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Department of Enterprise,
Trade and Employment

National AI Strategy for Ireland

Public Consultation Report

Prepared by the Department of Enterprise, Trade and Employment

Contents

Introduction

This is a report on the submissions received by the Department of Enterprise, Trade and Employment during the Public Consultation for the Development of the National AI Strategy for Ireland.

Future Jobs Ireland 2019 included the commitment to develop a National AI Strategy for Ireland. The Department of Enterprise Trade and Employment is leading on the development of this cross-Government Strategy, which is due to be published in the coming weeks. The Strategy is expected to provide a high-level direction to the development, adoption and implementation of AI in Ireland.

During the development of the National AI Strategy for Ireland, a wide consultation process was undertaken across the government system as well as with relevant stakeholders. As part of the consultation process, an open public consultation process was held from Wednesday, 16 October 2019 until Thursday, 7 November 2019, where engagement and inputs were sought from all stakeholders and interested parties.

The purpose of this public consultation was to better understand the views of the public on the opportunities, enablers and challenges for AI in Ireland and to gather views on key areas and issues that should be addressed by the strategy.

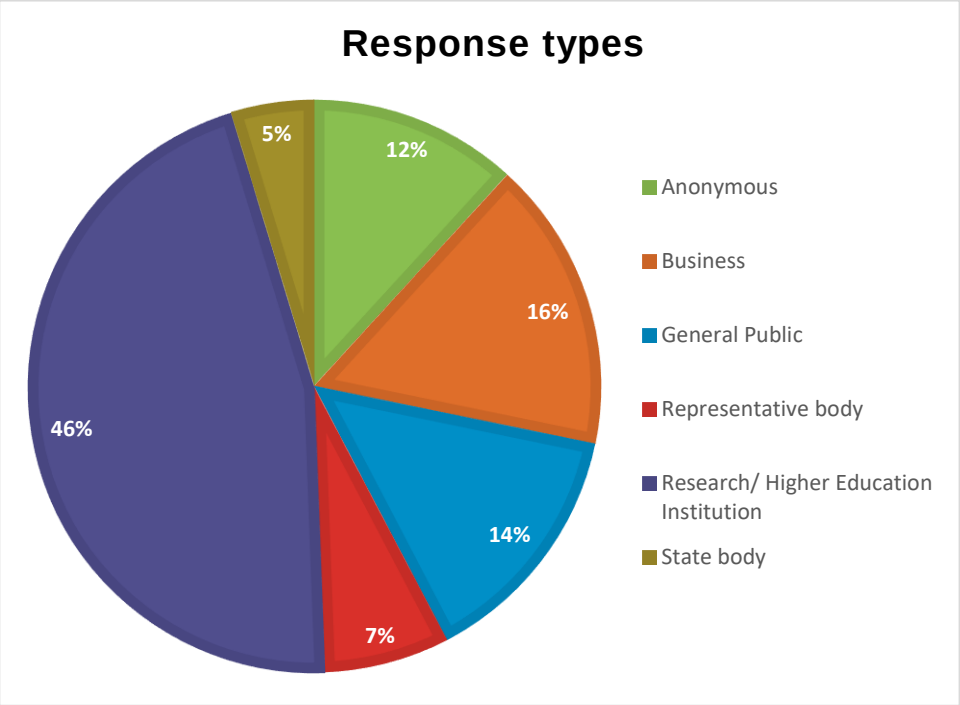
The public consultation invited responses to an online questionnaire as well as free form inputs to a dedicated email address. There were 85 responses to the online questionnaire which are included in this report as well as 7 written submissions which are also published on the website.

Responses are published here as they were received. Personal identifying information contained in submissions has been redacted and will not be published, in accordance with the General Data Protection Regulation and the Data Protection Acts 1988 to 2018.

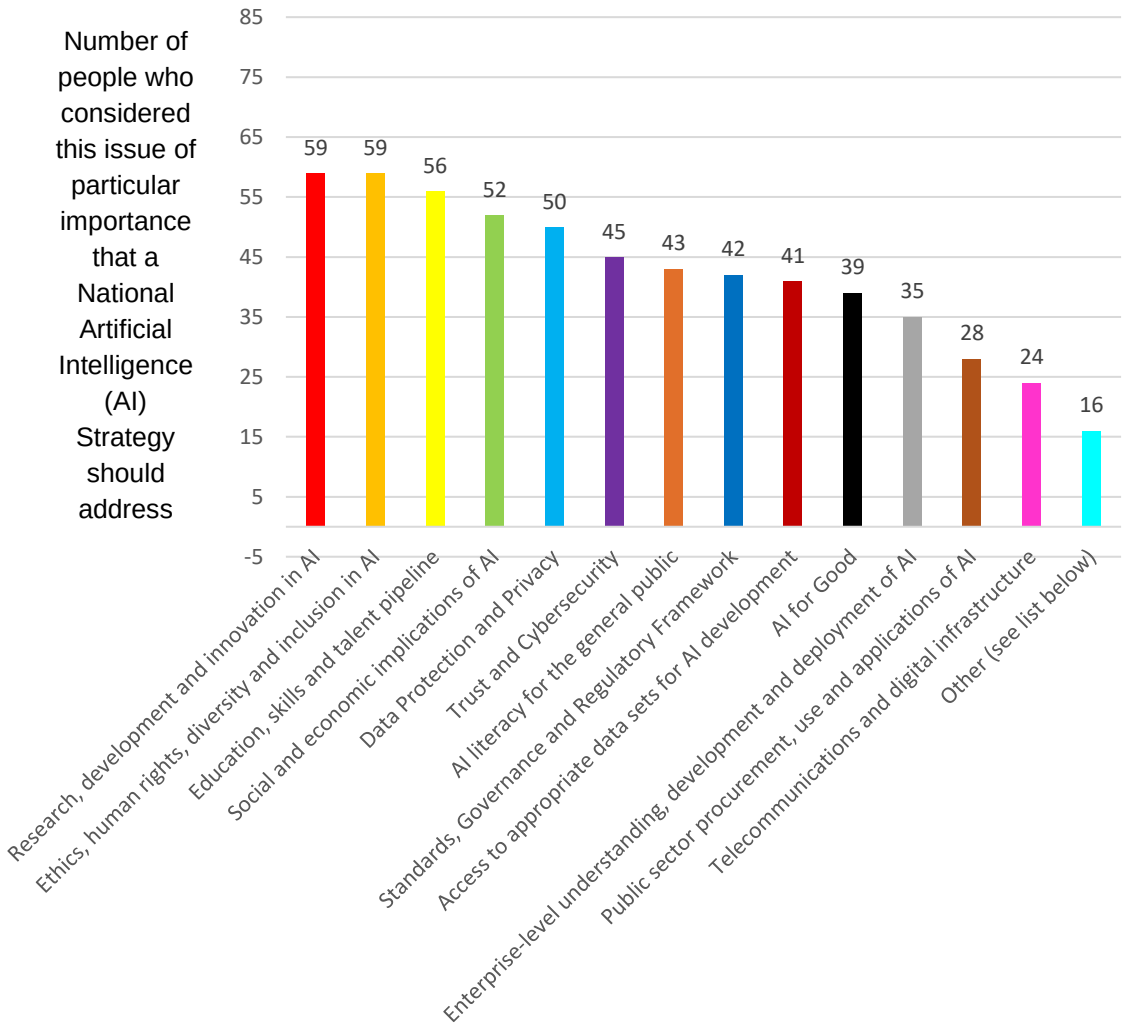
Questionnaire responses

Question 1- Please provide your name or the name of the organisation you represent (if applicable) and your contact email address

Personal identifying information contained in submissions will not be published, in accordance with the General Data Protection Regulation and the Data Protection Acts 1988 to 2018.



Question 2 – What do you consider to be issues of particular importance that a National Artificial Intelligence strategy should address?



Other topics mentioned:

- Standards and Regulatory Framework
- Trust building and new-age evolved values
- Funding for basic research in machine learning and supporting technologies in maths and computer science
- AI Test-beds
- International collaboration, especially at EU level
- Seed funding

- AI and life engagement
- Addressing the potential for misunderstanding and inappropriate use by government and private bodies
- Equality and non-discrimination
- Explainable AI & Transparency
- Legal aspects of AI
- Diversity legal issues
- AI Interpretability
- Implications of AI for the work and development of the Community & Voluntary sector.
- AI in Healthcare, also responsible use of AI areas where it will be exposed to children (including Social Media and Entertainment)

Question 3- Please explain here the choice you made in Question 2, if you wish

Ethics and human rights and trust / cybersecurity stand out as areas of importance. Rapid development of technology means we're still grappling with the ethical implications of AI so it's important to make sure the public's rights are protected as AI continues to evolve.
Ireland should seek to develop AI as an international competitive advantage. In order to achieve this we need: 1. A workforce that is educated and skilled in practical AI implementation 2. Access to state-of-the-art AI technology and academic research 3. And most importantly, executive management that is ready, willing and able to take advantage of AI opportunities
"On the other hand, we denounce with righteous indignation and dislike men who are so beguiled and demoralized by the charms of pleasure of the moment, so blinded by desire, that they cannot foresee the pain and trouble that are bound to ensue; and equal blame belongs to those who fail in their duty through weakness of will, which is the same as saying through shrinking from toil and pain. These cases are perfectly simple and easy to distinguish. In a free hour, when our power of choice is untrammelled and when nothing prevents our being able to do what we like best, every pleasure is to be welcomed and every pain avoided. But in certain circumstances and owing to the claims of duty or the obligations of business it will frequently occur that pleasures have to be repudiated and annoyances accepted. The wise man therefore always holds in these matters to this principle of selection: he rejects pleasures to secure other greater pleasures, or else he endures pains to avoid worse pains."
AI is the most impactful cross cutting technology to become mainstream in a generation. It is all pervasive in that it has become embedded in how we work, rest and play; from manufacturing to healthcare to social media it has economic , societal and environmental impacts and applications and as such all of the issues in Clause 2 should be addressed.

As an academic, I recognise the importance of continuing to develop the skills of our undergraduates, Masters level students, and PhD students. Teaching in this area is resource intensive, both in terms of people on the ground to support learning and also the compute resources required. I would like to see stronger collaboration across Universities to secure e.g. cloud compute facilities at favourable rates for teaching. There is an existing strong expertise in machine learning across the University research sector, particularly in [redacted] of media processing. This involves the use of machine learning in applications involving speech, language, images and video. This is not something new to us, but expertise built up over decades. Machine learning is the backbone of all AI, and we have been excellently placed to leverage existing knowledge. This research has become more consolidated through collaborations in the ADAPT SFI Centre. It is imperative to continue to provide access to basic research funding to continue this research and to maintain our place on the international stage. [redacted] training with large data sets and the technical community and the communities focused on ethics, diversity and inclusion in AI are talking more closely but that conversation needs to be further enabled. Each side must inform the other. These issues are not only based in the "theoretical", of what is ethically acceptable or not, but needs to involve a conversation about what is technically possible or desirable and how we might achieve that in ways that are more acceptable. Privacy can't be someone else's problem. [redacted] in the area of speech and language, we require large datasets to properly train systems. With deep learning and AI there are massive opportunities to develop applications with speech from Irish people and all those who call Ireland home, that represent the full diversity of how we use language, what accents we speak with, all traits that are very particular to us as a nation. Whilst there is much emphasis on Irish as a minority language, we should also bear in mind that systems developed based on large corpora of US and British English are not fully representative of the way we communicate day-to-day as a people. Irish-English is somewhat of a minority language too! It is expensive and time consuming to develop corpora, and the Irish public would benefit from Ireland taking a lead on how to develop speech-interfaces that work for Irish people. I would hence suggest that in developing large datasets for speech and language research, that we consider properly funding such work.
AI is poorly understood and subject to a lot of hype. It is important not to conflate AI with a lot of others issues in IT so as to develop a coherent strategy. AI is a key technology that will reshape industries and Ireland needs to be ready for these changes by first an foremost education & research. We also need to understand how to use AI to be if it our economy so there needs to be explicitly funding to build pilot applications in the public sector and private sector to develop these practical skills and develop export markets for our technology.
AI is changing the economic landscape. Europe/Ireland needs to keep up with the technological development not to fall behind. Jobs in AI need to be secured in Ireland by fostering innovation and increasing competitiveness (Education, Research). Advances in AI will enable exploitation of big data in unexpected ways, and it is the governments responsibility to watch over developments in this area such that civil liberties are not undermined by large corporations/government institutions.
AI permeates all facets of society.

For accountants, we see the priorities as including: • Building a wide understanding of the practical use of AI. AI will never replace the need for experts but it has potential to save time and money. • Build trust to work with AI rather than to resist it. • Enhancing the skillset of accountants to use AI – this also includes soft skills development. Part of our revamped education programme for 2019 includes modules on AI and data analytics. • Regulatory bodies embracing AI as part of the workplace environment. For example, if financial reporters or auditors use AI in their day-to-day work, regulatory bodies need to be able to understand these techniques and assess their reliability to produce quality financial data. Regulators can also actively encourage and adoption of AI among accountants for example.
There needs to be a strong alignment between Academia and Industry on collaborative projects involving large data sets. Key to this is making data available for the development and testing of new use cases.
While every item above is important I prioritise skills and standards above all else. The whole population needs improved digital skills to utilise new technologies in a safe and confident way. It is important that citizens understand when AI may be being used and what to do about it e.g. exercising their rights under GDPR for manual review. Business owners and managers need help to understand the potential for any new technology to help them compete.
All of these are potentially important. The priorities will depend on the goals and terms of reference.
The economic imperative of AI will ensure that enterprise stays informed and involved. So, particular effort should be made to keep the public sector up to speed on opportunities and skills. In this way there can be a balance between the economic and social risks and benefits.
AI is a tool to aid human interaction - not to dispense with it.
The impacts of AI are enormous. The university will be at the forefront for managing these. All the areas are of relevance to what is can do.
We need people who understand AI - we need to train them. That means having a critical mass of researchers in Ireland, in universities and working in industry.
1. Tools= We need the tools - in our case Robotics/Computing/Sensors/Connectivity 2. Knowledge= We need the training/expertise/knowledge - in our case - AI courses in Robotics/Computing/Sensors/Connectivity 3. Issues = We need to understand the problems that need solving, socio-economic-enviro priorities, how they can be solved, who to involve, regulatory & human aspects (ethics, trust, privacy etc) 4. Exploitation = Moving these prototype solutions from the lab to the real-world - start-ups, innovation, commercialisation
Seed funding for research and development is critical, as there are many students with new, untested ideas, who have a different world-view, who do not have access to capital. The Disruptive Technology Innovation Fund had potential, but discriminates against startups because of their restrictive co-financing and partnership requirements, thus only serves to maintain the status quo and doesn't disrupt the industries who actually need to be disrupted. Failure to do so will result in job & enterprise losses for Ireland. Huge startup potential in Ireland but no appetite for risk. Secondly, public institutions need to be accept that they are potential customers of software / AI companies if they want to save money and improve services, rather than expecting to procure IP. This will allow AI and public institutions to reach our full potential.

I believe we are still in the early days of sustained AI progress. To have any influence whatsoever on the future of AI we need practitioners to influence that progress. Otherwise we will be totally subject to external progress.
There is a need for an expert goup to be put in place that will inform the Government AI Strategy. The Expert Team should include those that would consider ethics and the moral use of AI; education, health; enterprise and other considerations such as data protection and privacy. Its important to remember that AI can influence the thoughts and actions of every citizen. Also AI, and is uses, is at present led by private/commercial entities ... who have little accountability to the public ... the standards, governance and regulatory framework must be led by Government who are answerable to the people.
AI depends upon citizens' providing huge amounts of data and, therefore, reduce the capacity for people to opt out, revoke their data or use of their data or to avail of services in the same way as others. There have been cases where AI has been demonstrated to evidence the biases of its creators and to reflect and amplify social inequalities. I believe that it should be thoroughly investigated prior to any widespread use of it and that it requires a much more robust public consultation, similar to that of the citizens' assembly.
Human development in a secure manner is most important to me
The application of AI is valid all the areas listed above
The education & empowerment of citizens re. issues such as AI, data has received less attention than innovation and talent. Innovation without regulation and citizen empowerment is a bad idea.
If AI is going to change the nature of work, and probably destroy forms of livelihood, then it should also be used for education -- to help our citizens to develop their full potential as human beings and their ability to contribute productively.
AI is such a diverse group of techniques and technologies, but public perception may be more limited to robotics. I think more education is necessary, and the fears about its adoption in everyday life will be lessened. Of course, there are real concerns over privacy and ethics in testing and training AI systems, which need the same level of research as the technology itself.
As an educator I see the benefits in de-mystifying the perceived power of AI techniques. There is an ideal opportunity for Ireland to accelerate development of solutions using AI due to the presence of many key companies in Ireland. The key to successful commercialization of AI solutions for the benefit of the Irish economy will need some work in terms of protection of novel data collection and processing methods.
AI is an unknown - therefore its implications are unknowable. Unless it is book-ended by strong ethical and impact informed supervision AI could be manipulated to damage the fabric of society and to exploit opportunities for an elite.
Education and skills underpin all factors, if people understand AI ethics etc will be better
I believe a national strategy should acknowledge the future jobs in the area and should plan for the future through eduction etc. the rest is for regulation.
The traditional IT principle "garbage in, garbage out" is even more important when it comes to the false security offered by AI. Much of its attractiveness will come from the proposition that it offers "truth", "fact", "understanding" etc. separate from the choices made in its construction and the quality and purposes of the data underlying it. It is a near-certainty that it will be used as a way to avoid thinking about difficult issues and to provide spuriously "objective" assessments etc. - its

contemporary use in disability assessment in the UK is a cautionary tale in this regard, but this will form much of its attractiveness to policymakers, bureaucrats and entrepreneurs.
An ethical debate does not seem to have been raised, this needs to be raised, and well publicised in all media. Consideration must be given to current, past and potential effects on the lowest common denominator (the ordinary public) of AI and other high tech.
[redacted] (www.ai-lawhub.com) [redacted], are concerned with the impact that the rapid deployment of AI and machine learning (ML) is having on equality rights of all kinds. We have been commissioned to work with Equinet to map the extent to which EU member states and also those that are in the Council of Europe are aware of the extent to which AI/ML can affect equality and what they are doing about it. Our report will be available in the new year. However one key point that has emerged is that there is not enough joined up thinking between National Human Rights Bodies, Equality Bodies and the Data Protection and other regulators such as competition and market authorities to consider the equality impact. There is a huge problem of biased data bases being used as the resource for AI/ML decisions and these are then leading to automatic decision making based on algorithms whcih had examined such data bases making decisions are based on these biases. In some cases this can lead to re-inforcing feedbacks when the results are added to the data bases. Another key point is that AI/ML decisions about pricing recruitment distribution of social advantages and other benefits can be very difficult to understand - this is the so called black box problem
Currently, multinational companies (Google, Amazon, Microsoft etc.) are pushing AI in every field without any regulations. People should understand that there are always inaccuracies, errors, bias (not-enough data or overfitting), false positives, false negatives, and misformulations exist, and will always exist inherently in AI applications. If the public (government) workers and regulators are not well-educated or feel inadequate to test, assess and regulate AI systems, then we as a society will have a serious problem. We should never be slaves of machines or software, and let them be in charge of the systems preventing (or without) human intervention. The latest crashes of Boing 737 MAX airplanes due to MCAS system showed us that the problem is not imminent anymore, it is actually happening in our daily lives. The technology should help the society, not chain them from their ankles or push them out of the system. We should be aware that becoming a Big Brother society is an imminent danger.
The term AI is used to refer to a multitude of different technologies. This makes it very diffcult for the general public to understand and therefore leaves them vulnerable in a digital world where personal data can be used to monitor their habits, influence their decisions and target their wallet!
Our platform uses secure artificial intelligence data analysis technology to support drug development and make disease treatment more efficient and secure. However without access to the right kinds of data artificial intelligence models are of limited value. To ensure data owners, end users, professionals and data subjects understand what artificial intelligence is and the benefits it can bring to society, and its varied used cases. It needs to be implemented in a transparent, secure, privacy preserving manner.
Great care should be taken when using the term AI as it can have many meanings. AI is a topic that is under active discussion in the legal sector, and there are detailed papers and analysis in development within the profession at a European level. Its use is becoming more prevalent in human rights, criminal justice systems and in court settings but there are also fundamental challenges associated

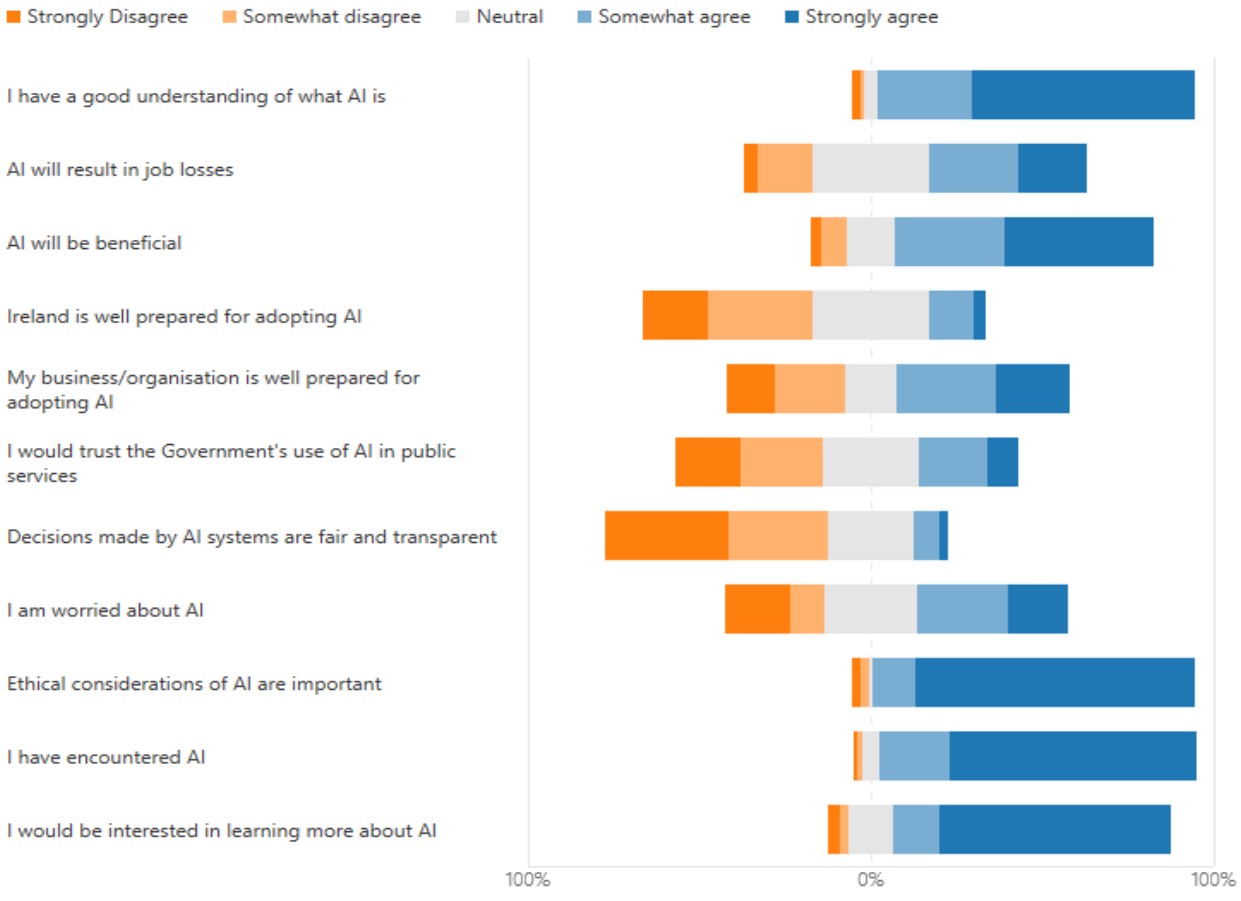
with AI. The challenges and opportunities arising from its use that need to be fully understood, e.g. right to privacy and data protection, right to a fair trial, right to freedom of expression and information.
Globally there are approximately 80 documents containing guidelines and principles for AI with most being published since 2016. Ireland has produced none and it is crucial that this is addressed in order to ensure that AI is used for social good in Ireland. It is important both that technology is developed for social good and also that Ireland takes a leading role in the development of digital policy.
I sell AI solutions to Enterprises and look forward to a future where there is a better Enterprise level understanding and agreement between IT Departments & Business Departments on the following: 1) the value of AI as a driver of operational efficiencies 2) how to procure and deploy AI solutions
Ireland has no advantage in the AI field, but can create the legal framework to make it profitable to run AI-centric companies from our jurisdiction. Think of it as an AI heaven instead of a tax heaven.
Legal issues arise in use of Ai and this is on going in some countries. We need to adopt with care and consider these issues in light of the regulatory background.
I am aware of the potential benefits of AI, however considering the lack of legislation, or retroactive legislation re: digital engagement, data protection/gathering and the relationship between our government and tech giants, I would be extremely concerned about another genie having to be ineffectively put into the bottle on this issue down the line. Frameworks, ethics considerations and strong legislation should be in place from the start, as well as education for the public and for TDs who will vote on it when it comes to the floor.
I just focused on the key issues that the Strategy should include. All are important but some are already addressed within other organisations.
AI is one of the most important pieces of technology for Insurance Industry. The key point is how it is applied and embeeded in the sector in view of current regulatory and policy requirements. There is question about availability of required data to drive AI applications and have proper governance in place to remove any biases from alogarthmic point of view. There is big demand to nurture local talent in this area as well, and relevant programmes and courses at Irish academic institutions will help in driving forward this agenda. Future is connected and smart society and with all the above in place, AI could deliver the desired outcome.
The deployment of AI is currently only on narrowly defined use cases (data categorization, recommendations, improving search, conversational AI etc) and that will remain for the next ~5 years, there is a big opportunity for Ireland to remain current in the evolution but in order to punch above its weight the nation will need to teach young minds the fundamentals for maths, computer science and attract high skilled talent from over the globe. Ireland needs to focus on making the country a rich place to create and research AI, currently there isn't a volume of leading edge research papers and shared code from Ireland, we can change this by deep partnerships with say Toronto University, ETH Zurich and other leading research hubs. Setting up transfer between students would facilitate a strong bond with a leading University powerhouses in Machine Learning and Irish University education.

Leading edge privacy is also important since data protection has been slightly ignored by technology companies and Ireland should be at the table for best practices in this regard. The public should feel assured and trust they have power over their data and if it is being used to improve AI models for the greater good of other members of the public. Creating hubs of innovation throughout Ireland is also important and I think revamping business parks could be explored, times have changed and using autonomous EV buses and making a business park an enjoyable place to work could unlock a big potential talent force in rural Ireland. This would require better digital infrastructure and tools to facilitate non-local team collaboration. AI is a complex topic and there are new impactful applications of the technology almost everyday, 'AI Literacy' should be tackled by highlighting how AI is applied in every day life and dig deeper into what 'AI' means. Most people need to be shown the progress of the field and now mathematics is at the core of its functioning.
Most of the items at point 2 apply here. I just added AI interpretability matters, which is a pretty hot topic in AI and on which front I am active at the moment. Glad to be of help there. I skipped from the list at point 2 the data protection, as it is already covered enough by the EU current and i believe there's no need to spend time and resources adding more.
All these areas, and others are important to consider when looking at how AI tools are applied, but there is a risk of moral panic reifying problems which don't really exist regarding what we are now calling AI. Data protection is obviously important, but that is covered by GDPR legislation, it is vital that we do not allow for discrimination, but this is already covered by the equal status acts. What is important regarding AI is how these tools are used, and that the users/developers know their limitations. Thereafter it will be important for them to monitor these tools for error, and adapt them to prevent these limitations becoming manifest (just as they would any other IT tool) - ultimately individuals, companies, and organisations will be liable if they use bad AI-tools, or misapply them in ways that are unfair to others, simply because the causal element is software will not protect them from liability. If government chooses to regulate in such a way that it regulates the technology, rather than the application of that technology we risk stalling local efforts in the field of AI, and consequently Ireland will be dependent on AI tools that are trained on datasets that originate in other populations, and so will contain the biases associated with those populations without controlling for the biases in our home population.
AI has become increasingly prominent in the legal and modern world and now poses a significant challenge to the traditional concept of human rights. The increased capacity of machines to replicate human cognitive function has created a conflict between human rights and non-human rights similar to but not identical to the conflict between human and non- human animal rights. This area of AI and liability challenges is definitely an issue of particular importance that I feel a National Artificial Intelligence (AI) Strategy should address. Who is legally responsible if AI causes harm? In this respect lets consider AI and automation – if an automated car hits a pedestrian and kills

them who is liable in law? Article 2 of the Human Rights Act protects your right to life. Essentially everyone's right to life is protected by law. So, who will be liable for the death of the pedestrian in these circumstances? The owner of the AI, the creator of the AI, or the AI itself? The rise of AI means the judiciary will soon be faced with questions of this nature. Further consideration must also be given by a National Artificial Intelligence (AI) Strategy to issues arising between AI and IP law. IP law places human initiative at its core. Can AI own copyright to artistic works they create? Should law consider them as individuals? Current law cannot vest ownership of the copyrights to an AI, as it is not 'human'. However, the laws of the United Kingdom make express provision for copyright-generated works and introduce the following definition: 'works generated by a computer in circumstances such that there is no human author'. The copyright in such works under UK law vests in 'the person by whom the arrangements necessary for the creation of the work are undertaken'. Therefore, the person still owns the copyright. We must consider the conflict with the right to property. Currently the right to own property is a human right for natural persons and will be owned by a legal person. If AI becomes a legal person will a conflict arise here? Lastly, I feel a National Artificial Intelligence (AI) Strategy should address concerns around the rise of AI and employment law? AI poses a number of problems for employment law. Workers use virtual or augmented reality as part of training, education systems are being changed to ensure the next generation are capable of working effectively alongside artificial intelligence and AI is fast becoming a regular feature in the workplace. Has this created an appetite amongst larger employers for younger employees who have had access to IT related training? Is there potential here for a violation of Article 14 of the Human Rights Act – the right to be free from discrimination. The thesis will also explore how AI can assist employers who are considering dismissing an employee. Does employee surveillance and tracking threaten an individual's right to a private life?
The INOU is concerned that the changing nature of work, in particular digitalisation, could have a detrimental effect on people more distant from the labour market, and reduce their capacity to secure and maintain economic independence. So, it will be critically important to map out the potential impacts and ascertain how best to address these developments so that they do not exacerbate socio-economic exclusion. Ireland must plan for the employment impacts of artificial intelligence: the job losses and gains and ensure the people affected gain access to decent employment.
We believe that all of: Trust and Cybersecurity; Data Protection and Privacy; and Telecommunications and digital infrastructure are extremely relevant to AI but are better dealt with under their own respective National Strategies.
The progression from regular use of data in business (i.e. from data capture to data analysis & reporting) to AI is a major paradigm shift in both understanding and implementation. Organisations need to understand where they are on a 'data maturity' curve before they consider AI. Some new companies will be born in AI and their entire business model will be based on either using AI to deliver value or developing AI related products and services to enable others to deliver value.

Intelligence brings moral and empathy into the equation. Worse than imoralism or moralism is amoralism and in it's worst form, psichopaty. Never forget the three laws of robotics, a benchmark for non-living (and non-dying) moral
AI will influence all aspects of life in the coming years and as such a national strategy must cover all potential areas of impact.

Question 4- Please indicate the level to which you agree with the following statements



Question 5- If you have any additional information related to AI research, development or policy, or recommendations for the use of AI that you believe the Government should consider, please provide details

An introductory pilot programme could be implemented in some State Departments e.g. chatbots/virtual assisatants to answer basic questions in the areas of social welfare/protection, health etc. eradicating lengthy public waiting periods for answers to basic questions. This would improve relations and systems in both of these Departments.
I would be interested in actively participating in the development of the National AI Strategy
I [redacted] believe that standards in AI are core to any National Strategy in Artificial Intelligence. There is a vast expertise in AI and AI standards now within SFI Research Centres, Large and Small Enterprise, Government Agencies and National Standards Authority of Ireland. A coalition of such expertise with the aim of understanding, supporting, developing and regulating AI with the foundational ethos of "AI must do no harm" like the medical hippocratic oath would be a sound starting point.
AI will be a leading technology in the next 30 years and countries are making significant investments eg MIT in Boston announced a $1billion AI campus. Ireland needs to make a strategic investment in AI and make Ireland a great place to develop & commercialise the core IP in the space.
[redacted] the H2020 proposal [redacted] "democratizing AI research". This is a Citizen Science proposal aimed to foster dialogue between AI experts and citizens. We have a particular focus on the inclusion of "hard to reach" public, typically people from low SES background and women. The rationale is to counter the potentially harmful social consequences of AI, i.e. benefits for some of the population but leaving some behind. [redacted] Regards
AI must serve humanity not replace it. Strong controls must be enforced to ensure benefits accrue from AI and inappropriate applications are limited. Human decision making must be supported not replaced by AI. AI must be subservient to sustainability also.
Most accountants will see AI as an opportunity to improve the quality of their work – it will save them time and money by interrogating data in a more efficient manner. In fact we know that many accountants are already using AI techniques in the area of auditing, financial reporting and customer service. We don't believe that AI systems will replicate human intelligence as there will always be a need for human judgement. Accountants will however need to be skilled to enable them to work alongside AI and understand how AI can solve accounting problems. AI initiatives need to be further supported by the Government by a nationwide literacy campaign to promote awareness and build trust, and to help organisations, especially smaller businesses, to retrofit their offices with AI technology and support systems. To further add priorities for the accountancy sector, AI can help accountants in three areas:

1. Providing more usable data to support decision-making (for example automatic coding of accounting entries, forecasting revenues, fraud detection techniques); 2. Generating patterns and insights by analysing data more efficiently; 3. Pave the way for smarter working – accountants can devote more time to decision-making, forward planning, advising, forecasting and strategy.
To do a good job in a national strategy we need at least three things: 1. a clear picture of what is AI and what is not; 2. what is the goal -- the economy versus society, home-grown versus FDI, Ireland versus the rest of the world; 3. fully understand existing strategies and build on them before inventing new strategies -- these include existing EU law and strategy, EU funding bodies' strategy, existing research/industry bodies such as CLAIRE and FATML, US strategy, and also existing relevant Irish strategy eg on telecommunications and education.
I believe that AI feels remote to many people and ways should be found to make it more knowable for the general public. If this isn't done soon, there is the risk of a backlash and the positive efficiency benefits of AI will be delayed.
The government should not seek commercial business partners in this endeavour where the risk of data exploitation is high.
The Irish funding situation for basic research in AI and its enabling technologies (machine learning, related areas of maths like matrix theory and dynamic systems, and enabling areas of computer science like programming languages for AI) is dreadful. The pipeline needs to be broadened at all levels, with care taken to avoid increasing the effort spent on administration and instead allow the scientists to do research, and to mentor.
We need to bring AI experts to Ireland. These means bringing them into universities and encouraging tech multinationals to do their research in Ireland. AI is complex - it requires sophisticated infrastructure. It's not going to happen without the right people. If you're not bringing world leaders to Ireland, it's just nonsense.
Ireland could have a key role to play in development and roll-out of AI in some key (vertical) sector areas and key technology/application (horizontal) areas. These could revolve around Health-care, Food, Climate-Environment, Mobility & Infrastructure
AI will result in job losses as a question above, is misleading because there is no balancing question asking whether I believe that AI will create jobs, which it will. So yes, AI will lead to job losses but it will also create new jobs. A major impediment to implementing any AI strategy in any country is the development of AI expertise at all levels, right across the board, as is realised in some other EU countries like Finland. At the lowest level, this would demystify AI, make it accessible, address the public push back which might turn into a backlash against AI which comes from mistrust, and misinformed. It would range from “AI low” which would address terminology, language and jargon and improve AI literacy and be part of lifelong learning, right up to AI high like in the SFI CRTs where we already have activities in place. it should include SMEs, and businesses and for this there is a role for Enterprise Ireland. The lack of engagement with our EU partners in the AI strategy consultation documents is a serious worry. The major developments in AI have all been done as a result of collaborations. We cannot develop our own AI in Ireland if we are working alone, we can only be part of leadership roles and

activities when we are part of larger teams across nations, with our EU partners. Even with the investment of public funds in our research centres and third level institutions in the broad areas of AI, there is a much much larger amount of AI research carried out in Ireland in the corporate sector, mostly in multinationals. This is carried out behind closed doors and takes advantage of public investment in education AI expertise. Its time to pay back, and one way to do this which is a carrot rather than a stick, is to fund part-engagement of AI researchers from industry to work in our third level institutions or directly in the public sector. The lack of public funding for incorporation of AI into the public sector continues to be a major policy mistake. In other jurisdictions, especially the UK, publicly funded AI research is not only encouraged but mandated to collaborate and work with the public sector. This helps the researchers as they focus on real world problems and develop AI talent which is better quality, it helps the public sector improve its effectiveness and it is cost-effective because incorporation of AI in the public sector is not delivered exclusively by consultancy and technology firms, as is the case now. The recent announcement of the SFI program for publicly funded researchers to work in the public sector is small scale and minor and a complete re-think on this is needed, as some of us have argued for some years. An AI strategy should include a “moonshot project”. Ireland cannot do health because we do not have the personal data, unlike somewhere like Australia which has Data61. Such a moonshot project should be around food / energy / water and the nexus around those topics and because this is the case of Ireland should focus on agriculture and climate change. There should be a consultation like what led to the formation of SFI in the early 2000s. The moonshot should be around collating public and sustainable data, cleaned and available.
Please visit openlittermap.com, we are developing a superior data collection experience that can involve millions of people in citizen science for the first time. Soon we will be able to achieve global open datasets of pollution in minutes. In the UK there is support for native companies, in the US there is support for native companies, but in Ireland there is no support yet. I was hoping to apply for DTIF but its restrictive and exclusionary.
Education and especially fundamental research will ensure Ireland has the greatest impact on the future of AI.
From Google research: The European Commission has appointed 52 Experts to a High Level Expert Group on Artificial intelligence comprising represesantatives from academia, civial society as well as industry. More details can be found at https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence Ireland needs to do the something similar to assist with the development of its own National Strategy on Artificial Intelligence. Ordinary civil servants do not have the expertise or knowledge to develop a compreshesive AI Strategy that would address all of ethical, education and other considerations. In addition the Education & Training 2020 Working Group on Digital Education: Learning. Teaching and Assessment is currently consideraing some key messages on Artifical Intelligence in Education.

More info can be found at https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-working-groups_en.
At present there is a significant challenge for our country, which is the brain drain from academia to industry to fill jobs around data, analytics and "AI". Leading academics who stay in academia are increasingly focused on short-term industry projects which have little to do with pushing the boundaries of true AI. And it is becoming increasingly challenging to recruit students into PhD and post doctoral positions and academic positions due to the huge disparity between industry and academic salaries. Medium to long-term this is going to have devastating consequences for our capacity as a nation to underpin the future economy which will be increasingly dependent upon true AI and associated technologies, which have yet to be invented through fundamental/basic research. From a strategic standpoint then we also need to develop true AI, and not the narrow media and populist perspective of AI which is comes from a subset of subset of the field of AI (i.e., Machine Learning (ML) is a subset of AI, and deep learning/neural nets are a subset of ML). It is only though the wider perspective and pushing towards the grand challenge of artificial general intelligence that really significant and transformational developments will occur for our society.
When AI "goes bad" it creates immense public dissatisfaction and creates many more barriers. Racial bias in training systems, collecting data unknowingly from citizens, etc. are rightfully creating skepticism among the public.
AI is only as good as the teacher who trains it... choose those teachers (who you give R&D funding to) wisely! i.e. some will work to benefit the Irish economy and others will give all the valuable IP away for free.
There is a danger that AI is delegated to the ICT sector. In that way, exclusion is exacerbated and society does not gain from the potential benefit of AI.
link to numeracy and statistics. Generally AI is 'learning' through large data sets . To know if inferences are correct mathematical literacy is essential. Not sure if AI is always best term though I know it is well used/
Government should first and foremost have an ethical debate on AI and wider high tech issues (and the government's and EU's record on ethical debates in the past is not good, for example in regards to Irish Water and, more recently, in regards to rural broadband - there appear to be plans to push this through, seemingly without an ethical debate, and without considering how this could benefit multinational corporations, big business and high tech businesses primarily) ... for a fair debate, the government should not consult exclusively with those who develop or have developed the technology, the government should not (before the debates) already have concluded that AI is a good thing, that it is inevitable, and that it could be put in place widely, as that makes the debate useless. Evidence already exists that AI is failing, and is profit motivated... its eventual failure however, does not prevent it from doing a lot of damage before it does fail.

An ethical debate must be initiated and must include the voices of those with suppoedly "unpopular" opinions, e.g. ethicists and philosophers, many respected academics, scholars and even tech entrepreneurs have already highlighted the profit and ego motives of various high tech businesses (e-commerce, robotics, space colonisation programmes, VR, etc). It must be born in mind that high tech entrepreneurs have their own thinkers, philosophers and scientists (Ayn Rand, Alan Greenspan, Michio Kaku) whose philosophies, ideas and arguments motivate their often unethical and potentially unethical actions. Recommended reading: "Falter: Has the human game begun to play itself out?", Bill McKibben (envrionmentalist academic), 2019 "The Internet is not the Answer", by Andrew Keen (former tech entrepreneur), 2013 Available in Irish public libraries. It must be born in mind that, in a true democracy, technological change is not inevitable, since the public is to decide its own future, and can reverse any changes it wishes to, if it so decides, via votes and political action, not via the market. To say or think otherwise is to oppose democracy. Thank you for your time taken in reading this.
We need to be careful in adopting these revolutionary technologies. Is there a risk that we are creating machines that will enslave us? I know reputable experts who believe that is exactly what is going to happen.
Please examine our website for more information. We have recently published a newsletter explaining some of the equality issues of whcih we are aware including our opinion for the UK's Legal Education Foundation. This can be seen here https://ai-lawhub.com/april-2019/ and the Opinion published last month can be seen here https://www.cloisters.com/wp-content/uploads/2019/10/Open-opinion-pdf-version-1.pdf
The government of Norway produced an online course to inform their citizens about AI, this may be something worth considering: https://www.elementsofai.com/
We are very focused on the creation of explainable artificial intelligence models to support advances in healthcare and to develop a greater understanding of human wellbeing and human characteristics.
The CCBE (European Lawyers European Body) is due to publish a report in the coming weeks on considerations on the legal aspects of complex algorithms and artificial intelligence. When published, I would be happy to share it.
The government should consider investment in humanities based AI research. Cross disciplinary teams are the next step in the development of AI and Ireland would be strategically ahead if we invested in AI research within the context of humanities research.

I have research coupled with and a practical working knowledge of how organizations: 1) can deploy AI-Driven Sales Messaging to greatly increase sales and marketing operational efficiencies 2) improve information transparency in the sales and marketing industry 3) improve decision making in the sales and marketing industry
I suggest the government representatives sit down with me and my colleagues to discuss ways forward in leveraging the AI opportunity in the next 2-10 years.
various legal bodies are publishing work on this inc ITechLaw recent book (I have a spare if needed !). Apologies for the brevity here but I just heard about this today and it's deadline day.
Data, and data science skills are key to the development of AI. Ireland can prove itself on the global stage and complete with the best but the strategy and collective effort is critical.
AI seems to be at initital stages but got a bright future. The challenge is to ensure that it has got a human-centric approach and proper ethical requirements while designing, developing and implementing AI solutions. Another area to be mindful of is around data protection and privacy. Transparency is paramount to ensure AI is not biased for exmaple customers interacting with a company/ buying a product should be aware of their interaction with AI systems. Academic institutions like UCD - Ceadar and DCU are working in AI research which is quite relevant to Insurance sector/ financial services.
There are many social, educational, economic and ethical considerations which I feel have not been discussed in a public forum, that could have both negative and positive consequences for our society, and which require expert opinion, further research, public consultation, and wider debate. I hope that the development of a National Strategy on AI will enable this.
I have a lot of experience with AI [redacted] There are some areas the Irish Government could win big with the facilitation of adoption and understanding of AI. The first big thing you could do is support modern datacenters to support cloud compute, this would also allow users to run AI modeling cheaply without the need for expensive hardware. Again getting AI in the hands of innovators should be a big priority. Support of staffing taking on a AI focused project while in FT work should also be looked into, there is huge value in existing talent working on other things and Gov support to allow people to explore their ideas should be encouraged.
Whatever AI initiative you are going to shape, please take into account the good and bad outcomes both. I am pretty tired to hear debates about AI where, for example, people complain about job losses, but no one points to the possibility of new jobs creation. It isn't fair to make decisions on AI strategies just considering catastrophic scenarios. Please also involve real AI experts (and possibly coming also from the industry and not only from the academy) when deciding about regulations: otherwise you are going to make day-to-day job of professionals like me really hard and stop the progress and all of the outcomes it could potentially bring to people. This to me is becoming an issue in the EU, much less in other geographic areas, and could also divert investments elsewhere. Please do also something about the house crisis as it would soon stop (it is happening) AI talents from the rest of Europe to move to Ireland.

This survey largely ignores the displacement elements of AI, there needs to be a sector by sector automation vulnerability analysis conducted so that the National Training Fund can preemptively target those working in vulnerable sectors with training options to allow them to up-skill and retrain.

There needs to be an educational effort made to demystify what AI tools can do, and what their limitations are. This will be important for consumers, businesses and officials as all are likely to be targeted by unethical actors that will be promoting products that are founded on fictions, 'caveat emptor' is particularly relevant to AI-tools.

Just like other IT-tools, AI-tools will be used to automate things that people already do, so that they can focus on the important elements of their work, when people are choosing to apply these tools they are responsible for their choices. It is important that a regulatory framework that looks towards AI does not absolve them of their responsibilities to apply these tools wisely and appropriately.

A real risk associated with over-regulating the sector, is that such regulations will become a perfunctory check list, and that meeting those requirements will be a sufficient defence to claim that due diligence was conducted even where such regulation has not been able to keep pace with the range of tools available to those working in the field, and even if the appropriate use of AI-tools involves regularly monitoring their behaviour to identify their deficiencies, because they are essentially fallible tools which give probabilistic results not certain ones.

As AI-tools are probabilistic tools (much like with medical screening) they will always give a certain percentage of false positives, and another percentage of false negatives. Deciding what the tolerance for these errors will be requires a person judgement which is founded on the likelihood of that form of error, and the costs associated with getting it wrong. Where these costs or risks of making such an error cannot be borne (say at the individual child level with regard to child protection services - https://www.communitycare.co.uk/2018/03/29/artificial-intelligence-childrens-services-ethical-practical-issues/), then that's an area where it is inappropriate to use AI tools.

Individuals need to know these aspects to AI-tools before they choose to use them, and they need to bear responsibility for applying them in that way.

- There is a real danger that AI will exacerbate inequalities within society, given that AI is learning from the world around it and it is a world with significant structural inequalities. To that end considerable work must be done to ensure that “Decisions made by AI systems are fair and transparent”.
- Though human systems can be deeply flawed, there can be a level of discretion that gives people who lives do not fit neatly into the parameters of a particular scheme / support access to what they need when they need it. Will AI be able to accommodate such dilemmas or will vulnerable people find themselves in a more precarious place? Automation and streamlining have certainly had that effect.
- Data plays an increasing role in people’s lives, and often without them fully realising it through personal devices and related on-line facilities. GDPR has brought to people’s attention the right to know what is known about them, by whom and to what end. AI is as good or as bad as the data it can draw on, with good data, and serious efforts made to address bias, AI could play a role in addressing socio-economic inequalities. However, with poor data, and ingrained bias AI could play a negative

role. It is this role that many people fear, in particular people whose experience of the system is one of exclusion. - A challenge facing the state is how to design systems that people living in the state perceive and experience as being there for them when they need them. An integral part of getting such systems right is the need for good and accurate data and to ensure this, requires improved engagement between the public and the state. The Public Service Card debates highlight the extent of the work to be done and indeed the harm to be undone.
Embracing AI should be a priority for industry in general, however most of the companies consider it but only a small percentage is investing resources in doing so. This is an informed vision of the ecosystem from my perspective as I constantly interact with companies and develop AI projects. Data science is not the first priority for many of them yet, and typically engage with us, CeADAR, to leverage national funding. There is still a need to fully educate industry in the benefits of AI. I believe rapid access to funding for industry is key to help companies start embracing AI, which in turn will have a positive effect in 5 years for Ireland as a centre of innovation in Europe and world wide.
Further AI research is needed to drive the understanding of complex machine learning processing to ensure it can be applied in a safe, transparent and controlled manner, in an algorithm-appropriate problem space and without harm or detrimental impact to individuals when deployed and utilised in the complex circumstances and environments that people live in. At the same time, it should be remembered that not all problems require an AI solution, or obtain maximum benefit from an AI approach. Alternative solutions to complex problem solving may exist and these need to be understood and developed too. AI's apparent dependence on very large volumes of "real world" data (organisations sometimes say that "we must have more data to make it work better") and narrow problem focus can present risks to individuals rights and freedoms and provide ground for unintended consequences. But, the responsibility, necessity and proportionality of choosing an AI approach, that presents such questions, should be determined based on fact and evidence rather than on hypothesis. Research and development is therefore needed including firstly on the application, techniques and limits of machine, data and algorithmic driven decision making and secondly on the "out-of-lab" experience when these technologies are deployed in everyday life and requires "explainability" and accountability. At the same time, research should be promoted on the development of alternative computational problem solving (for example the application of genetic algorithms) that may be better suited to complex, evolutionary or incrementally changing complex systems like everyday living - and that may solve problems without risking individuals rights or freedoms. The public sector, sometimes a high profile bellweather of technology usage and as an organisation with direct impact on citizens daily lives, will of course approach adoption of any AI or machine learning technology while considering risk management, responsibility and accountability. Data protection by design and default should also be a part of the decision making process that leads to such adoption. It may be tempting within the public and private sectors to direct use of AI and machine learning using personal data to driving efficiencies and opportunities in delivering outputs, pattern recognition

or human centred outcomes for problems. As with adoption of any new and evolving technology, minimising risk may be served by limiting this to problems that are well defined, well understood and where the benefits of automation in such discrete and limited problem solving has tested, demonstrable, explainable and justifiable outcomes. In any case, the use of personal data and the impacts on the rights of individuals requires consideration when choosing AI solutions. Deploying AI in public services areas such as the judiciary, care and welfare of the vulnerable, or law enforcement will likely need particular attention and careful consideration because of sensitivities or intimacies of circumstances, and the possible life-changing, significant or societal impacts.

Whether AI is being considered as processing method involving personal data, its use should include:
• The goal of centring AI data processing operations (including those involving personal data) on delivering results that can be demonstrably and reliably trusted
• effective and systematic transparency measures, including intelligibility for data subjects
• use of personal data that is permitted, reliable and accurate and where that reliability and accuracy can be maintained
• mitigation of risks of algorithmic or output interference or influence that could diminish effectiveness
• effective leverage of state-of-the-art implementations and standards
• processing that is necessary and proportionate means to obtain a human-rights respecting solution
• "cost" effectiveness measurement that includes regard for human rights
• implementation and use of effective controls and measures that allow for human intervention and graduated responses arising from any machine driven decision making.
• regard for applicable legislation, including GDPR and ePrivacy
• regard for the declaration by the ICDPPC on artificial intelligence, including the considerations of accountability, ethics and human dignity. [see https://icdppc.org/wp-content/uploads/2018/10/20180922_ICDPPC-40th_AI-Declaration_ADOPTED.pdf]

Certification & Codes
The General Data Protection Regulation requires data protection authorities to promote accredited certification schemes and codes of conduct that allow data controllers to demonstrate their processing operations are compliant. By following such schemes and codes, data controllers may further gain the trust of their users and may also help data protection authorities to understand how they compliantly process personal data. This can be especially helpful and advantageous where complex AI usage is an element of data processing operations and where its outcomes may lead to decisions that have impact or a risk to individuals. It is possible these risks can be significant in some cases and that this could lead to bias, discrimination or a limitation of rights.

Therefore, structured consideration of risk using certification schemes or codes of conduct, that may reduce or eliminate the possibility of this occurrence, that more generally allow risk to be recognised and effectively managed and that allow demonstration of GDPR compliance is important. Organisations, other stakeholders and individuals could be encouraged to come together to define these certification schemes and codes of conduct in order to drive efficient, responsible, accountable and ethical AI data processing that can be independently and effectively certified to international and Irish standards related to the protection and security of personal data involved in training, testing,

and application of AI algorithms, models and systems. Ethics Ethics and data protection obligations can be mutually complementary but are separate. Use of AI, no matter how ethically responsible, cannot be compliant with data protection regulations if the personal data being used during modelling or live use is not collected and processed lawfully, transparently, fairly, securely and where people can exercise their rights. Ethical conversations and reflections that take place about complex systems such as AI help to shape governance questions around personal data processing, bias, vulnerable people, harm, risk and impact. Ethics, diversity and human rights issues can drive the course of societal norms and may reflect cultural and philosophical standards. So, these conversations can not only drive questions within organisations about "should we use AI in this way?" but also influence legislative change and may reflect ethical standing in a globally connected and diverse world. In complement, good data protection governance and compliance, with its basis in fundamental human rights and principles, can assist in meeting ethical standards and decision making. Artificial intelligence should not be pursued to the detriment of human privacy and dignity, reinforce bad stereotypes, social or cultural bias, promote exclusion or restriction, emotional manipulation or contribute to threats to society and its institutions.
We present a summary below, taken from the SFI website at https://www.sfi.ie/research-news/stories/ai/. *Science Foundation Ireland's Strategy for AI addresses (1) difficulties in recruiting and retaining talent in AI; (2) the disjointedness of the national research and innovation system, with a lack of full visibility of the AI research landscape in Ireland; and (3) issues relating to affordable access to high-performance cloud-based computer infrastructure for research. We would be glad to provide more information if desired. *Ireland has strengths in AI research, and many of its researchers have been globally recognised for their achievements. SFI predominantly funds AI research in Computer Science, and supports several Centres, Investigators and projects in that area. *At its heart, AI research and development needs excellent software, and this is a focus at Lero, the SFI Research Centre for Irish Software. Headquartered at the University of Limerick, its 200 researchers work all around Ireland and they cover a wide range of software development related to AI, including automation, driverless cars and cybersecurity. *What other areas of AI research does SFI support? Under the general umbrella of AI, one field of research seeks to render objects as data, so that a computer can find and read easily. This is known as knowledge representation, and it is a strength of researchers at the Insight Data Analytics SFI Research Centre NUI Galway. They are looking to link information in the web in new ways based on aspects that web pages have in common and this 'semantic web' should make it easier to find information online that we or machines need. *AI is also important for planning, reasoning and scheduling, and this in turn enables robotic devices or components and automatic services to run smoothly, effectively and safely. Researchers at Insight Data Analytics SFI Research Centre in University College Cork have made great strides in this area, particularly around how to harness or constrain AI activities to make them more efficient. *Machine Learning is a term commonly used in AI. This is where computer algorithms or programs can improve automatically through experience. The Insight Data Analytics SFI Research Centre at University College Dublin is developing new supervised and unsupervised learning programs to make

computers, machines and robots better at learning the tasks they are set to do. *How humans interact with AI is an increasingly important field of research, particularly now that voice-activated devices are becoming common in homes, phones and cars. Meanwhile, machines are getting better at sensing the environment around them through connected sensors and facial and voice recognition. Researchers at Connect, the SFI Research Centre for Future Networks and SFI Research Centre ADAPT are exploring how to make information more usable for AI and more useful for humans, particularly on the web. *SFI supports many other facets of AI research too, including improved AI for the manufacturing industry in the Confirm, the SFI Research Centre for Smart Manufacturing, for the dairy industry in the VistaMilk SFI Research Centre, on pasture-based farming in the CONSUS Strategic Partnership and on ethics across numerous centres. *SFI has funded six Centres for Research Training focused on the training of 700 postgraduate students in the areas of data and ICT skills. Students will be trained in emerging technologies such as AI, Machine learning and genomics, and will ensure a pipeline of highly trained, well-networked research talent. *SFI is working together with the IDA on the development of a co-funded partnership between industry and academia also involving government on data governance.
The government and local authorities are in control of vasts amount of data covering all aspects of Irish life from tax, health, social services, transport, census (to name but a few). Efforts should be made to future OpenData to release more data for AI training (GDPR notwithstanding). New businesses ans services (ie jobs) can emerge from access to the public data.
PwC has a vast range of research in the area of AI's impact on society, environment and the economy, including a survey of 100 Irish business leaders and AI practitioners (both public and private sector). We have also developed a responsible AI framework