

The Impact of Artificial Intelligence on Malta's Labor Market

Thomas Gade

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IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on December 17, 2024. This paper is also published separately as IMF Country Report No 25/18.

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ABSTRACT: Artificial Intelligence (AI) and Generative AI models and their use have significantly advanced in recent years, evolving from their historical role in automating routine tasks to now performing complex cognitive functions. As a result, it has the potential to reshape the job landscape across a broad range of skills and sectors. Mapping occupational labor market micro data for Malta with a measure of exposure and complementary to AI indicates that Malta is slightly less susceptible to AI job displacement than other advanced economies. However, our analysis suggests that women, young, and people with high school degrees only, are at a greater risk of job displacement.

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Author's E-Mail Address:	tgade@imf.org

SELECTED ISSUES PAPERS

The Impact of Artificial Intelligence on Malta's Labor Market

Malta

Prepared by Thomas Gade

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON MALTA'S LABOR MARKET¹

Artificial Intelligence (AI) and Generative AI models and their use have significantly advanced in recent years, evolving from their historical role in automating routine tasks to now performing complex cognitive functions. This evolution enables AI to process vast amounts of data, recognize patterns, and make decisions. As a result, it has the potential to reshape the job landscape across a broad range of skills and sectors. Malta is digitally well-prepared to benefit from AI. Mapping occupational labor market micro data for Malta with a measure of exposure and complementary to AI indicates that Malta is slightly less susceptible to AI job displacement than other advanced economies. However, our analysis suggests that women, younger workers, and people with high school degrees only, are at a greater risk of job displacement.

A. Context

1. Artificial Intelligence (AI) and Generative AI models have evolved significantly in recent years. AI models have progressed from earlier machine learning models to now performing cognitive functions, processing vast amounts of data, recognizing patterns, and making decisions. Today, AI systems routinely exceed human performance on standard benchmarks.² New multimodal models can generate coherent text in dozens of languages, process audio, and explain photographs or memes. Companies are racing to build AI-based products, and AI is increasingly being used by individuals and organizations. As AI models continue to develop and their use expands, they have the potential to reshape the job landscape across a broad range of skills and sectors. While there are productivity gains in this process, AI integration may also lead to job displacement during the transition.

2. Malta is digitally well-prepared, but the labor market is likely to see some job displacement with the roll-out of AI. The first section of this paper assesses Malta's digital preparedness and potential to benefit from AI, using the IMF's AI Preparedness Index (APII) and other indicators of digital skills, intensity, and AI use. Malta is generally found to be well-prepared. The second section analyzes the characteristics of the Maltese labor market, mapping an index of exposure and complementarity onto occupational micro data. The analysis shows some risks of job displacement in Malta, especially for women, younger workers, and people with high school education only. The third section provides policy considerations.

¹ Prepared by Thomas Gade (EUR). The author thanks participants of a workshop held at the Central Bank of Malta for useful discussions and comments.

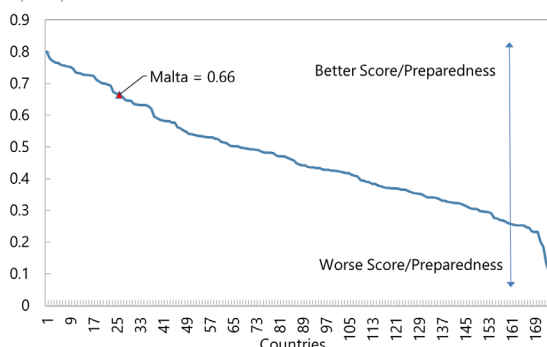
² See "[The AI Index 2024 Annual Report](#)," AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, Stanford, CA, April 2024.

B. Infrastructure, Human Capital, and Digital Preparedness in Malta

3. The Malta authorities are prioritizing digital transition to strengthen digital preparedness and the use of AI. The authorities allocate a significant part of multi-year funds from the EU's Recovery and Resilience Fund and cohesion funds – €196 million or 1.0 percent of 2023 GDP – for digital transformation.³ They have developed a workplan for digital transition in the 2021-2027 Smart Specialization Strategy and outlined six initiatives to gain competitive advantage as a leader in AI outlined in the National AI Strategy.⁴ These strategies focus on investment needs as well as public and private sector adoption, supported by initiatives related to the education system and workforce, the legal and ethical framework, as well as infrastructure. With 80 percent of the existing AI strategy completed, an updated AI strategy is being prepared to align with new AI technologies, sectoral trends and priorities, risks, and regulations.

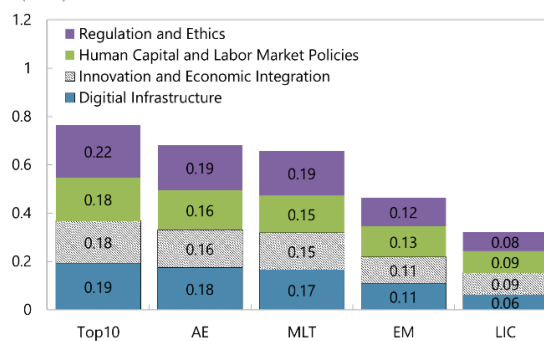
Figure 1. AI Preparedness and Digital Indicators

AI Preparedness Index
(Index)



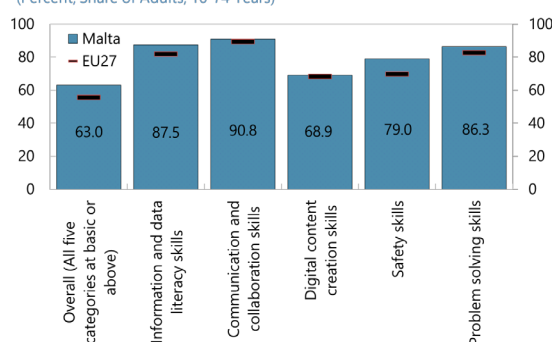
Sources: Cazzaniga and others (2024), IMF staff calculations.

AI Preparedness Index by Factors
(Index)



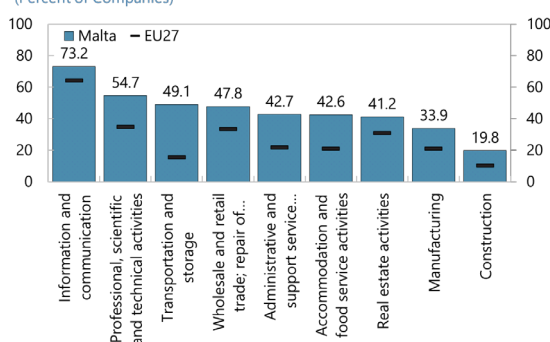
Sources: Cazzaniga and others (2024), IMF staff calculations.

Digital Skills - Basic or Above Basic Skills, 2023
(Percent, Share of Adults, 16-74 Years)



Sources: Eurostat, IMF staff calculations.

Digital Intensity - At least High or Very High, 2023
(Percent of Companies)



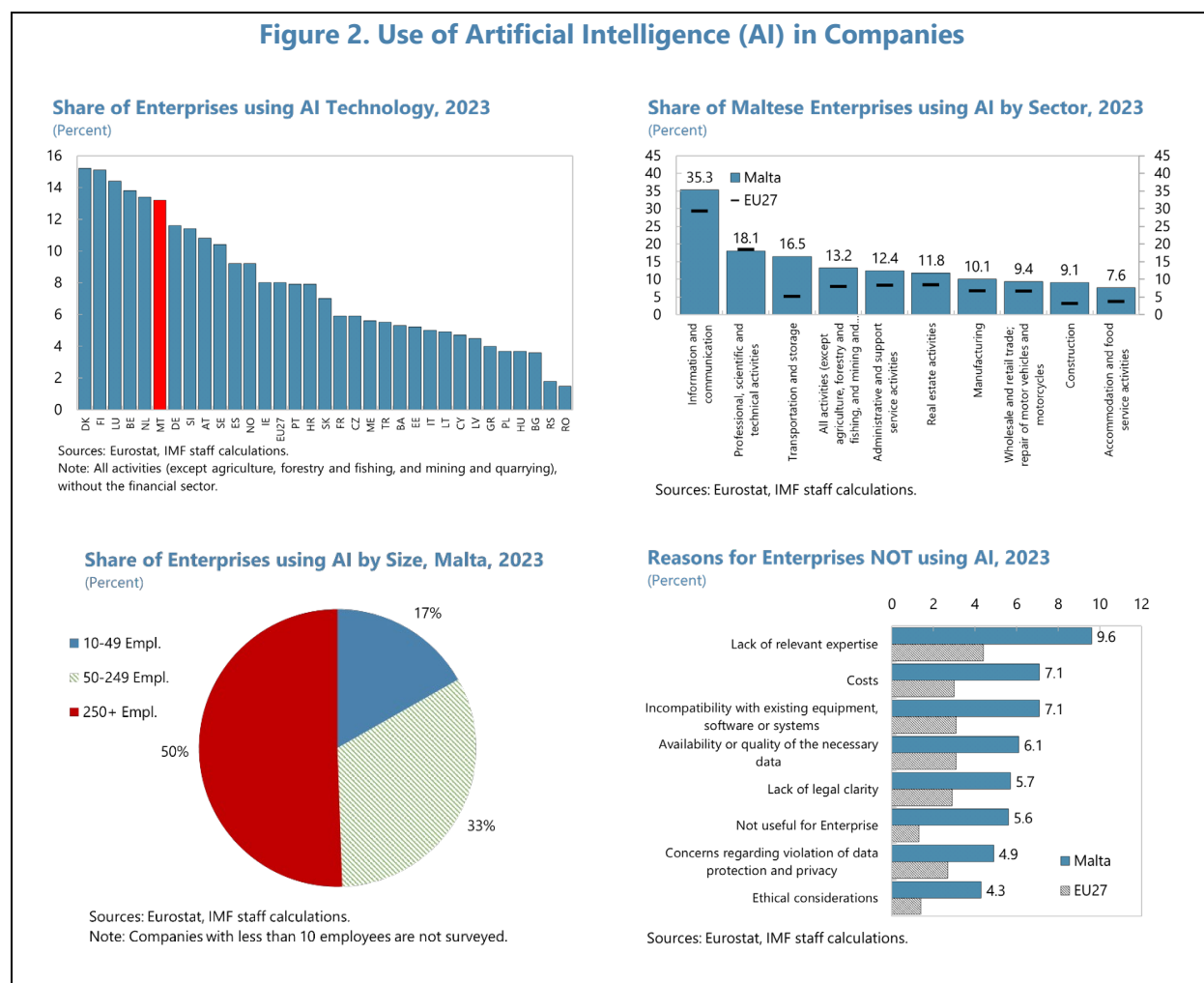
Sources: Eurostat, IMF staff calculations.

³ See [2024 Country Report](#) – Malta, European Commission, SWD (2024) 618.

⁴ See [Malta's Digital Innovation Authority](#).

4. Malta is well-placed to benefit from AI. The IMF's AIPI indicates that Malta is positioned well to roll out AI effectively and capitalize on potential benefits.⁵ Malta's AI preparedness aligns broadly with the average of advanced economies across a range of measures covering "Regulation and Ethics," "Human Capital and Labor Market Policies," "Innovation and Economic Integration," and "Digital Infrastructure" (see Figure 1). Also, digital skills are relatively sound in Malta with 63 percent of the working age population having basic or above-basic digital skills, with particularly high skills in areas like information and data literacy, communication, collaboration, and problem solving. Maltese companies' digital intensity is relatively high, compared to the EU-27 average, suggesting that both individuals and companies have the necessary skills and capacity to adopt digital technologies such as AI.⁶

Figure 2. Use of Artificial Intelligence (AI) in Companies



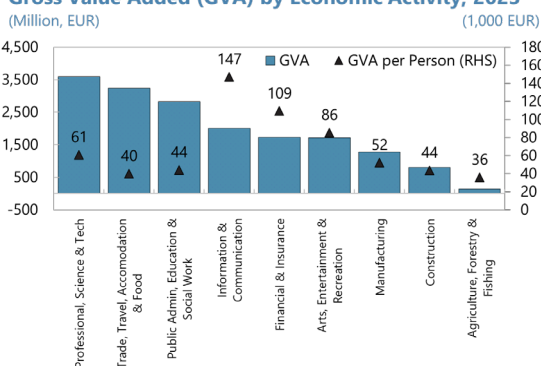
⁵ The IMF's AIPI (Cazzaniga and others, 2024) assesses the level of AI preparedness as of 2023 across 174 countries, based on a rich set of macro-structural indicators that cover the countries' digital infrastructure, human capital and labor market policies, innovation and economic integration, and regulation and ethics.

⁶ The Digital Skills Indicator (DSI) and the Digital Intensity Indicator (DII) are compiled by Eurostat. The DSI is a composite indicator related to internet or software use by individuals in five specific areas (information and data literacy, communication and collaboration, digital content creation, safety, and problem solving). The DII is a composite indicator, derived from the survey on ICT usage and e-commerce in enterprises.

5. Maltese companies are already using AI, but a lack of expertise, high costs, and system incompatibility hinder greater adoption. In 2023, 13.2 percent of companies in Malta, excluding agriculture, fishing, mining, and the financial sector, used at least one AI technology, which is relatively high in Europe (see Figure 2). Most of AI-using companies are large with more than 50 employees (83 percent). While the share of AI-using companies in the information and communication sector is the highest (35.3 percent), the use of AI is also high in other sectors, compared to other EU countries, such as administrative and support service activities (12.4 percent), manufacturing (10.1 percent), wholesale and retail trade (9.4 percent) and accommodation and food services (7.6 percent). However, a large majority of firms in Malta, especially SMEs, have yet to adopt AI technologies, suggesting a high potential for further use of AI. Companies not yet using AI technology indicate a lack of relevant expertise, high costs, and system incompatibility as key barriers, challenges that are significantly higher than the EU average, suggesting potential labor and skill shortages as well as financial constraints.

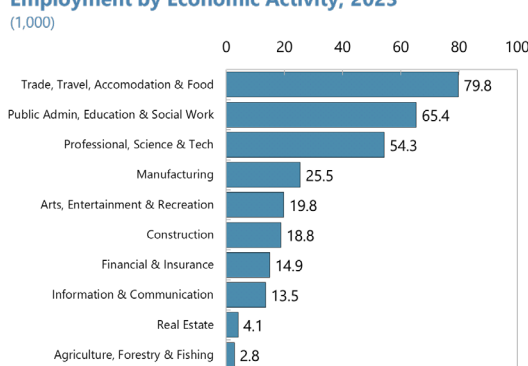
Figure 3. Value Added and Employment Characteristics in Malta

Gross Value Added (GVA) by Economic Activity, 2023



Sources: Haver Analytics, NSO Malta, IMF staff calculations.

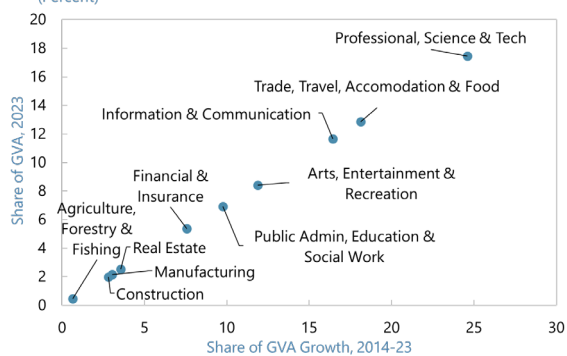
Employment by Economic Activity, 2023



Sources: Haver Analytics, NSO Malta, IMF staff calculations.

Share of GVA and GVA Growth 2014-23

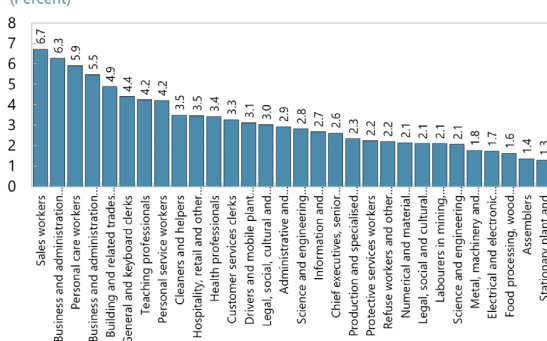
(Percent)



Sources: Haver Analytics, NSO, IMF staff calculations.

Main Occupations in Malta, 2023

(Percent)



Sources: Eurostat, IMF staff calculations.

C. Labor Market Exposure and Complementary to AI

6. The economy and labor market of Malta are relatively well-diversified. The largest economic activities in Malta, measured both by gross value added and number of employees, are related to professional, scientific, and technical activities, trade, travel, accommodation, food services, and public services (see Figure 3). These activities account for roughly half of economic output and two-thirds of employment. While manufacturing, arts, entertainment and recreation, construction, financial services, ICT, real estate services, and agriculture comprise the other half of output, they only account for one-third of employment. The main occupations in Malta are business administration professionals, sales workers, and personal care workers.

7. We measure exposure and complementarity to AI of different job types. Felten et al (2021) developed a measure of occupational exposure to AI, linking AI applications to workplace skills and occupations, using US occupational data. Pizzinelli et al (2023) also consider the social, ethical, and physical contexts of occupations, extending Felten's measure of exposure with the concept of complementarity to determine whether AI may complement or replace jobs. These measures are categorized into four dimensions: 'High Exposure and High Complementarity' (HEHC), 'High Exposure and Low Complementarity' (HELC), 'Low Exposure and High Complementarity' (LEHC), and 'Low Exposure and Low Complementarity' (LELC) (see Annex 1).⁷ We apply these measures to micro data of Malta from the 2023 Labor Force Survey, using approximately 10,000 observations. This allows us to assess exposure and complementarity in Malta across 40 occupations, 21 economic activities, 5 age groups, gender, 4 educational attainment groups, income, and 3 'country of birth' groupings.⁸

8. The results suggest that the labor market of Malta will likely see some job displacement within services-related occupations. Around 60 percent of the labor market of Malta is highly exposed to AI, indicating an overlap between AI applications and the skills required for these jobs (see Figure 4).⁹ The relatively high share of business administration professionals, sales workers, general clerical and other administrative support roles - functions with low complementarity - implies that approximately 30 percent of the labor market is at risk of job displacement. This share is broadly similar to that estimated for other advanced economies. However, the labor market of Malta exhibits slightly higher complementarity than other advanced economies, suggesting that the risk of job displacement and potential productivity gains could be higher in Malta than in the average advanced economy.

9. Women, younger workers, and people with only a high school education are more vulnerable to job displacement. Women face a higher risk of job displacement than men given

⁷ Cazzaniga and others (2024) apply these measures in a cross-country comparison.

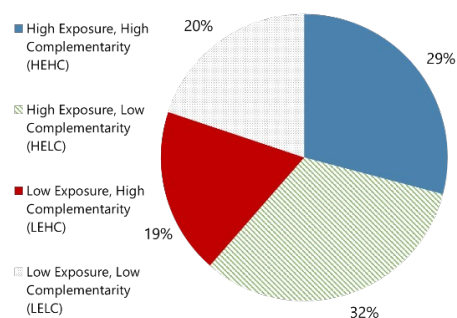
⁸ When disaggregating the data into subgroups and joint subgroups, the number of observations within each group and especially joint subgroups declines significantly, which increases the statistical uncertainty of the results.

⁹ The term 'highly-exposed' should be used with caution. It reflects the job occupations with an exposure score higher than the median across occupations, using the Felten et al (2021) occupational exposure index. It therefore measures exposure in a relative sense against all other occupations, and not necessarily in an absolute sense.

their prevalence in service-related sectors with high exposure and low complementarity, such as sales, business administration, and clerical support. Approximately 41 percent of women employees fall into this category, compared to only 27 percent of men (see Figure 5). The difference also reflects a higher share of men working in physical occupations (construction, drivers, agriculture). Tertiary education is valuable, as it is associated with very high complementarity (see Figure 6), while 40 percent of those with only a high school degree are in the high exposure and low complementarity category. The same applies to age and income, with young people under 30 and those with low and lower-middle incomes being more at risk of job displacement. There are no major differences in the high exposure and low complementarity category between Maltese nationals and immigrants.

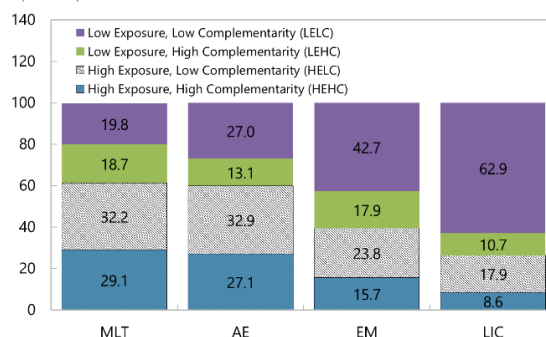
Figure 4. Exposure and Complementarity to AI

Employment Exposure and Complementarity to AI, 2023
(Percent)



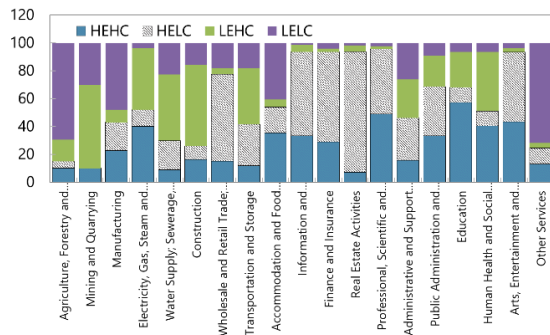
Sources: Eurostat, Cazzaniga and others (2024), Felten et al (2021), IMF staff calc.

Employment Exposure and Complementarity to AI, 2023
(Percent)



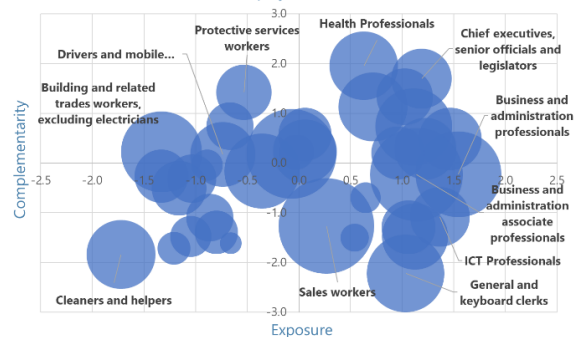
Sources: Eurostat, Cazzaniga and others (2024), Felten et al (2021), IMF staff calc.

Activity - Employment Exposure and Compl. to AI, 2023
(Percent)



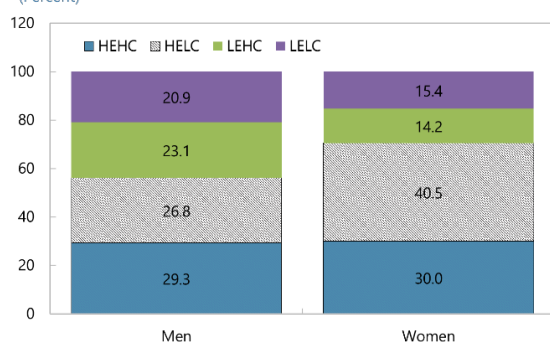
Sources: NSO, IMF staff calculations.

Occupational Exposure and Complementarity to AI, 2023
(Z-scores, Size of Circle = Share of Employment)



Sources: Eurostat, Cazzaniga and others (2024), Felten et al (2021), IMF staff calc.

Figure 5. Gender Differences

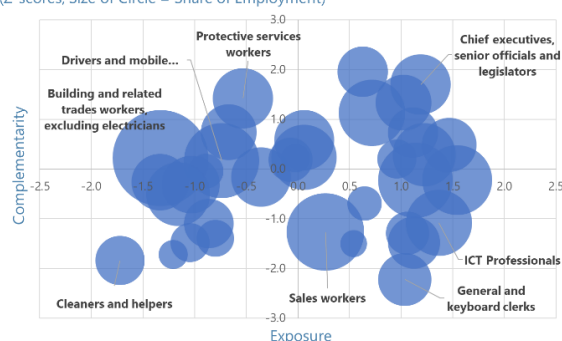
Gender - Employment Exposure and Compl. to AI, 2023
(Percent)

Sources: NSO, IMF staff calculations.

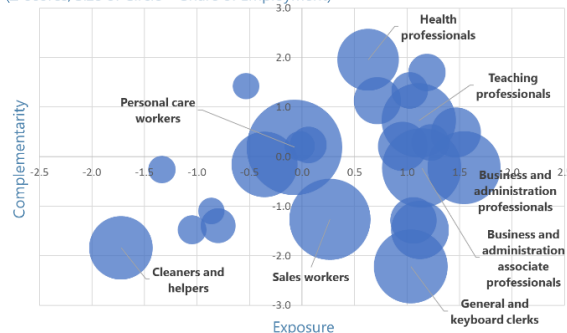
Women Employment by Economic Activity, 2023



Sources: NSO, IMF staff calculations.

Mens' Occupational Exposure and Complementarity to AI
(Z-scores, Size of Circle = Share of Employment)

Sources: Eurostat, Cazzaniga and others (2024), Felten et al (2021), IMF staff calc.

Women Occupational Exposure and Complementarity to AI
(Z-scores, Size of Circle = Share of Employment)

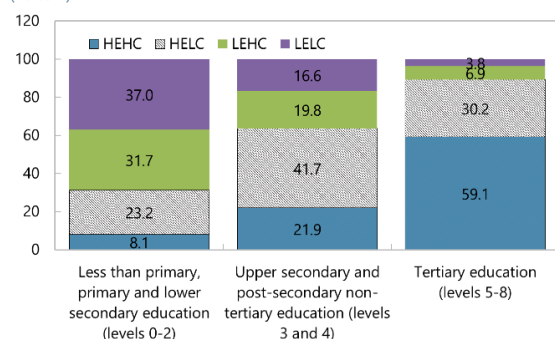
Sources: Eurostat, Cazzaniga and others (2024), Felten et al (2021), IMF staff calc.

D. Conclusions and Policy Considerations

10. Malta is well-prepared to reap the benefits of AI but may experience job displacement, especially among women, younger workers, and people with only high school degrees. Malta is digitally equipped to harness the potential of AI. The digital infrastructure is advanced, digital intensity in companies is high, and people have strong digital skills. The labor market of Malta is slightly less susceptible to AI-related job displacement than other advanced economies due to higher complementarity. However, approximately one-third of the labor force is at risk of job displacement, with women, young, and people with only high school degrees being particularly vulnerable. A mitigating factor in Malta is its already tight labor market.

Figure 6. Education, Income, and Age**Education - Employment Exposure and Compl. to AI, 2023**

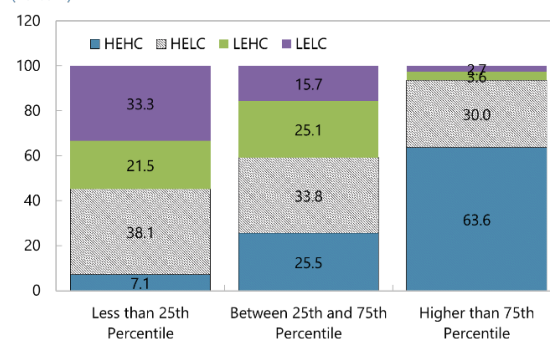
(Percent)



Sources: NSO, IMF staff calculations.

Income - Employment Exposure and Compl. to AI, 2023

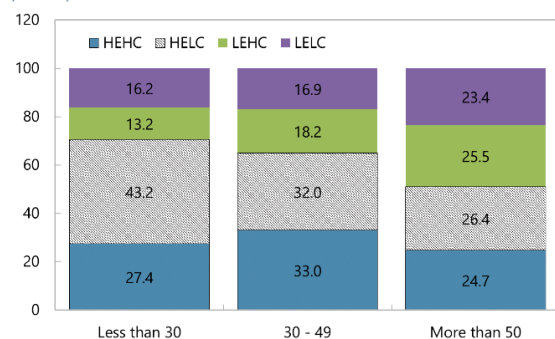
(Percent)



Sources: NSO, IMF staff calculations.

Age - Employment Exposure and Compl. to AI, 2023

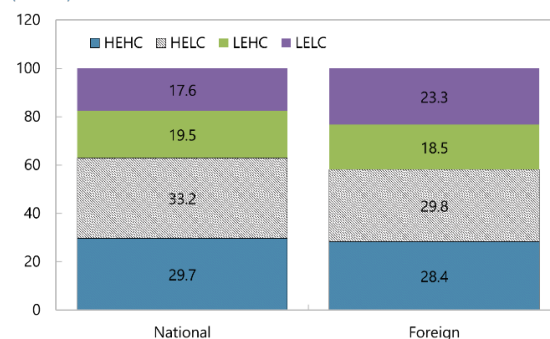
(Percent)



Sources: NSO, IMF staff calculations.

Immigrant - Employment Exposure and Compl. to AI, 2023

(Percent)



Sources: NSO, IMF staff calculations.

11. Prioritizing reskilling and upskilling of the labor force is essential. The authorities are prioritizing upskilling and reskilling of the labor force and through the education system and life-long learning. The National Education Strategy 2024-30 and the Lifelong Learning Strategy 2023-30 are pillars of this strategy. The authorities have also extended the Enterprise Skills Development Scheme intended to support small, medium-sized, and large enterprises to provide training to existing and new employees, in order to develop and update their skills and knowledge, and the authorities could review both the size of support and target groups.

12. Bringing Malta closer to the frontier of digitalization is important, especially for private sector adoption in SMEs. The authorities are prioritizing digital adoption and digital skills. The Digital Decade Strategic Roadmap 2023-30 is a key pillar in these efforts.¹⁰ The authorities have implemented a digitalization grant, supported by funds under the EU's Recovery and Resilience Facility, covering 50 percent of expenses in digitalization of operations up to a maximum of €50,000. This grant is particularly important as it targets SMEs, which make up the large majority of

¹⁰ See Ministry of Economy, [Digital Decade Strategic Roadmap, 2023-30](#).

companies in Malta, and where digitalization may be hindered by costs. Lowering the administrative burden of accessing public support schemes and continuing to roll out e-Government can play a key role in private sector adoption and greater efficiency.

Annex I. Measuring Exposure and Complimentary to AI

Measuring Exposure to AI

1. Felten et. al. (2021) develop a measure of occupational exposure to AI, linking common and general applications of AI (e.g., abstract strategy games, real-time video games, image recognition, image generation, reading comprehension, language modelling, translation and speech recognition) to workplace skills and occupations, using US occupational characteristics from the O*NET database. The index is essentially a measure of the overlap between AI and human skills, which is then weighted by the degree of importance and complexity of such skills in each job. High exposure occupations are typically service-related (see figure below).

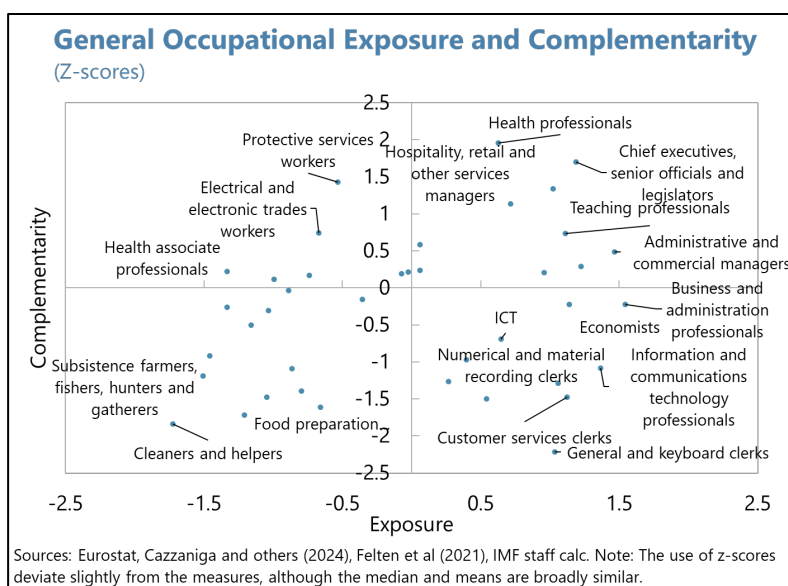
Measuring Complimentary to AI

2. Pizzinelli and others (2023) develop an index of complementarity, drawing also on the O*NET database, but from 'work contexts' and 'skills', adding an element of physical and social context. The authors argue that in some societies may be less likely to allow unsupervised use of AI in some cases. For instance, the criticality of decisions and the gravity of the consequences of errors may motivate societies to require humans, although highly exposed to AI, to make final decisions or take actions. These include e.g. health professionals, judges, and certain types of technical experts and operators (see figure below).

Bringing Exposure and Complimentary Together Conceptually

3. The measures of exposure and complementarity can conceptually be thought of as a matrix of four dimensions: 'High Exposure and High Complementarity' (HEHC), 'High Exposure and Low Complementarity' (HELC), 'Low Exposure and High Complementarity' (LEHC), and 'Low Exposure and Low Complementarity' (LELC), using the medians across all exposure and complementarity values as thresholds. The measure of High Exposure and Low

Complementarity (lower right dimension in the figure) can be interpreted as occupations which are at higher risk of job displacement.



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