AI FOR THE EARLY DIAGNOSIS OF DISEASE

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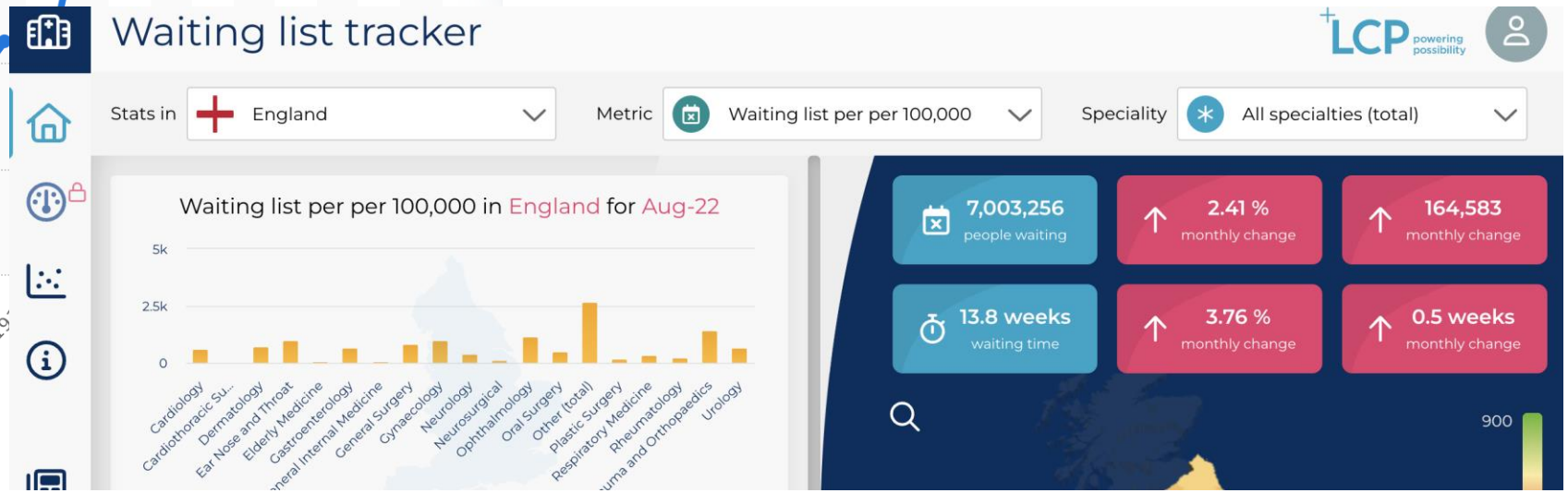
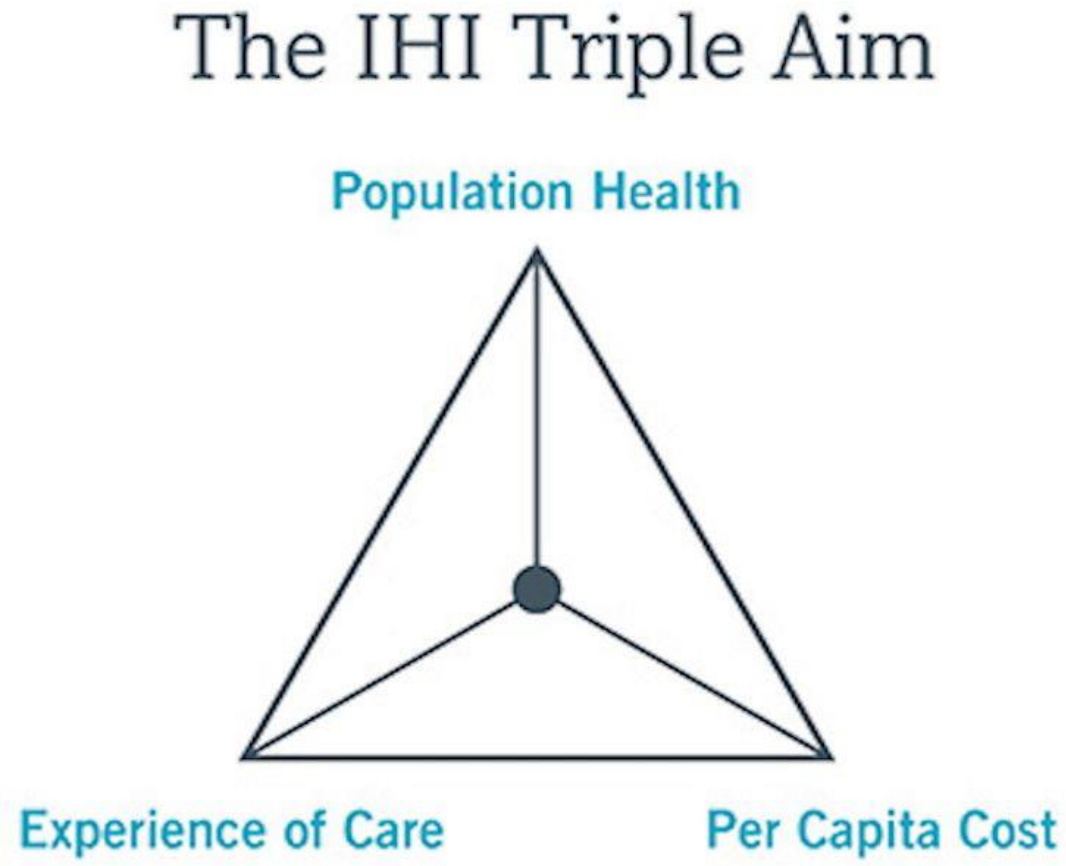
HEALTHCARE IN CRISIS

£910 million



https://www.statista.com/statistics/1040159/life-expectancy-united-kingdom-all-time/

A SOLUTION?



P4 Medicine

- Predictive
- Preventative
- Personalised
- Participatory

A SOLUTION?

"Our vision is for the UK to have the most advanced and data-enabled clinical research environment in the world – where we capitalize on our unique data assets to deliver improvements to the health and care of patients across the UK and beyond"

A SOLUTION?

"By 2030, the UK has a learning health and care system delivering better outcomes for the public, enabled by the effective use of safe, ethical, and effective AI, setting an example to the world"

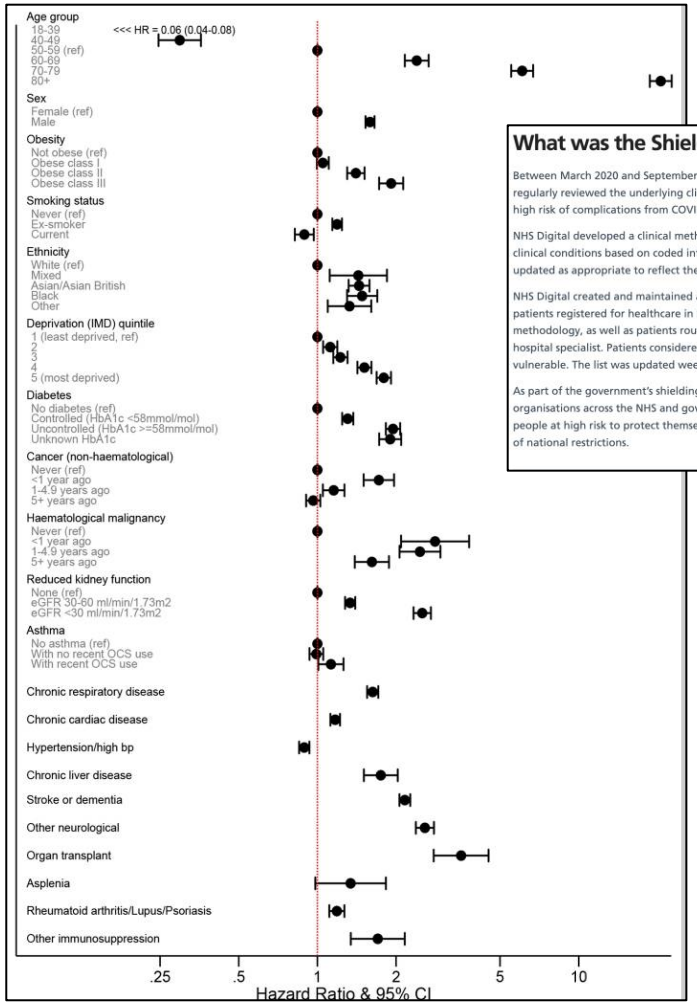
A SOLUTION?

"We will seize opportunities to support the NHS and patients through innovative NHS data partnerships that fundamentally drive improvements in health outcomes and/or reduce health inequalities ……"

– Life Sciences Vision

ENTER CLINICAL DECISION SUPPORT SOFTWARE (CDSS)

ENTER CDSS



What was the Shielded Patient List?

Between March 2020 and September 2021, the UK Chief Medical Officers (CMOs) regularly reviewed the underlying clinical conditions for which people should be high risk of complications from COVID-19 infection.

NHS Digital developed a clinical methodology, a ruleset to identify patients who clinical conditions based on coded information in their health records. This meth updated as appropriate to reflect the guidance provided by the CMOs.

NHS Digital created and maintained a Shielded Patient List (SPL) for England. The patients registered for healthcare in England and identified nationally using the methodology, as well as patients routinely identified as at high risk by their Gene hospital specialist. Patients considered at high risk were also referred to as clinica vulnerable. The list was updated weekly from March 2020 to September 2021.

As part of the government's shielding programme, the SPL was used by specific p organisations across the NHS and government to provide advice, guidance and su people at high risk to protect themselves from COVID-19 infection during and be of national restrictions.

Category	Group	Third Doses due at 22 Jun 2022 (n)	Third doses overdue (n)	Third doses given (n)	Third doses given (% of due)	Total population
overall	overall	1,109,941	24,059	1,085,882	97.8	1,156,330
Sex	F	636,993	15,484	621,509	97.6	664,657
	M	472,948	8,582	464,366	98.2	491,673
Age band	80-84	581,553	12,026	569,527	97.9	604,443
	85-89	351,260	7,714	343,546	97.8	365,421
	90+	177,121	4,312	172,809	97.6	
Ethnicity (broad categories)	Black	8,918	1,197	7,721	86.6	
	Mixed	2,975	231	2,744	92.2	
	Other	6,069	392	5,677	93.5	
	South Asian	26,845	3,283	23,562	87.8	
	Unknown	37,863	1,218	36,645	96.8	
	White	1,027,264	17,738	1,009,526	98.3	
Ethnicity (detailed categories)	African	1,589	308	1,281	80.6	
	Bangladeshi or British Bangladeshi	1,176	252	924	78.6	
	Caribbean	6,118	735	5,383	88.0	
	Chinese	1,533	70	1,463	95.4	
	Other	4,529	322	4,207	92.9	
	Other Asian	4,207	406	3,801	90.3	
	British or Mixed British	975,373	16,093	959,280	98.4	
Index of Multiple Deprivation (quintiles)	1 Most deprived	135,023	6,342	128,681	95.3	144,438
	2	181,951	5,096	176,855	97.2	191,359
	3	250,950	4,823	246,127	98.1	260,708
	4	260,470	4,060	256,410	98.4	269,444
	5 Least deprived	260,729	3,220	257,509	98.8	268,121
	Unknown	20,811	518	20,293	97.5	22,253
BMI	30+	200,809	4,228	196,581	97.9	206,234
	under 30	909,125	19,824	889,301	97.8	950,089
Housebound	no	1,003,723	20,636	983,087	97.9	1,045,387
	yes	106,218	3,423	102,795	96.8	110,943
Chronic cardiac disease	no	775,208	16,870	758,338	97.8	811,930
	yes	334,726	7,182	327,544	97.9	344,393
Current COPD	no	992,523	21,294	971,229	97.9	1,035,615
	yes	117,411	2,758	114,653	97.7	120,708
DMARDs	no	1,073,709	23,408	1,050,301	97.8	1,119,307
	yes	36,225	644	35,581	98.2	37,016
Dementia	no	1,026,522	21,119	1,005,403	97.9	1,069,187
	yes	83,419	2,940	80,479	96.5	87,136
Psychosis, schizophrenia, or bipolar	no	1,102,080	23,660	1,078,420	97.9	1,147,860
	yes	7,861	399	7,462	94.9	8,470
Learning disability	no	1,109,430	24,024	1,085,406	97.8	1,155,784
	yes	504	28	476	94.4	539

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BUT……WAIT!

A POOR TRACK RECORD

Editor Letter | Published: 29 February 2020

AI and Its New Winter: from Myths to Realities

Luciano Floridi

Philosophy & Technology **33**, 1–3 (2020) | Cite this article

11k Accesses | **41** Citations | **68** Altmetric | Metrics

The trouble with seasonal metaphors is that they are cyclical. If you say that artificial intelligence (AI) got through a bad winter, you must also remember that winter will return, and you better be ready. An AI winter is that stage when technology, business, and the media get out of their warm and comfortable bubble, cool down, temper their sci-fi speculations and unreasonable hypes, and come to terms with what AI can or cannot really do as a technology (Floridi 2019), without exaggeration. Investments become more discerning, and journalists stop writing about AI, to chase some other fashionable topics and fuel the next fad.

Explainer

Ofqual's A-level algorithm: why did it fail to make the grade?

There is a lot we can learn from the algebraic symbols used to determine results in England

A university vice-chancellor's diary of A-level chaos

A POOR TRACK RECORD

Health MPs change direction after receiving new evidence

MPs will hold inquiry into £12bn NHS IT plan

Tony Collins

KEY POINTS

The House of Commons' Health Committee has agreed to hold an inquiry into key facets of the £12.4bn NHS National Programme for IT (NPfIT) after some MPs expressed concerns that the scheme may be floundering.

The decision reverses a resolution taken by the parliamentary committee only weeks ago not to hold an inquiry, and vindicates a campaign led by leading academics, Computer Weekly and MPs.

The inquiry, the terms of reference for which will be announced shortly, is expected to involve the committee's members questioning ministers and officials at a series of hearings.

MPs on the committee can take in evidence from trust executives who are concerned about the lack of progress in the delivery of core patient systems for hospitals, and from GPs about whether controversial electronic health records will be secure.

The committee in October rejected an inquiry partly because some members believed the programme was too complicated to be investigated by non-expert MPs.

Its change of heart comes after Computer Weekly provided some committee members with new evidence – including a confidential briefing paper on the NPfIT from directors of informatics at a large NHS trust. The paper expressed profound concerns about some aspects of the NPfIT.

Computer Weekly has also learned that strong support for an inquiry came from Dr Richard Taylor, a former hospital consultant and the only independent MP in the House of Commons.

Taylor told Computer Weekly that he was originally not in favour of an inquiry, but changed his mind after an informal briefing by BT, one of the main suppliers to the NPfIT.

He said BT's briefing had been so interestingly positive about the programme that he found it lacked credibility, and this made him wonder whether the programme was as successful as the supplier claimed.

It is seven months since 23 academics, supported by this magazine, wrote an open letter to the committee calling on its members to ask the government to commission an independent audit into the national programme.

Marlyn Thomas, one of the 23 academics who wrote the open letter to the health committee, said, "Speaking on behalf of the 23, we welcome the news that the Health Committee intends to hold an inquiry early in the new year. We intend to submit evidence to the inquiry further supporting our call for a full, independent and open review of the NPfIT."

Read more inside

→ Opportunity for clarity, p23

→ Who will pay for IT accidents, p6

QUITTING ISN'T IN THE CONSTITUTION

The NHS aspires to the highest standards of excellence and professionalism
It provides high quality care that is safe, effective and focused on patient experience; in the people it employs, and in the support, education, training and development they receive; in the leadership and management of its organisations; and through its commitment to innovation and to the promotion, conduct and use of research to improve the current and future health and care of the population. Respect, dignity, compassion and care should be at the core of how patients and staff are treated not only because that is the right thing to do but because patient safety, experience and outcomes are all improved when staff are valued, empowered and supported.

Improving lives
We strive to improve health and wellbeing and people's experiences of the NHS. We cherish excellence and professionalism wherever we find it – in the everyday things that make people's lives better as much as in clinical practice, service improvements and innovation. We recognise that all have a part to play in making ourselves, patients and our communities healthier.

The NHS Constitution, 2021

CDSS & HEALTHCARE: IT'S COMPLICATED

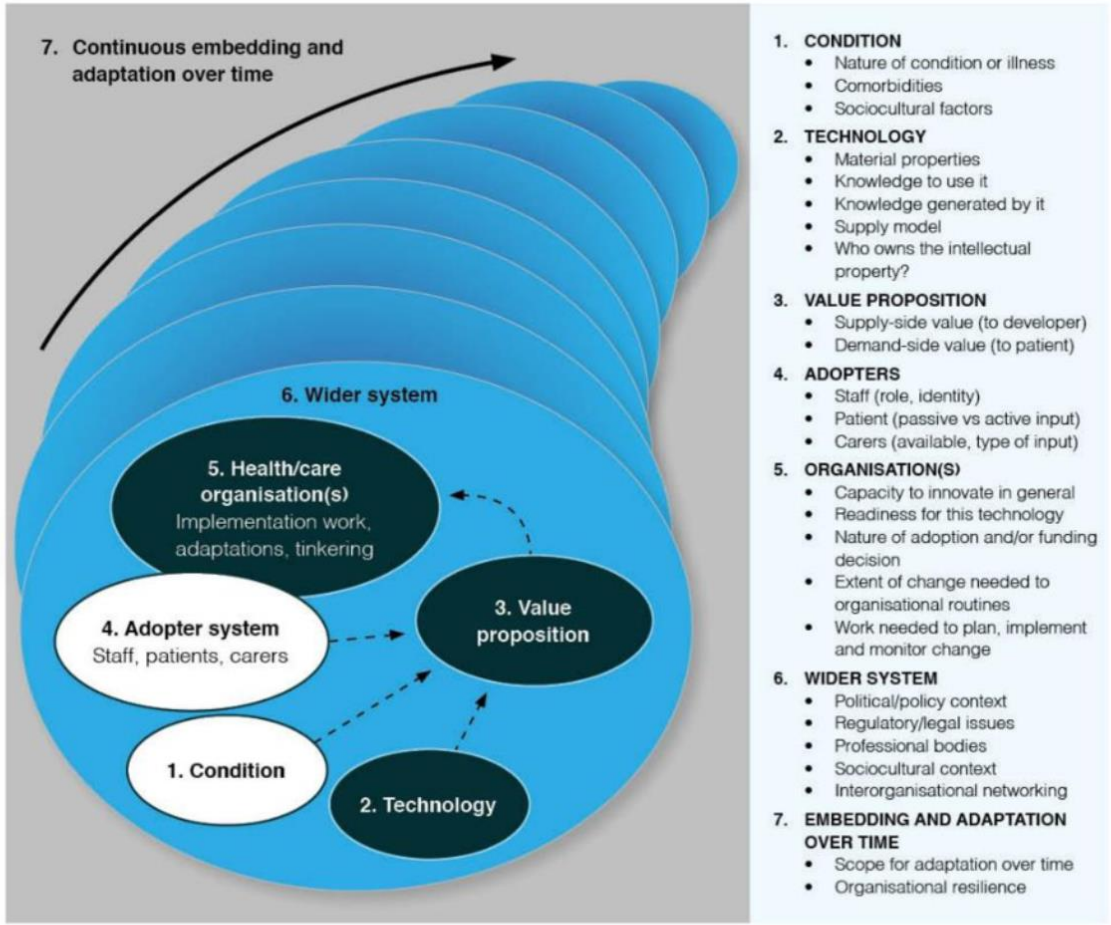
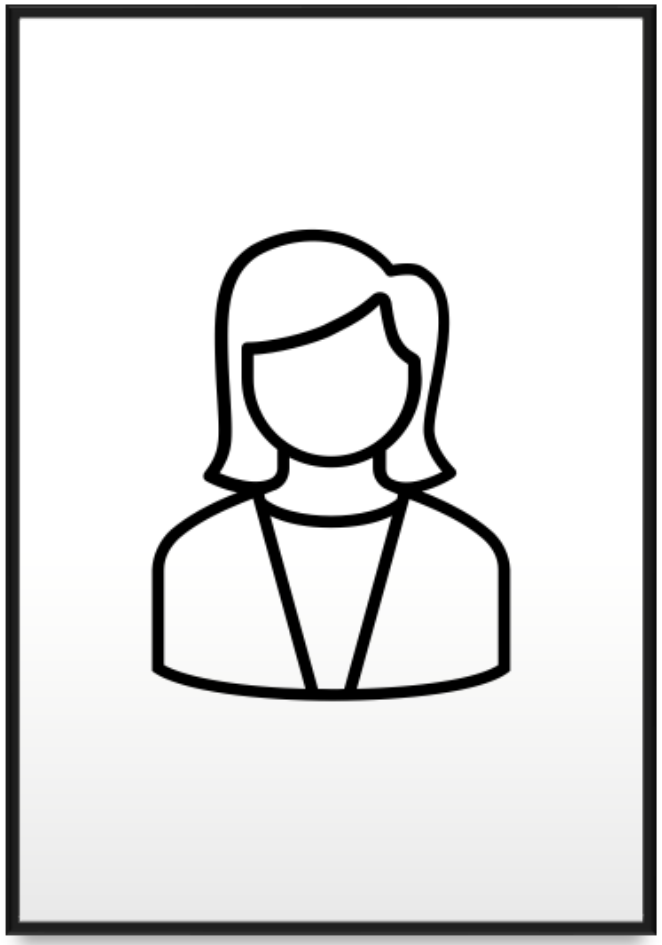


Figure 1: The NASSS framework for studying non-adoption and abandonment of technologies by individuals and the challenges to scale-up, spread and sustainability of such technologies in health and care organisations (adapted from Greenhalgh et al [1])

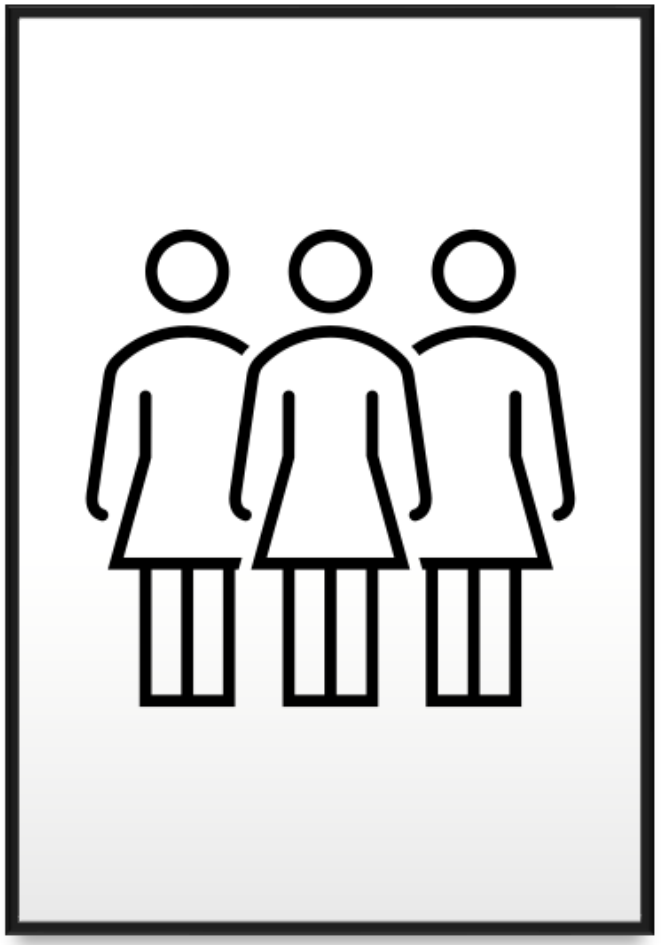
Greenhalgh, Trisha et al. 2017. 'Beyond Adoption: A New Framework for Theorizing and Evaluating Nonadoption, Abandonment, and Challenges to the Scale-Up, Spread, and Sustainability of Health and Care Technologies'. *Journal of Medical Internet Research* 19(11): e367.

THE RISKS OF RE-ONTOLOGISING



Knowledge about the Body

The Therapeutic Relationship



Relationship between the body, culture, and society

POLICIES & GUIDELINES

Guidance Doc	Requirements
Central Digital and Data Office, and Office for Artificial Intelligence. 2019. Understanding Artificial Intelligence Ethics and Safety. https://www.gov.uk/guidance/understanding-artificial-intelligence-ethics-and-safety (September 27, 2022).	Build a culture of responsible innovation
	Ensure the AI product is ethically permissible: consider the impacts it may have on the wellbeing of affected stakeholders and communities
	Ensure the AI product is fair and non-discriminatory: consider its potential to have discriminatory effects on indiviudals and social groups, mitigate biases which may influence your model's outcome, and be aware of fairness issues throguhout the design and implementation lifecyle
	Ensure the AI product is worthy of public trust: guranatee as much as possible in terms of safety, accuracy, reliability, security, and robustness
	Ensure the AI product is justifiable: prioritise the transparency of how you design and implement your model, and the justification and interpretability of its decisions and behaviours
	Support the development of the AI product with the SUM Values: respect the dignity of indiviudals; connect with each other sincerely, openly, and inclusively; care for the wellbeing of all; protect the priorities of social values, justice, and public interest
	Design the AI system to be fully answerable and auditable (accountability)
	Establish a continuous chain of responsibiltiy for all roles involved in the design and implementation lifecycle of the project
	Implement activity monitoring to allow for oversight and review throughout the entire project
	Be considerate of the transformative effects AI systems can have on individuals and society
	Ensure it is possible to explain to affected stakeholders how and why a model performed in the way it did in a specific context
	Build a process-based governance framework

Central Digital and Data Office. 2021. The Technology Code of Practice. https://www.gov.uk/guidance/the-technology-code-of-practice (September 28, 2022).	Define the user need
	Make things accessible and inclusive
	Be open and ise open source
	Make use of open standards
	Use cloud first
	Make things secure
	Make privacy integral
	Share, reuse and collaborate
	Integrate and adapt technology
	Make better use of data
	Define the purchasing strategy
	Make the technology sustianable
	Meet the service standard

Central Digital and Data Office, and Office for Artificial Intelligence. 2019. Assessing If Artificial Intelligence Is the Right Solution. https://www.gov.uk/guidance/assessing-if-artificial-intelligence-is-the-right-solution (September 28, 2022).	Share your model
	Ensure explainability
	Evaluate the project
	Ensure public scrutiny of the project
	Assess if AI is the right solution for your users' need
	Work with the right skills to assess AI
	Assess the dataset for accuracy, completeness, uniqueness, timeliness, validity, sufficiency, relevancy, representativeness, consistency
	Choose the right model for the challenge
	Ensure there is an appropriate governance framework in place
	Record where AI is in use, what it is being used for, who was involved in its development, how it has been assessed, what other teams rely on the technology

Central Digital and Data Office. 2020. Data Ethics Framework. https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework-2020 (September 27, 2022).	Define and understand public benefit and user need
	Understand unintended consequences of your project (fairness)
	Consider human rights (fairness)
	Justify the benefit for the taxpayer and appropriate use of public resources in your project (accountability)
	Make sure the user need and public benefit are transparent (transparency)
	Ensure there is a clear articulation of the problem before the project starts
	Involve diverse expertise
	Involve external stakeholders
	Ensure effective governance structures
	Comply with the law
	Review the quality and limitations of the data
	Share your model
	Ensure explainability
	Evaluate the project
	Ensure public scrutiny of the project

Central Digital and Data Office, and Office for Artificial Intelligence. 2019. Planning and Preparing for Artificial Intelligence Implementation. https://www.gov.uk/guidance/planning-and-preparing-for-artificial-intelligence-implementation (September 28, 2022).	Assess if AI is the right solution for your users' need
	Assess the dataset for accuracy, completeness, uniqueness, timeliness, validity, sufficiency, relevancy, representativeness, consistency
	Build a multidisciplinary team including data architect, data scientist, data engineer, domain expert, ethicist
	Assess how to integrate the AI into existing technology and services
	Complete a data factsheet
	Keep the data secure
	Research the end to end service
	Test and validate the model independently
	Evalute the live service and iterate appropriately

BARRIERS & ENABLERS

Information	Technology	Processes	Objectives & Values	Skills & Knowledge	Management Systems & Structures
Data Quality Data 'Relevancy' (calibration) Data Representativeness Epistemic Certainty Interpretability Timeliness	Integration Interoperability Privacy Access Usability	Verification Validation Evaluation	Value pluralism Clinical buy-in Social License Holism Tolerant Paternalism	Clinical Informatics Data Ethics Data Science Software Engineering Pathway Integration	Legal clarity Auditability

ITPOSMO MODEL

Category	Score
Information	7
Technology	7
Process	8
Objectives & Values	10
Skills & Knowledge	4
Management Systems and Structures	9
	45

“A value between 43-56 means the e-government project may well fail unless action is taken to close design-reality gaps.”

WHY?

DETERMINSM	**NEO-INSTITUTIONAL THEORY**
THE "FRAME" PROBLEM	**EPISTEMIC COMMUNITIES**

FOUR UNIFYING CONCEPTS

UTILITY

USABILITY

EFFICACY

TRUST

THANK YOU, QUESTIONS?