

Quinquennial Review of The Alan Turing Institute

September 2023

And

Written forewords and response to review from The Alan Turing Institute and EPSRC

March 2024

Version Control

Version	Changes	Authorised	Date
V1	N/A	EPSRC	31/10/2023
V1.1	Edits made according to feedback from all panel members	EPSRC	24/11/2023
V2.0	Edits to main text	EPSRC	08/12/2023
V2.1	Final Edits to main text before proof reading	EPSRC	11/12/2023
V2.1P	Text proof read	EPSRC	15/12/2023
V3.0	Final Draft	EPSRC	18/12/2023
FINAL	Minor amendments following review by panel Chair.	EPSRC	20/12/2023
Addendum	Written responses from Institute and EPSRC added	EPSRC	01/03/2024

Approvals

QQR Panel (Sign off main QQR text)	Nick Jennings, Panel Chair	Date 19/12/23
EPSRC (Sign off main text and forewords)	Kedar Pandya, SRO	Date 01/03/2024

Contents

The Alan Turing Institute written foreword and response to review.....	3
EPSRC written forewords and response to review.	4
1. Executive summary.....	5
2. Background and review process	9
2.1 The review process.....	9
2.2 The national institute for data science and AI.....	10
2.3 The Turing 2.0 Strategy	12
2.4 The funding model	13
3. Journey to the recommendations	14
3.1 General feedback.....	14
3.2 Quality of the programme.....	14
3.3 Overarching vision, ambition, impacts and strategy.....	16
3.4 Leadership and management.....	17
3.5 Added value, including on impact and advocacy	19
3.5.1 Connecting with stakeholders	19
3.5.2 People, talent and skills, EDI, responsible research and innovation, ethics and policy	21
4. Prioritised recommendations.....	23
5. Conclusions and future funding scenarios.....	29
6. Alan Turing Institute written response	30
7. EPSRC written response	30
8. Acknowledgements.....	30
9. List of Annexes	30
Annex 1 - QQR panel terms of reference	31
Annex 2 - QQR panel membership.....	34
Annex 3 - QQR panel assessment criteria.....	35
Annex 4 - QQR methodology overview	36
Annex 5 – Interviewees list.....	37
Annex 6 - Governance and Funding Assurance audits summary	40
Annex 7 - Overview of the Alan Turing Institute.....	42

The Alan Turing Institute written foreword and response to review.

On behalf of The Alan Turing Institute and its community, I would like to thank the Quinquennial Review (QQR) Panel for their diligent review, and EPSRC for its management throughout the process.

On receiving the report, we were pleased to see that the independent expert panel review saw '*strong evidence of the high-quality and impactful research work carried out by the Institute to date*'. The panel also recognised that the Turing is delivering research that is additive to the UK data science and AI landscape, which has '*supported the Institute in building and maintaining its international standing ... and the reputation of the UK as a world leader in AI*'. This review provides the confidence for the Turing as we progress towards implementing the Turing 2.0 Strategy and embedding the new Grand Challenge approach.

We also welcome the valuable recommendations and opportunities for improvement that were identified in the Panel's final report. The funding conditions outlined are already being actively addressed by the Turing's Board of Trustees and Executive Leadership Team, with support from the entire Turing community. The most crucial condition identified in the report was the need for the governance structure of the Institute to evolve. I am pleased to share that the Institute's constitutional documents have now been significantly updated and streamlined, in line with the requirements of EPSRC and the QQR panel, signifying a major step towards the Turing acting as a truly national institute in the interests of the whole UK ecosystem.

I am delighted by the panel's recommendation for a further five years of funding for The Alan Turing Institute. This represents a significant step towards long-term sustainability for the Institute and will enable the Turing to plan for and deliver on the ambitions set out in our strategy for Turing 2.0. We greatly look forward to working with partners to harness the collective talent of the community and push the boundaries of data science and AI for the public good.

Dr Jean Innes
CEO, The Alan Turing Institute

EPSRC written forewords and response to review.

On behalf of EPSRC, as SRO, I thank the panel for their insight and diligence during the review and for producing a fair and impartial report, with clear recommendations. I also thank the executives and staff of the Turing and from across UKRI, alongside all interviewees, for their help, support, and open discussions with the panel.

I am pleased that the panel recognised the excellent work done by the Turing since its inception and identified the clear value that a national institute provides within the UK's AI Research and Innovation ecosystem. This is particularly recognised within the vision and aspirations of the Turing 2.0 strategy. In this new phase, the Turing has an important role to play in contributing to the UK Government's priorities and utilising AI and data science to drive forward research, economic and societal impacts, working through focused programmes framed by major Grand Challenges.

EPSRC welcomes the conditions and recommendations identified by the panel and recognises their importance in guiding the next phase of the Institute. A plan of action is in place, with a number of changes either made or in train that actively respond to these aspects of the QQR report.

Clarity on long-term public sector funding for the Turing is an essential finding of the QQR, providing certainty and freedom to respond in a fast-moving landscape. EPSRC is working with the Turing to implement a funding model in the spirit intended by the QQR, that allows the Turing to deliver on its strategy and act as a fully national institute. This certainty of funding will enable the Turing to develop and articulate focused programmes within their three Grand Challenges. EPSRC welcomes the steer from the panel for the Turing to continue to build consensus on the evolving features of a national Institute for AI and data science and its position within the wider ecosystem. This will be done in a way that demonstrates clear alignment with other activities, such that the UK's investments in AI are optimised to deliver maximum value.

As SRO I look forward to the next five years of working with the Turing to help it deliver an outstanding contribution across the UK, within an international context.

Dr Kedar Pandya

Executive Director, Cross-Council Programmes, EPSRC

1. Executive summary

This report presents the conclusions and recommendations of the quinquennial review (hereafter QQR) panel to UK Research and Innovation – Engineering & Physical Sciences Research Council (hereafter UKRI-EPSC) on the Alan Turing Institute (hereafter ‘the Institute’).

The independent expert panel received inputs from the Institute and stakeholders across the UK and international landscape. The panel wishes to thank the Institute’s executive leadership, the staff and all the stakeholders for their hard work in contributing to the QQR, which helped the panel in formulating this impartial report.

The review, based on the QQR criteria agreed by the panel (Annex 3), focused on the future of the Institute. It provides advice to UKRI-EPSC on future allocation of core funding; that is, funding which cover the costs of the Institute’s executive, HR, legal and IT functions, rent, other operational costs, and some research-facing functions to allow the Institute to operate.

The UK government has designated the Institute, the national institute for data science and AI, therefore the panel considered how the Institute operates in this role. Included in the recommendations of this report are specific attributes which are essential for the national institute for data science and AI.

The national institute for data science and AI should:

- I. Work across and convene the best experts and entities within the national AI ecosystem.
- II. Be independent and impartial, with an independent governance and board to ensure and protect this impartiality.
- III. Represent the UK internationally and be a key interface with researchers and governments globally.
- IV. Have a defined and clear role with respect to government; whether it provides advice or delivers government research commissions, alongside a clear register of interests.

Overall, the panel is of the view that there has been clear value in the Institute’s activities and outputs during the first five years of its operation. They expressed a positive outlook for the Institute’s future, acknowledging its potential for greater impact and development. The panel expressed confidence in the approach taken by the incoming CEO and chair of the Board of Trustees to deliver against the Institute’s vision and mission for the next five years.

However, the panel also identified five principal areas of concern:

- Governance.
- Implementation of the strategy.
- Relationships with the ecosystem.
- Financial management.
- Operational effectiveness.

Any future core funding from UKRI-EPSC should therefore be conditional on resolution of the specific concerns, to ensure the Institute acts as a national institute for AI and data science.

The panel saw strong evidence of the high-quality, wide-reaching, and impactful research work conducted across the Institute, and across the cross-cutting activities and services it provides. This makes it an asset to UKRI and the UK.

However, the panel identified the need to clarify how the work in fundamental research fits with, and meets the needs of, the Institute's role in convening the UK community and providing additionality to research underway in other parts of the UK ecosystem. This includes both research within the Institute, and that which it commissions from others.

Governance The panel recognised that there is evidence of the Institute playing a national role in the AI ecosystem. The Institute engages with academia, industry, and other bodies, advises into some government departments, and hosts the UK AI Standards Hub. However, some UK research stakeholders feel disenfranchised. The potential of the Institute to act on behalf of the whole ecosystem has not yet been achieved, a key part of the national institute role. The Institute should aim to represent all actors in the UK ecosystem on an international stage, and enable research that is additive to, not duplicative of, that carried out in other institutions.

It is apparent that the current governance of the Institute acts as one of the barriers to fulfilling the national institute role. The panel believes that there is clear need for the governance and leadership structure of the Institute to evolve. It should reflect the transition from the founding university members, as primary funders and stakeholders, to a greater diversity in board membership representative of the wider ecosystem.

Implementation of strategy The panel is supportive of the refreshed strategy and vision for the Institute (termed as 'Turing 2.0'). This strategy centres on addressing three Grand Challenges (GCs): Defence and National Security, Environment and Sustainability, and Transformation of Healthcare. With its tighter focus, the panel believes this will drive impact, both within the AI landscape and for the economy and society. However, the panel recognises that the strategy is at an early stage. The panel recommends the Institute create and action a clear business plan and delivery mechanisms to achieve the stated vision.

The panel heard a clear view from stakeholders that the GCs should be delivered in partnership with and in a complementary fashion to universities, companies, research councils, and existing research endeavours. They must be additive to university research: the Institute should convene the most appropriate cross-disciplinary groups to tackle complex problems which are difficult for any single university to address.

Relationships with the ecosystem The panel recognises that the Institute has built an extensive network of academic, industry and government partners and collaborators within the UK and international AI landscape. Internationally leading research is delivered, both through these collaborations and independently. Noted examples included verifying fairness in AI models, digital twin research across energy grids and agriculture, and the evidence-based outputs of the Centre for Emerging Technology and Security.

The Institute acts as a marquee investment for the UK and has an internationally recognised brand. However, some stakeholders interviewed identified challenges engaging with the Institute, such as insufficient opportunities to work with the Institute, perceived operational barriers to entry, and seeing the Institute as a competitor rather than a collaborator.

While the Institute presented a convincing strategy for continued engagement with strategic partners, there is no mutually agreed consensus of how the Institute relates to other entities of the AI ecosystem in the UK or internationally (e.g. the Ada Lovelace Institute, Responsible AI UK, DSIT, the AI Safety Institute, the ELLIS network). The panel recommend a clear statement of how actors

within the AI ecosystem interact, to avoid duplication, ensure complementarity of function, realise the benefits of coordinated action, and provide simplicity of navigation. The panel recognises that these issues need be resolved both within the Institute and in discussion with funders and the UK government.

Institute's financial management Financial stability and flexibility of funding are required to allow the Institute to implement its strategy. To empower the Institute to act as the national institute for data science and AI, UKRI-EPSC should ensure that the Institute is provided with appropriate "core" funding through a multi-year arrangement. Financial oversight is currently not sufficient to provide assurance as to how all public funding is spent within the Institute. The panel strongly encourages UKRI-EPSC to work with the Institute to ensure that clear financial and monitoring plans for the core funds are agreed and made explicit.

Operational effectiveness The panel recognises that there is a range of views of the Institute within the UK and international community. There is disagreement as to what the Institute's role should be and how it should interact with academia. How the Institute should feed into and undertake work on behalf of government and the public sector has not been defined, nor how it should work with businesses.

There is a perception within some parts of the UK AI community that the research programmes delivered within the Institute could have been carried out by an individual university. There is the view that the Institute has not yet been successful in linking into and collaborating with activities and institutions in all regions of the UK. The panel also heard opposite views presented on both points.

The panel recognises this as a key challenge for the Institute. Clear expectations must be set for the vision and role of the Institute, both from the leadership of the Institute itself and from UKRI-EPSC and government. To allow the Institute to engage and facilitate the UK AI ecosystem, these expectations should include the planned balance between the Institute as a delivery body versus as a convenor of Research and Innovation (R&I).

The panel was impressed by the talented individuals working within and with the Institute. There is a focus placed on skills development in programmes run across the Institute and for external stakeholders. They particularly recognised the value and contribution of the Research Engineering Group (REG). As Turing 2.0 becomes more established, the interface between the GCs and the REG will help to develop each specific challenge and link them to applications. A clear people strategy is recommended to ensure the Institute continues this progress through Turing 2.0 and provides clarity for every employee. The people strategy should include principles which cover the proportion of staff as full employees versus secondments, a basis for longevity of employment, what defines visiting/aligned members and a statement of the management of conflicts across all roles.

Conclusion The panel sets four conditions which must be met for core funding to be provided to the Institute. These centre around:

- 1C: A revised governance structure of the Institute.
- 2C: Clarity on the primary activities of and anticipated outcomes of the 'Turing 2.0' strategy.
- 3C: A business implementation plan.
- 4C: A clear financial plan covering the next five years.



Assuming these conditions are met, the panel believes that public funding for the Institute should continue. The core funding settlement should be at least equal to previous years' investments in the core funding, setting a minimum funding level of £15M per annum. The panel also note that some additional funding could usefully flow into the Institute and would enhance its activities.

The Institute should continue to show evidence for appropriate leverage of additional funding outside of this core, to ensure delivery of the 'Turing 2.0' strategy. There must be clear monitoring and review, of spend and activities against performance indicators, while preserving the agility and impartiality of the Institute.

2. Background and review process

This report presents the conclusions and recommendations of the QQR panel to UKRI-EPSC on the Institute. The review is based on the QQR criteria agreed by the panel (Annex 3).

The review focusses on the previous five years of operation and the strategy and aspirations for the next five years of the Institute. The UK government has declared the Institute, the national institute for data science and AI, therefore the panel also considered how the Institute operates in this role.

2.1 The review process

UKRI undertakes reviews of all the institutes it funds throughout their lifecycle. The responsibility for coordinating and managing the QQR of the Institute was carried out on behalf of UKRI by UKRI-EPSC.

The QQR seeks to provide assurance to the funder (UKRI-EPSC) that the Institute is delivering against its objectives, delivering societal impact, providing high quality scientific programmes, and assurance that value to the UK is being achieved for the use of taxpayer funds.

The QQR takes a forward-looking approach, evaluating future proposed strategy and vision against whether it will maintain and strengthen the Institute's position as a world-leading national institute of AI and data science. The primary purpose of this QQR is to enable UKRI-EPSC to make informed, strategic, and unbiased decisions regarding the size and direction of any future investment in the Institute, bounded by the terms of reference of the review.

The panel recognises that the global landscape in AI is unfolding at a fast pace and the ecosystem has evolved even within the duration of the QQR. The QQR considered the priorities of the national AI strategy, while also considering the rapidly evolving strategic requirements in the broader AI ecosystem, both at the national and international levels.

The QQR was conducted by an independent review panel consisting of the chair, six external panel members and one UKRI-EPSC advisor (see membership details in Annex 2). UKRI-EPSC staff acted as secretariat. Throughout the process, the executive leadership and staff of the Institute provided information, interviews, and data to the panel. Additional input was sought across stakeholders and actors within and across the UK and international AI and data science ecosystem.

The agreed QQR Terms of Reference (ToR) (Annex 1) include the criteria on which this review is based. These criteria were agreed by the panel at the start of the review process and shared with Institute. The criteria assess the Institute's achievements and future ambitions. They are (defined fully in Annex 3):

- **Quality of the programme** Looking back at the achievements of the Institute and future programme plans.
- **Overarching vision, ambition, impacts and strategy** Overview of past progress, while focussing on the next five years.
- **Leadership and management** The mechanisms in place and the performance of both.
- **Added value, including on impact and advocacy** Past and forward-looking.

The QQR was carried out between May 2023 and December 2023, and consisted of:

1. Panel-led review of the past performance and future of the Institute. This included the review of documentation provided by the Institute and interviews with the Institute executive, staff, partners, and internal stakeholders. This was supplemented by further interviews with a diverse set of stakeholders across the AI landscape, including researchers, government, public sector, business, and international representatives (Annex 5).
2. Review of governance arrangements through the UKRI Risk and Assurance function, which reviewed the Institute's submitted documentation and interviews in line with the UKRI audit guidelines. The governance audit findings were made available to the panel.
3. Funding assurance review carried out by the UKRI Funding Assurance function, following the same review process as the governance audit. The audit findings will be published in line with normal UKRI audit procedure. Key aspects have been drawn out within this report.

In September 2023 the panel provided draft feedback and recommendations to the CEO and chair of the Board of Trustees of the Institute, recognising that further interviews and inputs from stakeholders would follow prior to finalising the report (this document).

A fuller explanation of the operations of the panel is provided in Annex 4.

***Please note:** This final report has taken into consideration the findings of the separate funding assurance and governance audits, carried out in parallel to the QQR. The key findings of both audits were similar to the findings of the QQR in both areas covered. The two audit reports have been presented to the Institute separately. The summaries of these audits are attached to this report as Annex 6.*

2.2 The national institute for data science and AI

The Institute is recognised by the UK government, and uses within its communications the title of National institute for AI and data science.

To assess the Institute's future against the QQR criteria, the panel believes that this must be recognised in how it is evaluated. This section provides a brief discussion of the applicable features and roles of the national institute for data science and AI, and specifically what "national institute" meant in this context.

The concept of a national institute surfaced many times during the panel deliberations and it was noted that there were multiple interpretations of what this means across stakeholders. The panel has not fully defined all the various ways in which an institute could be considered a "national institute". This is partly as, to do so needs much wider discourse across government, the Research and Innovation (R&I) sector and wider AI landscape. There are many possible interpretations. Nevertheless, it has become clear through the review process that some specific applicable features are vital in the context of the AI and data science landscape and the position and context of the Institute. These are:

- I. **A national institute should work across and convene the best experts and entities within the national AI ecosystem.** It should be impartial and collaborative, bringing

together quality contributions from various sources across the entire ecosystem, not just specific partners. The Institute should engage in direct collaboration, provide resources for others, and unite stakeholders to address common challenges. It is important that knowledge sharing and encouragement of activities which are beneficial to the ecosystem (but not necessarily led by the Institute) are central to this convening role. The Institute should strive for openness and accessibility throughout the ecosystem, minimising any barriers for themselves and others.

- II. **A national institute should be independent and impartial; un beholden to either corporate or other vested interests. It should, therefore, have an independent governance and board to ensure and protect this impartiality.** The panel notes that the definition of independent here would mean a broader range of members than currently present in the Institute's board; one in which no one member has a veto and which aims to guide the Institute to truly act in the interests of the whole research community in the UK. This statement does not disregard the immense contribution made by the founding university partners during the formation and early years of the Institute. The founding partners shaped the governance of that stage of the Institute but should recognise that a new inclusive model will be required which embraces and delivers on the entirety of UK interests. A key marker of a national institute is its ability to take this role and responsibility and is an essential function going forward.
- III. **A national institute should represent the UK internationally and be a key interface with researchers and governments globally.** The panel considers that this requires a reputation and standing in global research to be able to do this successfully. There is clear importance to the UK of a flagship AI Institute, with an established brand, that acts as an international attractor for global interest, investment, skills, and talent. The profile and prestige of the Institute was commented upon positively by stakeholders, especially the international interviewees. However, UK-based interviewees were less confident about the current ability of the Institute to represent the UK internationally and to government(s). The panel sees the clear value of the Institute in representing the UK internationally. It should continue to fulfil this role, while noting that its approach should evolve to enable greater links within and across the UK. The Institute should enable its international relationships to benefit more UK stakeholders, reflecting the enhanced collaborative function anticipated in its next phase.
- IV. **A national institute should have a defined and clear role with respect to government; whether and how it provides advice or delivers government research commissions, alongside a clear register of interests.** The panel saw examples of policy work and government engagement which demonstrated the importance of access to independent advice for UK government and policy makers generally. The panel notes that within such a role, response times are driven by the policy need. The panel heard differing views on whether a single entity can provide a definitive advisory role on all issues across AI. The panel's mandate does not extend to conferring such a role on the Institute. Funders and government should provide a clear direction to the Institute if they expect the provision of advice to the government to be a primary role of the Institute. Given the nature of this role, the Institute, funders, and government should also recognise that this function requires a different staffing and operational model: one which can respond at pace. The panel

acknowledges that in any form, the Institute is likely to be asked for advice, given their status as a host for experts. The panel encourage the Institute to consider how it might best use its partners and broader networks to provide access to independent advice to inform policy.

The panel have considered the above points throughout their deliberations and incorporated them into their recommendations accordingly.

2.3 The Turing 2.0 Strategy

Throughout this report, the new strategy for the Institute is referred to as 'Turing 2.0'. The strategy in full is available [here](#), having been published in March 2023. A summary is provided below to make the report self-contained.

Under the new strategy, the Institute's purpose remains unchanged, and is built around three key goals:

1. **Advance world-class research and apply it to national and global challenges** Innovate and develop world-class research in data science and AI that encourages next-generation theoretical developments and is applied to national and global challenges, supporting the creation of new businesses, services, and jobs.
2. **Build skills for the future** Contribute to training people across sectors and career stages with the necessary breadth and depth of technical and professional skills in data science and AI to match the UK's growing industrial and societal needs.
3. **Drive an informed public conversation** Provide balance in the public conversation on data science and AI by speaking to its technical, social, and ethical dimensions through public engagement and the provision of advice to policymakers, industry, and civil society.

To realise the goals, the Institute also sets the following principles:

- Lead responsibly.
- Build confidence, ensure independence.
- Enable impact, at scale.
- Drive interdisciplinarity.
- Move with agility.
- Continually innovate.
- Embed equality, diversity, and inclusion.
- Collaborate and convene.
- Learn and help others learn.
- Democratise access.

The Institute commits to providing an end-to-end, interdisciplinary pathway in data science and AI that enables impact at scale and major progress against societal challenges. The Institute's strategic approach is to build a community of researchers, innovators, and entrepreneurs who can work together to make a lasting impact on the world's most pressing societal issues.

The centrepiece of the new strategy is to reframe their research goals around Grand Challenges (GCs) with a clear focus on additionality and convening of the AI and data science landscape. This approach aims to provide common focus, clear direction, and a mandate to prioritise activity, as well as the inspiration and motivation for diverse communities and capabilities to come together. These were selected to align with areas of UK priorities, comprising:

1. **Defence and national security** To protect the UK, its people, and the places they inhabit.
2. **Environment and sustainability** To address the climate and biodiversity crisis and the need for greater sustainability.

3. **Transformation of healthcare** To improve the health and well-being of people in the UK and globally.

2.4 The funding model

The panel agrees that a strand of long-term core funding is needed to give the Institute certainty and to allow it to plan and operate effectively. There is also clearly a minimum level of funding which is required for it perform those essential functions of a national institute outlined above.

Given the national importance of AI and the need to operate as a national institute, the panel believes the core funding should not be less than £15m per annum, which is the current level of funding. This is deemed to cover operational costs including office rent and facilities, IT costs, staff costs across the Executive and chair; legal, finance and HR, depreciation and amortisation, and capital expenditure. It also covers or partially covers research-facing costs including communications and events, programme management and underpins some of the research programmes.

The deliberations on what constitutes a truly national institute and how the Institute can interpret and deliver this role are linked directly to the structure, sources, and quantum of funding for the Institute. The Institute already has a diverse set of incomes and funding routes. Each source and type of funding has different implications for the activities and priorities of the Institute. These are enabled by, and contingent on, that core grant of public funding through UKRI-EPSC. UKRI-EPSC core funding alone will not cover the full cost of all institute activities, nor should it. Appropriate funding sources and leverage should be sought to ensure 'Turing 2.0' can be realised.

There may be a tension between the Institute fulfilling its role as a "national institute", which the core grant is dependent on, while also receiving funds from large stakeholders. It is critically important that appropriate governance and controls are in place to ensure sufficient oversight of the core grant, while retaining flexibility for the Institute to respond to new challenges and form new productive partnerships.

As indicated in section 2.2, point IV, clarity should be provided on the role of the Institute in providing advice to government. The Institute should work with government and UKRI to understand the extent to which it is appropriate to position itself as the independent voice for advice to policy makers. This requires an assessment of the expertise and networks available to the Institute, and the internal structures that currently hinder the Institute from responding at pace to some government requests. Ultimately a higher-level mandate and significant additional funds, are needed beyond UKRI-EPSC for the Institute to take on such a role at scale.

3. Journey to the recommendations

This section presents the feedback and conclusions of the QQR panel. These synthesise the panel's views of evidence presented by the Institute, including interviews and written submissions, and interactions and interviews with other stakeholders, including international experts on AI and data science.

The conclusions and feedback are not listed in order of importance, but as articulated following the QQR criteria:

- **Quality of the programme** Looking back at the achievements of the Institute and future programme plans.
- **Overarching vision, ambition, impacts and strategy** Overview of past progress while focussing on the next five years.
- **Leadership and management** The mechanisms in place and the performance of both and including governance of the Institute.
- **Added value, including on impact and advocacy** Past and forward-looking.

Listed at the end of each sub-section are the recommendations most closely linked to the criteria, and primarily based on the section in question. A full table of recommendations and conditions of funding, prioritised by importance, is given in section 4 of this report.

3.1 General feedback

The panel saw strong evidence of the high-quality and impactful research work carried out by the Institute to date. All involved deserve recognition for their valuable contributions to the field of AI and data science research nationally and internationally. The panel recognised that this work and its outcomes have also supported the Institute in building and maintaining its international standing and contributed to the reputation of the UK as a world leader in AI.

3.2 Quality of the programme

The Institute presented a broad overview of its work, including both the fundamentals of AI and data science, and work at the interface with other areas of science and research; across social sciences, arts and humanities, environmental, biological, medical and physical sciences, and engineering. Multi-disciplinarity was a core part of most programmes reviewed and a main benefit of an organisation of this type.

One of the highlights was the Turing Way initiative, a handbook and training materials for reproducible, ethical, and collaborative data science. The panel recognised that the Turing Way initiative is an excellent activity with high potential, but the extent to which its impact has spread through the organisation and beyond was less clear.

Work within the Institute is appropriately connecting state-of-the-art AI thinking with application areas across the sciences and the economy, irrespective of disciplines and UKRI council boundaries. Notable examples include project Bluebird, delivering the world's first AI system

capable of controlling a section of airspace in live trials in partnership with the National Air Traffic Service (NATS) and the Living with Machines programme which showed excellent interdisciplinary working between technology research and the humanities.

The panel recognises that there are parts of the Institute delivering research activities in a way that is additive to the UK AI and data science research landscape. Carrying out programmes and activities of a type which could not easily be delivered elsewhere or through normal funding mechanisms (such as standard research council project grants). For example, the cross-cutting work of the Centre for Emerging Technology and Security brings policy makers together with researchers from multiple parts of the landscape and in many disciplines. This collaboration allows cross-learning between multiple stakeholders. Similarly, the Turing - Royal Statistical Society Health Data Lab was set up to convene experts from across the UK to develop statistical and machine learning techniques to answer UK government policy-relevant questions about COVID-19. Both programmes have clearly created an impact by convening a diverse range of stakeholders in areas of government need.

However, not all programmes delivered by the Institute are considered to be additive. The panel heard from some representatives of the external community that the Institute acted and/or acts in competition with universities and/or operationally duplicates similar work being undertaken by universities and other stakeholders in the ecosystem.

Considering the different perspectives that emerged across the AI landscape, the panel believes the Institute should have a clear and explicit strategy for when it is best placed to act in a way that is fully additional to the UK landscape. It should articulate how and on what basis it will collaborate with others and how this will enable 'Turing 2.0'.

Previous engagement with users of the research, such as businesses and researchers implementing AI into other disciplines, seems selective based on local and established partnerships. The Institute should ensure it is open to collaboration with every part of the UK research ecosystem such that it can act in the interests of the whole of the UK, as befits a national institute.

The Institute places a strong focus on data science, convening and facilitating owners of data, domain experts and data scientists in a trusted environment. The panel recognised that there is an opportunity for the Institute to showcase and collaborate with the data science community. The Institute can and should use its position to connect those accessing and using data to novel AI techniques. The Institute should continue to work with data providers to assist them in brokering and facilitating data arrangements and trusted research environments.

Recommendations

- Each team and staff member should understand their role in the new context of Turing 2.0, to ensure the whole Institute understands how their work aligns to the new strategy and promote better working with stakeholders and between related programmes. (*Recommendation 2R-Grand Challenges/Research Plan*)

- The panel believes that the Turing Way is a key programme that could benefit from increased publicity and consideration of how its impact might be maximised. (*Suggested action 2S – Turing Way Maximization*)

3.3 Overarching vision, ambition, impacts and strategy

The combined documentation submitted by the Institute shows that several methods, programmes and activities have been trialled across the Institute at various stages. Some have succeeded and grown where others have not continued. This is to be expected given the Institute is still relatively new and evolving into its role.

The panel recognises that the Institute has undertaken a substantial amount of work to design the vision of the Turing 2.0 Strategy (see section 2.3), which represents a move away from the early phase of the Institute and clearly emphasizes the Institute's core drivers:

- The three GCs, aligning with the UK National AI Strategy.
- The focus on additionality and convening of the AI and data science landscape.

The panel considers that vision is appropriate for the national institute for data science and AI over the next 5 years. The panel reflects that the vision of Turing 2.0 was articulated more clearly in the detailed interviews than its high-level presentation in the published strategy.

While the panel is supportive of the vision of Turing 2.0 and received the enthusiastic assurance of the Institute's full commitment from the CEO and chair of the Board of Trustees, the panel is less confident that the Institute's staff and other stakeholders had the same clarity of focus.

The Institute's wide-reaching and expanding remit under 'Turing 2.0' makes it an asset to UKRI and the UK, not just UKRI-EPSC and the fundamental AI and data science community. However, a number of stakeholders reflected that it is unclear how the areas of Turing 2.0 will align with strategies in other disciplines, especially those grand challenges which will have direct stakeholders across other UKRI councils, government departments and business sectors. Any aspiration to significantly expand the scientific remit of the Institute should be accompanied by agreement across UKRI and the Department for Science Innovation and Technology (DSIT) on the best funding model to enable this.

The evidence presented, both in writing and verbally, did not detail how the published Turing 2.0 strategy will be achieved, or explicitly describe expected outputs and outcomes. It is not clear which new key activities and programmes will be introduced to implement the Institute's core drivers, nor which activities from Turing 1.0 will be discontinued, repurposed, or given lower priority. Further clarification is also needed to determine how these changes align with the goals of fostering collaboration and providing added value to the UK and align to the UK's National AI Strategy and other objectives.

Recommendations

- Ensuring the actions taken to deliver the strategy are clear and having assurance that measurable outputs will be reached is vital. Both will need to be clear and understood across the Institute and the broader AI ecosystem. (Condition 2C – Clarity of Strategy).
- Clear plans for designing and implementing the Turing 2.0 strategy are crucial to its success and to solidify the role of the Institute. An action plan and clear objectives, key performance indicators and monitoring of progress should be provided (Condition 3C – Business Implementation Plan).
- Further, this clarity must extend across the whole AI ecosystem to allow relationships to form and grow with other partners (Recommendation 3R - Alan Turing Institute positioning within the wider ecosystem and Partnerships Plan).
- Clarity in the strategy and action will also provide an opportunity to engage with all the relevant stakeholders and showcase the future ambitions of the Institute. (Suggested action 1S - Turing 2.0 Strategy Communication).

3.4 Leadership and management

Throughout the review, there was evidence of the Institute undertaking a role in the national ecosystem across a range of stakeholders. Examples included engaging and collaborating with academia within projects, especially across their core partner universities and advising into government and public bodies (e.g. in defence and security into the ministry of defence, and with local NHS trusts). There were also large collaborations with industry partners such as HSBC, Roche, Accenture and Lloyds Registry.

However, there are currently barriers which hinder the Institute's stated goal of acting and being seen as a convenor and enabler of the entire AI ecosystem. In particular, the governance structure that was set up when the Institute was formed is now a hindrance to this role. The joint venture agreement developed and implemented at the founding of the Institute involves the Board of Trustees in operational decisions and gives each member of the Board a veto over decisions. This has led to instances where the decision-making process, or enacting change, is slow and difficult. There is a risk of a limited diversity of viewpoints in decision making, over-representing the founding universities rather than the broader ecosystem. This may have limited the benefits of the Institute and has created the perception from external stakeholders that it is not inclusive. This problem is most acute within academia. It is hard to justify these governance arrangements, particularly as the founding universities no longer provide core funding to the Institute and their previous investment was linked to the initial public investment rather than future funding.

The panel firmly believes that there is a clear need for the governance and leadership structure to change fundamentally to reflect a more representative set of stakeholders and to improve agility in realisation of the future strategy. As the national institute for data science and AI, the Institute must

have an impartial governance arrangement which is fit for this purpose, follows best practice for similar public investments, and be shown to represent the concerns of the whole community. This will also help with agility and decision making and allow the Institute to prioritise effectively.

The panel acknowledges that part of the core funding provided by UKRI-EPSC is for flexible use and sustaining core operational functions within the Institute, which leverages additional investment from elsewhere. However, the panel found it difficult to understand from documents provided how UKRI-EPSC core funding has been used. This is also reflected in the financial audit. This lack of clarity made it difficult to distinguish where the key benefits of this funding have occurred. No financial plans or projections were provided to the panel that covered the next five years and the transition to delivery of the Turing 2.0 strategy. There is an urgent need to clearly articulate the financial planning over this period, including indicative estimates around effective leverage, sources of funding from outside core funding, and financial pressures and savings.

The panel recognises that core funding is essential to support the operational aspects of the Institute, as funding for these is unlikely to be leveraged from elsewhere. However, the panel also anticipates that UKRI-EPSC core funding should be used primarily to support leading-edge academic research aligned to the Institute's GCs, convening activities across the ecosystem in support of research, and non-hypothecated and serendipitous opportunities that arise where it is appropriate for the Institute to act. It should be a responsibility of the Institute, as all who operate from the public purse, to focus on an efficient operational structure to maximise the funding available to specifically generate outputs, outcomes, and impacts.

The panel acknowledged that the model of single-year core funding provided to the Institute by UKRI-EPSC in the last couple of years has been detrimental. It has prevented the Institute from engaging in longer term planning, and from building multi-year programmes without accepting significant risk. It was recognised that to empower the Institute, UKRI-EPSC must ensure that the Institute is provided with appropriate core funding through a multi-year arrangement (of at least 5 years).

Core funding should be allocated such that there are sufficient levels to enable core functions, while encouraging efficiencies, and not disincentivising leveraged funding. This will allow the Institute to focus on areas of high priority, recruit and retain high quality staff and be both flexible and effective in its mission. Not doing so may create subcritical levels of funding which will not deliver value for money from the investment (i.e. it would not attract sufficient leverage, nor allow the Turing to act on its priorities).

Recommendations

- The Institute must have a governance structure which reflects its role and is truly independent in nature and function. This should be a condition of funding. (*Condition 1C – Governance Structure.*)
- Clear financial and monitoring plans for the core funds should be agreed and made explicit between the Institute and UKRI-EPSC. This should include financial projections, expectations

around leverage and how money is spent, the monitoring placed upon it and performance indicators against which the Institute will be judged on an ongoing basis. (Condition 4C – Financial Plan).

- UKRI-EPSC should ensure that when allocating core funds, the Institute is provided with sufficient funding through a multi-year arrangement. UKRI-EPSC should also ensure that expected use of core funds, including where there are expectations around funds to be used in partnership with other actors in the landscape or to build additional capabilities in the UK ecosystem, should be made explicit. (Recommendation 1R – Financial Stability).

3.5 Added value, including on impact and advocacy

The precise role of the Institute within the AI ecosystem elicited a range of views, both within the Institute and across the AI ecosystem. This ambiguity puts the Institute in a situation where it is not able to satisfy all stakeholders' needs and views all the time.

Given this, providing clarity on the precise role which the Institute should inhabit will help it develop and allow the AI community to understand how to work with the Institute in a constructive and additive way. This set of considerations demonstrates a clear need to set out the Institute's position within the complex AI ecosystem, including the strategic approach to stakeholder relationships. The panel recognised that this is a complex matter and needs strong engagement with UKRI-EPSC, other parts of UKRI, DSIT and other key stakeholders to come to an agreed joint position. Section 2.2 covers some of the key attributes the panel believes should form part of the national institute for data science and AI.

3.5.1 Connecting with stakeholders

The Institute has formed a good network, both domestically and with overseas partners, and is appropriately collaborating at those interfaces. It is not known whether the range and breadth of these connections may need to change to realise Turing 2.0.

The industry partners praised the Institute's role as an intermediary. Several international and industrial stakeholders likening it to a 'one-stop shop' and a way for partners, particularly from overseas, to access academics at universities in various parts of the UK ecosystem from a single-entry point. There are examples where collaborations with universities have been facilitated from a single contact point within the Institute, brokering collaborations to set up programmes involving multiple universities and partners. This is to be applauded and is clearly an asset for the UK.

However, the panel reflected that there is a difference between allowing access to academics at or partially employed by the Institute and enabling universities as institutions to develop partnerships with industry and other stakeholders via the Institute; ultimately enabling collaborations to develop independently of the Institute once these have been put in place. Brokering collaborations, not just with close partners but with any appropriate university or other actor in the UK ecosystem, could help enable step changes in the operation of the whole ecosystem. The Institute should look to act

in this way and consider this facilitation of new international links for other parts of the ecosystem as a part of their role in convening the community.

It was also noted that despite the impressive network of stakeholders, there does not appear to be a clear strategic partnership plan covering the relationships with the different stakeholders across the AI ecosystem, especially across new university and academic partners. Nor are there clear entry points for all stakeholders wishing to work with the Institute. Different stakeholders report different experiences depending on whom they interacted with at the Institute. While there was a model for engagement with industry partners and sensible expectations around the number of partners who could be worked with, there does not appear to be a strategic approach to partner selection. Consideration should be given to how different partners are likely to apply different priorities and, potentially, limitations to the Institute, and how these interact (e.g., there may be a tension between defence partnerships and responsible innovation).

The panel noted that there is a perception in some parts of the AI landscape, and particularly in parts of academia, that the Institute is not representative of the whole community. Those stakeholders would welcome the Institute playing a role as a convenor that can embrace the strength in AI and data science across the UK and create wider collaborations, where it can be shown they are acting in the interests of the whole of the UK. Several interviewees from the academic community expressed concern surrounding the nature of the Institute as both a collaborator and a competitor for grant funding and for contracts, and worried that this may distort the landscape rather than complement other UKRI or government investments. Ensuring the Institute acts for the good of stakeholders and facilitates collaborations on behalf of both it and the rest of AI R&I in the UK should be an important part of its mission.

The panel also heard that there are perceived barriers to entry for new partners, either due to complicated bureaucratic requirements, an absence of entry routes, or lack of clarity as to the touchpoints and routes to entry.

The panel acknowledged good examples of policy work delivered by the Institute, its staff and collaborators for specific departments, and feeding into cross-Whitehall training and decision making. The production of the first internationally recognised guidance on AI use for policy makers is a significant achievement, as well as the international reach that this has had. Relationships are clearly strong with some government departments and the Institute is seen as a trusted provider of advice. However, this is not universal; conversations with representatives of other government stakeholders suggested that the Institute is not always equipped or able to engage and respond in a way or at the pace needed for carrying out work on behalf of their departments. The panel reflected that the policy function and embedding of staff in government departments does not appear to have mitigated this. There is a need for a clearer statement of the services the Institute can and cannot provide to departments and public sector bodies, as well as clear routes of entry and advice for policy developers.

The panel found the connection with policy and the embedding of staff in government departments to be very valuable and likely to become even more important in future years. Consideration should be given to how those working into these agencies can upskill those around them in all cases.

There was some concern that there is no singular quality approval and assurance function within the Institute. Advice given, or technologies developed by, the Institute will remain associated with

the Turing brand. Ensuring there is a consistency of approach would provide assurance for those in receipt of the advice and would mitigate any risks of incomplete or non-assured technologies being associated with the Institute.

3.5.2 People, talent and skills, EDI, responsible research and innovation, ethics and policy

The panel was impressed by the talented individuals working within and with the Institute. They particularly recognised the value and contribution of the REG and the software engineering expertise within it. As Turing 2.0 becomes more established, the interface between the GCs and the REG will be critical for success.

Equally, the associated work packages in Tools, Practices and Systems (TPS), Ethics, and Equality, Diversity and Inclusion (EDI) functions are integral capabilities for the Institute. The panel would encourage greater linkages in these areas. It is crucial that these relatively new efforts are developed further and properly integrated into the wider programmes and feed into the Institute's own internal work. For instance, if there are ethical insights developed for technologies and techniques within the Institute, these should, as a matter of course, be integrated and embedded into the Institute's research programmes. The panels noted that it is not clear how these programmes will integrate with future programmes envisaged in Turing 2.0.

Additionally, the panel reflected that to continue delivering excellent responsible innovation, ethics and policy work and impact, it is important to ensure continued collaboration with other organisations across and beyond the AI landscape (e.g., Ada Lovelace Institute, Centre for Data Ethics and Innovation (CDEI), and Responsible AI UK). Using the reach of the Institute to further the responsible innovation agenda across the UK, and globally through partnerships, is a leadership role which the Institute can and should play.

While the panel recognised the extensive talent available to the Institute through its staff and partnerships, it was not clear what strategy was used to build capacity, recruit and develop its professional, scientific, and academic staff. It was also not clear how this would be incorporated into the future strategy of the Institute and what models of programme building would be implemented. There was good evidence demonstrating EDI initiatives and focus, including an embedded approach among the Institute's researchers, and the impacts these are having. It is evident from the data presented and those working across the Institute that a diversity of talent has been encouraged and included within the community.

While there were specific initiatives in place, it was less clear how the EDI approach and initiatives permeated through the whole organisation. More details of how the principles are implemented and operationalised in the day-to-day operations, as well as how the development of best practice processes will be shared and promoted, should be considered. The panel appreciated the opportunity to interact with a variety of staff and noted the diversity present across programmes. However, this diversity was less well evidenced across the senior and programme leadership areas.

Recommendations

- The Institute should work collaboratively with UKRI, DSIT and other relevant stakeholders to develop a clear statement of its role as a national institute, and how it will interact with other parts of the AI ecosystem. It should ensure that there are clear entry points for collaboration, that these are properly signposted, and be clear both on what it will be doing, but also where activities will not form part of its operations. (Recommendation 3R - Alan Turing positioning within the wider ecosystem and Partnerships Plan).
- The Institute needs to set out a clear people strategy, which should set the direction for people/talent requirements, career paths and support, to deliver the Turing 2.0 vision. (Recommendation 5R – People Master Plan).
- The Institute should implement an assurance process where it is acting to provide advice or technologies to other actors, noting that it may not always currently be clear where this is occurring across the Institute. (Recommendation - 7R Turing Assurance Process).
- Where ethical insights are developed for technologies and techniques within the Institute, these should be integrated and embedded in the Institute’s research programmes. (Suggested action 3S – Ethics and responsible innovation).
- The Institute should further the responsible innovation and responsible AI agenda across the UK and globally, working with other actors in the landscape to avoid duplication. (Recommendation 4R - Responsible Innovation and collaboration with the wider Ecosystem).
- The Institute’s EDI activities are welcomed but could be further strengthened through greater work with the broader community. This will help pave the way for a fairer AI ecosystem and ultimately a more inclusive and accessible AI and Data Science landscape. (Recommendation 6R – Equality, Diversity and Inclusion).

4. Prioritised recommendations

Throughout section 3, recommendations and suggested conditions of funding have been provided based on the findings of the panel. For completeness, the panel has produced a combined set of recommendations which they advise be actioned, in collaboration between the Institute as owner and UKRI-EPSC as the core funder. These also include suggested timelines, where appropriate, for their resolution.

The panel recommend that four critical conditions are met for future UKRI-EPSC core funding. Making these “Conditions”, which should be met prior to any financial settlement, will provide animus for their prompt resolution and help the Institute to develop in future years and ensure the value of future public investment. These conditions are supplemented by recommendations and opportunities for improvement.

- **Conditions (C)**: must be resolved and agreed with UKRI-EPSC (or have a clear timeline for resolution and agreement) before UKRI-EPSC releases further core funding for the Institute.
- **Recommendations (R)**: should be addressed to ensure that the Institute has the greatest chance of achieving its strategy. For UKRI-EPSC, resolution and improvement of these should be considered as key part of performance monitoring, management, and evaluation.
- **Suggested Actions(S)**: should be taken to improve the Institute’s performance and maximise the benefits for the AI ecosystem.

Table 1 lists all the conditions, recommendations and opportunities for improvement. Where recommendations are directed at the funder, rather than the Institute, this is noted.

This advice is ultimately for the SRO within UKRI-EPSC as providers of funding. The panel believe that resolution of these directions is a shared responsibility between the Institute and the funder, with mechanisms of the funding, interactions and overall governance of the Institute to embed these operationally. They should be properly monitored over time and reviewed and evaluated at appropriate points to ensure they are, and remain, addressed. Attention should be given within the monitoring as to how the Institute has worked with, funded, collaborated or otherwise facilitated actors across the breadth of the UK; the realisation of its core strategy and grand challenges, and performing research that could not be done in individual universities.

As mentioned in section 2.2, the panel has made suggestions of critical aspects of a national institute in AI and data science. The panel strongly recommends that there is a wider discussion across government, UKRI and the Institute as to a greater definition of this role.

Conditions: Must be resolved and agreed with UKRI-EPSRC and have a clear timeline for resolution and agreement before UKRI-EPSRC releases further funding for the Institute.

Reference	Statement	Recipient & Timeframe	
1C	<p>Governance structure</p> <p>There must be a robust and fit-for-purpose governance structure for the Institute, which enables it to act independently and impartially in the interests of the UK and to ensure effective delivery of the Turing 2.0 strategy.</p> <p>The Institute must provide a revised constitution agreed by the Board of Trustees and UKRI-EPSRC, which includes a clear written assurance plan, detailing the specific changes to the governance and leadership structures. It must be in place by the end of 2024 and preferably before any additional core funding is awarded. The new governance should reflect the transition from the control exercised by the university founding members to one which acts in the interest of the whole of the UK.</p> <p>(Please also refer to Recommendation 3R)</p>	Alan Turing Institute	December 2024
Refer to section 3.4			
2C	<p>Clarity of strategy</p> <p>The Institute must provide clarity on the detail, and anticipated results of the Turing 2.0 strategy. This statement should detail how the strategy will support and enhance research at the Institute, aligning with its role and significance. Additionally, it should provide more detail for each of the grand challenges and how these will be incorporated into the continuing research programmes of Turing 1.0, while addressing how these changes align with the goals of fostering collaboration and providing added value to the UK AI ecosystem.</p> <p>(Please also refer to Condition 3C)</p>	Alan Turing Institute	March 2024
Refer to section 3.3			
3C	<p>Business implementation plan</p> <p>Following Condition 2C, the Institute must develop an implementation plan which details how the Turing 2.0 strategy will be achieved. This plan should articulate and include the following:</p> <ul style="list-style-type: none"> • Key objectives and timelines for achieving them. • Schedule for implementation/progression, including key milestones. • Key performance indicators, measures of success and related monitoring plan. 	Alan Turing Institute	March 2024

	<ul style="list-style-type: none"> Key activities plan articulating what existing activities will be discontinued/repurposed and what new activities will be introduced. 		
Refer to section 3.3			
4C	<p>Financial plan</p> <p>The Institute must develop a clear financial plan, covering the next five years, showing expected income and expenditure and a linked monitoring and reporting plan. This plan should cover all sources of income and categories of expenditure at a high level, including anticipated leverage. Performance against this plan should be monitored by UKRI-EPSRC.</p> <p>There must be clear expectations set by UKRI-EPSRC around any limitations on use of the core funds.</p> <p>All recommendations from the financial audit should be addressed. In future financial reporting, the Institute should maintain high levels of transparency such that core funding can be tracked and monitored.</p>	Alan Turing Institute	March 2024
Refer to section 3.4			
<p>Recommendations</p> <p>Which the Institute should address to ensure that they have the greatest chance of achieving their strategy. For UKRI-EPSRC as funder these should be considered as part of key performance metrics for allocated funding.</p>			
1R	<p>Delivering financial stability</p> <p>UKRI-EPSRC must ensure that the Institute is provided with sufficient core funding through a multi-year arrangement, to allow it to recruit and retain high quality staff, focus on areas of high priority, and be both agile and effective.</p> <p>UKRI-EPSRC/UKRI should ensure that the model, processes, and governance used to setup the Institute (loosely Turing 1.0) is not adopted again, either for this Institute or elsewhere, without understanding the implications of such a choice. Learnings from the process should also feed into any future Institute design and processes elsewhere in UKRI's portfolio.</p>	UKRI-EPSRC	March 2024
Refer to section 3.4			
2R	<p>Grand challenge/research plan</p> <p>The Institute should develop a programme plan for each GC, which includes the overarching goals, objectives and partnership approach. It should also specify the role the Institute anticipates playing, clearly defining the expected contributions in terms of</p>	Alan Turing Institute	March 2024

	bringing stakeholders together and adding value and providing details on how the directors for each GC will be appointed. (Please see Recommendation 5R)		
Refer to section 3.2			
3R	<p>Alan Turing Institute positioning within the wider ecosystem and partnerships plan</p> <ul style="list-style-type: none"> • Together UKRI-EPSC, DSIT and the Institute should define the role of the national institute for data science and AI within the national and international AI landscape. • The Institute should articulate a clear position with regards to bidding for additional public research funding. This should include a clear statement about the relationship of any such bid within the wider landscape. • UKRI-EPSC should agree with the Institute the principles under which, where and when the Institute will and will not be allowed to bid for additional funding through, or otherwise be involved in, competitions run by UKRI. • The Institute should continue to establish its positioning and role within the international landscape. • The Institute should develop a clear partnership plan that covers engagements with universities, industry, government, research funders and the public. This plan should articulate how relations will be managed while maintaining the Institute’s independence and impartiality; ensure strong collaboration across the UK’s ecosystem, a consistent approach to partnerships and ensuring points of entry and how they will engage communities for each of the grand challenge areas. (Note this is linked to condition 1C, recommendations 4R & 5R.) 	Alan Turing Institute & UKRI-EPSC	March 2024
Refer to sections 3.3 & 3.5			
4R	<p>Responsible innovation and collaboration with the wider ecosystem</p> <p>The Institute should continue to apply its responsible innovation principles to all its projects and ensure their value are clearly evidenced and demonstrated.</p> <p>In line with Recommendation 3R, the Institute should explore opportunities for greater collaborations for key activities across responsible AI and responsible R&I. This could include partnerships with entities like Ada Lovelace, the Centre for Data Ethics and Innovation (CDEI), RAI UK, and industry bodies such as TechUK.</p>	Alan Turing Institute	Continue
Refer to section 3.5			

5R	<p>People master plan and operations</p> <p>The Institute should develop a people plan for its staff (professional, scientific, and academic). This should encompass guidance on the Institute's human resource needs, such as talent requirements, career pathways, and support mechanisms. The plan should include a statement of the Institute's expected balance of core and more transient staff, such as but not limited to, seconded academics, visiting fellows, PhD students, that is necessary to deliver the Institute 2.0 strategy. The plan should also provide a clear statement on how financial efficiency in operation is being achieved.</p> <p>Within this plan, there should be a dedicated section addressing the role of GC Directors. There should be a clear delineation of the GC Director's duties and their accountability, especially concerning their levels of autonomy in operational structure of their challenge and their relationship with the CEO and Chief Scientist.</p>	Alan Turing Institute	March 2024
Refer to section 3.5			
6R	<p>Equality, diversity and inclusion (EDI)</p> <p>The Institute should continue to develop its efforts in championing EDI principles. In particular, the Institute should develop ways to ensure diversity is better represented in its senior leadership, including in the leaders of its programs.</p> <p>The Institute should also determine how EDI approaches, initiatives and the development of best practice processes can be embedded throughout the whole organisation, and where specific activities can drive greater diversity and inclusion in the AI and data science ecosystem at large.</p>	Alan Turing Institute	Continue
Refer to section 3.5			
7R	<p>Technology assurance process</p> <p>The Institute should establish suitable quality control processes that provide clarity on the nature of assurance on the advice and products it produces. This includes a clear statement of technology readiness level of published code or software, irrespective of whether this is open source.</p> <p>Where affiliated researchers are publishing results, it should be clear where these papers are specifically endorsed or otherwise associated with the Institute, and the affiliation noted. Care should be taken to ensure that users are made aware of any limitations on the use of these outputs.</p>	Alan Turing Institute	Continue
Refer to section 3.5			

Suggested actions (S)			
Suggested actions the Institute should take to improve performance and maximise benefits.			
1S	<p>Turing 2.0 strategy communication</p> <p>The Institute should:</p> <ul style="list-style-type: none"> • Ensure the Turing 2.0 strategy is clearly communicated within the Institute and all staff can understand their roles within it. • Ensure the strategy is communicated to all stakeholders across the broader AI community. Particular attention should be paid to articulating the role the Institute plays in the national and international AI ecosystem. • Ensure the strategy reaches the wider public, articulating what benefit the Institute will deliver for the public good. 	Alan Turing Institute	Ongoing
Refer to section 3.3			
2S	<p>Turing way maximisation</p> <p>The Institute should amplify the impact of the Turing Way, its handbook and training materials for reproducible, ethical, and collaborative data science. It has achieved good traction in places and within the Institute community; it should consider how to bring this work to a wider audience.</p>	Alan Turing Institute	Ongoing
Refer to section 3.2			
3S	<p>Ethics and responsible innovation</p> <p>To maximise the impact of the ethical insights the Institute has developed for data science, it is important that these are incorporated into the Institute’s research programs as a standard practice.</p>	Alan Turing Institute	Ongoing
Refer to section 3.5			

5. Conclusions and future funding scenarios

The Institute has individual programmes of research which are of high quality, driving impacts and delivering value for the UK. This also extends to those programmes developing talent, skills and promoting ways of working across the UK AI ecosystem. There are, however, challenges in articulating the way in which these activities combine to deliver an effective national institute that serves a broad set of UK and international stakeholders.

The panel have primarily taken a forward-looking approach to the review. There have been clear issues in the early life of the Institute, some of which stem from the way it was set up and from the operational methods which were employed in its first phase. It is critical to establish appropriate future governance, clearer engagement routes for external stakeholders, and to have a widely understood clarity of purpose.

Turing 2.0 represents a significant shift for the Institute. The panel believes the focus on specific GCs, and on the principles of additionality to, and convening of, the broader UK landscape, is a promising way forward. The leadership of the Institute has provided confidence that, with the above conditions, recommendations and actions addressed, the Institute can progress and increase its impact on the national and international stage. A national institute - one which can help to unite the community, facilitate, and foster new and existing links and relationships on behalf of the whole AI ecosystem, while acting impartially with and in the interests of all researchers and stakeholders in AI - can provide a nexus to catalyse R&I for the whole AI community. The Institute's international brand is prestigious and recognised globally and the role of the Institute as a 'front door' to the UK has grown over its operation and should be expanded where it can be shown that this gives benefit to the UK and the Institute itself.

The panel are supportive of continuing core funding for the Institute for the next five years, assuming the conditions of funding are met and actions addressing each of the recommendations are put in place.

The funding settlement should be at least equal to £15M per annum. This reflects the core funding from UKRI-EPSC to the Institute over the past two years, recognising core costs and supplemental funding for research programmes. To realise the full ambitions of the Turing 2.0 strategy, the Institute will need to continue to realise appropriate levels of leverage from other sources. This recognises that the UKRI-EPSC core funding enables a much greater total financial sum to be spent on research and research-facing activities both within the Institute and in collaboration with the community.

The panel would like to reiterate their thanks to all involved in the QQR. Throughout the process, there has been excellent engagement across all staff at the Institute, from wider stakeholders, and from the broader UK and international AI community. The panel believes the future for Turing 2.0 is bright and that with appropriate support it will play an increasingly prominent role in the national and international AI and data science ecosystem.

6. Alan Turing Institute written response

Comments from the Institute to follow.

7. EPSRC written response

Comments from the UKRI-EPSRC SRO to follow

8. Acknowledgements

The SRO on behalf of UKRI-EPSRC and UKRI would like to thank the chair and panel members for their hard work, patience, impartiality and good judgement in conducting this review and providing a fair set of conclusions and recommendations while making a valuable contribution to the AI and Data Science and R&I ecosystem.

Likewise, the SRO on behalf of EPSRC and UKRI wishes to thank the CEO, the chair of the Board of Trustees, and all the executive management and staff of the Institute for supporting and collaborating to ensure the QQR was fair and thorough. The Institute's executive management and staff's openness and honesty in openly engaging in the interviews and their hospitality while on site has been very much valued and appreciated and deserve recognition.

Lastly but not in order of importance, the SRO would like to thank all the interviewees across the UK AI landscape and beyond for their time contributing to this review, and finally the staff of the EPSRC AI and Robotics team for co-ordinating the review.

9. List of Annexes

Annex 1 – QQR panel terms of reference

Annex 2 – QQR panel membership

Annex 3 – QQR panel assessment criteria

Annex 4 – QQR methodology overview

Annex 5 - QQR interviewees list

Annex 6 – Governance and Funding Assurance audits summary

Annex 7 – Alan Turing Institute overview

Annex 1 - QQR panel terms of reference

Terms of reference for the Institute's QQR

Background

EPSRC's AI & Robotics (AIR) team are coordinating an independent five-year (quinquennial) review of the Institute, to evaluate progress to date, understand impacts delivered in this first phase of the Institute, and establish value for money as well as assess the forward-looking plans.

The QQR will be complemented by independent and parallel governance and funding assurance reviews conducted by the UKRI governance audit and funding assurance functions. Outputs of the audits will be summarised into reports and provided to the panel.

1.1 Purpose

This review will assess:

- The overall purpose of the Institute, its relationship with the wider ecosystem and its strategic plans.
- The scientific quality (looking at the activities of each directorate plus those of the Institute as a whole) the impact and 'added value' of the Institute and its activities.
- The leadership of the Institute within the AI and data ecosystem and its influence on government strategies and priorities.
- What has been delivered against the internal and external objectives (including UK priorities) over the last five years and the future five-year plan?
- The operational model of the Institute and whether it's fit for purpose.

The review will provide guidance and recommendations for longer term, sustained and secure funding for the Institute.

1.2 Membership and stakeholders engagement

The review will be conducted by an independent review panel consisting of 6 external panel members, a representative for EPSRC and a chair. The panel chair to be a person of sufficient standing to provide reassurance to EPSRC and to the wider community that the QQR has followed

robust governance and operational delivery processes and that open, transparent and unbiased recommendations have been developed during the evaluation of the past performance and future potential.

The QQR panel is made up of members with sufficient focus and expertise to cover different aspects of the QQR review and they will engage with stakeholders, including but not limited to, government, AI international space, tech companies, and academia.

1.3 Overall responsibilities of the Institute's QQR review panel

The Institute's overall past performance and future plans will be reviewed by the QQR panel regarding:

1. The overall quality, impact and productivity arising from the Institute's core award and the associated directorates, programmes, and overall operation of the Institute, in the context of their additive role to the UK landscape. This will include the Institute's role in:
 - The development of novel methods, technologies in data science and AI, and their accessibility and applications.
 - Supporting and delivering AI and data science training, mentoring, career development and capacity building.
 - The development of translational research, knowledge transfer and exchange, including opening opportunities for direct interactions across academia, government and other public sectors, industry and the third sector.
 - Developed links and created new networks which have advanced the ecosystem of AI and data science R&I in the UK.
2. The Institute's contribution and investment in Data Science and AI at both a national and international level, exploring the work of other Institutes with similar remit, size and magnitude, strategies and expertise.
3. How well the Institute's Structure and environment has provided added value for its constituent organisations, directorates, and programme and those of the AI and data community at large as well as looking at future plans in this space. This will consider resources, additional cofounding, collaborations and partner organisation contributions.
4. The value for money to EPSRC and other core funders provided by the Institute's funding model and whether the added value provided by this type of support justifies this form of support or whether other funding arrangements could be better, considering the Institute's expectations around future leveraged funding outside of the core award.
5. Developments of the Institute's governance and management structure to deliver its overall long-term strategy, including value for money of central executive, administrative delivery costs supported by the core award and the efficacy of its current internal and external governance model (to be reviewed by independent commission).
6. How well, and what progress the Institute has made towards to public engagement and what future plans for public engagement look like.
7. The Institute's contribution and progress to create, foster, improve and advance responsible innovation, research integrity and EDI across the AI landscape and communities as well as plans for a forward looking on the mentioned areas.

Please note that the final review should provide recommendations on the scale and form of future investment, considering the potential funding options proposed and ensure that the outputs of the review are made accessible to the wider communities.

1.4 Ways of working and quoracy

The panel executes its assessment and advisory responsibilities through appropriate meetings and interview sections (in-person, hybrid, online) and via correspondence, intended in line with the QQR process timeline and with business requirements.

The panel may use comparisons with other Institutes if this will simplify the review.

The QQR panel quorum depends on the type of meetings/interactions, hence the QQR panel will be deemed quorate as follows:

- For the general QQR panel meetings (as per the agreed timeline) and meetings and interviews with the Institute stakeholders, the QQR Panel will be quorate with 4 QQR panel members present (in-person, hybrid, remote).
- While for meetings and interviews with no Institute stakeholders, the panel will be quorate with 2 of the panel members present (in-person, hybrid, remote).

Additionally, the QQR panel needs to ensure a diverse set of panellists, skills and expertise to guarantee fair involvement, diverse perspectives and thorough and transparent assessment while meeting the stakeholders.

If the panel is executing its responsibilities via correspondence, members should respond by the set deadline and no-response will be interpreted as approval or ratification.

1.5 Panel Coordination and strategic secretariat

The QQR panel will be supported by the secretariat of the EPSRC AI & Robotics Team, who will provide the appropriate tools and documentation to the panel to take informed decisions, as well as minute its meetings and other interactions.

1.6 Review of terms of reference

This document will be agreed by the QQR panel members in the first meeting on 10th May 2023 and reviewed in line with the needs of the QQR if needed.

Annex 2 - QQR panel membership

QQR panel members

Nick	Jennings	VC Loughborough University – panel chair
Patrick	Baker	MoD - DSTL
Julia	Black	London School of Economics
Veronica	Bowman	MoD - DSTL
Alistair	Fitt	VC Oxford Brookes University
Jonathan	Legh-Smith	UK Quantum
Sarah	Sharples	Chief Scientific Adviser DfT
Kedar	Pandya	EPSRC – UKRI panel adviser

Annex 3 - QQR panel assessment criteria

- **Quality of the Programme:** looking back at the achievements of the Institute and future programme plans.
The quality of the Institute's programme of activities, investments, facilities, and opportunities offered by the Institute and future Programme plans.

- **Overarching vision, ambition, impacts and strategy:** overview of past progress while focussing on the next five years.
The extent to which the Institute has a forward-looking five-year strategy, including alignment with and impact on the Institute and UK objectives and priorities.

- **Leadership and management**
Asses the Leadership and Management mechanisms in place and their effectiveness and next steps.

- **Added value, including on impact and advocacy:** past and forward looking.
This criterion focusses on outputs and outcomes delivered by the Institute in line with the business case, in terms of economic value as well as the impacts on the AI and wider community (including EDI, Integrity and Responsible Innovation) as result of the advocacy role played by the Institute, and next steps going forward.

Annex 4 - QQR methodology overview

The QQR of the Institute was carried out between April 2023 and December 2023 and consisted of:

- Panel-led review of the past performance and future of the Institute. This included the review of documentation provided by the Institute, interviews with the Institute executive, staff, partners, and internal stakeholders. This was supplemented by further interviews with a diverse set of stakeholders across the AI landscape, including government, business and international representatives (Refer to Annex 5 for the full list of interviewees).
- Review of governance arrangements through the UKRI Risk and Assurance function, which reviewed the Institute's submitted documentation and interviews in line with the UKRI audit guidelines.
- Funding assurance review carried out by the UKRI Funding Assurance function, following the same review process as the governance audit.

In September 2023 the panel provided draft feedback and recommendations to the CEO and chair of the Board of Trustees of the Institute, recognising that further interviews and inputs from stakeholders would follow prior to finalising the report.

The final report, finalised in December 2023, presents the conclusions and recommendations of the QQR panel on the Institute to EPSRC.

Annex 5 – Interviewees list

In order of appearance

Adrian	Smith	Outgoing Turing CEO
Jon	Atkins	Turing COO
Mark	Girolami	Turing Chief Scientist
Nico	Guernion	Turing Director of Partnerships
Allaine	Cerwonka	Turing Director of International
Kathryn	Magnay	EPSRC Deputy Director
Donna	Brown	Turing Director of Academic Engagement
Sophie	McIvor	Turing Director of Communication and Engagement
Ray	Eitel-Porter	Accenture UK
Alison	Roberts	NATS
Ryan	Copping	Roche
Chris	Harbron	Roche
Adam	C-S	GCHQ
Miguel	Rodrigues	UCL
Ana	Basiri	Glasgow University
Kate	Robson Brown	Bristol University
Doug	Gurr	Turing Chair of Board of Trustees
Maria	Liakata	Turing AI Fellow
Richard	Kenway	Turing Board Member
Frank	Kelly	Turing Board Member
Neil	Viner	EPSRC, Turing Board Member
Tom	Rodden	Turing Science & Innovation Advisory Group
Kerry	Sheehan	Turing Engagement & Ecosystem Advisory Group
Iain	Styles	Turing Skills & People Advisory Group
Clare	Randall	Turing Director of People and Operations
Camilla	Rangel- Smith	Turing REG
Judy	Wajcman	Turing Fellow

Malvika	Sharan	Turing TPS
Erin	Young	Turing PPP
David	Leslie	Turing Director of Ethics and Responsible Innovation Research
Kirstie	Whittaker	Turing Programme Director TPS
Mike	Wooldridge	Turing Director of Foundational AI
Helen	Margetts	Turing Director of Public Policy
Simon	Reeve	Turing Director of Innovation
Martin	O'Reilly	Turing Director of Research Engineering
Dani	Arribas-Bel	Turing Urban Analytics
Jon	Rowe	Turing
Ben	McArthur	Turing ASG
Scott	Hosking	Turing TRIC
Adam	Sobey	Turing Data Centric Engineering
Tim	Watson	Turing Defence & Security
George	Balston	Turing Defence & Security
Chris	Holmes	Turing Health & Medical Sciences
Jean	Innes	Incoming Turing CEO
Sam	McGregor	AHRC
Sara	El-Hanfy	Innovate UK
Anna	Angus-Smyth	NERC
Klas	Pettersen	CEO NORA, Norwegian AI Research Institute
Per-Gunnar	Martinsson	University of Texas, Austin
Daniella	Rus	Director of the MIT Computer Science and AI Lab
Yvonne	Rogers	Chair of Interaction Design, UCL
Michael	Luck	Professor of Computer Science, Kings College, London
Kenji	Takeda	Director of Academic Health and AI Partnerships, Microsoft
Gopal	Ramchurn	CEO, Responsible AI UK, University of Southampton
Peter	Stone	Professor of Computer Science, University of Texas, Austin
Chris	Johnson	Engineering and Physical Sciences, Queens University, Belfast

Carles	Sierra	Director of the AI Research Institute, Spanish National Research Council
Charlotte	Watts	CSA for FCDO
Sam	Cannicott	UK Government Centre for Data Ethics and Innovation
Yarin	Gal	UK Government Frontier Task Force
Dave	Smith	UK Government National Technology Adviser

Annex 6 - Governance and Funding Assurance audits summary

Governance audit

The governance audit provides an independent and objective assessment on the design and effectiveness of the Institute's systems of governance, risk management and internal control. The governance audit aims to provide assurance to UKRI-EPSC that these systems support strategic thinking and delivery across the Institute, its partners and the wider ecosystem as part of the QQR of the Institute.

The resulting Governance audit report is an evidence-based snapshot of the Institute's governance at the time of the review. It reflects the opinion of the auditors, based on information evaluated over the audit, which resulted concluded on an opinion of Moderate Assurance.

Opinion

Moderate Some improvements are required to enhance the adequacy and effectiveness of the framework of governance, risk management and control.

The governance report shows that there is a good governance system in place within the Institute, albeit with some room for improvement. More work is required to establish how the Institute can obtain external strategic advice to help it deliver against its new strategy, and negotiation is required with the Institute's founder members to update its constitutional documents to reflect what is now required. A more structured approach to setting out UKRI-EPSC's reporting requirements as a major funder of the Institute would ease some tensions and encourage a better working relationship, and UKRI-EPSC are encouraged to consider how the Institute can engage with AI and data science programmes of other parts of UKRI.

The Institute provides a robust approach to risk management with good levels of discussions taking place at the Institute's Trustee board, Audit and Risk Committee and beyond. Whilst there are some gaps associated with the Institute risk management approach. A key focus for the Institute is to ensure its risk management approach links to the delivery of the organisational objectives within the strategy. An important step in that process is for the Trustee board to revisit the risk appetite and provide the organisation with clear statements regarding acceptable levels of risk.

The Institute has an assurance programme with appropriate governance oversight. The Institute does not join up the individual assurance activities into an overall map, and therefore does not coordinate and communicate the breadth of assurance to its trustees and founder members as well as it could do. The Institute has taken a decision to not appoint an internal auditor. This decision is reviewed annually and there is a case that the independent and objective assurance that an internal auditor could provide on the effective operation of risk management, governance, and internal control processes would be valuable.

The audit team conducted a light-touch review of process documentation around grant funding by the Institute from UKRI-EPSC monies. The process for managing large grant programmes as described by interviewees appears to follow good practice with tracking of finances and reporting to programme boards. The development of impact reporting and standard impact metrics should

support the demonstration of impact moving forward, noting it is easier to demonstrate impact with large strategic programmes enabled by multi-year funding.

The Institute meets reporting requirements in terms of the financial accounts and received an unqualified opinion for the 2022-23 financial year. The audit team did not review the management accounts in the available time but note the scrutiny by the Audit and Risk Committee and Board.

Funding Assurance Audit

UKRI Funding Assurance provides independent assurance to the UKRI Accounting Officer over the regularity of funding made by the Research Councils in respect of research grants, fellowships and training grants. Funding Assurance activity is designed to provide an explicit and robust opinion to allow the Accounting Officer to discharge their personal responsibility in safeguarding public funds and achieving value for money. In accordance with the approved plan, UKRI Funding Assurance have conducted a funding assurance review of the Institute. Three key areas of concern were identified during the course of our review:

- Timesheets are not completed consistently across all UKRI projects, as per the requirements of UKRI's terms and conditions. As a result, the Institute was unable to sufficiently demonstrate that Directly Incurred (DI) staff costs charged to UKRI projects reflected the actual hours worked. Given our findings, we have been unable to place any significant reliance on the accuracy of DI staff cost calculations for those individuals who spend less than 100% of their time on one UKRI project.
- The Institute does not currently have a methodology in place to calculate indirect and estates charges for application onto FEC awards – relying instead on a flat rate which was agreed with EPSRC as an interim solution.
- We noted that (following guidance previously issued by EPSRC) the Institute has historically adopted cash, rather than accruals accounting for core expenditure. Discussions should be held between the Institute and EPSRC to determine when the adoption of accruals accounting should be implemented.

Based on the work undertaken, an opinion of limited assurance has been awarded. As a result of this, Final Expenditure Statements (FES's) submitted by the Institute will be subject to additional scrutiny by UKRI prior to being reconciled and the final payment issued. This measure will be in place until the Institute are able to sufficiently demonstrate the issues identified through our review have been rectified.

Annex 7 - Overview of the Alan Turing Institute

The Institute was founded in 2015 as the national institute for data science, following a recommendation from the Council for Science and Technology. In 2017 the remit of the Institute was extended to include AI as a result of a government recommendation, with a mission “to make great leaps in the development and use of data science and artificial intelligence to change the world for the better”. The Institute is a company limited by guarantee and a registered charity governed by a Joint Venture Agreement (JVA), Articles of Association and by a Board of Trustees.

Key Alan Turing Institute Highlights

In the past five years, the Institute has worked on several hundred projects, funded from a variety of sources and with different partners. The following list of five activities were provided to the QQR panel as the most significant ‘Jewels in the Crown’.

Data-centric engineering

- Established with £10m from the Lloyd’s Register Foundation.
- Took a central role in the emerging discipline of data-centric engineering.
- Projects included a collaboration with Rolls Royce that resulted in the equadratures software, now used by the company to optimise design processes for its jet engines and more widely to streamline complex engineering models.
- Led to pioneering work in developing and deploying digital twins which is being advanced through the Turing Research and Innovation Cluster (TRIC) in Digital Twins.

AI ethics, standards and guidance

- Published internationally recognised guidance on AI ethics (2019), which has been put into practice in a dozen different government departments
- Work in ‘explainability’ produced the world’s most cited guidance on explaining AI-assisted decisions (2020) and informed Google’s What-If tool, which explores issues of fairness in algorithmic decision-making.
- Inputted directly to the UK’s landmark Online Safety Bill.
- In 2022, the Institute became a core partner in the new AI Standards Hub and it is driving forward pioneering work in standards and regulation both nationally and internationally.

Partnership with the defence and security community

- The Institute partners with the Government Communications Headquarters (GCHQ), Ministry of Defence (MOD), Defence Science and Technology Laboratory (DSTL) and MI5 to contribute directly to policy-making on security issues.
- Researchers are developing modelling tools to help track violent criminals.



- In 2022, the Institute launched the Centre for Emerging Technology and Security (CETaS), which has already developed an influential network of stakeholders from across the UK security and technology community, and published on issues including open-source intelligence and disinformation in the Russia-Ukraine conflict.
- Partners continue to rely on (and invest in) the Institute, to guide them through the evolution and implications of these technologies.

Data Study Groups (DSGs)

- Research sprints with a focus on training and knowledge exchange that enable PhD students to work on real-world problems from industry, government and the third sector.
- The Institute has hosted 20 DSG events, over 80 challenges and more than 1,000 participants.
- In 2021, the Institute DSGs were announced as a winner of the PraxisAuril Knowledge Exchange Awards, in the category of 'Academic Engagement of the Year'.
- DSGs are continuing and even being combined with our Turing Internship Network through pilots to amplify their joint activity.

AI UK

- Launched the UK's first national showcase in data science and AI in 2021.
- It has grown an audience from around 1,000 online to more than 1,500 in person and online in 2023.
- Engagement has come from across academia, industry, public and the third sector.
- Planning for an even bigger and better event in 2024 is already underway.

In addition to those listed above, the QQR panel took particular note of the following activities:

- The establishment of the Research Engineering Group (REG) and the Tools Processes and Systems (TPS) group. These are both resources to support AI research and development projects that no university and few commercial firms could match.
- The Turing Way is an ever-developing online guide to safe and ethical AI development, with over 400 contributors, which has been downloaded over 17,000 times.
- The SPARRA project predicts patients' risk of readmission to hospital – potentially reducing patients distress and harm and reducing costs to the Health Service.
- Work on multiple long term health conditions and polypharmacy, both using the NHS unique data resource to potentially improve patient outcomes and reduce costs.
- IceNet predicts arctic sea ice conditions six months into the future using deep learning to provide higher accuracy and using 2000x less computing resource than traditional approaches. This not only provides valuable data for conservation work in this sensitive environment but

has significant commercial implications and points the way to more efficient and effective methods for environmental forecasting.

Turing 2.0

The Institute has recently unveiled a new strategy, Turing 2.0; the strategy, coupled with a change in both the Chair of the Board of Trustees and Chief Executive point to a significant change in focus.

In future the Institute will focus on three GCs, Health, Environment and Defence & Security, with a clear focus on additionality and convening of the AI and data science landscape.