



PARLIAMENTARY SECRETARIAT FOR FINANCIAL SERVICES,
DIGITAL ECONOMY AND INNOVATION
OFFICE OF THE PRIME MINISTER

MALTA

TOWARDS AN AI STRATEGY

High-level policy document for public consultation

March 2019

MALTA AI
Towards a National AI Strategy

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FOREWORD

Hon. Silvio Schembri, Parliamentary Secretary for Financial Services, Digital Economy and Innovation within the Office of the Prime Minister

Malta's exciting journey into the digital world and the commitment of this administration to embrace new technology has mobilised us onto the next natural step, the exploration of Artificial Intelligence as a new economic niche. It has been only a few months since the Malta.AI Taskforce, which is made up of public and private sector representatives, including entrepreneurs, academics and experts within the field, was established with the remit of assisting Government in devising a policy and eventually a strategy in the best interest of the Maltese economy and society.

The same as with Blockchain, Artificial Intelligence is likely to shape, change and mould the landscape of how sectors we know today, operate. After successfully positioning Malta at the forefront of Blockchain technology, earning the name of The Blockchain Island, we are now taking the next leap forward, that is, positioning Malta amongst the top 10 nations in the world with a policy for Artificial Intelligence.

Devising a policy that delineates for ethically aligned, transparent and socially responsible AI is now of utmost importance. This is only feasible by introducing the most appropriate policy as well as regulatory and fiscal measures to strengthen Malta's appeal as a hub for foreign investment in this sector, while also identifying the underlying skill base and infrastructure needed to support AI.

Our vision is to position Malta as a test-bed for AI related projects, possibly in specific sectors where Malta is best placed to apply AI-powered solutions. The aim is always the same – to bring about benefits to the end-consumer, and strengthening quality of life in Malta. In this regard, we really need to work together to better understand how AI can be implemented by the Government to better serve citizens.

Recognising the full potential of Artificial Intelligence is the first step. Now, the time is ripe to incorporate AI into our already strong ecosystem, to become a contributor to Malta's economic growth, create new jobs and the right environment for businesses to flourish.

Having a policy for Artificial Intelligence would set the scene for the exploration of other niches such as Quantum Computing. Malta.AI is the starting point of a thrilling stage which has yet to evolve. It is hoped that this document will serve as a foundation to better understand where we want to position Malta in this sector, blaze the trail for innovative ideas in the best interest of our future.



FOREWORD

Mr Wayne Grixti, Chair of Malta.AI Taskforce

Malta has historically offered one of the oldest AI degree programmes in Europe, since 1995, and has steadily built up AI expertise over the years. Last year, the country became a pioneer by creating the Malta Digital Innovation Authority (MDIA), a regulatory authority responsible for Governmental policies aimed at positioning Malta as a centre for excellence and innovation across digital technologies.

Building on these foundations and my role as Chief Technology Officer (CTO) of the MDIA, I was asked by Government to Chair the Malta.AI Taskforce and work on developing a National AI Strategy. The Taskforce members include a diverse set of brilliant minds spanning entrepreneurship, academia, public policy, technology strategy, law and technical knowledge.

Over the last four months, the Malta.AI Taskforce has worked hard to define the focal areas that the Strategy will tackle and the foundational pillars and policy enablers that will underpin it. These are set out in this document and will be built out in detail across the following six months as the National AI Strategy is developed. Careful consideration has been given to ensuring that the social and economic benefits brought about by AI can be maximised and risks mitigated, across all segments of society.

A strong ethical framework will be designed to underpin the Strategy, in close conjunction with the National Technology Ethics Committee contemplated in the MDIA Act. The objective is to make sure that AI deployment is ethically aligned, transparent and socially responsible. Measures will also be developed to equip our current and future workforce with the skills needed to thrive in this new era.

Our vision is to make Malta a model nation where AI policy has a positive impact on citizens and business. In addition to setting out policy measures, the Taskforce will look to identify pilot projects that the country can take forward as part of its Strategy. The goal is to apply AI to issues that can make a real difference to the well-being of Malta's citizens.

Malta has already taken a global lead by developing a regulatory and certification framework for innovative technology arrangements, and, as part of the Strategy that will be developed, the country will now look to explore how this framework can be widened to embrace AI technologies. We are big believers in collaboration. We plan to consult widely with local and international stakeholders as detailed policy measures are developed and look forward to receiving your feedback on this document.

TASKFORCE

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MALTA: TOWARDS AN AI STRATEGY

CHAPTER 1

**ARTIFICIAL INTELLIGENCE
IS A FORCE FOR
GLOBAL DISRUPTION**



“Artificial intelligence, especially machine learning, is the most important general-purpose technology of our era. The impact of these innovations on business and the economy will be reflected not only in their direct contributions but also in their ability to enable and inspire complementary innovations.”

Brynjolfsson, E. and McAfee, A. (2018). The business of artificial intelligence: Harvard Business Review

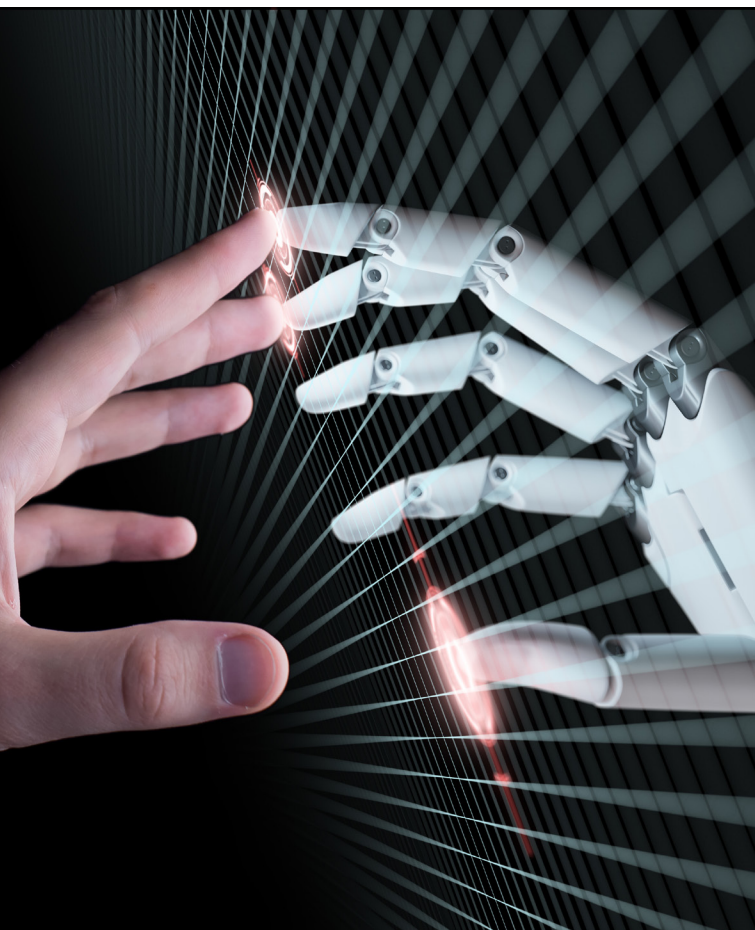
After more than six decades as an academic discipline, and several cycles of hope, hype and decline, the field of Artificial Intelligence (AI) has emerged from labs as a science project into a more consumable, commercially viable and socially impactful technology innovation. AI is still, more or less, just math at enormous scale, but as an application in production, it enables us to scale human-like cognitive function, such as the ability to recognise emotion or have conversations in a natural language, opening up a new plethora of possibilities for business, Government and humanity itself.

By all accounts, AI is also potentially very disruptive. On the one hand, it will help reinvent industries and inspire new business models, but AI may also be a destabilizing force, reshaping the nature of work and employment, and creating scenarios that thwart existing data protections. Ultimately, a convergence of advancements across multiple fields, including cloud computing, chip architecture and data science, have together created the conditions for this latest, and perhaps most durable cycle of investment and adoption. At this point, in 2019, AI now meets or exceeds human-scale performance on a growing list of tasks, demonstrating a form of “machine-scale” knowledge acquisition that may force society to reconsider the very meaning of performance, value and competition. It also creates a global imperative for policy makers.

AI is widely-viewed as a general-purpose technology (GPT) that is expected to have a significant impact on all facets of society, just as electricity, the internal combustion engine, automobiles, airplanes, computers, and the internet.

Moreover, one of the most challenging aspects of AI is that it is a dual-use technology. Traditionally, dual-use describes a technology that can be adapted for both peaceful and military aims. However, more generally, dual-use can also refer to any technology which satisfies more than one goal at any given time. For example, Global Positioning System or GPS, can be applied horizontally across public and private sectors with a myriad of civilian, commercial, direct-to-consumer, business-to-business and even national security use-cases. AI is a classic dual-use technology with limitless potential in the public and private sector.

AI is anticipated to drive significant productivity gains, if not transform how businesses operate, across all sectors of the global economy, though the timeline and nature of impact will play out differently across those sectors. Beyond the workplace and industry, AI will also transform the way we live, and play. AI makes it possible to create more anticipatory, ambient and conversational experiences between people and machines, which will alter how we engage with products, services and physical spaces. It is already embedded in many dimensions of daily life, making our lives better in ways that are not obvious, from improving the safety of transportation systems and the accuracy of weather predictions to assisting with clinical diagnostics and reducing accidents at industrial worksites. The variety and scale of impact is truly endless.



Malta's ambition

The Government's aim is to develop a National AI Strategy that focuses investment, resources and attention in ways that maximize the benefits for Malta and its contributions to the global economy. This includes an explicit aim to put Malta amongst the top 10 nations with the highest impact national AI programme. To realize this vision, Malta will engage with a broad spectrum of stakeholders, aiming to be inclusive and transparent, and to build awareness of key topics and issues to level-set and promote a shared understanding. The country will further strive to formulate AI policies that are consistent with emerging international standards and norms around AI ethics. Malta will also strive to propose regulatory actions, fiscal measures and public-private partnerships (PPPs) that strengthen its position within the global AI ecosystem and especially as a hub for foreign investment in this sector. Simultaneously, the country will look to identify the underlying skill base and infrastructure required to support AI.

At a high-level, the Government of Malta has taken a clear stance on technological innovation: it should be embraced, not stifled; Malta should be a disrupter, rather than a follower. Following through on this commitment, Malta firmly established itself as a leader in new, up-and-coming areas such as Distributed Ledger Technology (DLT), a trailblazing example that many countries across the globe are now looking to emulate.

Against this backdrop, Malta now pursues the development of a holistic National Strategy on AI (the Strategy). The Strategy will map the path for Malta to gain a strategic competitive advantage in the global economy as a leader in the AI field, generating investment and positioning the country as a hub for AI application and niche areas of research and development, supported by a vibrant start-up community. The Strategy will be expansive, looking at the impact commercially and socially, areas of economic opportunity and the need for special consideration, if not regulation, where AI use-cases potentially intersect with our national priorities, values and citizen rights. The Strategy will also explore how AI can be deployed widely across Government operations to improve citizens' experiences, expand access to public services, and to directly improve Maltese citizens' well-being. It will set-out policy measures to promote private sector AI adoption as well as actions to update Malta's education system to better prepare our citizens, especially children, to prosper in a digital world increasingly defined by automation.

Finally, the Strategy will draw on Malta's unique advantages, reflecting our national priorities and passions to fully harness innovation as an opportunity, rather than a hindrance. The country will continue in its strong tradition of using regulation as a key differentiator by developing a robust and innovative legal and ethical framework to support its ambition and build trust and transparency in the way technology is deployed.





Welcome to Malta

The ultimate AI Launchpad.

MALTA: TOWARDS AN AI STRATEGY

CHAPTER 2

MALTA'S VISION: THE ULTIMATE AI LAUNCHPAD



Malta aspires to become the **Ultimate AI launchpad** – a place in which local and foreign companies, and entrepreneurs, can develop, prototype, test and scale AI, and ultimately to showcase the value from their innovations across an entire nation primed for adoption. Our ambition is to create the conditions for AI to be a springboard from Malta to the world.

Malta's benefits as a launchpad for AI are numerous:

- ▶ With its small population, with just under half a million inhabitants, the entire nation, rather than a town or city, becomes the ultimate AI pilot site.
- ▶ Malta is an EU member state with a tech-savvy population
- ▶ English is the official national language.
- ▶ Malta's telecommunications infrastructure is amongst the most advanced in Europe, with high mobile and broadband penetration rates and 5G ready infrastructure in place.
- ▶ Local laws and regulatory frameworks are specifically designed to promote the adoption and use of innovative technologies
- ▶ The Maltese Government is committed to creating the conditions for a robust local AI ecosystem, helping companies that invest in and serve Malta not only to establish their business, but to commercialize and scale, using public policy to accelerate private sector adoption of AI.
- ▶ The Maltese telecoms regulators already operate a test and trial licensing scheme in support of innovative spectrum uses which aim to exploit Malta's unique potential as a test-bed. The programmes cover technology tests and the other covering service trials involving third parties or the public, which provides a unique opportunity for delivering consumer and business grade AI services and experiences.

Where is the current opportunity?

Many experts believe that only two countries, the US and China, have the resources to tackle every dimension and field of AI, but this "winner take all" perspective does not fully or fairly convey the situation at hand. AI is not a singular or discreet innovation, but best considered a spectrum of methods, tools and technologies. As such, it is very likely that there will be many "winners" and "winning scenarios" across the global economy, and the many fields of and applications for AI. While a handful of large countries can out-invest and out-build others, the nature of AI development makes it possible for a single company or academic lab to put a small country on the map, even to lead and drive the agenda in one branch of AI. Illustratively, Canada is large in land-mass, but has a population that is roughly 50 times smaller than China. Yet, many of the leading AI research in the world in the area of Deep Learning takes place in Canada, where many of the world's top tech companies have now opened offices and made investments.

AI has also sparked existential debates on the fate of humanity. In 2014, the late Stephen Hawking stirred controversy when he told the BBC that: "The development of full artificial intelligence could spell the end of the human race ¹." His reference to "full" relates to the distinction between general and narrow intelligence. Humans learn and apply such learnings across domains; put differently, the human

brain can "generalize" knowledge gained from a single experience and apply such knowledge to different experiences in entirely different contexts. Machines are not able to replicate this deeply-human skill. Even the "smartest" and most powerful AI systems today, which outperform humans in a specific task, such as playing a game or diagnosing cancer, are not able to "generalize" knowledge beyond a specific task and context. Such systems may demonstrate a superior but narrowly engineered form of human-like cognitive function. While it may be possible, in the distant future, for human engineers to architect an artificial intelligence that can demonstrate a more general intelligence, no currently available system can or will evolve, organically, to become "full" or a "general intelligence."

Consequently, this future scenario in which machines "generally" outthink humans to become a threat to humanity itself is not a practical scenario and has limited utility for public policy makers. Rather, discussions about the rise of sentient AI, or Artificial General Intelligence (AGI), are proper topics for academic circles, future-focused think tanks and Hollywood producers. They are otherwise a distraction from the real and current risks of AI that must be understood and considered by public policy makers. A more pragmatic threat worthy of policy consideration is how humans may corrupt or misapply this technology.

What is AI?

Defining what AI actually is remains challenging and a consensus amongst experts on the matter is still not in place.

Nick Bostrom, a director of the Future of Humanity Institute at Oxford University and a leading AI thinker explains: "[a] lot of cutting edge AI has filtered into general applications, often without being called AI because once something becomes useful enough and common enough it is not labelled AI anymore ²." That was back in 2006 prior to the significant advancements of the technology that has been taken on today. The thought process that was once AI becomes useful, it is then classified as an algorithm, app or computer programme.

AI has many different definitions and is constantly evolving. The reason for this is that it consists of a wide-range of technologies, scientific approaches and definitions which are simultaneously being researched, discovered and taken forward to expand what is currently possible. The European Commission's High Level Expert Group on AI published *A Definition of AI: Main Capabilities and Scientific Discipline* in December 2018. This seven page document opens with the disclaimer that: "the following description and definition of AI capabilities and research areas is a very crude oversimplification of the state of the art. The intent of this document is not to precisely and comprehensively define all AI techniques and capabilities, but to describe summarily the joint understanding of this discipline that the High-Level Expert Group is using in its deliverables ³".

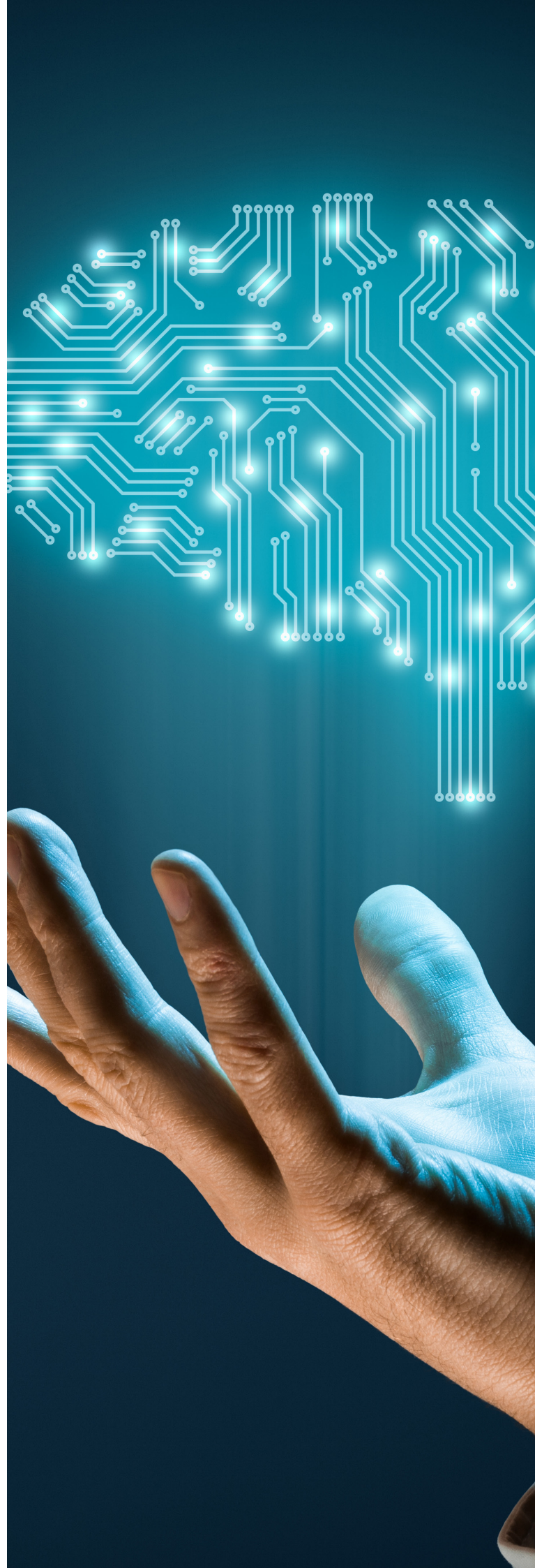
¹ Source: BBC News. (2014). <https://www.bbc.com/news/technology-30290540>

² Source: AI set to exceed human brain power: CNN. (2006) <http://edition.cnn.com/2006/TECH/science/07/24/ai.bostrom/>

The definition provided in the document states:

“Artificial intelligence (AI) refers to systems designed by humans that, given a complex goal, act in the physical or digital world by perceiving their environment, interpreting the collected structured or unstructured data, reasoning on the knowledge derived from this data and deciding the best action(s) to take (according to pre-defined parameters) to achieve the given goal. AI systems can also be designed to learn to adapt their behaviour by analysing how the environment is affected by their previous actions. As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems).”

³Source: European Commission's High Level Expert Group on AI. (2018) A Definition of AI: Main Capabilities and Scientific Discipline: European Commission



Where does Malta fit in?

The lack of a precise definition is not stopping researchers, start-ups and established tech-companies from forging ahead around AI and it is against this backdrop that Malta now has an opportunity to lead.

We encounter AI on a daily basis, from predictive algorithms that personalize our news feeds to search engines that curate results. Yet despite a half-century of academic pursuit, the broad field of AI remains nascent and emergent, with many advancements still to come. Now, in addition to a growing field of academic researchers developing new data models, system architectures and training methods, we also have individuals, companies, entrepreneurs, business managers and even regulators seeking to new use-cases for AI, across business operations and human experiences, within industry and government agencies. There is a lengthy and iterative

data science journey that takes an idea from a data model to an applied use-case, where an intelligent system learns to deliver value within a business process or customer interaction, and it frequently begins with a hypothesis and evolves through stages of testing and learning.

Malta can leverage its natural resources and size as well as innovative public policy to translate a bold leadership vision into a set of tools, incentives, resources and collaborative ecosystems that accelerate the journey from AI development to AI adoption, leading to commercial success, social benefit and international recognition. This is our plan for making Malta the Ultimate AI Launchpad.



MALTA: TOWARDS AN AI STRATEGY

CHAPTER 3

**AI: MAXIMISING SOCIAL AND
ECONOMIC BENEFITS,
MITIGATING THE RISKS**



AI has the potential to transform every facet of our personal and public lives. Yet, it also creates a new set of risks that must be understood, discussed, monitored and, where necessary, addressed directly through public policy, including regulatory and enforcement mechanisms.

AI is projected to underpin close to c. €14 trillion of global economic growth by 2030⁴, impacting every economic sector and transforming many labour categories. National governments increasingly see AI as an opportunity to drive growth, improve the citizen experience, expand access to public services and gain a strategic advantage in the global economy, but they are also increasingly concerned with counteracting the challenges posed. These include the potential for job displacement, the risks of biased and unaccountable automated decision-making, and data privacy related issues. Besides being ethical, fully acknowledging and addressing these concerns is a commercial and political imperative to build trust in AI and drive adoption.

“Overwhelmingly, AI is characterised by its ability to accelerate, exaggerate and amplify issues that surround it – for both good and bad.”

Source: Baker, T. Smith, L. Anissa, N. (2019) *Educ-AI-ion Rebooted*: Nesta

A Strategy built on the right foundations

The Strategy will aim to maximise the social and economic benefits brought about by AI. Risks will be acknowledged and mitigated, ensuring that no parts of Maltese society are unduly burdened or left behind. This includes a well-informed framework that incorporates leading practices in the emerging discipline of Trustworthy AI, emphasizing the need for AI to be applied in a fair, ethical, transparent, accountable, responsible and reliable manner.

The Strategy will take account of the *Draft Ethics Guidelines for Trustworthy Artificial Intelligence*⁵ issued in December 2018 by the EU High-Level Expert Group on AI, which reflects a set of principles and values articulated in EU Treaties and the Charter of Fundamental Rights, in addition to the work being undertaken by various organisations from across the globe. The Asilomar AI Principles which promote ethics, values, privacy and the common good as core attributes will guide the Strategy that is being developed.

The Fourth Industrial Revolution

Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, outlined: “We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society⁶.”

The impact of intelligent automation on the workforce is expected to pose one of the greatest challenges brought about by this convergence of technology innovation. While the impacts of prior advancements in automation is well documented, there are differing views on how this Fourth Industrial Revolution will play out for the average worker, with some sectors expected to be hit harder than others. The convergence of AI and Industrial Robotics is expected to transform job roles across many sectors, displacing some, but also inspiring the development of entirely new jobs as well. Workers will need to adapt and develop new skills to prosper, with the help of employers and supportive public policy.

Malta’s unique challenge

Malta has a unique challenge in that the country is effectively at full employment at this moment. Given the tightness of the local labour market, the productivity benefits from AI could be a key avenue for growth. While certain roles may disappear, in a large part it is likely that, in Malta, AI will increase output and open up new career paths. The widespread adoption of AI will enable local businesses to compete more effectively within our borders, but also on a global scale. The Government is keen to support this transition by developing a robust strategy that seeks to equip not only the current

⁴ Source: PwC. (2017) *Sizing the Prize*: The World Economic Forum.

⁵ Source: High-Level Expert Group on Artificial Intelligence. (2018) *Draft Ethics Guidelines For Trustworthy AI*: The European Commission

workforce, but also the future workforce, school-age children and university students, with the knowledge and skills they need to thrive and prosper in a digital world.

The building blocks of Malta’s National AI Strategy

The purpose of this Policy Document is to lay the foundations and sharpen the national focus as a cornerstone to Malta’s National AI Strategy which will be developed over the next six months. It aims to set out the focus of national resources across both the public and private sectors to ensure that the Maltese economy and citizens fully participate in, benefit from, and where necessary, are protected from a new global economic and social landscape influenced, if not reshaped, by AI.

The Strategy is built on three Strategic Pillars:

- ▶ Investment, Start-ups and Innovation;
- ▶ Public Sector Adoption; and
- ▶ Private Sector Adoption.

These pillars are supported by three Strategic Enablers:

- ▶ Education and Workforce;
- ▶ Legal and Ethical Framework; and
- ▶ Ecosystem Infrastructure.

The Government of Malta has a critical role to play in positioning Malta as the Ultimate AI Launchpad. A high-level overview of the areas of focus for each pillar and enabler are set out below. This is followed by chapters on each of the areas outlining policy considerations, objectives and main areas of focus.

Investment, start-ups and innovation

Malta will seek to attract and develop talent, drive investment and incubate an innovation ecosystem that will allow the AI sector to flourish. Economic development will be a primary key objective of the Strategy and one deserving key focus. Foreign Direct Investment (FDI) is a central part of Malta’s economy and a key driver for growth. The Government will look to attract and welcome companies of all shapes and sizes, from start-ups to scale-ups to established global tech leaders. Plans are currently being put together to develop a cutting-edge Research and Innovation Centre of Excellence for AI, Big Data and Robotics to enhance the innovation agenda.

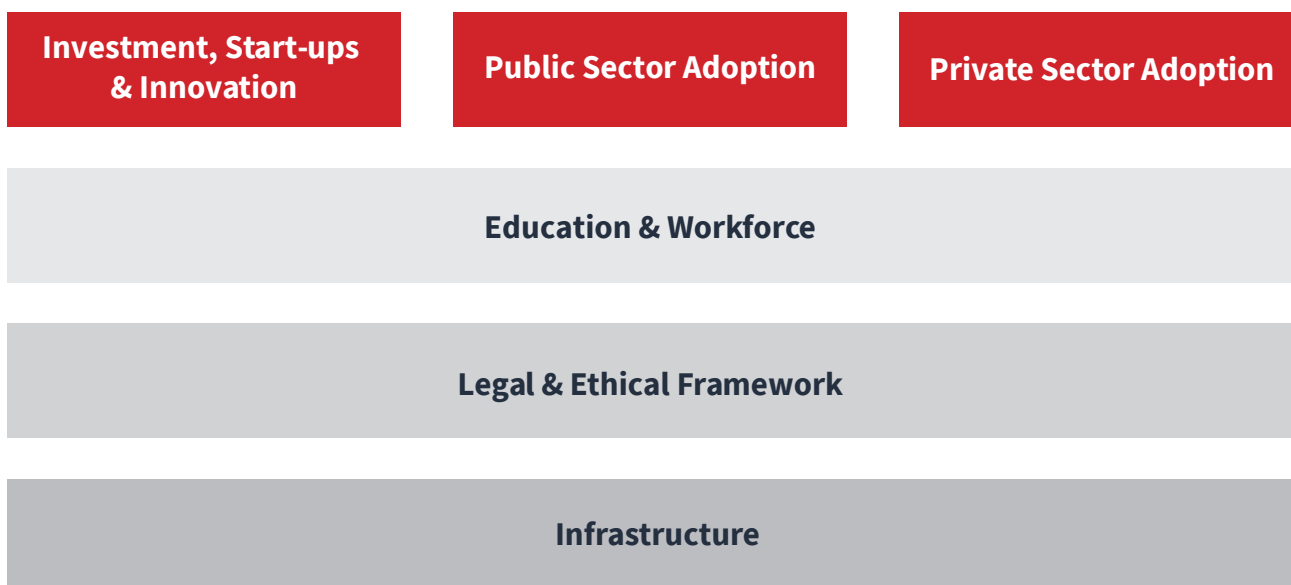
Public Sector Adoption

The Government will take a lead in showcasing the benefits that can be brought about by AI by developing and running pilot projects across several key thematic areas. Primary objectives for these projects include:

- ▶ providing better services to citizens and businesses;
- ▶ improving the social and economic well-being of citizens and business; and
- ▶ enhancing the internal operations of the public sector.

High-impact projects that address some of Malta’s most pressing domestic challenges will be prioritized. This may include Healthcare, Education, Traffic Management, Citizen Services, Tourism and Elderly Care, amongst others. Other public sector priorities may include projects that contribute towards the achievement of the UN’s

Strategic Pillars & Enablers



⁶ Source: Schwab, K. (2016) The Fourth Industrial Revolution: The World Economic Forum



Sustainable Development Goals.

To raise large-scale awareness of the projects, the Strategy may recommend Grand Challenges or Contests anchored to Malta specific issues, promoting the development of solutions that leverage AI through open and public competitions. This may include a monetary prize-pool to drive interest.

Private Sector Adoption

The Government will also commission research to study the state of private sector readiness to adopt AI technologies. As part of the study, the Government will look to identify enablers and blockers and put in place support and policy measures to encourage adoption. The Government hopes that its own AI success stories will help lead the way, showcasing what is achievable. To accelerate progress from pilot to production, it will go beyond just being a customer, procuring AI, seeking to work closely with the private sector in a Public-private partnership (PPP) model, where possible.

Policy tools will be developed to speed up the adoption, including actions to make AI easily understood, accessible and affordable. Awareness campaigns will be developed to break-down barriers about what AI is, how it can be applied across sectors and businesses of various sizes, and the impact it can have on output and productivity.

Education and Workforce

The Strategy will set-out to equip, reskill and upskill workers in every sector of society. Policy measures will be designed to help businesses explore how technology can be deployed to augment the labour force, together with advice, incentives and support programmes to help them do it. Life-long learning programmes will be developed and championed to support social and economic well-being, and in addition, stimulate innovation and progress. The ambition is for Malta to have a resilient workforce, well-equipped for change and able to benefit from the technology of today and tomorrow.

Malta's education system will also need to evolve and adapt to the requirements of the Fourth Industrial Revolution. A high percentage of young children today learn to expertly interact with electronic devices and navigate mobile operating systems, before they can speak. They grow up viewing technology as integral to their life. In fact, they are rarely sentimental about the idea of "disconnecting," having never known a world without continuously streamed personalized content to an always-connected mobile device. As such, digital tools are commonplace across most of Malta's schools, with teachers augmenting the educational experience with interactive whiteboards and tablets. However, more than using some digital tools in the classroom, Malta must consider how to expand the curriculum itself and better prepare children for a future workplace where decision making is assisted, supported and enhanced by the application of AI.

Over the last two decades, as technology transformed societies and economies, most educational curricula have remained largely

unchanged. The Strategy will consider how Malta’s education system can be updated to reflect this emerging field of AI and how it redefines workplace requirements, so we can better prepare young people for what comes next.

Building transferable skills alongside domain knowledge will be one key pillar of the educational reform that will be contemplated. Alongside this, the Strategy will aim to identify new-subjects that could be introduced in early years such as the basics of machine learning, coding, human-machine interaction and robotics. The use of AI in teaching, educational administration and learning will also be explored, with public education possibly emerging as an AI related pilot focus, should there be support from the relevant stakeholders.

take an active role in designing a future-proofed technology roadmap and data infrastructure that allows AI to flourish. There are various dimensions of this new enabling infrastructure that will need to be considered, including access to resources, technology, platforms, institutional infrastructure and external partners.

As a next step, the Government will embark on assessing the current state of the key related enablers for the desired future state of technology, including security, and data infrastructure to provide the infrastructure needed to support a thriving domestic AI ecosystem. As a following step, it will then build a detailed roadmap setting out the actions, initiatives and investments needed to make Malta more attractive across all these areas.

Ecosystem Infrastructure








The Government, with the support of the private sector, will need to

Given that the new digital and data-driven world permeates all areas of the economy, the investments the country will make are expected to provide cross-sectoral benefits across many domains.

Legal and Ethical Framework

Malta has taken a global lead in developing a regulatory approach that supports innovation and emerging technologies, including a voluntary regime for the certification of innovative technology arrangements (currently open to DLT platforms and smart contracts) which aims to build trust and transparency amongst the public, users and stakeholders.

AI raises profound questions across ethical, legal and regulatory domains, touching many fronts from protecting national security and citizen rights to advancing commercial interests and international standing. The Government will look to build on the strong regulatory foundations it has developed and supplement these with AI specific provisions to address key challenges and opportunities. Key areas of attention for the Strategy include:

- 
-  the development of a National Ethics Framework that will mandate trusted, ethical, transparent and unbiased use of AI;
 -  the adaptation of existing legislation to embrace AI applications;
 -  the exploration a “regulatory sandbox” for AI applications to provide exemptions from the usual regulatory requirements in a controlled environment closely monitored by the supervisory agency responsible;
 -  specific provisions to clarify ownership of intellectual property rights in AI-generated outputs, particularly where multiple entities are involved in the value chain;
 -  specific liability provisions that provide clarity and protection to users, co-developers, owners and investors; and
 -  domestic provisions in line with the EU General Data Protection Regulation (GDPR) which authorise automated decision-making/profiling in certain circumstances.

Responding to this consultation document

The following chapters of the document outline the foundational areas that will form the basis of the Malta National AI Strategy. A number of policy considerations and statements that will inform National AI Actions are outlined in each chapter. They will be developed in depth across the following six months in conjunction with a wide-range of stakeholders as the National AI Strategy sets out what actions Malta will take to become the Ultimate AI Launchpad.

The Malta.AI Taskforce and the Parliamentary Secretary for Financial Services, Digital Economy and Innovation within the Office of the Prime Minister invite interested members of the public, industry and academia to provide feedback on this Consultation Document.

Responses must be provided by 22nd April 2019.

Feedback can be sent by email to: **fsdei.opm@gov.mt**

Or in writing to:

Malta.AI
Financial Services, Digital Economy and Innovation
Office of the Prime Minister
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Valletta VLT 1061
Malta

MALTA: TOWARDS AN AI STRATEGY

CHAPTER 4

INNOVATION, START-UPS AND INVESTMENT



Malta's vision as the Ultimate AI Launchpad will be centred on incubating and fostering a domestic AI ecosystem in which innovation and collaboration can thrive. This vision will aim to stimulate an experimental mindset, investment in tech, and opportunities for entrepreneurial discovery, thereby creating an environment which stimulates research, knowledge, economic growth and new opportunities for Malta's citizens. The objective is to establish Malta as a leading centre of excellence and hub for applied AI while providing an environment for the creation of niche AI solutions where Malta can leverage its small size to its advantage to generate national success stories. This objective will be achieved by focusing on the actions below.

Identify niche areas that put Malta at the forefront to become a disrupter in AI

AI is a broad field with many branches and sub-branches. The limitless scope of application means that there are many niches that can be explored, showcased and championed. While Malta's inherent limitations make it challenging for the country to become a leader across every field of AI, it can be a model nation focused excelling in the application of AI across specific fields. The Strategy will therefore focus on discovering use-cases that play to Malta's natural strengths and areas of smart specialisation, with a view to making a purposeful difference to Malta's society and economy.

Position Malta as a Centre of Excellence and Technological Hub in the field of AI and explore how AI can contribute to the attainment of the UN's Sustainable Development Goals

The Government anticipates that AI will catalyse a step-change in focus and investment in Research and Development (R&D) activities locally and will look to support the development of a Research and Innovation Centre of Excellence for AI, Big Data and Robotics.

Malta envisages that part of the Centre's research might focus on how AI can be applied towards the achievement of the United Nation's (UN) Sustainable Development Goals (SDGs). The UN Interregional Crime and Justice Research (UNICRI) Centre for AI and Robotics, the only AI focused UN Agency based in The Hague, has offered to collaborate with Malta to showcase the country's efforts in this area.

Harness the power of collaboration as a pedal to accelerate growth

Collaboration will be a central theme that underpins Malta's AI ecosystem. As a small country, it is essential that Malta not only builds a robust AI ecosystem at home but also plugs into the global AI ecosystem, actively teaming, sharing and co-innovating with organizations, researchers, tech entrepreneurs and pioneers around the world. The Strategy will support communications efforts that sends a clear message to the international community that, when it comes to AI, Malta is open for business and will consider proposals for collaboration from all corners of the globe. This includes measures that encourage international thought-leaders, start-ups, researchers

“ Harnessing how AI can be used to tackle the United Nation's (UN) Sustainable Development Goals, which is a huge area of work, and exploring the possibilities to engage closely with UN agencies will therefore be of paramount importance. The UNICRI Centre for AI and Robotics is happy to contribute and support the above process and aspirations of Malta to become a global AI hub. In this regard, I can volunteer our UNICRI Centre for AI and Robotics to start discussions aimed at putting together real, practical projects to further engage Malta as a pro-active country in contributing to the global good. ”

Irakli Beridze, Head of the Centre for Artificial Intelligence and Robotics, United Nations, UNICRI

and technology companies to reside, conduct research and set-up new AI ventures in Malta.

Malta is also keen to explore opportunities for collaboration with other countries and international organisations. The country was one of the signatories to the Declaration of Cooperation on AI amongst EU Member States signed in April 2018 and is keen to be an active contributor to the development of European AI policy.

One collaboration measure being considered by Malta is the development of a digital collaboration platform which will allow Government, research institutes, and the private sector to publish project profiles, collaboration requests, challenges and Requests for Information (RFIs). The collaboration platform would be the digital hub of Malta's AI activity, showcasing the volume of AI opportunities in Malta and facilitating opportunities for local and international start-ups, corporates and research organisations to tap into and work together.

Attract leading global technology and AI companies to set-up in Malta

Global technology companies are some of the largest investors in and most-advanced users of AI. Malta will seek to encourage them to make AI related investments into the country, set-up operations or research facilities here, and use the country as a test-bed for new ideas. In parallel, Malta will encourage local entrepreneurs to make similar investments to form a balanced ecosystem and create long term synergies to encourage Malta's best and brightest to remain in the country. To achieve this, the country will embark on active global promotion campaigns in conjunction with Malta Enterprise and Tech. MT, and consider sponsoring innovation challenges and pilot projects that will shine a spotlight on the country as a leader in the application of AI. Key areas of interest include Health, Education, Tourism, Traffic Management, Citizen Services, Elderly Care, Entertainment and Financial Services, amongst others.

Raise international awareness and visibility of the Malta AI sector

The Government is keen to raise the visibility of Malta's AI sector and will support the set-up and funding of an industry body to promote the Maltese AI sector internationally through a presence at key global AI related events. It will also provide funding for local AI events which target an international audience.

AI Startups will benefit from various support measures. The Government is keen to provide facilities, tools, infrastructure, funding and advisory services to help position Malta as a hub for global AI start-up activity.



Attract AI Talent from overseas to educate and support local resources and industries

The Strategy will consider a range of policy measures to increase the number AI specialists on the labour market, such as increasing local supply through actions identified in the Education and Workforce Enabler. The Government will also work to attract foreign AI professionals to Malta. Possible measures include the funding of multi-year “AI Fellowships,” and the exploration of simplified, fast-track visa schemes for third-country nationals including special classes of visas for:

1. Entrepreneurs;
2. Specific skill sets addressing local talent shortages; and
3. Employees transferring from other international branches located in the EU.

Position Malta as a leading hub for AI start-up activity

Malta offers a beautiful Mediterranean location and an excellent climate, a rich cultural history and a skilled English-speaking workforce. Some key advantages to setting up shop in Malta include:

1. Quicker access to Government services;
2. A lower cost operating environment leading to a slower burn-rate of capital (when compared to tech hubs such as London or San Francisco); and
3. Ample and easier access to many industries primed for AI adoption.

With these advantages, AI start-ups will have more time to test and refine their offerings, build customer bases and engage with

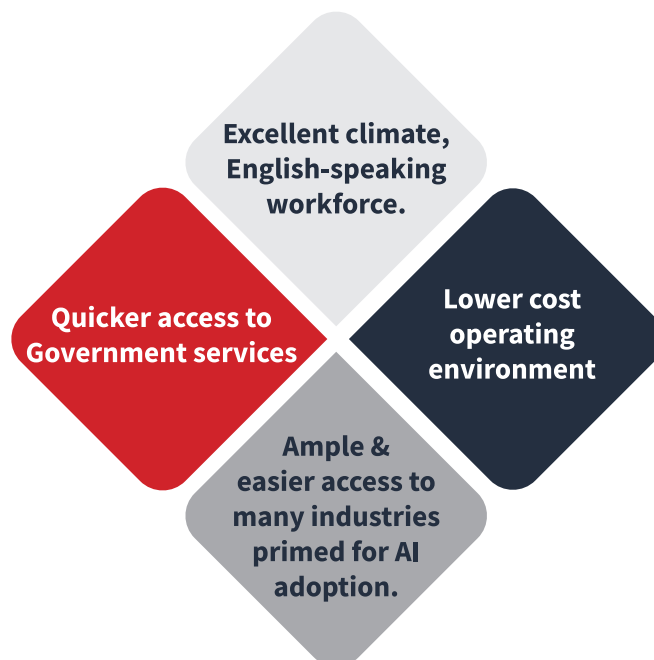
investors. As part of the Strategy, Malta will identify additional measures that enhance the country’s appeal in this area such as:

- ▶ **Incubators and accelerators.** The Government will seek to support the set-up and operation of AI and Open Data related start-up incubators and accelerators in the country. These entities often play a key-role in helping start-ups to fast-track the development of products and services, refine business models, test go-to-market strategies, and access new customers and funding opportunities.
- ▶ **Funding.** Access to capital is crucial for a thriving start-up ecosystem. The Government will create events for angel investors, venture capitalists, family offices and private equity houses to meet AI start-ups and scale-ups. Other measures to enhance access to funding sources will be explored, including co-financing mechanisms and Government-sponsored growth capital funds, European funding schemes, and enhancing instruments and incentives which aim to stimulate private investment into start-ups, and the eventual exits of founders.

Promote tech entrepreneurship as an alternative career path

Policy measures to stimulate, empower and promote technology entrepreneurship as a viable career path amongst the local population will be an important aspect of the Strategy that is being developed. To this effect, the country will consider developing promotional activities to showcase local success stories and address cultural issues related to failure. Other measures to incentivise Maltese tech talent to discover opportunities to start up using AI, Big Data and Robotics may include thematic accelerator programmes, R&D and innovation vouchers, and support to raise the international visibility of local start-ups at overseas conferences and events.

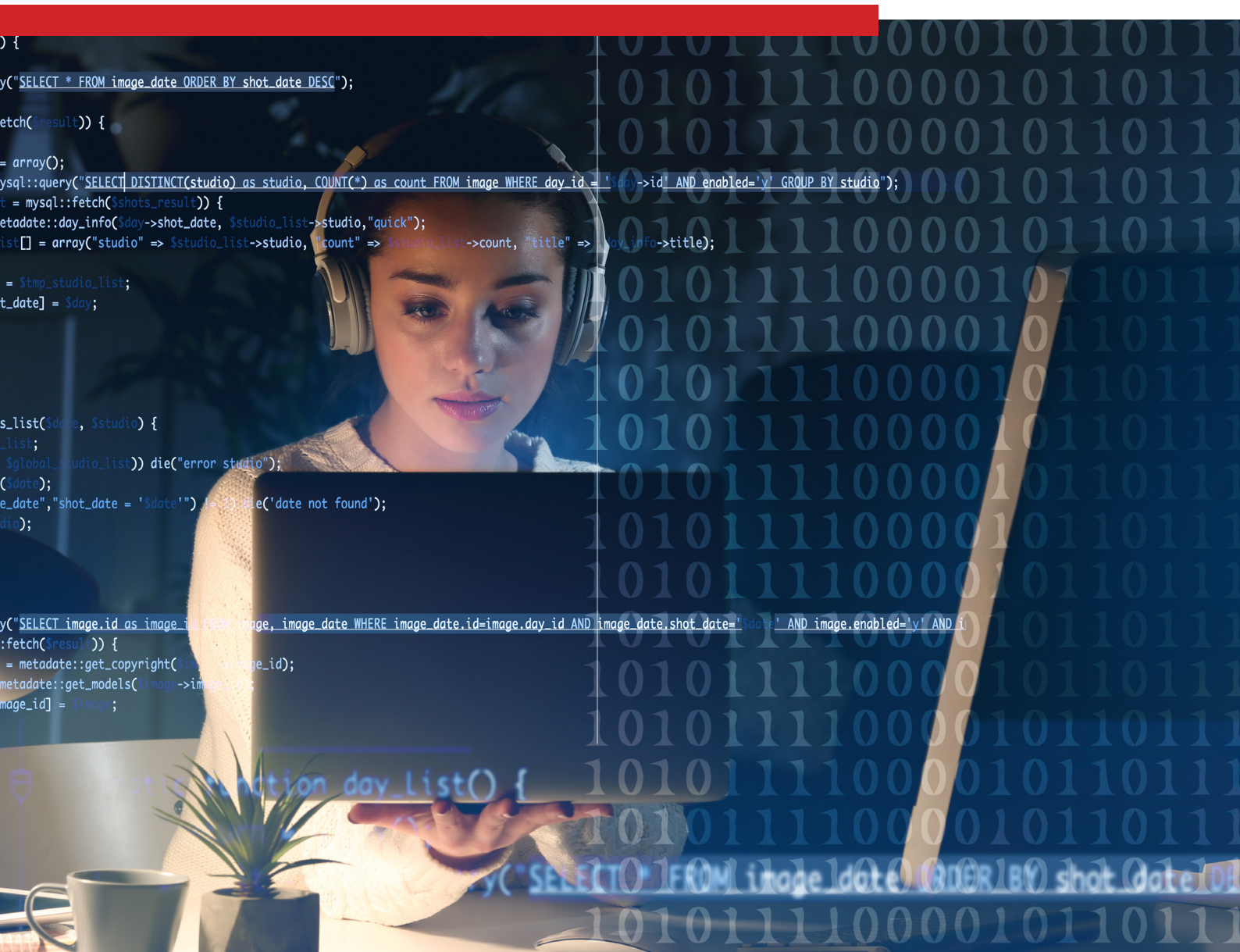
Key advantages to setting up shop in Malta



MALTA: TOWARDS AN AI STRATEGY

CHAPTER 5

PUBLIC SECTOR ADOPTION



```
mysql::query("SELECT * FROM image_date ORDER BY shot_date DESC");
mysql::query("SELECT DISTINCT(studio) as studio, COUNT(*) as count FROM image WHERE day_id = '$day->id' AND enabled='y' GROUP BY studio");
mysql::query("SELECT DISTINCT(studio) as studio, COUNT(*) as count FROM image WHERE day_id = '$day->id' AND enabled='y' GROUP BY studio");
mysql::fetch($shots_result) {
    $studio_list = array();
    while($row = mysql::fetch($shots_result)) {
        $studio_list[] = array("studio" => $row->studio, "count" => $row->count, "title" => $row->title);
    }
}
mysql::query("SELECT image_id as image_id FROM image, image_date WHERE image_date.id=image.day_id AND image_date.shot_date='$sdate' AND image.enabled='y' AND i");
mysql::fetch($result) {
    $image_id = $row->image_id;
    $copyright = metadata::get_copyright($image_id);
    $models = metadata::get_models($image_id);
    $image_id = $image_id;
}
function day_List() {
    mysql::query("SELECT * FROM image_date ORDER BY shot_date");
}
```

Given the size of the country and the relative novelty of the field, Government and the public sector need to take a catalyst role to drive the development, application and the widespread adoption of AI across Malta. This is part of the local background in that Government has often had to take a central role in spearheading new sectors, in turn, often creating demand and stimulating private sector take-up.

AI also creates unbounded opportunity for public services to be delivered in a better, more efficient, and personalised manner which in turn will enhance the lives of Malta’s citizens and the productivity of local business, whilst improving the relationships and satisfaction with Government. Local Government has consistently aimed at providing its services in a more economic, efficient and effective way – this has been achieved by reducing bureaucracy, delivering comprehensive one-stop shop approach services and adopting e-Government wherever possible.

In this regard, the Strategy will look into achieving the following objectives to identify how AI can be used to:

1. Provide better services to citizens/businesses

Automation makes it possible to expand the delivery of certain services to a 24/7 basis, and for personalised services to be developed and offered in affordable ways. The Public Sector is keen to develop and pilot tangible use cases which showcase the potential that AI can deliver and stimulate its adoption going forward.

Some examples of how AI could be applied to provide better services include responding to non-complex customer service requests (chat, voice and email) on a 24/7 basis; creating efficiencies in certain data-entry and processing tasks to free-up backlog; and using AI translation tools to assist non-native speakers interface with Government departments.

The Government plans to sponsor research into Maltese natural language processing (NLP) research to enable use-cases to be developed in both of the country’s two official languages.

Objectives of the Strategy set by the Government

- Provide better services to citizens/businesses
- Improve the economic and social well-being of citizens/businesses
- Improve the internal operations of the Public Service/Sector



2. Improve the economic and social well-being of citizens/businesses

Any Government intervention can only be justified if it brings about improved social welfare, and selected AI applications have the potential to bring these about for both citizens and businesses. The range of AI applications for social good are vast and new use-cases are being thought up each day. A recent study identified 160 AI social-impact use cases.

AI can help the visually impaired navigate their surrounding via a smartphone and identify objects or convert handwriting and printed text into spoken text. AI can also be used to diagnose skin cancer from mobile phone photos; predict families at risk of poverty; help children with autism manage emotions; assist emergency responders detect cardiac arrest from voice patterns; and combine and analyse vast data-sets to identify tax evasion.

The opportunities to apply AI for social good are vast and Malta is keen to explore how AI can be applied to tackle UN SDGs.

3. Improve the internal operations of the Public Service/Sector

AI has the potential to make Government more efficient, thus improving internal operations and governance, and leading to better use of taxpayers' money. The Strategy will explore some of the foundational steps that the Government will need to consider including the re-engineering of processes to enable automation opportunities, the introduction of self-service models and better use of data across the public sector.

To encourage more innovation in this respect, Government will consider supporting measures which incentivize bottom-up approaches to stimulate innovation. Pre-commercial procurement (PCP) may also be considered as an alternative to internally generated R&D whereby industry could be asked to respond to a request to develop innovative solutions which may not be readily available on the market to address a specific public sector need.

Creating an AI powered Government

The Maltese Government has already embraced the digital transformation opportunity, as evidenced by its investment and approach to new IT sectors and e-Government. Additionally, Government has access to specialized human resources (e.g. MITA, University), key (and large sets of) data points and, as regulator, legislative access. But it is also faced with larger and more complex national challenges (e.g. mobility; ageing local population). In this regard, the vision is to have local public sector powered by AI, wherever relevant and beneficial, with policy measures and actions designed to support this.



Promote Government projects that use AI

Linked with the point of acting as a catalyst, Government will aim to lead by example by promoting use of cases/ projects that have a key AI component. Apart from the benefits referred to above, such selected projects will also act as showcases to incentivize further public and private adoption.

To achieve such objectives, the following related actions will be required in the implementation phase:

- ▶ Based on the National focus areas identified, assess a number of use cases for public sector application. These use cases will be clearly defined and then assessed against pre-set criteria that will go into considerations related to operational, economic, financial, legal and regulatory fields, in order to prioritise and select a number of them which would have a fit with local requirements. The key objective will be to develop pilots that have a profound and positive impact across a large section of society.
- ▶ Following the selection of such plausible use cases for local adoption, develop prototypes and proof-of-concepts (POCs) for these projects.
- ▶ Once these pilot projects are successfully completed, dependencies and detailed implementation plans will be developed for large scale public sector roll out of these projects. These plans will include detailed technical, financial and resource analysis to fully assess the project's viability before they are undertaken.

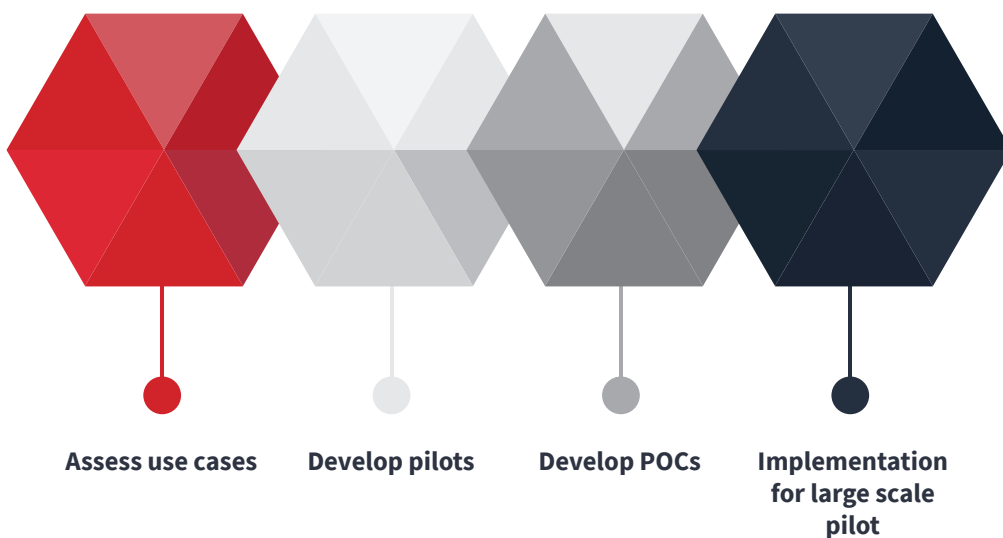
Set up multi-disciplinary public sector teams to champion AI in Government

This measure will ensure capacity and capability building and knowledge transfer within the public sector, address training needs, and help drive a culture shift and change management. The Government will seek to create reusable assets and methods from the projects it develops and build a team of AI experts to educate, raise awareness, provide advice and support to Government agencies, ministries and public sector entities that have an interest in undertaking AI related projects.

Raise awareness and encourage procurement of smart technology based solutions

Many AI use-cases require common technology infrastructure on which applications can be built and deployed. As part of the Strategy, the Government will seek to develop training and awareness programmes to build knowledge amongst public sector procurement teams and stimulate the purchase of smart, sector-based solutions and the infrastructure needed to support them. The goal is to drive cohesive planning which facilitates procurement of AI, IOT and data-based solutions in line with Malta's ambition.

AI projects implementation phase

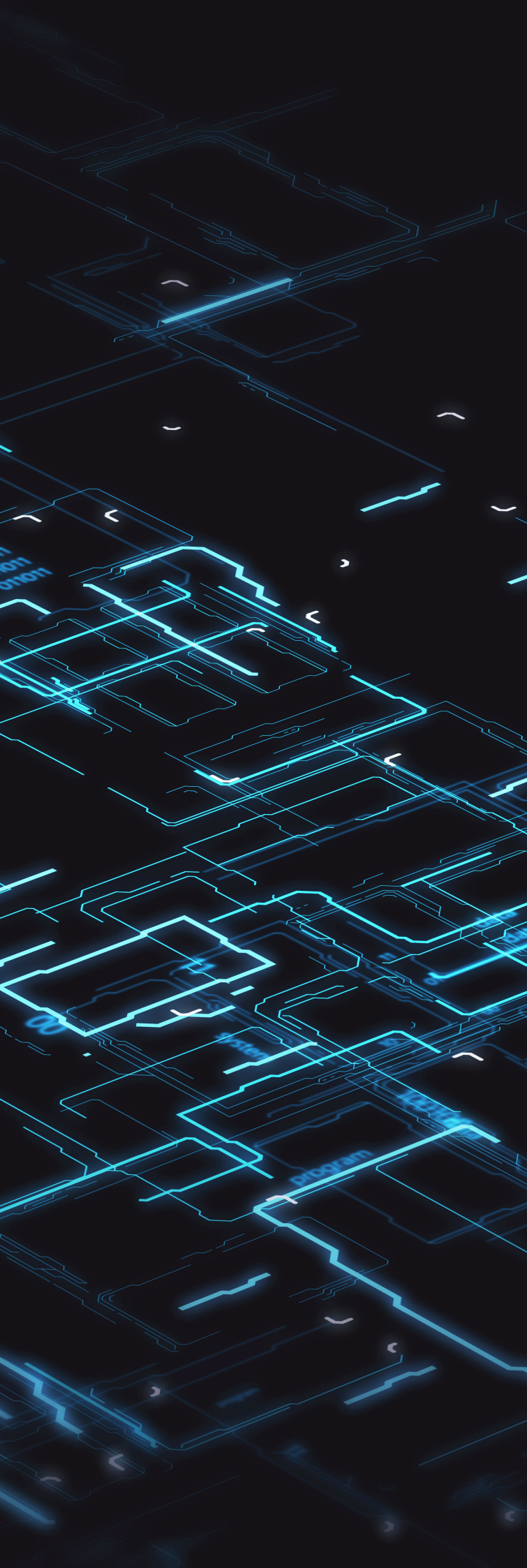


MALTA: TOWARDS AN AI STRATEGY

CHAPTER 6

PRIVATE SECTOR ADOPTION





Since Apple introduced the world to an “App Store” in 2008, the world has become increasingly “digital.” By 2018, 500M people from 155 countries were visiting and downloading apps every week, evidencing a remarkable level of consumer adoption. At the same time, private sector enterprises raced to modernize their IT infrastructure and workplace platforms to be more convenient and accessible, creating a more digital workplace for employees. While some Governments followed suit and even distinguished themselves as digital Government leaders, most have struggled to keep up with the pace of digital innovation, burdened by legacy infrastructure as well as budget and procurement processes.

Governments have reacted differently to AI, moving faster and more proactively, to accelerate the adoption of AI. They are actively racing to develop National AI Strategies and taking the lead in helping to shape adoption across a broad set of areas in their local economies. Malta is no exception.

Private sector technology giants have swiftly brought AI into daily life through the applications they have developed. Algorithms used across search and social media are two of the most widespread examples. Whilst these applications are broadly used by businesses across the globe, there is an opportunity for the private sector enterprises to do so much more with AI. The Government is looking to take an active role to stimulate this broader AI adoption across the local private-sector. It aims to set-out a clear AI vision, direction and strategic priorities to guide private sector interest. Furthermore, it aims to help shape and accelerate private sector AI adoption through several measures listed below:

Identifying areas and sectors that can benefit from AI

Given the experimental nature of AI, many private sector companies are cautious about adoption, and may stay on the side-lines waiting for the space to mature. This is especially true for small-to-medium enterprises (SMEs) that cannot afford to invest in an emerging technology with exciting potential but unpredictable costs and risks. A combined public-private sector effort is needed to address these barriers to adoption, and to ensure that limited resources are immediately target areas where the local community sees benefit (financial/ economic and social) but needs support in pursuing. Given the dual-use nature of AI, moreover, private sector companies might also need to work together, across sectors, to fully reap the benefits. Again, promoting cross-sector sharing and co-innovation is a good role for the Government.

Identify readiness of private sector to adopt AI

Another key barrier to private sector AI adoption is readiness. Companies need a baseline level of digital maturity in order to adopt AI at scale. To help local companies understand and close gaps in their organization and technology infrastructure that impede AI adoption, the Government could help companies assess their readiness. We will research ways to help the private sector in this area, including the possibility for a Government-sponsored AI

readiness tool. Research will also be conducted on the areas the private sector is most interested in, the areas it thinks it can most benefit, the readiness of the work-force to adopt to using AI related technologies and key challenges constraining adoption.

The Government aims to develop policy tools to:

1. Encourage SMEs to embrace and adopt AI

SMEs (including Micro Enterprises) are the lifeblood of the Maltese economy and account for close to 99% of Maltese businesses. Encouraging adoption amongst this cohort is therefore hugely important. Many small businesses have a basic lack of understanding around the practical applications of AI. They think it is futuristic, expensive and technologically complex; something a scientist might need to work with. They also fail to understand how it could be applied to their business.

The Government will focus on designing measures that enable companies of all sizes to use, develop and integrate AI applications in the way they work and the way they do business. Actions being considered include promotional campaigns and sector based outreach programmes to break down barriers and myths and highlight the benefits AI can bring to businesses of their nature. The promotional campaigns will also generate awareness around how existing funding schemes and fiscal incentives can be applied to AI.

2. Help local businesses be the best at using AI

Government will encourage businesses to upskill their employees to learn how to use and excel at applying AI across their business. Awareness campaigns will be developed to promote AI focused Massively Open Online Courses (MOOCs), many of which are free, with flexible start times and durations to suit working professionals. The Government will also explore the possibility of running specially designed free courses locally, with a national AI up-skilling and re-skilling programme high on the Government's agenda.

3. Build trust in how AI works in terms of transparency and accountability

The Government is hoping to achieve this in three ways. Firstly, it is developing a National Ethics Framework to ensure that AI application in Malta is ethically aligned, transparent and used responsibly. Secondly, it will look to expand the existing certification framework for innovative technology arrangements to cater for specific AI applications and use-cases. Thirdly, it will generate awareness on and contribute to global emerging standards being developed and encourage developers to adopt them.

The Government aims to develop policy tools to:

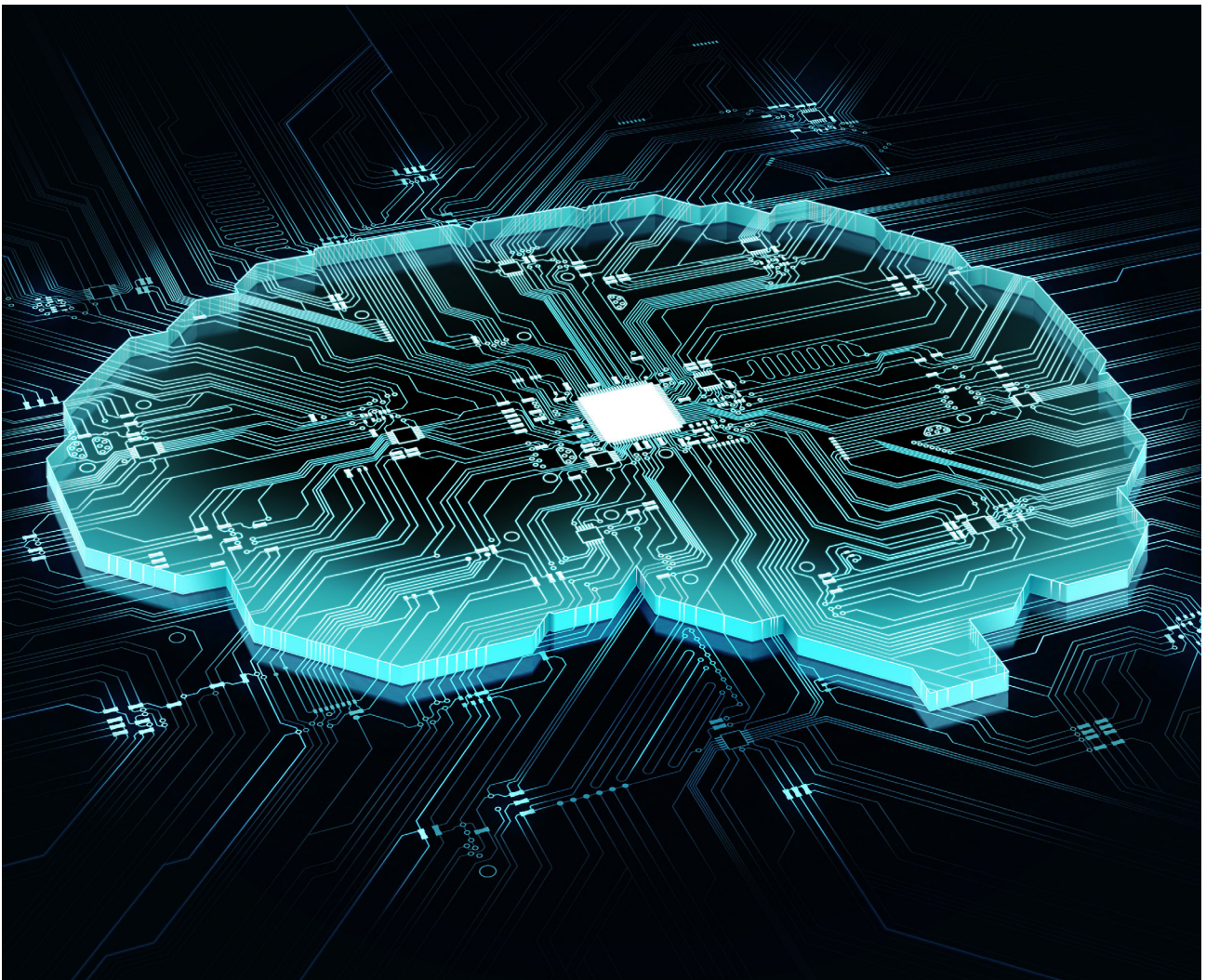


- Encourage SMEs to embrace and adopt AI
- Help local businesses be the best at using AI
- Build trust in how AI works in terms of transparency and accountability

Involve the private sector in the discussion to understand what works for them

One key aspect of the Strategy is to determine actions that can be taken by the Government of Malta to accelerate adoption across all sectors and strata of the private sector. While it is Government's role to develop initiatives that are aimed at targeting increased private sector adoption, the most successful policy measures are those that are designed with a bottom-up approach, where potential beneficiaries are asked to identify their needs and capacity limitations (e.g. financial; human resources). In this regard, any policy measures aimed at germinating AI adoption will be co-developed through public-private interaction, to ensure efficient and effective results, at economically feasible costs. Past experience demonstrates that valuable insights and lessons can be gleaned by understanding what businesses need and require. Policy measures will also target small and large businesses, keeping in mind the different requirements of such organisational structures.

Any initiative without private sector backing is likely to fail, as private sector AI adoption will generate an economic and social multiplier effect, which is the final metric of strategic success.



MALTA: TOWARDS AN AI STRATEGY

CHAPTER 7

EDUCATION AND WORKFORCE



Malta is predominantly a service based economy that relies on quality human capital delivering high-value added services. Government recognises the critical function provided by the working population, as well as the educational system in Malta that provides the fundamental function of sustaining current and future generations of trained people.

At the same time, the on-set and widespread adoption of AI is expected to disrupt current work practices and functions at a broader level and create both opportunities and skills gaps.

As such, the educational system and workforce implications are deeply intertwined elements of Government's AI Strategy, and therefore the objectives around this enabler will include the following:

Foster and embrace the adoption of Artificial Intelligence in Education (AIED)

A key goal will be to develop a modernised and boosted education system for Malta. While the educational system and curricula have undergone a number of developments and innovations in recent years, the broader delivery of training and education have not developed significantly from the traditional classroom based set up. Advancements in AI in education have the potential to allow for a personalised learning system drawing on vast learner and student data, leading to a richer and better knowledge transfer.

The Fourth Industrial Revolution is expected to create a stronger reliance on skills which are more cognitively demanding⁸. This will invariably create pressures such as the need for effective/ efficient studying, dependence on factors that impact cognitive learning, and teacher expertise and confidence. Research⁹ highlights that AIED has the potential to significantly improve learning experiences, support teachers and facilitate administrative functions.

Education has been identified as a priority area for AI pilot projects in Malta. The Strategy will seek to explore how AIED could be used to provide support across the following areas through research and dialogue with teachers, students, parents, policy makers and other relevant stakeholders:

- 1. Learning experiences:** the identification of AIED tools within our educational institutions could allow for the customised delivery of learner content based on informed analysis around the learner's behaviour and interactions. This could allow for the broader adoption of one-to-one personalised tutors that can supplement other teaching methods and significantly improve the quality of education, as well as the access of such educational levels irrespective of the student's social or financial background. Augmented reality (AR) has started to be incorporated into children's books to drive a more immersive experience. It is expected that AI driven virtual reality (VR) would assist students in developing creative problem solving

through real world situations.

- 2. Teacher support:** it is acknowledged that the teaching profession faces significant workloads and bottlenecks. AIED tools can free up capacity for teachers to focus on other critical tasks by supporting in areas such as automating feedback delivery to students, student assessments, and virtual teaching assistants among others. Collaborative learning can also be further promoted through AIED, by supporting teachers in adapting optimal study group formations based on student traits, cognitive levels and behaviours.
- 3. Administrative functions:** the identification of AIED solutions within our educational system will also be explored to facilitate certain tasks such as timetable preparation, facilities bookings and predicting inspections.

The Strategy that will be developed will take a clear stance to recognise that the functions of the human teacher cannot be replicated or automated, and that AIED represents support for the teaching profession in the continuous development of people. In view of this, teachers are expected to be in control of what tools are used and in which context. The Strategy will further consider ways as to how the teaching profession will itself adopt the required skills, potentially as part of the CPE programmes, to utilise AI technology to its optimal extent.

The Government is clear that it wants to take a consultative and collaborative approach. Extensive consultation with educators will be undertaken to drive awareness and common understanding of the opportunities at hand and garner their support and backing to undertake any initiatives considered.

Position Malta as a home for AI researches and graduates

AI is expected to impact us in a fundamental way. As part of this significant change, Malta needs to attract world-class talent in the fields of AI and related areas, as well as attract and develop graduates in this field of study.

From a strategic point of view, this can be achieved through a number of initiatives, including for example:

- ▶ Establishing Malta as a centre of excellence in AI research by funding specific programmes, PPP collaborations, and promoting deeper collaboration between educational institutions and private and public sector in areas dedicated to AI adoption;
- ▶ Providing the right incentives for world-class experts to relocate to Malta, including streamlined administrative processes, and an open work environment which promotes the sharing of ideas;
- ▶ Providing leading infrastructure to enable the use of development of AI based technologies;
- ▶ Further investment and continuous development in IT and AI related programmes at all levels of education;

⁸ World Economic Forum. (2019). Leading through the Fourth Industrial Revolution. Putting People at the Centre. White Paper

⁹ Luckin, R., Holmes, W., Griffiths, M. & Forcier, L. B. (2016). Intelligence Unleashed. An argument for AI in Education: Pearson

- ▶ Providing laboratory space, maker labs, and computing power in which researchers and entrepreneurs can test and build their ideas;
- ▶ Exploring the provision of scholarships, grants and research funding that can be channelled towards AI related fields of studies to assist in building local capacity; and
- ▶ Support in the development of further courses and study programmes in AI, potentially cross-linked with other disciplines such as healthcare, marketing, sociology, physics, law and finance among others.

The Strategy will contemplate the development of specific initiatives to sustain this objective and explore unique selling points that Malta can offer in the international arena to attract and bring back the right talent to carry out research and pilot the application of AI.

Malta has historically offered one of the oldest AI degree programmes in Europe, since 1995, and has steadily built up AI expertise over the years which provide a strong foundation to build on.

Addressing the societal aspects and promoting AI as an enabler rather than something to fear

Although AI is anticipated to bring forth numerous opportunities and improvements to our quality of life, it is acknowledged that this can be a potentially big change. Another fundamental view is that this change is not something that can be avoided, but that it needs to be embraced and leveraged within our society and institutions.

The Strategy will seek to develop communication campaigns to keep the public at large informed of the developments taking place. Education and training will remain at the forefront of the strategy to support people in broadening their knowledge on AI as an enabler, including public talks and discussion forums where stakeholders can share experiences, thoughts and ideas around AI and its impacts on society – both positive or negative.

The European Commission sent a Communication ¹⁰ in April 2018 outlining that women and people of diverse backgrounds, including people with disabilities, need to be involved in the development of AI, starting from inclusive AI education and training, to ensure that AI is non-discriminatory and inclusive. Malta backs this initiative and will develop promotional activity and actions to support it.

Facilitate collaboration between Industry, Educational and Research institutes on AI related initiatives

The Strategy will explore how deeper collaboration between, industry, educational and research institutes can incentivize the development of not only AI based technologies, but also broader applications in general.

As part of this plan, the Strategy will look at developing a detailed framework for collaboration between industry, educational and research institutes, including designing a collaboration model, tools, instruments, guidelines, and relevant standards that can be adopted to facilitate interactions. Consultation with the University of Malta will take place to discuss the possibility of introducing professional doctorates (eg. EngD), where students conduct PhD-equivalent research and undertake taught business and technical courses whilst working closely with an industrial sponsor.

Researchers in both the public and private sector should be encouraged to share their time and skills with the industry through the use of appropriate incentives, flexible administrative processes and compensation schemes. This could also involve board representation, appointments in research related capacities, and support to academics seeking to establish start-ups.

Furthermore, consideration will also be given to hiring opportunities from local universities, including the setup of internships in AI, “lab” courses and placements that have student teams work on real problems for local businesses.



¹⁰ European Commission. (2018). Annex to Coordinated Plan on Artificial Intelligence.



Encourage and enable the reskilling of the workforce to prepare for the AI r/evolution

Government is cognizant of the various pronouncements made in international research on the possibility of loss of certain jobs and skills because of automation permeating all levels in our society and business world.

While it is recognized that new opportunities will be created due to new technologies becoming prevalent, and that people in general will naturally seek career paths in line with these changes, the negative consequences on society as part of an economic transition will not be overlooked.

One action considered is the establishment of a dedicated think tank to assess the more vulnerable skills and jobs in our society today, monitor how these are likely to be impacted by automation and AI based technologies in a broader sense, and propose a transition plan.

Furthermore, consideration will also be made towards potential reforms needed to the existing employment conditions to support for a world with automation, and major upheavals in the job market as a result of this. Such a reform could also cater for specific schemes in relation to jobs defined as being at risk due to automation.

A crucial component will also include a national reskilling programme for people seeking to transition effectively into areas that are complementary to AI based tasks, as well as other areas requiring a stronger element of creative thought, innovation and cognitive aptitude. Continuing education will be critical to keep the workforce relevant into the future, particularly in terms of getting everyone in the mindset of continuous learning to adjust quickly and keep up with the speed of change happening around us.

Projects will be supported by the eSkills Malta Foundation, a coalition of various representatives from Government, industry and education, which is currently developing a project to upskill industries sectors in digital and emerging technologies.

The European Parliament and the Council of the European Union reached a provisional political agreement in February 2019 on the first-ever Digital Europe programme which will see €9.2 billion invested between 2021-2027 across five key digital areas: High Performance Computing (HPC), AI, cybersecurity and trust, advanced digital skills, and ensuring the wide use and deployment of digital technologies across the economy and society, in order to strengthen European industrial technological leadership. €700 million will be allocated to ensure that the current and future workforce in EU countries, including Malta, will have the opportunity to easily acquire advanced digital skills through long- and short-term training courses and on-the-job traineeships ¹¹.

¹¹ Source: EU budget: Commission proposes €9.2 billion investment in first ever digital programme - http://europa.eu/rapid/press-release_IP-18-4043_en.htm (Accessed on 11 March 2019)

MALTA: TOWARDS AN AI STRATEGY

CHAPTER 8

LEGAL AND ETHICAL FRAMEWORK



The Government understands that if AI is not ethically designed, responsibly applied, and properly trained and maintained, it cannot be trusted. Without trust, AI may become a corporate liability, a national risk and/or a source of social disruption. It is therefore imperative that Governments stay mindful of the unique risks associated with AI and use this knowledge to inform public policy. It may be necessary to develop local regulations, and/or adopt and enforce international standards and laws, to sustain trust in how citizens are applying, using or being impacted by AI. This becomes even more complicated when considering that intelligent systems may be hosted and consumed locally, or they may be consumed locally in Malta but hosted in a foreign datacentre many thousands of kilometres outside Malta's borders.

AI raises profound questions across ethical, legal and regulatory domains, touching many fronts from protecting national security and citizen rights to advancing commercial interests and international standing. Most technologies do not require such consideration, but AI is among only a handful of technology innovations in the past 11,000 years that qualify as a General Purpose Technology (GPT). In fact, there have only been twenty-three, tracing back to the dawn of civilization. The very first GPT may have been the domestication of plants, and more recently, humanity has benefited from the introduction of electricity, steam engines and the internet. Today, it is widely believed that AI is the 24th General Purpose Technology.

AI can improve the safety of medicine, combat financial fraud, help meet the UN's SDGs and personalize digital experiences. Yet, if AI is unethically designed, poorly trained and/or maliciously applied, this may lead to bad, or at the very least, unintended consequences such as algorithmic bias and unaccountable decision making. For policy makers and business leaders alike, it is prudent to focus on these legitimate cognizable risks when formulating national AI programmes and strategies.

As such, the Government of Malta will be taking the following steps:

Explore the potential to develop a regulatory framework for the certification of AI technologies

Malta has taken a global lead in developing a regulatory and certification framework for innovative technology arrangements through the set-up of the Malta Digital Innovation Authority and the creation of the Innovative Technologies and Services Act. The certification framework was intentionally developed to be technology neutral and voluntary because the country understood that individuals and organisations of good will would seek out a positive sign of recognition that would build trust and transparency amongst users, consumers and wider stakeholders, even if not mandated by a National Competent Authority (NCA). The Strategy that is being developed will examine what specific provisions need to be made in the context of expanding this regime to include AI arrangements.

Explore provisions on intellectual property and liability related issues

Malta is currently working on a Private Law Bill that aims to provide clarity on specific provisions related to Intellectual Property (IP) and Liability related issues in the context of DLT. As a next phase, the country will explore whether further provisions could be developed which would clarify ownership of IP rights in AI-generated outputs, particularly where multiple entities are involved in the value chain. Liability related issues on specific use-cases, open source development and automated decision making will also be explored to help determine if supplementary legislation may be needed to mitigate some potential blockers and grey areas in existing legislation.

Explore the set-up of a regulatory AI sandbox

Certain regulatory provisions may restrict the ability to test new innovative AI applications and ideas. Malta is keen to explore the set-up of an AI regulatory sandbox to provide regulatory exemptions to enable firms to explore and test concepts and solutions with proportionate safeguards, in a contained environment for a well-defined duration. Approved sandbox tests would be closely monitored to enable the regulatory authorities to contain risk, build capacity and experience in regulating these fields. Sandbox tests would need to be modelled on particular use-cases. Autonomous vehicles, autonomous drones and robot assisted surgery for instance, would all require completely different forms of exemptions, consent and approvals from regulatory authorities.

Define AI and articulate Guiding Principles for sustaining trust in AI across the public and private sector

AI is a broad and developing field with many definitions that experts are yet to agree on. As part of the work undertaken, Malta will set out to provide a definition of AI, taking into consideration and aligning closely, with what is being developed by the EU High-Level Expert Group on AI. More importantly, the country will seek to articulate Guiding Principles for sustaining trust in AI across the public and private sector. Malta will take into close consideration the Asilomar AI Principles which place ethics, values, privacy and the common good at the heart of AI adoption. The country will seek to ensure that regulated industries and areas where AI may be used for trusted decision making will have appropriate use of Explainable AI and transparent processes that can be examined for correctness and validity.

Developing a National Ethics Framework and supporting its transposition into national law

As part of the Strategy that is being developed, Malta will work to develop a National Ethics Framework that will underpin the values we aspire to and set out how AI should be used in a responsible way. The United Nations Human Rights Commission has reported to the UN General Assembly on AI on the human rights implications of AI, including proposing a human rights framework for the design and

use of AI technologies by states and private actors. The Strategy will seek to examine how the National Ethics Guidelines being developed can be transposed into Maltese law and whether one of the prerequisites of the certification framework the country is seeking to develop must be the adherence to these principles. The Malta Digital Innovation Authority Act provided enabling legislation for a National Ethics Committee to be formed. Work will now be undertaken to set-up and formulate this committee as part of the Strategy.

Actively collaborating with European Institutions and International Organisations on AI related initiatives to understand emerging standards and norms

Malta firmly supports global initiatives to develop standards to use AI for good. The ethical framework which the country is developing will take account of the Draft Ethics Guidelines for Trustworthy Artificial Intelligence issued in December 2018 by the EU High-Level Expert Group on AI. The principles and values articulated in the guidelines are based on fundamental rights articulated in EU Treaties and the Charter of Fundamental Rights.

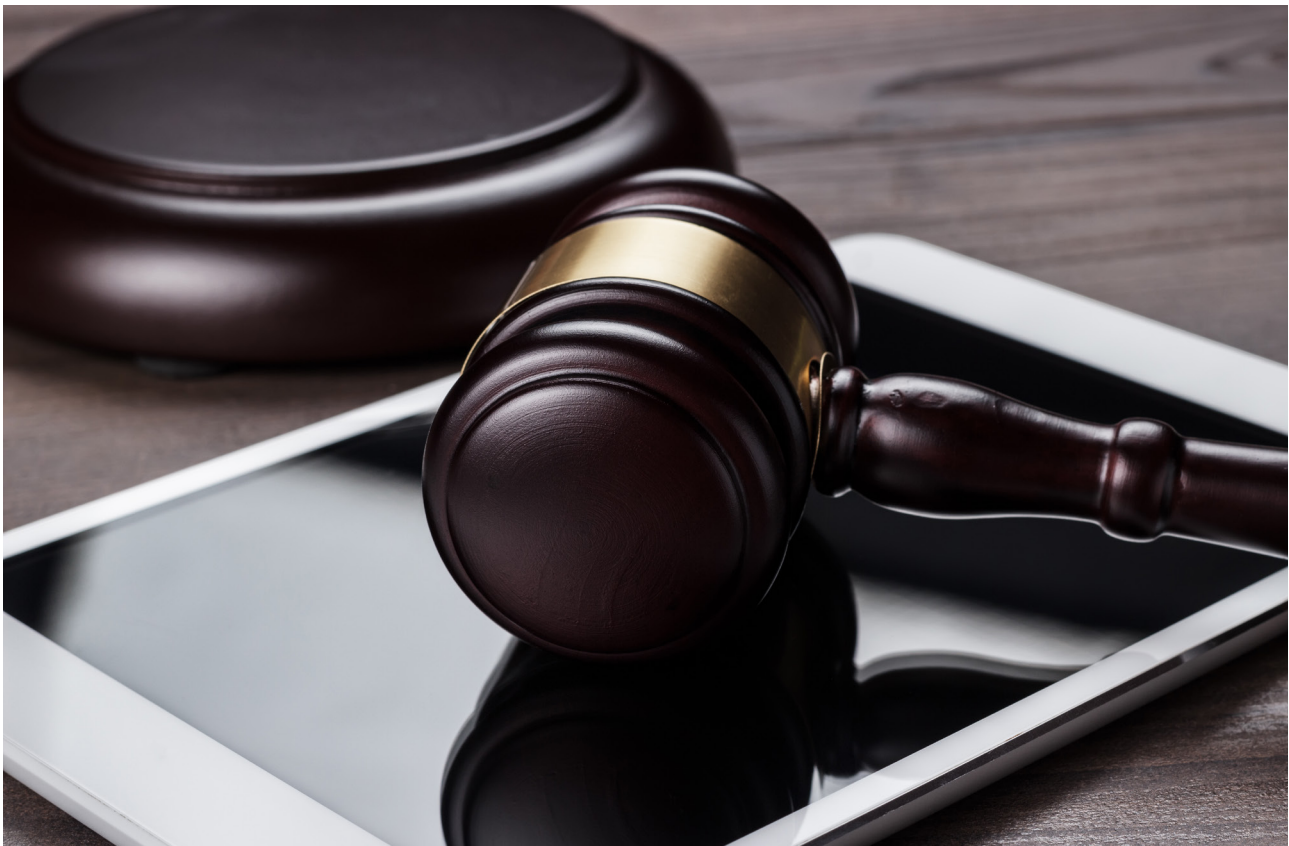
The ethical framework will also consider the work of various international organisations such as the Institute of Electrical and Electronics Engineers' (IEEE) with respect to Ethically Aligned Design, the work of the AI Now Institute at New York University (NYU), and Amnesty International and Access Now's Toronto Declaration which seeks to protect rights to equality and non-discrimination in machine learning systems.

Furthermore, Malta plans to actively contribute to discussions

with the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) in relation to European Standardisation within the proposed EU initiative on AI, through the Malta Competition and Consumer Affairs Authority (MCCAA), the body overseeing standards in Malta.

Facilitate cross-border data flows and consider the use of GDPR exemptions

The EU General Data Protection Regulations (GDPR) were introduced in May 2018 across all EU countries included Malta with specific safeguards around the use of personal data within the context of AI. Whilst keeping these principles in mind, the regulations enable certain provisions that allow Member States to enact domestic laws that authorise automated decision-making/profiling in certain circumstances and provided other GDPR obligations are satisfied, including "suitable measures to safeguard the data subject's rights and freedoms and legitimate interests". The Strategy being developed will explore if Malta might need to be develop and enact certain exemptions whilst safeguarding the rights of data subjects. The Data Protection Commissioner (DPC) will be actively involved in this work. The Government will also explore arrangements with non-EU countries to encourage the free flow of non-personal data, much like what will soon come into effect in Europe with Regulation (EU) 2018/1807 on a framework for the free flow of non-personal data in the European Union. This would help maximise access to non-personal data, helping to drive data-hungry innovation like AI. The EU and Canada have identified access to open data as a key aspect of any AI "ecosystem".



Explore development of regulation and legislation to support specific AI related use-cases as required (eg. self-driving cars)

The application of AI is expected to completely transform certain industries. The impact and transformation are expected to be so profound that it is envisaged that specific legislation to enable and provide for such change will be required. From a policy point of view, the Government is open to explore the development of regulation and legislation to support specific AI use-cases in its ambition to be a trendsetter in its adoption and approach to AI.



MALTA: TOWARDS AN AI STRATEGY

CHAPTER 9

ECOSYSTEM INFRASTRUCTURE



The Government is aware that cutting edge technology and data-infrastructure, together with supportive regulatory and policy initiatives are needed for the country’s AI strategy to truly take off. There are various dimensions of enabling infrastructure that need to be part of a holistic AI strategy which are set-out in the diagram below.

Enable open data across the public and private sector to fuel AI applications

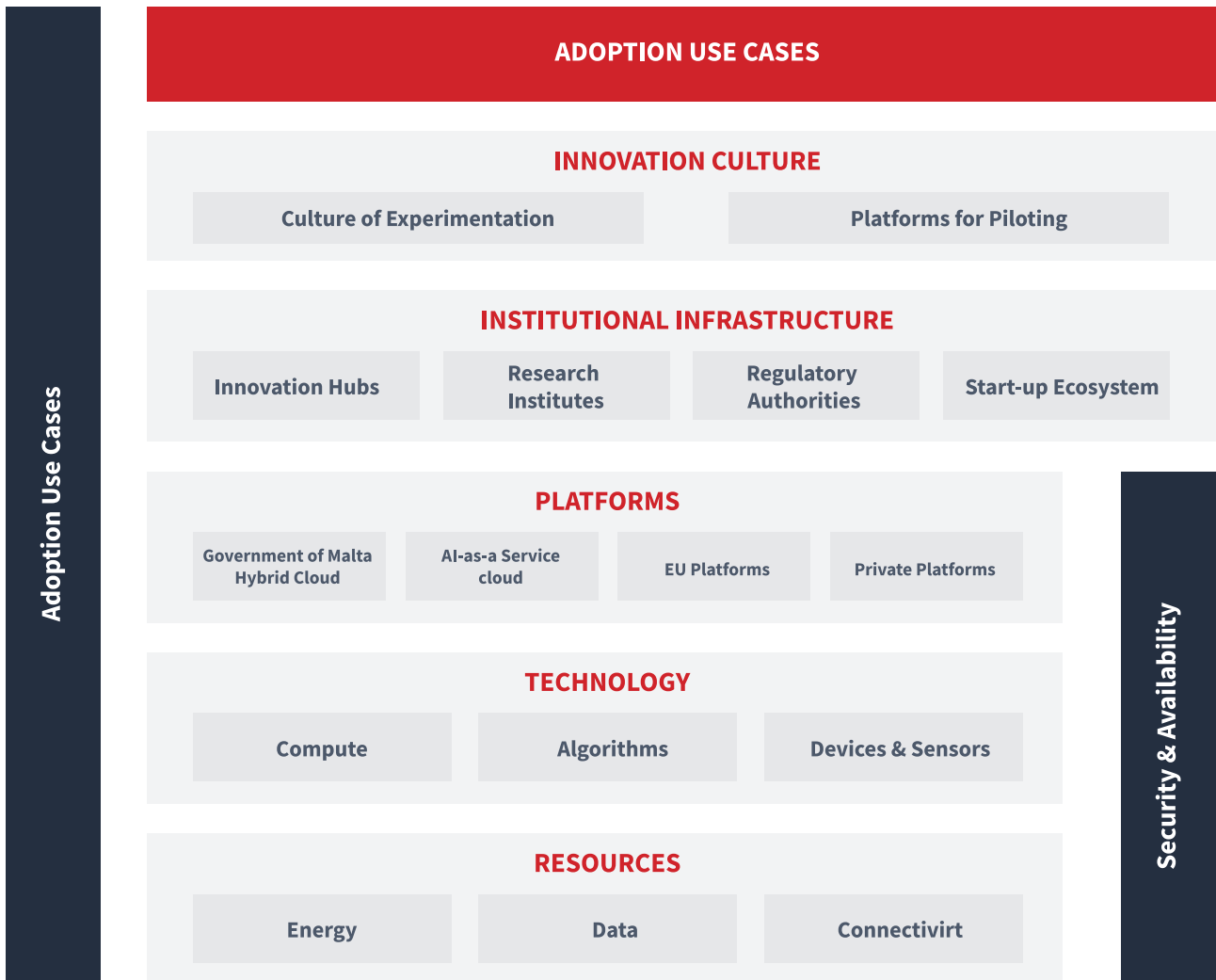
Data is often considered the “new gold” or “new oil,” and is no doubt the foundation for the development of intelligent systems. Machines are able to “learn” by processing and seeing patterns in data, which may come from textual documents, images, video and audio files. Access to clean, tagged data is often the key determinant of AI success, although recent advancements have made it possible to train intelligent systems on smaller, unstructured data sets, even without human supervision. The European Commission (EC) has recently outlined plans to aggregate datasets from many countries within Europe to support local AI innovation and research in fields such as energy, health and manufacturing. According to the EC plan, each country and the EC would identify and share public data sets that could be made accessible to businesses and public sector bodies to inform the development of AI tools and solutions. Furthermore, the public sector should adopt an Open Data approach to making

their datasets available to private sector entities for the purpose of training AI systems.

Malta will fully participate in and benefit from these activities. Furthermore, the Strategy that is being developed will emphasize the importance of making data available from and for public sector entities, educational institutes, research organisations as well as the private sector. For many AI ventures, the ability to combine internal data with externally sourced data is important especially in use cases where internal data may be limited. Therefore, the Strategy will consider measures to make public datasets available and to contribute to both national and EU-wide data programs, while ensuring that the interests of Maltese companies and individuals are protected.

Provide cost effective access to compute capacity required for the most demanding workloads

Access to large-scale compute capability is a foundational element of AI research and development. Malta will require access to local, regional and global infrastructure and will consider various policy measures to facilitate this.



Emerging compute capabilities and technologies could also be explored to create a mix of specialised compute solutions each targeted at different use cases, thereby improving the overall cost effectivity. Many organisations throughout Europe have already invested heavily in the creation of significant compute capabilities. Malta could partner with such organisations to facilitate access to these capabilities.

Connectivity is also key to enable this. The Government will continue to nurture and support a regulatory environment conducive of investments in advanced telecommunications networks and services that enable the delivery of wide-spread AI research, development and adoption.

Enable access to platforms for the public sector and explore collaboration for shared platforms with the private sector

More and more AI capability is delivered through cloud platforms. In fact, most companies that consume AI-as-a-Service do so through a third-party cloud provider. Access to world-class cloud and compute infrastructure will be required to support the Strategy, and public-private collaborations will be explored to ensure that there is the ongoing investment in connectivity infrastructure.

Platforms are also a key enabler to the Strategy as they enable the exposure of compute capabilities, access to algorithms and integration with Internet of Things (IoT) devices. Through platforms like the Government of Malta (GoM) Hybrid Cloud, which offers cloud capability to Government entities, Malta can provide access to these capabilities and enable synergies at a national level, making even cases where there is limited scale more feasible.

With a service-orientated cloud environment, Malta would be able to develop tailor-made AI functionality that serves the varying needs of stakeholders.

Access to the platforms, technology and resources can be facilitated through organisational bodies mandated to support the AI ecosystem

Institutional Infrastructure will be required to drive AI adoption, and these organisations will be mandated to provide support to the intended end-users. The European Commission's Digital Europe Programme ¹² includes proposals for €9.7b in funding for supercomputing, AI, cyber-security and trust, digital skills and Digital Innovation Hubs (DIHs – 'one-stop-shops' for SMEs and public administrations to access technological expertise, advise and experimentation facilities). DIHs and research institutes would be established as centres of excellence, being able to provide insight into industry practices and stay abreast with research in this evolving field. Regulatory authorities will be required to guide stakeholders and ensure that Malta's own regulations are in line with

the expectations of the public sector, citizens, investors, and other stakeholders. Security and availability will be given the utmost consideration and will be a key focal point of the work undertaken. Finally, a nurturing ecosystem should be established to increase the chances of success of new AI-focused start-ups that have been established. Such organisations are to make the enabling platforms, technology and, resources available and accessible.

The Strategy will focus on identifying and setting out the objectives and the desired future state for technology, security and other key technology related enablers that will underpin the ecosystem. It will then assess the current state of the key related enablers.

Following the publication of the Strategy, the Government will build a detailed roadmap setting out the actions, initiatives and investments needed to position Malta as a leading AI hub. Given that the new digital and data-driven world permeates all areas of the economy, the investments the country will make are expected to provide cross-sectoral benefits across many domains.



¹² Source: EU budget: Commission proposes €9.2 billion investment in first ever digital programme http://europa.eu/rapid/press-release_IP-18-4043_en.htm (Accessed on 11 March 2019)

Concluding Remarks

This document intends to highlight the vision, objectives and policy considerations that will guide the development of Malta's National AI Strategy. Wide-ranging consultations will take place with interested stakeholder groups to gather feedback, input and consideration on the specific measures and actions that will be developed over the coming months. The vision is to make Malta a model nation where AI policy has a tangible, positive and long-lasting impact on citizens, business and the economy.

The Malta.AI Taskforce and the Parliamentary Secretary for Financial Services, Digital Economy and Innovation within the Office of the Prime Minister invite interested members of the public, industry and academia to provide feedback on this Consultation Document.

Responses must be provided by 22nd April 2019.

Feedback can be sent by email to: fsdei.opm@gov.mt

Or in writing to:

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