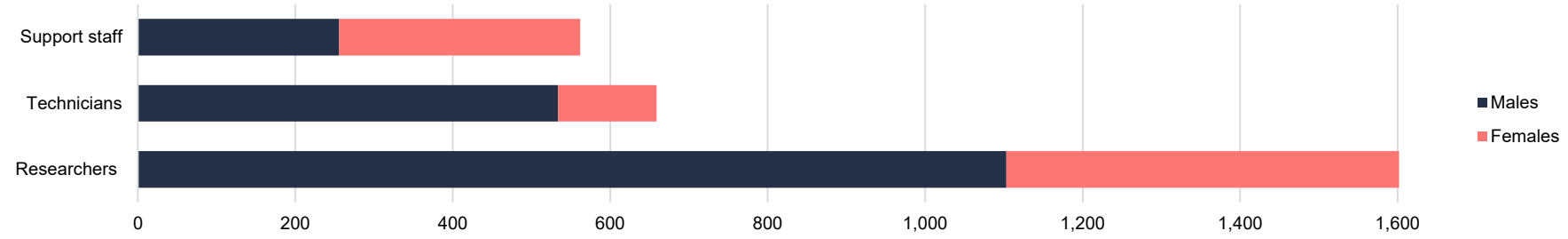

**Table 7. R&D employment by major field of science, sector and year**

Headcount

| | | Natural sciences | Engineering and technology | Medical sciences | Agricultural sciences | Social sciences | Humanities | Total |
|---|---|---|---|---|---|---|---|---|
| GOV | **2018** | 3 | - | 7 | 30 | 40 | 3 | **83** |
| | **2019** | 5 | - | 3 | 22 | 1 | 2 | **33** |
| | **2020** | 8 | 1 | 6 | 21 | 9 | 6 | **51** |
| BES | **2018** | 488 | 524 | 50 | 10 | 2 | 16 | **1,090** |
| | **2019** | 472 | 518 | 95 | 7 | 21 | 16 | **1,129** |
| | **2020** | 396 | 802 | 108 | 7 | 55 | 1 | **1,369** |
| HES | **2018** | 211 | 206 | 284 | 30 | 408 | 190 | **1,329** |
| | **2019** | 227 | 234 | 289 | 16 | 441 | 201 | **1,408** |
| | **2020** | 233 | 242 | 298 | 18 | 447 | 210 | **1,448** |
| **Total** | **2018** | **702** | **730** | **341** | **70** | **450** | **209** | 2,502 |
| | **2019** | **704** | **752** | **387** | **45** | **463** | **219** | 2,570 |
| | **2020** | **637** | **1,045** | **412** | **46** | **511** | **217** | 2,868 |

**Chart 4. R&D employment by major field of science in 2020**

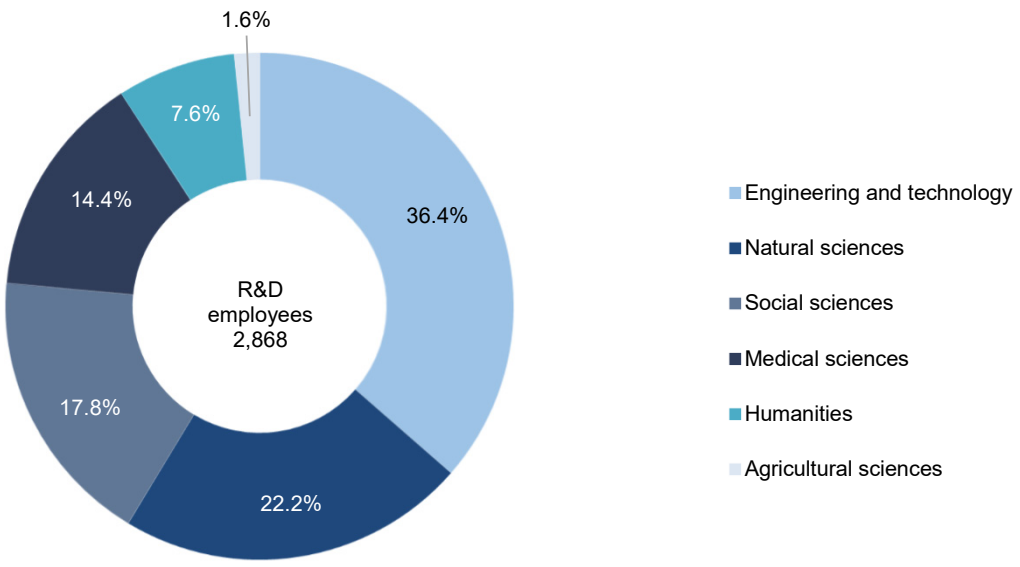

**Table 8. Government Budget Allocations for R&D (GBARD) by year and socio-economic objective**

€000s

| Socio-economic objective | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| Exploration and exploitation of the earth | - | 100 | 800 | 600 |
| Environment | 101 | 166 | 382 | 660 |
| Exploration and exploitation of space | 308 | 480 | 400 | 400 |
| Transport, telecommunication and other infrastructures | 64 | 258 | 72 | 56 |
| Energy | 16 | 11 | 200 | 200 |
| Industrial production and technology | 568 | 1,353 | 2,213 | 1,334 |
| Health | 477 | 575 | 3,002 | 214 |
| Agriculture | 1,116 | 1,492 | 849 | 982 |
| Education | 59 | 86 | 70 | 116 |
| Culture, recreation, religion and mass media | 80 | 193 | 218 | 479 |
| Political and social systems, structures and processes | 1,144 | 1,061 | 220 | 478 |
| General advancement of knowledge: R&D financed from General University Funds (GUF): | 22,028 | 24,460 | 25,446 | 29,822 |
| R&D related to Natural Sciences | 3,422 | 4,396 | 4,244 | 4,677 |
| R&D related to Engineering Sciences | 3,581 | 4,446 | 4,563 | 4,958 |
| R&D related to Medical Sciences | 5,255 | 5,063 | 5,430 | 7,703 |
| R&D related to Agricultural Sciences | 338 | 386 | 366 | 449 |
| R&D related to Social Sciences | 6,371 | 6,753 | 7,318 | 8,064 |
| R&D related to Humanities | 3,061 | 3,415 | 3,524 | 3,971 |
| General advancement of knowledge: R&D financed from other sources than GUF | - | - | - | - |
| Defence | - | - | - | - |
| **Total** | **25,960** | **30,234** | **33,872** | **35,342** |

## Methodological Notes

1. Research and Development (R&D) 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 does not qualify as R&D.
5. This is a list of activities that are excluded from R&D. However, should the activities below be undertaken as part of an R&D process, they are considered as part of 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, analysing 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. defence and security analysis); and the work of legislative commissions of inquiry with general government or departmental policy or operations.
    ix. Routine software development 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 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 (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 (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 (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 (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.

9. Data for the Government and Higher Education sectors is captured through an annual questionnaire that is 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: https://nso.gov.mt/en/nso/Sources_and_Methods/Unit_A2/Public_Finance/Documents/Additional-Notes-for-RandD-Questionnaire.pdf

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

12. References to this news release are to be cited appropriately.

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

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

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

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