XJENZA MALTA

MALTA'S SMART SPECIALISATION STRATEGY 2021-2027

PROGRESS REPORT 2024

CONTENTS

EXECUTIVE SUMMARY

Between 2021 and 2024, Malta made notable progress in implementing its Research and Innovation Strategy for Smart Specialisation (RIS3) 2021–2027, with advancements made across its identified priority sectors. The 6 smart specialisation thematic areas for Malta for the 2021-2027 period are Health and Well-Being, Sustainable Uses of Resources for Climate Change Adaptation, Smart Manufacturing, Marine and Maritime Technologies, Aviation and Aerospace, and Future Digital Technologies.

The Aviation and Aerospace sector has witnessed substantial growth through increased R&D investment, the expansion of Maintenance, Repair and Overhaul (MRO) services, and a strengthened focus on sustainability. However, the sector's continued success will depend on addressing pressing challenges such as rising operational costs, skills shortages, and infrastructure limitations. Strategic planning, particularly around airport capacity and MRO scalability, will be essential to unlocking future growth.

The Smart Manufacturing sector has also evolved significantly, supported by the adoption of advanced technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and Additive Manufacturing. These developments have enhanced flexibility and efficiency while advancing sustainable practices. Despite these gains, the sector continues to face a skills gap in emerging technologies, limited private investment in R&D, and financial constraints for SMEs. As AI and related technologies reshape the industrial landscape, Malta must proactively respond to ethical, regulatory, and societal implications, leveraging strong research and academic collaboration to remain globally competitive.

In parallel, Malta's Marine and Maritime Technology sector has progressed through innovations in aquaculture, renewable energy, and maritime engineering. Initiatives promoting green logistics and ICT integration underscore the sector's sustainable trajectory, supported by strategic developments such as the delineation of an Exclusive Economic Zone. Yet, persistent financial, spatial, and skills-related barriers must be addressed to fully realize Malta's maritime potential and reinforce its position within the Mediterranean region.

Sustainable Use of Resources remains a cross-cutting priority, with Malta demonstrating its commitment through targeted efforts in renewable energy, waste management, and resource efficiency. The increase in solar photovoltaic capacity and improved recycling rates are clear indicators of progress toward climate goals. Nevertheless, land scarcity, energy-efficiency challenges in buildings, and waste infrastructure limitations continue to constrain broader transformation.

Health & Well-being innovation in Malta is also gaining momentum, driven by advancements in biomedical engineering, digital health, and cellular therapy. The establishment of modern research facilities and the integration of telemedicine and AI into health systems reflect a strategic push toward improving healthcare delivery. While Malta is well-positioned to attract pharmaceutical investment and develop increased competence in specific areas, ongoing issues like workforce shortages and infrastructure strain will require sustained attention to ensure equitable and future-ready healthcare.

Finally, Malta's progress in Future Digital Technologies has laid a strong foundation for a digitally enabled economy. With nationwide 5G and Very High Capacity Networks (VHCN) coverage, a growing research ecosystem, and active government support for entrepreneurship and cybersecurity, the country is becoming a hub for digital innovation. Continued investment in digital skills, talent retention, and international collaboration will be key to consolidating this momentum and navigating challenges such as brain drain and regulatory adaptation.

The monitoring period from 2021 to 2024 reveals important milestones and measurable progress. These sectoral developments reflect Malta's evolving innovation landscape. Addressing persistent gaps and building on recent achievements will be critical to unlocking long-term competitiveness and sustainable growth

01

INTRODUCTION

Smart Specialisation is a key principle which underpins the European Cohesion Policy for 2021-2027 and it is also an enabling condition for access to structural funding. Smart Specialisation aims to stimulate place-based research and innovation activities by prioritising specific areas where a region or country has a potential or existing competitive edge. It also addresses societal needs, such as sustainable development and digital transformation and encourages investment in the country's most promising sectors. Malta's Smart Specialisation Strategy 2021-2027 was formulated through a bottom-up Entrepreneurial Discovery Process (EDP) involving the engagement of the quadruple helix (which includes representatives from the Government, Academia, the Business Enterprise and Civil Society).

The 6 smart specialisation thematic areas for Malta are Health and Well-Being, Sustainable Uses of Resources for Climate Change Adaptation, Smart Manufacturing, Marine and Maritime Technologies, Aviation and Aerospace, and Future Digital Technologies. Digital technologies is also a horizontal cross-cutting enabler across the 6 thematic areas. Expert thematic committees were set up in July 2022, one for each thematic area, to keep the EDP ongoing.

The implementation of Malta's Smart Specialisation Strategy is led by the Ministry for Education, Sport, Youth, Research and Innovation as the ministry responsible for R&I. Science Malta provides technical support to the lead ministry responsible for the smart specialisation strategy. As part of this work, Science Malta is responsible for the monitoring framework related to the Smart Specialisation Strategy and has already prepared two monitoring reports based on the indicators of the Strategy. These reports were presented to the Ministry for Education, Youth, Sport, Research and Innovation, as well as the RIS3 thematic committees to further inform their work. The Strategy also calls for periodic reports to be compiled and published; the present report aims to fulfil that requirement. This report provides a snapshot of developments in implementation over the course of the first half of the RIS3's implementation. It is largely a qualitative analysis which seeks to complement the quantitative analysis of the indicators-based monitoring reports (presented as annexes to this report) by providing more context and counterbalancing the limited granularity of the quantitative analysis - a consequence of Malta's specific context. The report is structured around thematic updates on each of the identified RIS3 areas for 2021-2024, identifying progress made to date and further areas of opportunity.

02 AVIATION AND AEROSPACE

The Aviation and Aerospace sector in Malta is focused on making use of cutting-edge technologies to modernise and strengthen the country's position as a regional hub for aerospace-related activities. Malta's strategic focus on this sector seeks to capitalise on emerging global trends in aviation, including the increasing adoption of sustainable aviation technologies, and a growing demand for efficient, low-carbon aerospace solutions.

2.1 Achievements and Progress (2021-2024)

Malta is actively strengthening its research, development, and innovation (RDI) in aerospace through national strategies, funding schemes, and international collaboration. The Smart Specialisation Strategy prioritizes aerospace, and national programs like Xjenza Malta's TDP and TDP Lite fund advanced aerospace projects[1]. Malta also made significant progress in securing international collaborations through EU funding programs such as Horizon Europe. Between 2021 and 2023, Malta secured approximately €594,000 in funding for collaborative research and innovation projects in aerospace.

Malta's aviation sector is also harnessing digital transformation to significantly elevate operational efficiency, reduce environmental impact, and enhance competitiveness in the global aerospace domain. A standout example is KM Malta Airlines, which deployed NAVBLUE's Mission+ FLIGHT solution in mid-2024 to implement a fully paperless cockpit on its Airbus A320neo fleet[2]. This integration enables seamless data exchange between ground Ops Control Centres and flight crews - delivering streamlined workflows, faster access to briefing data, and reduced administrative burdens.

Malta's aviation sector has expanded training and specialized workforce development initiatives, facilitated by local institutions and international partnerships. MCAST[3] and the University of Malta's Institute of Aerospace Technologies[4] offer programs aimed at building skills in related areas. The commitment towards upskilling in the sector is outlined in Malta's Civil Aviation Policy 2023-2030[5].

2.2 Challenges and Barriers

Despite significant progress in the Aviation and Aerospace thematic area, Malta's aviation sector has faced several challenges and barriers from 2021 to 2023. These challenges range from economic and operational issues to sustainability concerns and regulatory limitations.

Malta's aviation sector is increasingly facing economic pressures and rising operational costs, driven by both EU regulatory shifts and global market dynamics. A major contributing factor is the EU Emissions Trading System (ETS), which is set to phase out free allowances by 2026[6]. At the same time, the volatility of global fuel prices continues to impact cost structures, as fuel accounts for roughly 30% of total airline operating expenses[7]. Labour costs are also rising amid inflationary wage pressures and expanded compliance demands related to environmental regulations and operational standards[8]. Meanwhile, maintenance, repair, and overhaul (MRO) expenditures, along with energy, rent, and depreciation—are placing additional strain on operators' balance sheets, particularly those with limited scale.

1 https://xjenzamalta.mt/2024/11/14/technology-development-programme-tdp-2024/
2 https://aircraft.airbus.com/en/newsroom/press-releases/2024-07-km-malta-cockpit-goes-paperless-with-navblues-mission-flight
3 https://link.springer.com/article/10.1007/s42496-024-00200-0
4 https://www.um.edu.mt/iat/
5 https://infrastructure.gov.mt/wp-content/uploads/2023/05/Civil-Aviation-Policy-Document.pdf
6https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en#:~:text=Full%20auctioning%20from%202026,to%20their%202023%20verified%20emissions
7 https://www.iata.org/en/iata-repository/publications/economic-reports/global-outlook-for-air-transport-december-2024
8 https://www.dixcartairmarine.com/aviation-in-malta-market-niches-and-a-bright-future-interview-with-the-director-of-the-civil-aviation-directorate

03

SMART MANUFACTURING

Smart manufacturing represents a paradigm shift in industrial operations, combining advanced technologies with sustainable practices to enhance efficiency, flexibility, and environmental responsibility. Malta's efforts align with the European Union's broader objectives of fostering digital transformation and sustainability within the smart manufacturing sector.

3.1 Achievements and Progress (2021-2024)

The objective of promoting Smart Manufacturing in Malta is to enhance the country's industrial competitiveness by integrating advanced technologies and digital solutions in the sector to foster the adoption of Industry 4.0 principles, which include Internet of Things (IoT), Artificial Intelligence (AI), remains important for the country since the manufacturing industry accounts for over 11% of the island's workforce and around 10% of its GDP [9].

Malta has registered significant achievements in relation to Industry 4.0 and the modernisation of the industrial sector with multiple investments by the private sector to adopt automation, IoT and AI Systems[10] [11]. These investments in such systems optimise overall production, reduce waste, and enhance product quality.

Malta has also introduced several grant schemes to promote smart manufacturing and support businesses in adopting efficient technologies. These include the Smart and Sustainable Investment Grant [12], the Business Development Scheme, Invest Scheme, Innovate – Innovation Aid for SMEs and MicroInvest, administered by Malta Enterprise.[13] Through initiatives such as the Smart and Sustainable Investment Grant, Government incentivises businesses to design products for longer lifespans, improve equipment efficiency, and facilitate reusability, contributing to more sustainable production cycles. Government also supports Sustainability through Energy Efficiency measures, including programmes of Energy Audits for SMEs[14]. Additionally, the ADMA TranS4MErs Project, which is an EU-funded project supported by Malta Enterprise, aims to assist ambitious SMEs on their digital transformation journey by providing access to digital competencies and advanced skills training in digital technologies.[15]

Through the European Regional Development Fund (ERDF), Malta has been providing financial support to businesses aiming to adopt advanced technologies and enhance their competitiveness. ERDF Funded schemes include the SME Business Enhance Grant[16], the Startup Enhance Grant[17], and the Business Reports for SMEs scheme[18]. Furthermore, the University of Malta's Department of Industrial & Manufacturing Engineering is currently participating in an EU HORIZON MSCA funded project titled "SME 5.0, A Strategic Roadmap Towards The Next Level Of Intelligent, Sustainable And Human-Centred SMEs"[19].

Malta's participation in the IPCEI on Semiconductor Technologies also underscores its commitment to advancing Industry 4.0 capabilities and high-tech manufacturing. Supported by Malta Enterprise, ST is transforming its Malta facility into a fully-fledged smart factory, representing a major step forward in Industry 4.0 and sustainable manufacturing. This investment focuses on next-generation semiconductor innovation, industrial research, and the integration of advanced technologies that are essential to building smart and sustainable production systems.

9 https://www.ccmalta.com/publications/maltas-smart-manufacturing-industry
10 https://timesofmalta.com/article/seifert-systems-ltd-to-set-up-a-smart-factory-based-on-industry-40.911421
11 https://timesofmalta.com/article/stmicroelectronics-get-injection-euapproved-state-aid.1036511
12 https://maltaenterprise.com/SmartandSustainableInvestment
13 https://www.bdo.com.mt/en-gb/insights/malta-incentive-schemes
14 https://energywateragency.gov.mt/energyaudits/
15 https://maltaenterprise.com/adma-trans4mers
16 https://fondi.eu/business-enhance/
17 https://fondi.eu/what-funding-is-available/start-up-enhance/
18 https://fondi.eu/what-funding-is-available/business-reports-for-smes/
19 https://sme50.eu/

To enhance skills development and workforce readiness for Additive Manufacturing, the eSkills strategy for Malta focuses on enhancing training and education in digital and advanced manufacturing technologies. This enhances Malta's overall resources to be equipped with relevant skills for Additive Manufacturing processes.[20] With regards to skills development for Industry 4.0, Malta's commitment is evident through initiatives such as the launch of the Master in Artificial Intelligence for Industry 4.0 programme offered by the Malta College of Arts, Science and Technology (MCAST), which aims to provide theoretical and practical knowledge for implementing AI across industries.[21] Additionally, the University of Malta's Department of Industrial & Manufacturing Engineering has participated and led various Erasmus+ projects such as projects ICARUS, and TRAINEE as well as organised seminars to address the digital skills gap in higher education employees, highlighting the importance of continuous professional development.[22]

Through the Skills Development Scheme[23], businesses are encouraged to invest in the re-skilling and up-skilling of their employees to have a knowledge-based workforce. Training in the use of digital technology and other topics related to digitization is deemed eligible for assistance under this measure administered by Malta Enterprise.

3.2 Challenges and Barriers

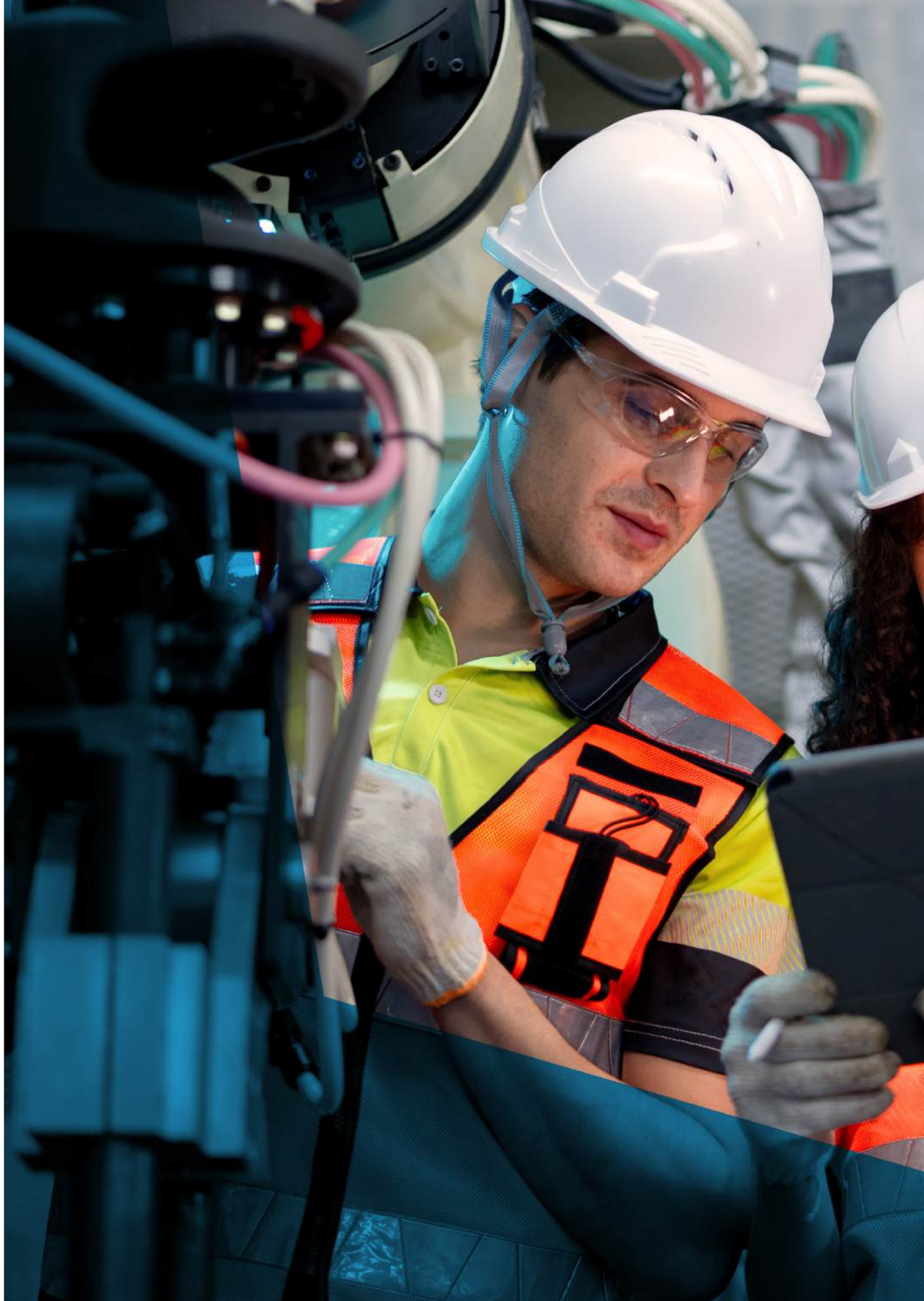
Despite the availability of funding mechanisms such as Horizon Europe and national grants, private sector engagement in R&D activities related to smart manufacturing is relatively low; out of 183 signed grants under Horizon Europe, only 15 were awarded under the Digital, Industry and Space topic[24]. This limited participation hinders the ability of Maltese businesses to innovate and compete in the dynamic global manufacturing landscape.

Despite the introduction of targeted educational programs and upskilling initiatives, Malta faces a persistent shortage of skilled workers proficient in Industry 4.0 technologies. Expertise in automation, AI, and additive manufacturing remains limited, creating a bottleneck for businesses seeking to integrate these advanced systems. By providing hands-on training, mentorship, and access to cutting-edge technology, DiHubMT equips SMEs with the tools they need to bridge this skills gap. Its collaborative ecosystem fosters knowledge exchange, enabling businesses to adopt Industry 4.0 solutions without being hindered by a lack of technical expertise.[25]

Small and medium-sized enterprises (SMEs), which form the backbone of Malta's economy, often struggle to adopt digital technologies due to limited financial and technical capacity. Despite this hurdle, a significant 81.3% of Maltese SMEs possess at least a basic level of digital intensity. [26] This figure increased from 76.5% in the previous year, placing Maltese SMEs in 5th place in this ranking among EU Member States. A survey by the Malta Chamber of SMEs revealed that 72% of respondents are interested in reducing running costs through lower resource use and operating more sustainably, indicating financial limitations. [31] The national Digital Decade Strategic Roadmap[27] lists a number of measures to assist the digitalisation efforts of businesses. This emphasises the government's strong commitment to fostering digital transformation within the business sector, particularly for SMEs, to enhance their competitiveness and drive economic growth in Malta.

While Malta has made progress in digital infrastructure, key gaps persist in areas such as SME capacity, and the availability of energy-efficient systems to support smart manufacturing[28]. Limited availability of natural resources for renewable energy generation limits access to clean energy which hinders the sustainability of manufacturing operations, impacting long-term competitiveness and alignment with EU climate goals. The Malta Chamber of Commerce, Enterprise and Industry's Economic Vision for 2020-2025 comments on the need for improved utility infrastructure to support industrial growth. One of the recommendations highlighted in this Economic Vision, was for Government to reduce the cost of energy for non-household consumers to render businesses more internationally competitive and reduce the inflationary wage prices resulting from price transferring of energy costs from the retail and distribution sector onto the domestic economy.[29]

20 https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/malta-national-eskills-strategy-2022-2025
21 https://mcast.edu.mt/courses/ri7-06-21/
22 https://www.um.edu.mt/newspoint/news/2022/08/bridging-the-industry-4.0-skills-gap-in-malta
23 https://maltaenterprise.com/SkillsDevelopment
24 https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/d58f3864-d519-4f9f-855e-c34f9860acdd/sheet/KVdtQ/state/analysis
25 https://dihubmt.eu/services/
26 https://ec.europa.eu/newsroom/dae/redirection/document/116751
27 https://economy.gov.mt/wp-content/uploads/2024/08/Digital-Decade-Strategic-Roadmap-2023-2030.pdf
28 https://nationalproductivityboard.gov.mt/wp-content/uploads/2025/04/NPB-Report-2024.pdf
29 https://www.maltachamber.org.mt/wp-content/uploads/2023/03/a10d1e6c-70c1-4ee1-ad32-3879359d33fb.pdf



04

MARINE AND MARITIME TECHNOLOGIES

Malta's strategic focus on Marine and Maritime Technology leverages its central Mediterranean location to drive innovation and sustainability. In biotechnology, including aquaculture, the country is investing in sustainable practices and exploring marine bio-resources to enhance food security and contribute to the bioeconomy. Efforts in offshore renewable energy, such as wind energy, aim to diversify energy sources and align with EU goals for carbon neutrality and the Mediterranean's renewable energy potential by 2030 [30]. These initiatives, coordinated and planned within the Maritime Spatial Planning Framework, support Malta's alignment with the EU's Blue Growth agenda, fostering sustainable economic development.

4.1 Achievements and Progress (2021-2024)

Between 2021 and 2023, Malta also made substantial progress in the sustainable utilisation of its marine resources. The aquaculture sector grew significantly, producing 18,051 metric tons of farmed fish in 2022 and contributing €319.4 million to the economy - a 40.7% increase (€92.4 million) over 2021 [31] [32]. This growth reflects the sector's expanding role in national food security and economic development. Malta has also designated over 4,100 km² as Marine Protected Areas, covering more than 35% of its Fisheries Management Zone, to protect biodiversity and support sustainable practices[33] . Complementing these efforts, the Government established the Aquatic Resources Malta agency to drive research, development, innovation, and sustainability in aquaculture among other activities [34]. These initiatives reinforce Malta's alignment with the EU's Blue Growth Strategy and position the country as a leader in marine resource stewardship.

The National Policy for the Deployment of Offshore Renewable Energy outlines plans for project implementation in areas beyond territorial waters, within Malta's potential Exclusive Economic Zone [35]. These initiatives are in line with the broader objective to transform the Mediterranean into a renewable energy hub[36], a goal reinforced by the commitment of MED9 Group to advance offshore wind and solar projects. In shipping logistics, the Malta Freeport continues to strengthen its position as a major Mediterranean transshipment hub. It has adopted advanced terminal operating systems and real-time tracking technologies to improve operational efficiency[37]. In 2022, the port handled over 3 million TEUs (Twenty-Foot Equivalent Units), underlining its importance in global maritime routes [38]. With regards to the onshore power supply project at the Malta Freeport, this is currently underway. Once completed, this will enable container vessels calling such terminal to switch off their engines.

30 https://govcms.gov.mt/en/Government/DOI/Press%20Releases/Pages/2024/10/24/pr241739en.aspx
31 https://maltabusinessweekly.com/farmed-fish-produce-up-40-in-2022-nso/24397/
32 https://tradingeconomics.com/malta/aquaculture-production-metric-tons-wb-data.html
33 https://era.org.mt/topic/marine-protected-areas-2
34 https://legislation.mt/eli/ln/2023/283/eng
35 https://energywateragency.gov.mt/national-policy-for-the-deployment-of-offshore-renewable-energy-launched-at-the-national-energy-conference/
36 https://www.gov.mt/en/Government/DOI/Press%20Releases/Pages/2023/05/18/pr230740en.aspx
37 https://maltafreeport.com.mt/about-us/core-business-section/core-business-resources-2/
38 https://www.portseurope.com/malta-freeport-terminals-limited-teus-handled-2018-2022/

To enhance shipping logistics and services, Malta undertook key projects between 2021 and 2023 to boost maritime sector efficiency and sustainability. The North Grand Harbour and Boiler Wharf Shore Supply project introduced an onshore power supply system in the Northern Part of the Grand Harbour and Boiler Wharf, allowing docked cruise liners to switch off their engines and connect to Malta's electricity grid through shore-to-ship technology, with current capacity of up to five cruise liners powered simultaneously [39]. The South Grand Harbour Shore Supply project, started in June 2025 within the general cargo terminal, will extend the provision of onshore power supply to other quays in the Southern part of the Grand Harbour that are also used by Ro-Ros. This move is expected to reduce air pollution in the Grand Harbour by 90% and improve the quality of life for residents near the Valletta Grand Harbour [40]. Additionally, Transport Malta has been modernising the sector by implementing electronic systems, both for ship registration and as well as for port clearance, reducing administrative burdens and improving turnaround times. Port clearance falls under the remit of the Ports and Yachting Directorate, which implemented the new national single window (the tmSW) and the new VTS system, in line with the applicable EU Directives and international regulations. The digitalisation of the Malta Ship Register will contribute towards the promotion and higher take-up of eGovernment services by making the Ship Register fully digital, thus making ship registration services more accessible, simple and transparent for citizens to use. The project shall also contribute towards making Government services accessible through mobile devices, allowing the re-use of public sector information, extending government transparency, as well as stimulating greater collaboration between international partners, Government, local enterprises and citizens.

Innovation in maritime engineering can be een with local firms developing hybrid power passenger ferries capable of fully electric operation [41]; a focus on energy efficiency and environmental impact is also evident. These vessels help reduce emissions and noise pollution, particularly in environmentally sensitive marine areas. The University of Malta has contributed to offshore energy storage innovation through the FLASC project [42], integrating renewable energy solutions into maritime applications and enhancing sustainability across the sector.

39 https://www.emsa.europa.eu/greening-operations/grand-harbour-clean-air-project-malta.html
40 https://www.infrastructuremalta.com/projects/shore-ship
41 https://whoswho.mt/en/virtu-ferries-actively-looking-at-tech-developments-in-electric-propulsion-for-ships
42 https://flasc.eu/

4.2 Challenges and Barriers

The maritime industry in Malta faces a wide range of challenges, including those driven by environmental concerns linked to global warming, the push for sustainability, and the need to comply with increasingly stringent regulations. Challenges such as limited human resources, rising operational costs, cybersecurity threats, geopolitical tensions impacting trade routes, and the growing pressure to undergo digital transformation to boost efficiency and remain competitive[43].

In the maritime sector, Malta's shipping logistics and services are hindered by infrastructural limitations. The Freeport Terminal and the Grand Harbour require significant modernisation and expansion to accommodate larger container vessels and cruise ships. These limitations restrict Malta's ability to fully position itself as a leading transshipment and maritime services hub in the Mediterranean[44]. Shortage of skilled professionals further complicates efforts to integrate digital solutions across the maritime sector. There is a persistent gap in expertise related to maritime technology, digital logistics, and port operations management. This skills mismatch weakens the capacity of local operators to fully adopt and benefit from new technologies, impacting overall competitiveness [45]. National policy frameworks such as the National Employment Policy 2021[46] and the Smart Specialisation Strategy highlight human capital development in maritime fields as a national priority to enhance sectoral performance.

Regulatory and compliance demands add another layer of complexity. As a member of both the International Maritime Organization and the European Union, Malta must adapt to a growing set of maritime regulations, particularly around environmental sustainability [47]. The revised IMO strategy commits the international shipping sector to net-zero greenhouse gas emissions by or around 2050, with intermediate targets for 2030 and 2040 [48]. This accelerates the need for Malta to align its maritime registry and port operations with global decarbonisation objectives. Compliance with measures such as the carbon intensity indicator (CII), the energy efficiency existing ship index (EEXI), and upcoming market-based mechanisms is essential. Given Malta's position as the sixth-largest ship registry in the world (by gross tonnage as of Q2 2025), the regulatory burden is significant. The Malta Ship Registry, within the Authority for Transport in Malta, oversees the compliance of a large and diverse fleet. The shipping industry is currently navigating one of its most significant challenges as a result of increasing regulations, particularly new greenhouse gas (GHG) reduction measures. The path to decarbonization remains uncertain due to questions about the availability of alternative fuels.

Progress has been made in the promotion of green energy innovation, particularly in the development of photovoltaic technologies, smart energy systems, and energy storage solutions adapted to island contexts. These innovation efforts are closely tied to the Malta Low Carbon Development Strategy (LCDS)[49], which outlines the country's long-term vision to achieve climate neutrality by 2050.

43 https://mmf.org.mt/maritime-industry-at-centre-of-new-economic-model-for-malta/
44 https://www.porttechnology.org/news/malta-freeport-signs-container-terminal-capacity-boost/
45 https://www.oecd.org/en/about/programmes/dg-reform/developing-a-skills-strategy-for-malta-and-its-maritime-sector.html
46 https://finanzi.gov.mt/wp-content/uploads/2023/06/nep.pdf
47 https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-shipping-sector_en
48 https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx
49 https://unfccc.int/sites/default/files/resource/MLT_LTS_Nov2021.pdf

05

SUSTAINABLE USE OF RESOURCES

FOR CLIMATE CHANGE MITIGATION & ADAPTATION

5.1 Achievements and Progress (2021-2024)

The Building Construction Authority (BCA) has published the updated Minimum Energy Performance of Buildings Technical Document F (2024), with effect from July 2024. The requirements address building energy efficiency on multiple levels. The revised standards significantly raise energy performance requirements for new and renovated buildings, aligning with near zero-energy targets set out in the 2018 Cost Optimal Studies[50]. Key improvements include stricter thermal specifications for external walls, roofs, and glazing, as well as enhanced efficiency standards for building systems such as heating, ventilation, air-conditioning, lighting, and water heating[51]. The BCA has also launched fiscal incentives to promote energy-efficient renovations, which have seen overwhelming demand[52].

In the built environment, Malta's Long-Term Renovation Strategy plays a pivotal role in improving energy performance across both residential and commercial buildings, directly supporting national decarbonisation targets[53]. These efforts are being reinforced by the integration of smart building technologies, such as real-time energy monitoring, automated lighting and HVAC systems, and adaptive energy demand solutions. These innovations contribute to reduced consumption and improved energy efficiency, complementing the ambitions of the European Green Deal and the EU's 2050 climate neutrality targets[54].

Alongside building renovation, Malta is actively increasing its share of renewable energy in the national energy mix, with a target of 25% by 2030[55]. This reflects the country's growing focus on solar energy generation, which benefits from Malta's favourable climatic conditions. Complementary to this expansion is the exploration of innovative energy storage systems—such as grid-scale batteries[56] and offshore renewable integration—aimed at enhancing energy security and enabling greater uptake of intermittent renewables. These developments are supported by national policy instruments and EU funding mechanisms, facilitating the transition toward a more sustainable and resilient low-carbon energy system.[57] National plans, such as the 2030 National Energy and Climate Plan (NECP), outline objectives across decarbonisation, energy efficiency, and energy security, reinforcing Malta's long-term sustainability commitments.[58]

In parallel, Malta has made notable strides in expanding its renewable energy capacity, particularly through the growth of photovoltaic (PV) installations. Over recent years, the market for solar PV has grown steadily and substantially. Between 2021 and 2023, the total installed capacity of grid-connected PV systems increased from 205,743.8 kWp to 241,125.9 kWp, marking a 14.7% rise. Correspondingly, estimated energy generation from these PV systems grew from 256.1 GWh in 2021 to 309.3 GWh in 2023, reflecting a 17.2% increase.

Progress in Solar PV Installations and Energy Generation (2021–2023)

Year	Number of PV Installations	Total Installed Capacity (kWp)	Estimated Energy Generation (GWh)
2021	30,931	205,743.8	256.1
2022	32,420	222,598.3	289.8
2023	33,818	241,125.9	309.3

Source: National Statistics Office, Renewable Energy from Photovoltaic Panels (PVs): 2023

50 https://www.um.edu.mt/library/oar/bitstream/123456789/55782/1/EPBD_cost-optimal_analysis_for_non-residential_buildings_in_Malta_2019.pdf
51 https://bca.gov.mt/guidance-documents/
52 https://bca.gov.mt/open-schemes/buy-sustainable-property-scheme-2025/
53 https://sustainabledevelopment.gov.mt/wp-content/uploads/2021/10/longTermRenovationStrategy2050.pdf
54 https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en
55 https://energywateragency.gov.mt/wp-content/uploads/2025/01/MT-%E2%80%93-FINAL-UPDATED-NECP-2021-2030-English.pdf
56 https://icm.mt/projects/battery-energy-storage-systems/
57 https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf
58 https://energy.ec.europa.eu/system/files/2020-01/mt_final_necp_main_en_0.pdf

Two utility scale BESS (Battery Energy Storage Systems) facilities are being installed at Delimara and Marsa Power Stations, with a combined storage capacity of 84 MWh. These systems aim to enhance grid reliability and accommodate fluctuations in renewable energy supply. Furthermore, distributed battery storage systems are being encouraged. As of mid-2024, over 14 MWh of residential battery capacity had already been installed under the scheme, with a further 10 MWh in the pipeline. This distributed storage capacity is critical for absorbing excess solar generation during the day and releasing it during peak evening hours, reducing pressure on the national grid and enhancing energy autonomy at the household level[60]. The FLASC project, developed by engineers from the University of Malta, focuses on offshore energy storage by integrating compressed air energy storage into floating offshore wind turbine structures. This technology makes use of Malta's maritime expertise to store wind energy and redistribute it as needed, providing flexibility to the energy supply and increasing the value of the power delivered[61].

Malta's Circular Economy Strategic Vision 2020–2030**,** launched by the Government of Malta emphasises on reducing waste and promoting sustainable resource use by encouraging industries to recycle by-products and design products for durability[62]. By 2023, a significant number of participating industries reported reductions in waste and increased use of recycled inputs. These improvements are supported by regulatory and policy tools, including the Energy Efficiency Directive (EED) (2012/27/EU), which has been transposed into Maltese law. The recast EED requires enterprises with an average annual consumption higher than 85 TJ of energy over the previous three years to implement an energy management system. Enterprises with an average annual consumption higher than 10 TJ of energy over the previous three years, and which do not implement an energy management system are subject to an energy audit every four years, identifying opportunities for cost-effective energy savings and improved energy management[63] [64]. In line with EU Directive 94/62/EC on packaging and packaging waste, Malta's national regulations - Subsidiary Legislation 549.43 - enforce Extended Producer Responsibility (EPR)[65], obliging producers to minimise the environmental impact of packaging throughout its lifecycle. Producers must register with the National Register of Producers of Packaging or Packaging Material and comply with guidelines promoting better design, increased reuse, and improved recycling.

These efforts are further reinforced by the BCRS scheme, which directly supports resource-efficient industrial practices by promoting the use of recycled materials and sustainable packaging[66], while aligning with Malta's Circular Economy Strategy and the National Energy and Climate Plan (NECP). Between 2021 and 2023, Malta saw a marked improvement in recycling rates, collecting a record 20,000 tonnes of recyclable waste in 2023 through enhanced waste separation and recycling infrastructure[67]. Key to this effort is ECOHIVE, Malta's largest waste management project, which uses advanced technologies—such as thermal treatment for energy recovery and organic waste composting—to convert waste into valuable resources[68]. Complementing this, national EPR frameworks have been strengthened to ensure producers are accountable for the end-of-life impact of their products, driving innovation in packaging sustainability and supporting Malta's transition to a circular economy[69]. An innovative measure to minimize food waste and enhance resource efficiency is the valorisation of animal by-products being undertaken by the Government of Malta. *The Public Abattoir reduces waste by transforming certain animal by-products into useful materials such as traditional food products[70], turning what was once discarded into new market opportunities and supporting a more circular, sustainable operation.*[71] Another initiative is the conversion of fruit and vegetables that are not fit for human consumption at the Pitkali market into recycled material such as compost.

60 https://timesofmalta.com/article/delimara-marsa-get-battery-plants-store-renewable-energy.1039902
61 https://offshoreenergystorage.com/
62 https://www.cemalta.gov.mt/circular-economy/strategy/
63 https://www.maltatoday.com.mt/news/national/126911/waste_separation_efforts_yield_record_20000_tonnes_of_recyclable_waste
64 https://www.thestar.com.my/news/world/2024/01/09/malta-reduces-mixed-waste-by-23-pct-in-2023
65 https://era.org.mt/topic/packaging-waste
66 https://bcrsmalta.mt/environment-first/
67 https://www.wsm.com.mt/en/article?id=810c1a87-6195-44df-9b2f-f51bc7c361c1#gsc.tab=0
68 https://www.ecohive.com.mt/#gsc.tab=0
69 https://era.org.mt/topic/extended-producer-responsibility/
70 https://biccerija.gov.mt/en/mazzit/the-product/a-traditional-maltese-product/
71

Malta's ambition to expand its renewable energy capacity also faces substantial spatial and technical constraints. The country's limited landmass and deep surrounding waters complicate the deployment of large-scale solar and wind energy projects. Offshore renewable energy, although promising, is constrained by high capital and maintenance costs and challenging marine conditions. Nonetheless, the government has recently published a National Policy for the Deployment of Offshore Renewable Energy and is actively working to attract private investment into this emerging sector[72].

Beyond offshore development, there is untapped potential for photovoltaics in less conventional areas. For instance, a GIS-based study on 45 arterial roads across Malta identified a potential for vertical bifacial photovoltaics on sound barriers, which could contribute an additional 31.7 GWh/year—equivalent to a 10% increase in Malta's total PV generation for 2023[73]. Moreover, the Recovery and Resilience Plan outlines investments in integrating solar photovoltaics into footpaths, roads, and public spaces, aligning with efforts to foster a smart and resilient economy while preparing for higher daytime electricity demand from electric vehicle charging [74]. The development of renewable energy technologies in Malta faces key challenges due to the country's limited maritime space and surrounding deep waters, which complicate the deployment of large-scale offshore renewable energy projects. The high capital investment required for such installations, along with the need for specialised technical expertise, creates additional barriers that slow the sector's growth and innovation[75].

Agrivoltaics represents another underexploited avenue. Installations on agricultural land, greenhouses, and vineyards offer a dual use of space that can support both food production and clean energy generation. Recent studies show that over half of Malta's surveyed greenhouses already have the infrastructure necessary—such as access to the electricity grid—to support PV integration, indicating a clear opportunity for growth in this sector[76].

Despite these prospects, financial and technical limitations continue to hinder progress. Small and medium-sized enterprises (SMEs), which make up the backbone of Malta's economy, often lack the capital to invest in energy-efficient technologies or renewable energy systems. The upfront costs can be prohibitive, and even when incentives are available, SMEs frequently face hurdles related to administrative complexity and a shortage of technical expertise. Projects such as the EU-funded EnergyEfficiency4SMEs initiative aim to address these barriers by supporting targeted sectors in reducing their energy consumption and operational costs, yet gaps persist in capacity and resource access[77].

To support green business practices, initiatives like the Smart and Sustainable Investment Grant offer financial support for enterprises investing in resource-optimised, sustainable processes, helping to boost both environmental performance and competitiveness[78]. These efforts are designed not only to meet EU climate objectives but also to enhance Malta's economic resilience through innovation and efficiency.

Malta's commitment to sustainability is further evident in its Waste Management Plan 2021–2030, which sets ambitious targets for increasing recycling rates and improving material recovery from waste streams[79]. Policies promoting extended producer responsibility are pushing industries to adopt more sustainable packaging and production models, fostering a culture of accountability and circular innovation. Collectively, these strategies aim to move Malta closer to a waste-free economy that supports both environmental protection and long-term economic development. These infrastructural and financial challenges are mirrored in Malta's waste management sector, where systemic deficiencies threaten the country's ability to meet EU targets on recycling and landfill diversion. Despite a doubling of total waste generation over the past decade, Malta has not succeeded in decoupling waste growth from economic development. In 2022, municipal waste generation reached approximately 618 kg per capita—well above the EU-27 average of 513 kg. At the same time, only 13% of this waste was prepared for reuse or recycled, compared to an EU average of around 49%, with landfilling remaining the dominant treatment method. These trends highlight the pressing need for upgraded infrastructure and more robust policy enforcement to support a transition towards circularity and environmental sustainability[80].

Health innovation is pivotal in enhancing societal well-being, driving economic growth, and improving healthcare delivery. It makes use of advanced technologies and interdisciplinary research to tackle complex health challenges, promoting accessibility, efficiency, and sustainability within healthcare systems.

72 https://energywateragency.gov.mt/national-policy-for-the-deployment-of-offshore-renewable-energy-launched-at-the-national-energy-conference/#:~:text=The%20policy%20reflects%20the%20government's,to%20its%20lower%20visual%20impact.
73 https://www.um.edu.mt/library/oar/handle/123456789/118613
74https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/maltas-recovery-and-resilience-plan_en
75 https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf
76 Bartolo, K., & Yousif, C. (2017). Assessing PV module degradation and the potential of using greenhouse roofs for supplemental PV power generation in Malta. In Mediterranean Green Buildings & Renewable Energy (pp. 223-233).
77 https://maltabusinessweekly.com/overcoming-barriers-to-energy-efficiency-in-smes/25861/
78 https://maltaenterprise.com/sustainable
79 https://era.org.mt/long-term-waste-management-plan-2021-2030/
80https://www.eea.europa.eu/en/topics/in-depth/waste-and-recycling/municipal-and-packaging-waste-management-country-profiles-2025/mt-municipal-waste-factsheet.pdf/@@download/file#:~:text=Page%20%7C%203-,Municipal%20waste,cap%20in%20the%20same%20year.

06

HEALTH AND WELLBEING

6.1 Achievements and Progress (2021-2024)

Through initiatives like Xjenza Malta's funding programs, such as the FUSION R&I scheme, researchers and businesses are supported to develop cutting-edge biomedical solutions and advanced medical technologies, including prosthetics, imaging systems, and wearable devices. This aligns with broader EU goals to enhance medical device development and healthcare technologies. Between 2021 and 2024, Malta has made significant advancements in biomedical engineering, driven by strategic initiatives and funding support.[81]

Other notable activities contributing to the local ecosystem include a major conference hosted by the IEEE Engineering in Medicine and Biology Society in Malta focusing on data science applications in healthcare.[82] Furthermore, the Maleth Project - the country's first biomedical experiment sent to space - studied the effects of microgravity on human skin tissue, contributing to the burgeoning field of space bioscience and showcasing Malta's innovative capabilities on a global scale.[83] Additionally, the EU-funded 'BioGeMT' project at the University of Malta focuses on bioinformatics for genomics, highlighting the country's dedication to advancing bioinformatics.[84]

The National eSkills Strategy 2022–2025 emphasises building the digital infrastructure and workforce capacity required to support e-health initiatives.[85] These objectives align with the European Health Data Space, enhancing interoperability and data security in healthcare.[86] During the period of 2021-2023, Malta has prioritised the modernisation of its healthcare system by integrating digital solutions such as telemedicine, AI-driven diagnostics, and secure health data platforms. Notable developments include the private sectors' involvement in developing a patient record and telemedicine platform built in Malta. Such platforms facilitate remote consultations and secure patient data management, exemplifying the country's commitment to digital health transformation[87].

Malta is dedicated to advancing cancer research through initiatives that enhance early diagnosis, develop advanced treatments, and contribute to global efforts to reduce the cancer burden. The establishment of the Cancer Research and Innovation Hub Malta (CRIHM) in April 2024[88], exemplifies this commitment, bringing together leading researchers, clinicians, and industry partners to foster collaboration, drive innovation, and fund impactful projects. In 2024 CRIHM launched its first national cancer research call in collaboration with Xjenza Malta, committing just under €1.2 million in funding. CRIHM introduced a mobile cancer awareness and research unit, working with community organisations to promote screening, collect population data in collaboration with DwarnaBio[89], and an advanced prevention research project. As the National Cancer Mission Hub, CRIHM is also a partner in major EU-funded projects such as EU-CIP and CANDLE, strengthening Malta's role in Europe's collective fight against cancer while contributing to the EU's Cancer Mission, which aims to save three million lives by 2030.[90] Europa Donna Malta also works to raise awareness and improve care for breast cancer patients, and has also funded research scholarships[91].

81 https://lovinmalta.com/malta/fuelling-innovation-e4-million-investment-in-17-cutting-edge-research-projects/
82https://www.embs.org/press/ieee-embs-hosts-data-science-and-engineering-conference-in-malta-to-promote-data-revolution-in-health-care-medicine-and-biology/
83https://www.independent.com.mt/articles/2024-08-11/local-news/Cells-in-Space-What-they-did-and-how-a-Maltese-team-got-them-there-6736263405
84 https://timesofmalta.com/article/bioinformatics-sprouting-seed-malta.1052494
85 https://sustainabledevelopment.gov.mt/wp-content/uploads/2024/10/National-eSkills-Strategy-2022-2025.pdf
86 https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space-regulation-ehds_en
87 https://digimed.health/telemedicine-revolution-malta/
88 https://www.um.edu.mt/newspoint/news/2024/04/establishment-cancer-research-innovation-foundation
89 https://www.um.edu.mt/newspoint/news/2023/02/dwarnabio-launch
90https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/eu-mission-cancer_en
91 https://www.um.edu.mt/newspoint/notices/opportunities/2023/08/europa-donna-malta-phd-scholarship-breast-cancer-research

The Malta Life Sciences Park in San Gwann Industrial Estate provides infrastructure for biotech companies, enabling the development of advanced therapies.[92] The Life Science Park is also strategically located near the University of Malta, the island's general hospital and the Sir Anthony Mamo Oncology Centre, making it easier for collaboration between researchers and clinicians[93] in the medical community. The Life Sciences Park assists businesses and start-ups to retain a competitive edge in the global market. It is also a focal point for technology advancement and research initiatives for private industry, government and educational institutions. Over the past few years, Malta has made significant strides in cellular therapy and regenerative medicine. A notable advancement in this field is the establishment of the new stem cell facilities aimed at processing bone marrow and umbilical cords cells locally, reducing the need for patients undergoing cancer therapy to seek treatment abroad.[94]

The Malta Medicines Authority has also been proactive in supporting the medical cannabis sector, which intersects with regenerative medicine. Malta now processes applications for the production of cannabis for medical purposes, fostering an ecosystem conducive to research and innovation in therapeutic developments.[95] Furthermore, recently Malta has attracted significant foreign direct investment (FDI) in the pharmaceutical sector, reinforcing its position as a hub for pharmaceutical manufacturing and innovation. Notable investments include announced commitments of project in new facilities by Torrent Pharma[96], KELIX bio[97], and A2W Pharma[98]. Between 2021 and 2023, the pharmaceutical sector experienced notable growth in the production of chemical and pharmaceutical products. Figures published by the NSO show that manufacturing output in this sector increased significantly, notably by 20.2% from in 2023 when compared to 2022.[99]

6.2 Challenges and Barriers

The integration of artificial intelligence (AI) and digital technologies in healthcare raises significant issues related to data privacy and ethical use. Ensuring patient confidentiality and addressing ethical considerations are critical as Malta advances in AI-driven healthcare solutions. Developing robust regulatory frameworks and ethical guidelines is essential to safeguard patient data and uphold ethical standards.[100]

Healthcare workforce has also been an issue for Malta over the past recent years. The Health Workforce Strategy 2022-2030[101] highlights issues such as labour migration, retention difficulties, and skill imbalances. Nearly 7% of all health workers in Malta, and more than 11% of nurses are foreign nationals, indicating a reliance on international recruitment to meet demands.[102] To address this issue, the Maltese Government has also initiated studies to attract more local students to careers related to healthcare and ensure a more sustainable, homegrown workforce.[103]

Malta's ageing population presents significant challenges to its healthcare system, particularly in managing chronic diseases and providing long-term care. As of 2023, individuals aged 65 and over constitute approximately 18.4% of the total population[104] and projections indicate that by 2050, this demographic will comprise one-third of Malta's population, marking a 50% increase from current figures.[105] This demographic shift intensifies the demand for healthcare services, especially in addressing age-related conditions such as arthritis, obesity, hypertension, and diabetes, which are prevalent among the elderly. The rise in age-related health conditions, including Parkinson's and dementia, further strains healthcare resources and necessitates innovative solutions to meet evolving health needs. Malta has implemented policies like the National Strategic Policy for Active Ageing 2023–2030[106], aiming to promote healthy ageing and enhance the quality of life for older adults. However, the rapid increase in the elderly population continues to exert pressure on healthcare infrastructure, underscoring the need for ongoing adaptation and resource allocation to meet the complex needs of an ageing society.

Malta's healthcare infrastructure faces significant challenges, particularly concerning the modernisation of key facilities such as St. Luke's Hospital [107] and Mater Dei Hospital, Malta's primary acute general teaching hospital. This indicates scope for innovative solutions towards community-based care with digital-based solutions with the intention to alleviate pressures on the national healthcare system.

Malta's life sciences sector faces challenges in aligning with evolving EU pharmaceutical legislation, which aims to foster innovation and ensure timely access to medicines. Compliance requires significant administrative and financial resources, posing a burden for smaller member states like Malta. Proactive engagement with EU initiatives and strategic investment in regulatory capacities are essential for Malta to navigate these complexities and advance its health innovation agenda.[108] [109]

Over recent years, Malta has strived to strategically position itself as a leader in digital innovation, focusing on Future Digital Technologies (FDT) to drive economic growth and societal advancement.

92 https://www.maltalifesciencespark.com/
93 https://publicservice.gov.mt/en/news/an-oncology-centre-of-excellence-for-cancer-care
94 https://www.independent.com.mt/articles/2024-06-29/local-news/New-stem-cell-facilities-to-end-the-need-for-patients-undergoing-cancer-therapy-to-go-abroad-6736262345
95 https://medicinesauthority.gov.mt/cannabisformedicinalandresearchpurposes?l=1
96https://www.independent.com.mt/articles/2023-04-03/local-news/103-local-foreign-direct-investment-projects-to-create-more-than-1-000-new-careers-Dalli-6736250856
97 https://tvmnews.mt/en/news/se-tiftah-fmalta-binvestiment-ta-e48m-u-thaddem-100-haddiem/
98 https://maltabusinessweekly.com/e16-million-foreign-direct-investment-by-a2w-pharma-inaugurated/18644/
99 https://nso.gov.mt/short-term-business/index-of-industrial-production-december-2023
100https://www.independent.com.mt/articles/2024-08-18/newspaper-opinions/AI-Advancements-How-Malta-nurtures-cutting-edge-technology-in-healthcare-6736263525

101 https://www.parlament.mt/media/126054/pq12757.pdf
102 https://www.who.int/europe/news/item/04-11-2022-malta-launches-first-ever-national-health-workforce-strategy
103 https://www.maltatoday.com.mt/news/national/127384/not_enough_healthcare_graduates_ministry_launches_study_in_bid_to_attract_students
104 https://nso.gov.mt/population/world-population-day-11-july-2024/
105 https://lovinmalta.com/malta/one-third-of-people-in-malta-will-be-over-65-by-2050-according-to-un/
106 https://activeageing.gov.mt/wp-content/uploads/2023/04/NSPActiveAgeing2023-30.pdf
107 https://www.maltatoday.com.mt/news/national/121586/watch_footage_shows_shocking_state_of_abandonment_in_st_lukes_hospital
108https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/promoting-our-european-way-life/european-health-union/modernising-eu-pharmaceutical-legislation_en
109 https://anthiazammit.com/publications/eu-life-sciences-and-pharmaceutical-legislation-reform-malta

07

FUTURE DIGITAL TECHNOLOGIES

7.1 Achievements and Progress (2021-2024)

Malta has made significant strides in advancing its digital infrastructure, improving digital connectivity and enabling developments in IoT and smart city solutions. The European Commission's State of the Digital Decade 2025 report highlights that while Malta has made strong progress in digital infrastructure, public services, and AI adoption, it must address persistent gaps in digital skills, ICT workforce, and strategic planning to fully meet EU 2030 Digital Decade goals. [110]

It is also noted in the country report that Malta has achieved full coverage of Very High-Capacity Networks (VHCN) and basic 5G coverage. Malta also stands out in the digitalisation of public services for both citizens and businesses, as well as in the adoption of artificial intelligence (AI) by enterprises, which is now above the EU average. Its proactive approach to enhancing digital sovereignty, including national cybersecurity initiatives like CYBER+ALT and investments in a vibrant start-up ecosystem, underscores Malta's ambition to strengthen control over its digital infrastructure and foster innovation.

Despite these achievements, Malta continues to face challenges in several critical areas. The country lags behind EU targets in the share of ICT specialists (5.2% of the workforce), and in basic digital skills, which are held by only 63% of the population. However, Malta is still above EU average in both areas (5.0% and 55.6% respectively). While there is growing interest in STEM careers, a clear skills gap persists, particularly among women and in small businesses. To fully capitalise on its digital potential, Malta must prioritise digital education, workforce reskilling, and closing the digitalisation gap between SMEs and larger enterprises. The Malta Digital Innovation Authority (MDIA) has been actively supporting digital innovation through various initiatives, including the MDIA Applied Research Grant (MARG) which provides financial support to capacity-building, investment and adoption in artificial intelligence and other emerging technologies. Through this initiative, Malta aims to move towards safer and more trustworthy development and use of digital technologies.[111]

To drive commercialisation of innovative technologies, Malta launched the Take-off Seed Fund (TOSFA)[112], a programme which funds early-stage technology and startup development in the areas of AI, Science, Technology, Engineering, and Creative Media. This support is crucial to bridge the gap between an innovative early-stage idea or technologies and its market development. Through TOSFA, Malta is supporting innovation with strong potential for economic impact, aiming to drive investment, create better job opportunities, and strengthen its role in driving technological growth. Business expenditure on R&D in NACE code J correlating to Information and Communication activities, increased from €21.4 million in 2021 to €27.6 million in 2023.[113] This increase reflects Malta's strategic emphasis on fostering innovation and attracting talent in the digital sector. These investments supported projects that improved the competitiveness of local firms, promoted innovative solutions for the healthcare system, and strengthened the digital economy's foundation. The government's active role in encouraging public-private partnerships such as Tech.mt[114] further amplified Malta's R&D capabilities, enabling it to align with EU innovation targets and attract foreign direct investment. Through the in Malta initiative, Tech.mt facilitates the interaction of foreign Tech investors with Malta.

The University of Malta and MCAST have played crucial roles in expanding digital technology programs to meet evolving industry needs. Between 2017 and 2024, MCAST's Institute of Information and Communication Technology (IICT) registered a total of 8,441 full-time students. Enrolment reached 1,160 students in 2024, up from 1,079 in 2023 and 1,043 in 2022. Between 2017 and 2024, IICT produced 3,031 graduates across all levels, with 505 graduates in 2024 (compared to 384 in 2023 and 333 in 2022) (MCAST, 2025). The percentage of female IICT graduates increased from 8% of the total IICT graduates at MQF Level 6 in 2017 to 19% in 2024. MCAST has also recently launched a Master of Science in Computing and Emerging Technologies, which addresses emerging digital and ICT skills needs. This programme places strong emphasis on advanced topics such as artificial intelligence, data science, cloud computing, blockchain, cybersecurity, and the Internet of Things (IoT). With regards to facilities, the recent installation of a state-of-the-art Cyber-Physical Lab at the Institute of Engineering and Transport (IET) marks a major step forward for applied learning and innovation at MCAST. This advanced laboratory is equipped with cutting-edge technologies, including sensors, robotics, automation systems, and simulation tools that enable students and staff to work on real-world industrial scenarios.[115]

110 https://ec.europa.eu/newsroom/dae/redirection/document/116751
111 https://mdia.gov.mt/services/mdia-applied-research-grant/
112 https://takeoff.org.mt/seed-funds/
113 https://ec.europa.eu/eurostat/databrowser/view/rd_e_berdindr2__custom_17387926/default/table?lang=en
114 https://tech.mt/ & https://tech.mt/facilitating-connections/
115 https://mcast.edu.mt/2024/11/12/mcast-invests-in-new-cutting-edge-cyber-physical-lab-by-ryan-vella-senior-communications-officer-mcast-communcications-office/

the number of ICT specialists in the EU, while also promoting gender balance in the field. This pillar recognises that digital skills are crucial for participation in the economy and society and seeks to bridge the digital divide through various initiatives in education and training. Recognising the pivotal role of digital competence, the Roadmap incorporates several distinct measures specifically designed to enhance the digital proficiency of its population and facilitate the nation's contribution to the Digital Decade Policy Programme's ambitious digital skills objectives. These initiatives are geared towards equipping Maltese citizens with the necessary skills to thrive in the digital age and ensuring Malta effectively meets the EU-wide targets for digital literacy and the number of ICT specialists.

The objective of developing digital skills aims to equip Malta's workforce with the competencies needed for the digital age. This includes upskilling and reskilling programs tailored to emerging technologies like AI, data analytics, and software development. Educational institutions such as the University of Malta and MCAST play a significant role by aligning their curricula with industry needs. National strategies, including the National Digital Strategy[118] launched in 2022, emphasise lifelong learning and partnerships with international tech firms to provide relevant training and opportunities for growth. To ensure that the Maltese labour market is supplied with individuals having the necessary skills and specialization in the area of STEM, the Pathfinder MDIA Digital Scholarship[119] was introduced to support postgraduate education in the fields of Artificial Intelligence and/or Digital Trust and/or Knowledge and Data Representation and Analysis and/or Technology for Sustainability and Environmental, Social, and Governance (ESG) and/ or Quantum Computing and Other Emerging Technologies. Furthermore, the Ministry for Education, Sport, Youth, Research and Innovation (MEYR)'s National Students Wellbeing Services in collaboration with MDIA are also organising ICT Talks for Year 7 female students.[120] These sessions are specifically being organised to explore and discuss the importance of girls' role in ICT and inspire the young minds of these female students to explore this dynamic field.

Within the private and public sectors, the MDIA has been instrumental in fostering digital entrepreneurship in Malta. Through initiatives like the Technology Sandbox[121], the MDIA provides a controlled environment for start-ups to develop and test innovative technologies. The Sandbox is designed to ensure that technological products are fit-for-purpose, thereby building trust in innovative technologies. Additionally, in September 2023, the Maltese government announced the establishment of a €10 million venture capital fund aimed at providing equity investments in innovative technology start-up companies. This fund is set to support various sectors, including video game development, Fintech, and E-sports. This was announced during TECHXPO, Malta's first-ever tech expo.[122]

Fostering digital entrepreneurship aims to create a supportive environment where start-ups and SMEs can thrive. This includes providing funding opportunities, training mentorship, and access to high-end technologies and innovation hubs that encourage collaboration between entrepreneurs and established companies. The Malta Digital Innovation Authority (MDIA) is tasked with facilitating these efforts, offering regulatory guidance and support frameworks to nurture a dynamic digital business ecosystem that contributes to job creation and economic diversification. As part of its broader mission, the MDIA hosts the Malta's European Digital Innovation Hub (DiHubMT)[123], which serves as a key enabler of digital transformation for startups and SMEs. DiHubMT acts as a one-stop-shop offering practical support such as test-before-invest services, skills and training programmes, innovation ecosystems and networking, and support to find investments. Access to high-end technologies, particularly the high-performance computing, will help facilitate cutting-edge research and development. This advanced infrastructure reflects DiHubMT's commitment to enabling innovation, providing a platform where ideas are born, grown, and become a reality. The Hub assists startups and SMEs as well as public sector organisations to navigate the complex landscape of digital transformation and address challenges to thrive in a competitive market. Through the DiHubMT`s Digital Maturity Assessment (DMA), a company`s digital transformation readiness is evaluated to assesses various aspects of digital capabilities, including digital business strategy, digital readiness, human-centric digitalisation, data governance, AI and green digitalisation.

118 https://www.maltadigitali.mt/
119 https://mdia.gov.mt/services/pathfinder-digital-scholarship/
120 https://digitalskills.mdia.gov.mt/article/empowering-future-innovators-girls-in-ict-talks-2024-2025-marks-another-successful-year/
121 https://mdia.gov.mt/services/technology-assurance-sandbox/
122 https://techxpo.eu/
123 https://dihubmt.eu/services/

The MDIA is tasked with implementing and supporting key legislative frameworks such as the EU AI Act, Data Governance Act, Data Act, and Cybersecurity Act, all of which provide legal certainty and promote trustworthy digital environments.[124] To assist stakeholders comply with the EU AI Act, the MDIA launched several AI information tools, including the MDIA EU AI Act self-assessment. This tool provides generic guidance to determine whether a system is likely an AI System under the EU AI Act, understand its potential classification and identify the stakeholder's potential role as a Provider, Importer, Distributor, or Deployer. To safeguard its burgeoning digital ecosystem, Malta introduced the National Cybersecurity Strategy[125] in 2022, designed to protect digital infrastructure, enhance resilience against cyber threats, and promote data privacy. This strategy included initiatives to strengthen cybersecurity capabilities within both public and private sectors and emphasised building a skilled workforce adept at managing cybersecurity challenges. Compliance with EU regulations such as the General Data Protection Regulation (GDPR) further reinforced Malta's reputation as a safe and secure digital hub.

Continuous training programs and partnerships with international cybersecurity bodies have ensured that Malta remains proactive in addressing evolving threats, maintaining trust in its digital economy. The National Cybersecurity Coordination Centre (NCC)[126] offers various training initiatives, such as the Cybersecurity Skilling Programme, designed to enhance the skills of professionals in the field. This program provides foundational and advanced courses to equip individuals with the necessary expertise to tackle current and emerging cyber threats.[127] Malta has made strides in ensuring that digital infrastructure and digital skills training reach all demographics, promoting inclusivity and accessibility. The government's commitment to closing the digital divide has been demonstrated through national campaigns and initiatives aimed at providing digital literacy programs for all age groups, including older adults and disadvantaged communities. Through collaboration with community organisations and educational institutions, Malta has increased participation in digital training, which supports lifelong learning and workforce adaptability.[128]

Malta's efforts in Blockchain and Distributed Ledger has allowed businesses to utilise DLTs for secure transactions, data management, and operational transparency. The establishment of the regulatory framework for blockchain through the MDIA, alongside the implementation of the Technology Assessment Recognition Framework (TARF)[129] which is designed to provide varying degrees of recognition to a wide range of technologies, strengthening trust these technologies and reinforcing Malta`s leadership in governance and regulation. Further legislative efforts such as the Virtual Financial Assets Act (VFA) have solidified Malta's position as a leader in blockchain regulation and innovation. These advancements have not only spurred new business opportunities but also positioned Malta as a model for other countries looking to implement blockchain technology.[130]

124 https://mdia.gov.mt/about/legislation/
125 https://ncc-mita.gov.mt/news/the-launch-of-a-new-cybersecurity-strategy-for-malta/
126 https://mita.gov.mt/portfolio/digital-security/national-cyber-security-coordination-centre/
127 https://ncc-mita.gov.mt/the-cybersecurity-skilling-programme/
128 https://mkfintechpartners.com/2024/07/12/how-malta-is-becoming-a-digital-economy/
129 https://mdia.gov.mt/services/technology-assessment-recognition-framework/
130 https://legislation.mt/eli/cap/590/eng/pdf

7.2 Challenges and Barriers

Despite significant educational advancements, Malta continues to face a shortage of professionals skilled in high-level digital technologies such as artificial intelligence (AI) and cybersecurity. The University of Malta has estimated a skills gap of approximately 1:6, indicating six available open posts for ICT-specific related employment for every-one local available skilled individual. This disparity highlights the need for targeted educational programs and training initiatives to bridge the gap and meet the demands of the evolving digital economy.[131] Recognising the challenges the shortage of ICT professionals presents to Malta's digital ambitions and economic growth, sustained and targeted efforts are crucial to cultivate a skilled workforce capable of driving innovation and competitiveness. Supporting Malta's ongoing digital transformation and addressing the existing workforce gap, the national Digital Decade Strategic Roadmap includes measures aimed at increasing the number of ICT specialists in Malta to meet the growing demands of its digital economy.

The challenge of brain drain in Malta is a known phenomenon, with skilled professionals opting to move abroad due to higher salaries, better career advancement, and more substantial tech ecosystems in larger countries.[132] The EY Generate Youth Survey[133] revealed that 77% of Millennials and 72% of Gen-Z would prefer to live outside of Malta, citing better employment prospects and the desire for quieter, more spacious environments as key reasons. While not specific to the digital sector, this trend poses a substantial challenge to Malta's future, as the emigration of highly trained professionals can lead to a depletion of the nation's skilled workforce. This outflow can hinder the development of local expertise and the ability to sustain long-term growth in Malta's digital sector.

Despite efforts to build digital skills through educational programs at institutions like the University of Malta and MCAST, retaining top talent remains difficult. This challenge is exacerbated by competition with larger EU nations that offer more attractive employment packages and broader job prospects. To combat this, Malta needs to create stronger incentives for skilled workers to stay, such as career development opportunities, competitive salaries, and supportive work environments.[134]

The rapid pace of technological advancements also presents challenges in maintaining up-to-date regulatory frameworks to ensure they remain effective. In response to emerging risks, Malta is actively implementing key legislative instruments such as the EU AI Act, which complements existing frameworks like the General Data Protection Regulation (GDPR). Together, these frameworks provide a foundation for governing the development and deployment of AI systems, particularly those classified as high-risk.

In the 2025 European Innovation Scoreboard Malta performed above the average of Moderate Innovators in the EU with strong performance in digitalisation and firm-level investments in nonR&D innovation. On the other hand low public and private R&D expenditure, weak venture capital, poor commercialisation of innovations, limited SME collaboration, and a shortage of new doctorate graduates translate into limited employment and trade impacts as per the report. [135] As digital transformation accelerates, the risk of cyber threats and vulnerabilities increases. Despite the implementation of the National Cybersecurity Strategy[136] and partnerships with international cybersecurity bodies[137], Malta must continually upgrade its cybersecurity measures to address sophisticated threats. This challenge requires ongoing investment in cybersecurity training, infrastructure, and global cooperation to safeguard digital assets and maintain public trust.

131 https://economy.gov.mt/wp-content/uploads/2024/08/Digital-Decade-Strategic-Roadmap-2023-2030.pdf
132 https://www.independent.com.mt/articles/2022-12-14/newspaper-leader/TMID-Editorial-Malta-s-brain-drain-6736248196?utm_source=chatgpt.com
133 https://www.ey.com/en_mt/insights/generate-survey-2022
134 https://timesofmalta.com/article/internal-brain-drain.962735

135 https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-mt.pdf
136 https://ncc-mita.gov.mt/strategy/
137 https://mita.gov.mt/2025/06/16/maltas-first-participation-in-locked-shields-2025/?utm_source=chatgpt.com

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CONCLUSION

The implementation of Malta's Smart Specialisation Strategy (RIS3) 2021–2027 continues to demonstrate a clear trajectory toward economic transformation across key priority sectors. The monitoring period from 2021 to 2024 reveals important milestones and measurable progress, particularly in the thematic areas of Aviation and Aerospace, Smart Manufacturing, and Marine and Maritime Technologies.

In the Aviation and Aerospace sector, Malta has firmly positioned itself as a regional hub for Maintenance, Repair, and Overhaul (MRO) services, with a significant increase in aircraft handled over the past years. Horizon Europe funding supported international research partnerships, while sustainability commitments, including efforts to promote sustainable aviation fuels, align with EU Green Deal goals. However, challenges persist, including rising operational costs, skills shortages, and infrastructural limitations that may hinder growth unless mitigated through policy and investment.

The Smart Manufacturing area has benefitted from the adoption of Industry 4.0 technologies, including artificial intelligence, additive manufacturing, and IoT. Private sector investments and national grant schemes such as the Smart and Sustainable Investment Grant have catalysed transformation, although barriers such as limited R&D investment, digital skills gaps, and high entry costs continue to challenge SMEs and innovation uptake.

Meanwhile, the Marine and Maritime Technologies sector has demonstrated strong potential, with significant developments in aquaculture, renewable energy, and shipping logistics. Projects like the North Grand Harbour and Boiler Wharf Shore Supply, the South Grand Harbour Shore Supply and digitalisation of maritime operations underscore Malta's push for sustainability and efficiency. Nonetheless, space and infrastructure constraints, together with regulatory and investment challenges, must be addressed to unlock further growth.

Across all areas, the need for enhanced human capital development, streamlined regulation, and targeted support for SMEs is a recurring theme. Malta's continued integration with EU programs and its commitment to stakeholder-driven innovation remain central to overcoming these obstacles. The monitoring results affirm that while strategic implementation is on course, continuous adaptation and investment are essential to ensure the long-term success of the RIS3 strategy and Malta's role as a competitive innovation-driven economy within the European context.

ANNEX

MALTA'S NATIONAL SMART SPECIALISATION STRATEGY (RIS3) 2021-2027 2ND MONITORING REPORT

Contents

Introduction

This report contains the compilation of the second monitoring exercise that has been undertaken as part of Malta's Smart Specialisation Strategy 2021-2027 (RIS3) and includes a compilation of statistical data up until 2023

This monitoring exercise for Malta's RIS3 is essential to ensure that the strategy is being effectively implemented, and that the intended benefits are realised. It supports evidence-based policymaking, fosters continuous improvement to ensure that strategic priorities are met, and that Malta remains competitive in the global economy.

From an EU-level perspective, reports show that Malta's innovation performance presents a blend of strengths and challenges. Strong results are observable in areas such as trademark applications, knowledge-intensive employment, creative outputs, and digital infrastructure, including digital public services and network coverage. However, areas such as innovation investment, R&D intensity, and business R&D spending show lower levels of performance. Additional factors include fewer graduates in science and engineering, a small domestic market, and gaps in digital skills and ICT specialists.

Malta's innovation performance according to EU-level and international rankings

Malta's performance in European and global innovation-related rankings, scoreboards, and indexes differs depending on chosen indicators and applied methodology. The country's small size, population, and limited data pool make it difficult to thoroughly assess its R&D sector performance. With relatively small data samples, even the slightest variations can cause big percentage changes in the variables measured for ranking purposes.

The annual European Innovation Scoreboard (EIS) provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems. It uses quantitative data to help Member States assess areas in which they need to concentrate their efforts to boost their innovation performance. According to 2024 edition, Malta is one of the Moderate Innovators with an above-average performance within the group (88% of the EU average). With an overall score of 96.8, Malta placed 21st in the general ranking and 17th among the European Union Member States. The country's score peaked in 2020 at 106 points, however, in 2023 the figure declined by 1.9 points.

The scoreboard lists foreign doctorate students as a % of all doctorate students, trademark applications, and employment in knowledge-intensive activities as relative strengths of the country. On the other hand, direct and indirect government support of business R&D, R&D expenditure in the public sector, and new doctorate graduates are relative weaknesses of Malta.

The strongly underlined message in the European Innovation Scoreboard's country profile concerns clear underinvestment in innovation compared to other EU Member States. This conclusion can also be drawn from analysing data provided by the National Statistics Office (NSO) of Malta. For instance, business R&D expenditure (BERD) in the selected Smart-Specialisation-related NACE codes as a percentage of total business R&D expenditure in the country has declined by above 10 percentage points between 2020 and 2022, showing an increasing private sector R&D investment gap in strategic Maltese sectors. According to the EIS 2024, Malta experiences an abnormally high annual GDP increase in relation to a minimal innovation investment.

The European Innovation Scoreboard's 2024 findings on innovation investment in Malta are reflected in the gross domestic expenditure on R&D as a percentage of GDP (GERD), also called R&D intensity. The OECD's Frascati Manual on collecting R&D data defines research and experimental development as creative and systematic work undertaken in order to increase the stock of knowledge — including knowledge of humankind, culture and society — and to devise new applications of available knowledge.

In 2023, Malta was spending only 0.61% of its GDP on R&D, despite the government's commitment to 2% expenditure[138]. It is also worth noting that the GERD indicator for Malta has been decreasing over the past years. This resulted in an unfavourable placing in the Scoreboard for Malta, followed only by Romania as the lowest performing country amongst European Union Member States. The top EU R&D spenders, with Belgium in the lead, are devoting at least 3.1% of their respective GDPs toward research and development activities.

The Global Innovation Index (GII) provides performance measures and ranks 132 economies on their innovation ecosystems. The Index is built on a rich dataset – the collection of 81 indicators from international public and private sources – going beyond the traditional measures of innovation since the definition of innovation has broadened. In its 2024 release, Malta was placed in a high, 29th spot among the best innovators in the world. The country performed the best in creative outputs (11th place) and business sophistication (19th place). In other categories, namely human capital and research, infrastructure, institutions, market sophistication, and knowledge and technology outputs, the country ranked between 35th and 48th in the world.

In terms of strengths, the report identified the cultural and creative services exports, intellectual property payments, intellectual property receipts, joint venture/strategic alliance deals, pupil-teacher ratio in secondary education, GDP per unit of energy use, FDI net inflows, tertiary inbound mobility, trademarks, and the number of venture capital investors as such. As Maltese weaknesses, GII 2024 listed domestic market scale, low-carbon energy use, graduates in science and engineering, citable documents H-index, creative goods exports, labour productivity growth, QS university ranking, and unicorn valuation.

138 Eurostat, *Gross domestic expenditure on R&D (GERD)*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R%26D_expenditure&oldid=645219#Gross_domestic_expenditure_on_R.26D, (last accessed 04/11/2024).

Another European ranking, the Digital Decade Report, explores the progress of the EU in its digital transformation, measured in 4 key areas: digital infrastructure, digital skills, digitalisation of public services and digitalisation of businesses. The 2024 edition highlights Malta's very strong contribution to the European Union's Digital Decade objectives, especially in the areas of fixed very high-capacity network, overall 5G coverage, and digital public services for citizens and businesses. In all above-mentioned categories, Malta already fully achieved the desired EU outcomes for 2030. The report points out notable annual progress in connectivity infrastructure and uptake of artificial Intelligence and cloud by enterprises. As per challenges identified by the Digital Economy and Society Index (DESI), incorporated into the Digital Decade Report in 2023, basic digital skills, the number of ICT specialists, and SMEs with at least a basic level of digital intensity are the categories falling slightly below the EU targets. The Digital Decade 2024 observes that digital transition is one of the Maltese top priorities for upcoming years, with nearly EUR 200 million dedicated to the cause from the Recovery and Resilience Plan (RRP) and Cohesion Funds, supported by the national funds[139].

Selected examples of European and global innovation-related rankings, scoreboards and indexes show a varied picture of the Maltese R&D sector performance. With a number of strong points, like the percentage of foreign doctorate students, trademark applications, digital technologies coverage, and digital public services availability, the country has solid fundaments to continue growing its R&D sector and increasing its innovation levels. As pointed out by several sources, innovation investments need to increase in both public and private sectors for Malta to move towards the status of an advanced innovator and enhance its European and global competitiveness.

139 2030 Digital Decade, *Malta 2024 Digital Decade Country Report*, https://digital-strategy.ec.europa.eu/en/node/12843/printable/pdf, (accessed 2 October 2024).

RIS3 Monitoring Framework Methodology

Malta's Smart Specialisation Strategy (RIS3) 2021-2027 includes a monitoring framework, which utilises the below set of high-level indicators intended to track the outcomes of its implementation.

Indicators	Definition
T-Z1 Gross value-added in relevant NACE codes as a percentage of total value-added	Gross value-added (GVA) measures the value of goods and services made by an individual producer, industry or sector to the Gross Domestic Product (GDP). GVA is the value of output minus the value of intermediate consumption (the cost of production).
T-Z2 Business R&D Expenditure in the selected NACE codes as a percentage of total Business R&D Expenditure	The amount of R&D funds spent by enterprises in the selected Thematic Area NACE codes (in total) as a proportion of total expenditure on R&D by enterprises.
T-Z3 Exports in relevant NACE codes as a percentage of total exports	Intra- and Extra-EU exports in the thematic area sectors (classified by NACE codes) as a proportion of total Intra- and Extra-EU exports.
T-Z4 Employment by Tertiary Education attainment in relevant NACE codes as a percentage of total employment	The number of individuals with a tertiary education (International Standard Classification of Education5 (ISCED 2011) levels 5 to 8) employed in thematic area sectors as a proportion of total employment.
T-Z5 Number of SMEs introducing innovations (all types) as percentage of total SMEs in relevant NACE codes	The number of small to medium enterprises (SMEs) classified within the thematic area NACE codes that have introduced innovation (product, process, organisation etc.) as a percentage of all SMEs classified within the thematic area NACE codes.
T-Z6 SMEs in relevant NACE codes introducing innovation (all types) as a % of total SMEs	The number of small to medium enterprises (SMEs) classified within the thematic area NACE codes that have introduced innovation (product, process, organisation etc.) as a percentage of all SMEs in Malta.
T-Z7 Turnover from innovation as a percentage of total turnover in relevant NACE codes	The revenue made by an enterprise as a result of a type of innovation (product, process, organisational etc.) as a proportion of total revenue made by enterprises classified in thematic area NACE codes.
T-Z8 Turnover from innovation in relevant NACE codes as a percentage of total innovation turnover in all NACE codes	The revenue made by an enterprise as a result of a type of innovation (product, process, organisational etc.) as a proportion of total revenue made by all enterprises in all NACE codes.
T-Z9 Researchers in relevant NACE codes as a percentage of total number of researchers	The number of researchers employed in economic sectors related to the thematic areas as a proportion on total researchers in Malta.
T-Z10 FDI attracted in relevant NACE codes as a percentage of the whole	Foreign Direct Investments made in the thematic area economic sectors defined by NACE as a percentage of total Foreign Direct Investments made in Malta.
T-Z11 Patents filed in relevant NACE codes as a percentage of total patents filed	Patents filed by Maltese individuals with the European Patent Office (EPO) using IPC codes corresponding with the thematic and niche areas as a proportion of total patents filed by Maltese individuals in all IPC codes.

In order to standardise the quantitative data as much as possible, NACE[140] and International Patent Classification (IPC)[141] codes were used as a proxy for monitoring the economic sectors most aligned with the RIS3 thematic areas. It should be taken into consideration that that statistical classifications used for this monitoring exercise are not fully representative of the Thematic and Niche areas outlined in the strategy. Since the level of granularity is not fine enough to capture the scope of these areas, the NACE and IPC codes utilised should therefore be considered as the best proxy available.

The data in this report is also presented in aggregate format for all the RIS3 Thematic areas together to avoid issues concerning data confidentiality which can be particularly acute in a small country setting such as Malta with a limited data pool.

Data was collected via the National Statistics Office (NSO) and the Ministry for Economy, Enterprise and Strategic Projects (MEEP).

140 NACE Rev.2: https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF
141 https://ipcpub.wipo.int/?notion=scheme&version=20230101&symbol=none&menulang=en&lang=en&viewmode=f&fipcpc=no&showdeleted=yes&indexes=no&headings=yes&notes=yes&direction=o2n&initial=A&cwid=none&tree=no&searchmode=smart

Monitoring Results

- T-Z1: Gross value-added in relevant NACE codes as a percentage of total value-added

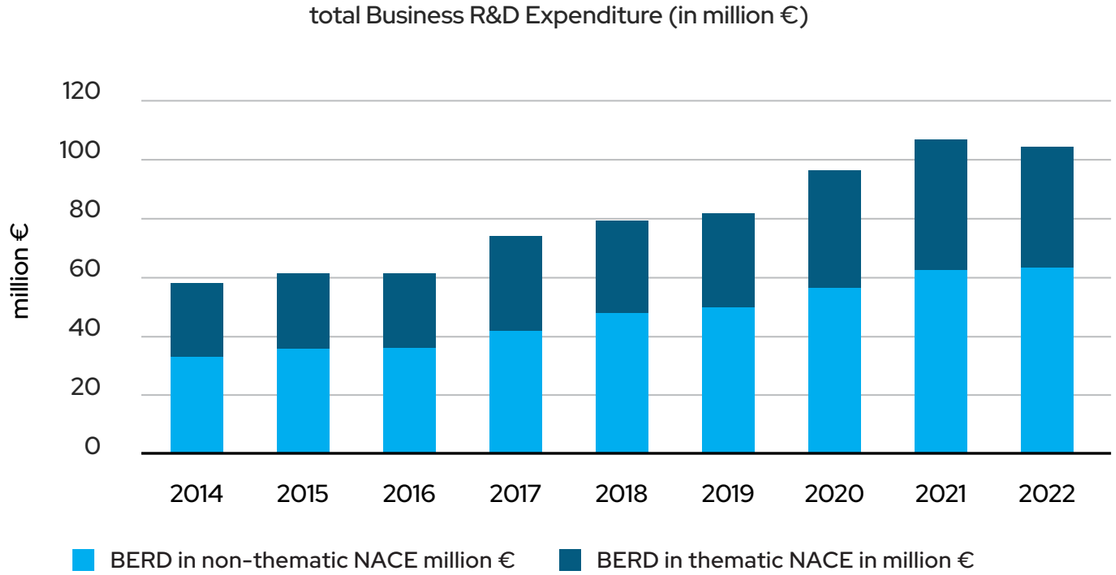
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
21.91%	20.50%	21.69%	20.15%	22.28%	21.66%	21.33%	23.71%	25.41%	25.05%	24.51%	27.06%

The **Gross value-added (GVA) in relevant NACE codes** shows an overall upward trend, starting at around 21.91% in 2012 and rising to 27.06% by 2023. Although there were slight fluctuations between 2012 and 2017, where the percentage hovered around 20-22%, the GVA in relevant NACE has been growing steadily from 2018 onward. The GVA peaked in 2020 at 25.41%, and then continued this trend through to 2023.

The upward trajectory, particularly since 2018, could shed some light on the growing importance and strength of Malta's thematic areas under the Smart Specialisation Strategy.

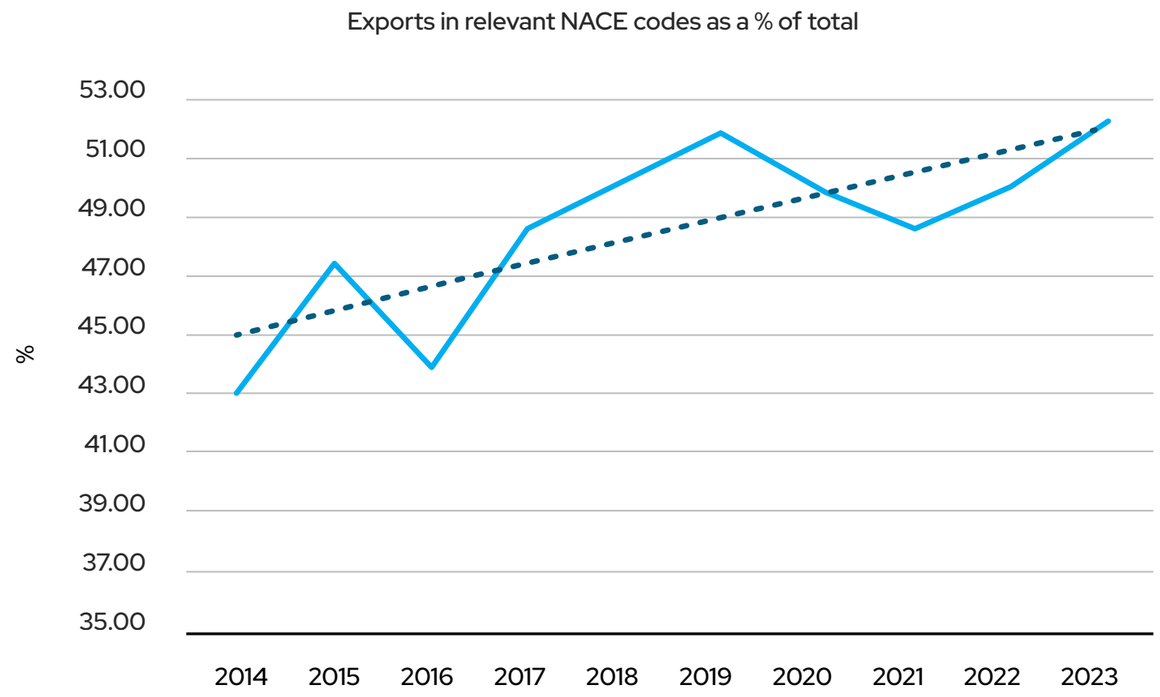
- T-Z2: Business R&D Expenditure in the selected NACE codes as a percentage of total Business R&D Expenditure

2014	2015	2016	2017	2018	2019	2020	2021	2022
75.73%	70.96%	71.82%	71.95%	69.39%	68.44%	72.43%	67.37%	61.45%



The proportion of business R&D undertaken in the selected NACE codes representative of Malta's RIS3 areas has increased in real terms from €25.34 million in 2014 to €40.10 million in 2022. However, BERD in private sector areas outside of Malta's RIS3 areas has increased even more over the same time span (BERD in non-thematic NACE codes increased from €33.46 million in 2014 to €65.25 million in 2022), leading to a consistent decrease in BERD in thematic NACE codes when expressed as a percentage of total BERD. This may suggest a decreasing relative importance of R&D investment in thematic NACE areas compared to non-thematic areas, potentially indicating a shift towards sectors outside these thematic areas. Conversely, while thematic NACE BERD also grew from €25.34 million in 2014 to €40.10 million in 2022, this growth has been inconsistent, and it may suggest a diversification in R&D investments.

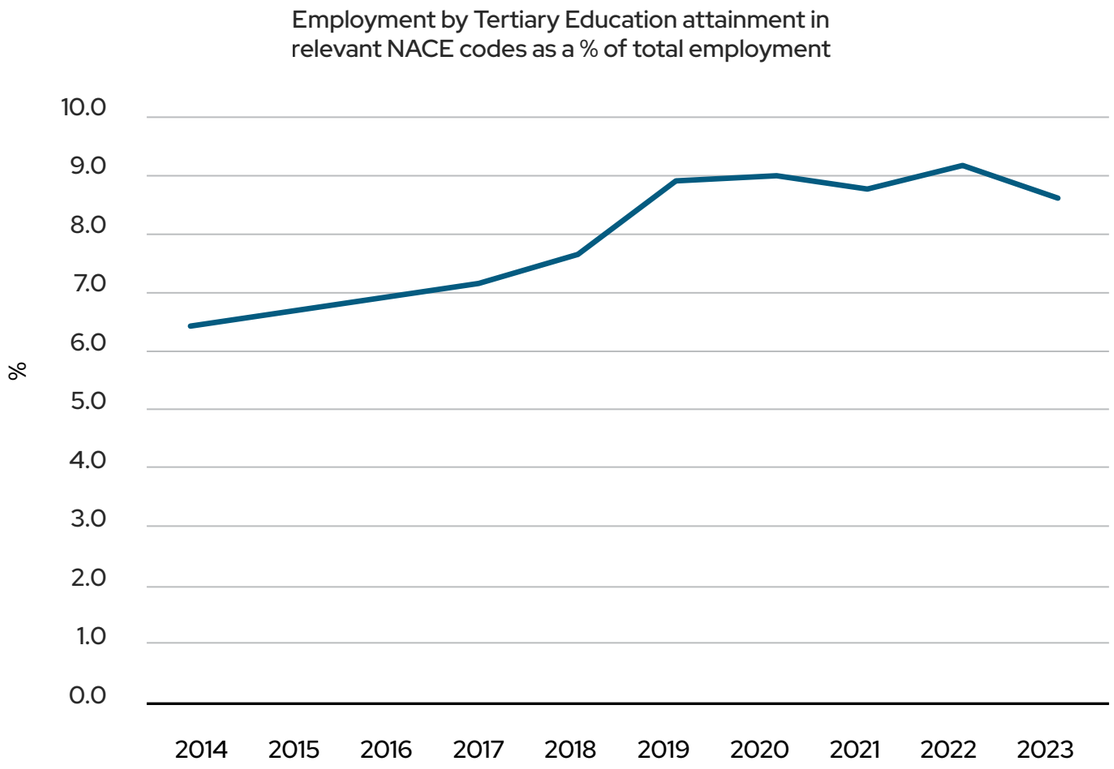
- T-Z3: Exports in relevant NACE codes as a percentage of total exports



2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
43.23%	47.44%	43.87%	48.59%	50.26%	51.78%	49.96%	48.63%	50.00%	52.14%

The percentage of **Exports (intra-EU and extra-EU) in relevant NACE codes** has shown a steady increase from 43.23% in 2014 to 52.14% in 2023, which may indicate a growing importance and competitiveness of these sectors within the national export economy. The absolute value of exports from these sectors also rose significantly, from €1.63 billion in 2014 to €2.38 billion in 2023.

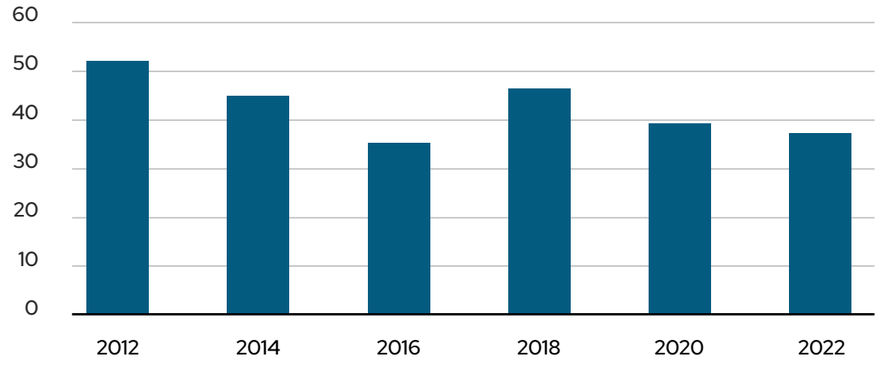
- T-Z4: Employment by Tertiary Education attainment in relevant NACE codes as a percentage of total employment



2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
6.43%	6.65%	6.88%	7.16%	7.69%	8.88%	8.95%	8.78%	9.17%	8.61%

Data for the indicator on **Employment by Tertiary Education attainment in relevant NACE codes** shows that the share of total employment occupied by tertiary level graduates rose from 6.43% in 2014 to a peak of 8.9% in 2019 and has remained largely stable since then.

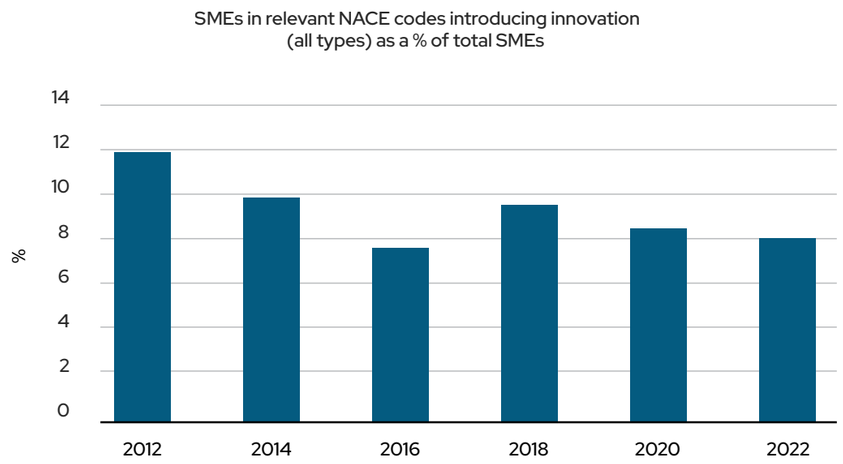
- T-Z5: SMEs introducing innovations (all types) as percentage of total SMEs in relevant NACE codes



2012	2014	2016	2018	2020	2022
51.68%	44.39%	35.57%	46.44%	39.53%	38.10%

The figures for **SMEs introducing innovations (all types) as percentage of total SMEs in relevant NACE codes** show a fluctuation over the years, starting at 51.68% in 2012, dropping to 35.57% in 2016, and slightly recovering to 38.09% by 2022. This inconsistency may suggest challenges in sustaining innovation, possibly due to capacity limitations, and market conditions.

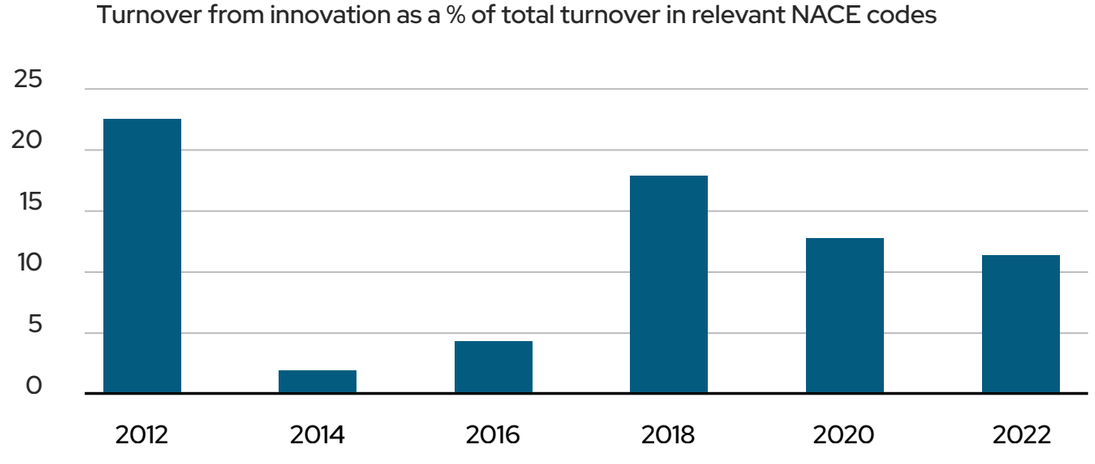
- T-Z6: SMEs in relevant NACE codes introducing innovation (all types) as a % of total SMEs



2012	2014	2016	2018	2020	2022
11.94%	9.77%	7.58%	9.41%	8.30%	7.96%

Similarly, **SMEs in relevant NACE codes introducing innovation (all types) as a % of total SMEs** has declined from 11.93% in 2012 to 7.96% in 2022. This may indicate that while the number of SMEs has grown, fewer are engaging in innovation. This trend highlights the need for strategic efforts to foster innovation across all SMEs in these sectors.

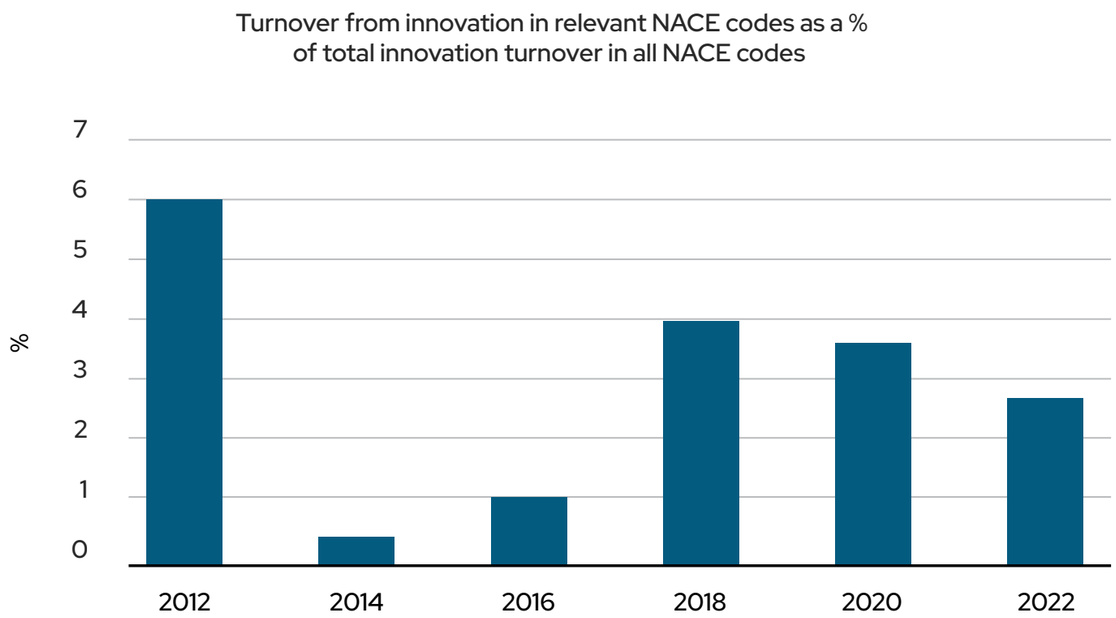
- T-Z7: Turnover from innovation as a percentage of total turnover in relevant NACE codes



2012	2014	2016	2018	2020	2022
22.02%	1.22%	4.39%	17.56%	12.91%	10.84%

The **turnover from innovation as a percentage of total turnover in relevant NACE codes** has experienced significant fluctuations, starting at 22.02% in 2012, dropping sharply to 1.22% in 2014, recovering to 17.56% in 2018, and gradually declining to 10.84% by 2022.

- T-Z8: Turnover from innovation in relevant NACE codes as a percentage of total innovation turnover in all NACE codes



2012	2014	2016	2018	2020	2022
6.02%	0.41%	1.01%	3.96%	3.66%	2.70%

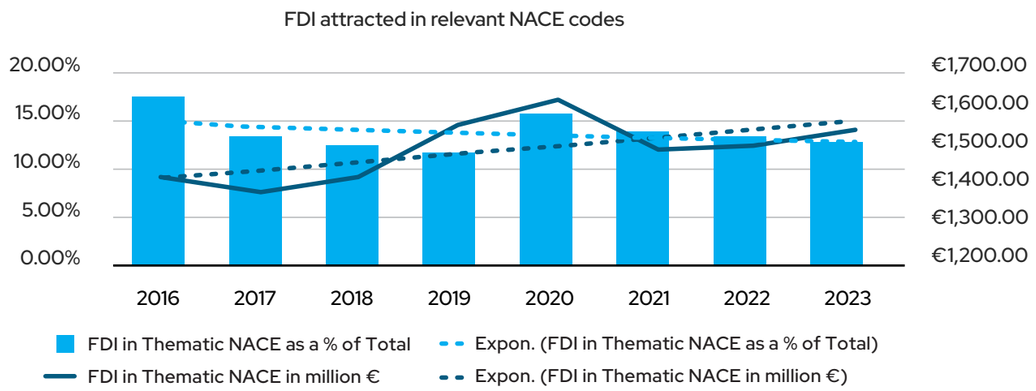
Additionally, **turnover from innovation in relevant NACE codes as a percentage of total innovation turnover in all NACE codes** has decreased from 6.02% in 2012 to 2.70% in 2022, indicating that other sectors may be gaining ground in innovation contributions.

- T-Z9: Researchers in relevant NACE codes as a percentage of total number of researchers

2014	2015	2016	2017	2018	2019	2020	2021	2022
71.88%	69.32%	66.78%	67.01%	65.49%	61.52%	63.80%	61.01%	65.76%

The **percentage of researchers in thematic NACE codes** has generally decreased from 71.88% in 2014 to 65.76% in 2022, despite an absolute increase in their numbers from 340 to 457. This decline in share may also indicate that other sectors are becoming more research-intensive, reflecting a broadening of the research base across the economy. Although there has been some recovery since the lowest point in 2020, the slower growth rate in thematic NACE researchers compared to the total researcher population suggests a need for increased focus and investment in these areas to maintain their strategic importance.

- T-Z10: FDI attracted in relevant NACE codes as a percentage of the whole (excluding Financial Services and Special Purpose Entities)



	2016	2017	2018	2019	2020	2021	2022	2023
FDI in Thematic NACE as a % of Total	17.77%	13.43%	12.28%	11.40%	15.70%	13.88%	13.27%	12.91%
FDI in Thematic NACE in million €	€1,429.19	€1,394.42	€1,434.67	€1,566.49	€1,630.25	€1,507.54	€1,515.01	€1,552.75

From 2016 to 2019, **FDI as a percentage of total** investment showed a declining trend, dropping from 17.77% to 11.40% between 2016 and 2019, before experiencing a noticeable increase to 15.70% in 2020. However, from 2021 to 2023, this percentage stabilised to 13.88%, slightly declining to 12.91% by 2023. In contrast, the absolute FDI amount has generally increased, peaking at €1,630.25 million in 2020 and remaining stable around €1,500 million in subsequent years. This may suggest that the thematic areas under NACE codes are attracting an increasing amount of FDI in absolute terms, indicating growing interest or investment in these areas.

MALTA'S SMART SPECIALISATION STRATEGY 2021-2027