BCS - The Chartered Institute for IT
Summary of Response to National Data Strategy
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Executive Summary

The government published a policy paper[1] on September 7, 2020 outlining a National Data Strategy. As explained by the Rt Hon. Oliver Dowden CBE MP the National Data Strategy is intended to fulfil the "*government's wider ambition for a thriving, fast-growing digital sector in the UK, underpinned by public trust*". In particular the purpose of the National Data Strategy is to "*harness the power of data to boost productivity, create new businesses and jobs, improve public services and position the UK as the forerunner of the next wave of innovation."* The government launched a public consultation on the strategy alongside its publication. This document is a summary of the response made by the BCS.

The Strategy is based on four overarching pillars, which are shown in Figure 1. Each of those pillars are expanded upon in the Strategy and lead to a series of implementation actions[2] across government departments.

Figure 1: the four overarching pillars of the National Data Strategy

Key points in the BCS response

While we broadly agree that the Strategy will support the government's stated ambitions, in our view the central pillar of 'Responsible Data' in the Strategy conflates three vitally important areas that should be separated out into pillars in their own right to ensure they are given suitable prominence when the strategy is executed in practice. The pillar of 'Responsible Data' should be separated out into these three distinct pillars:

- Building public trust in data driven services,
- Ensuring data is always used responsibly, and
- Developing a sufficient supply of competent, ethical and accountable computing[3] professionals across all sectors of the economy.

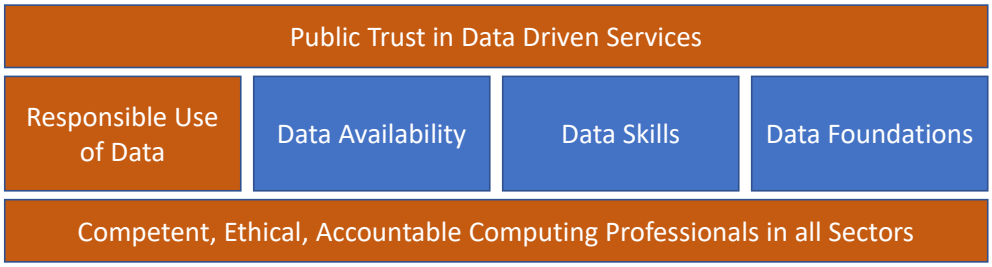

Figure 2: National Data Strategy Pillars with three key areas separated out as pillars in their own right

[1] https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy

[2] https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy#annex-a---list-of-actions-and-owners

[3] we take computing to be a catch all term covering computer science, digital technologies, data science, artificial intelligence, machine learning and cyber security

Figure 2 illustrates how the original 'Responsible Data' pillar can be split into these three new pillars (shown in brown), which then wrap around the other three pillars (in blue) from the Strategy.

Seen in this light the following recommendations support delivery of the National Data Strategy as rapidly as possible and optimise value for money. Government should:

Demand that professionals who develop computer software used to deliver public services, or that is used to inform public policy, such as for example developing computer models of climate change, or who manage the adoption of such software by the public sector, must be Chartered by a relevant professional body.
Set the expectation that all computing undergraduates are assessed on their professional competency against widely recognised standards, as well as on their academic ability.
Galvanise the development of a broad range of professional computing qualifications at all levels that supports progression to Chartered status.
Work with all professional bodies (not just computing) to support incorporating relevant digital and data competencies within their professional recognition (e.g. aspects of Artificial Intelligence and Machine Learning are becoming important to data science roles in accountancy).

Figure 3: Main BCS recommendations

Government is already doing much to support professionalism across computing related professions. Government has set out in the National Data Strategy, in its AI sector deal, the UK National Digital Skills Strategy, the Cyber Security Skills Strategy and before that in its Industrial Strategy the vital importance of highly skilled professionals in computer science, digital technologies, data science, artificial intelligence, and cyber security.

The National Data Strategy recognises the work being done by the Royal Statistical Society alongside BCS, the Operational Research Society, the Royal Academy of Engineering, the National Physical Laboratory, the Royal Society and the Institute of Mathematics and its Applications working to develop data science as a profession[4]. BCS, The Society of Research Software Engineering and the Software Sustainability Institute are also working together to promote professional standards for coding used in scientific research. This is particularly relevant in the wake of high profile challenges[5] to scientific modelling used in COVID-19 policy.

Government is funding a consortium led by the IET in partnership with BCS and fourteen other professional organisations to set up the UK Cyber Security Council, which will establish Cyber Security as a profession governed by a Royal Charter. The NHS is supporting the Federation for Informatics Professionals in health and care (FedIP), created in 2016 to professionalise the informatics community in the UK in Health and Social Care.

These are all important steps in developing professionalism in line with the pillars set out by the National Data Strategy, but are no longer sufficient in the world we now live in outside

[4] https://royalsociety.org/-/media/policy/projects/dynamics-of-data-science/dynamics-of-data-science-skills-report.pdf
[5] https://www.nature.com/articles/d41586-020-01685-y

of the EU and post COVID-19. Recent YouGov surveys[6] of the UK public commissioned by BCS show that

- Over half (53%) of UK adults have **no faith** in any organisation to use algorithms when making judgements about them, in issues ranging from education to welfare decisions.
- 63% of UK adults **disagree** with the statement "*Students graduating with a computer science university degree are qualified to write software that makes life decisions about people*"
- 62% of UK adults believe someone who for a living develops computer software that can significantly affect people's lives should be qualified as a government-approved **Chartered professional**

Further details of the surveys are given in the following sections.

Chartered status of a computing practitioner gives the public confidence that the practitioner is competent, ethical and accountable (in this case accountable to their professional body). Professional bodies already exist and have an effective infrastructure for managing Chartership, which is by definition backed by a Royal Charter that ensures it remains independent, objective and must work for the benefit of the public. Demanding computing professionals in responsible roles are Chartered therefore presents a readymade and cost effective solution to the issue of rebuilding public trust, which is a solution the public say they want, and will significantly support delivery of the National Data Strategy pillars.

Why we recommend separating out the Responsible Data pillar

The remainder of the document gives the background context that explains the reasoning for our key recommendations. They follow on from a presentation BCS gave at the November 2020 roundtable hosted by Caroline Dinenage Minister of State for Digital and Culture at DCMS.

The National Data Strategy states:

- "The strategy is a central part of the government's wider ambition for a thriving, fast-growing digital sector in the UK, **underpinned by public trust**."
- "Used badly, data could harm people or communities, or have its overwhelming benefits **overshadowed by public mistrust**."

Public trust is founded on the knowledge computing practitioners are

- ✓ Competent
- ✓ Ethical
- ✓ Accountable

Unfortunately, public trust has been seriously eroded by events over the last six months, as we summarise in the next section.

[6] https://www.bcs.org/more/about-us/press-office/press-releases/the-public-dont-trust-computer-algorithms-to-make-decisions-about-them-survey-finds/

High profile examples that undermined public trust in use of computing for public services since May 2020

Between May and November of 2020 there has been a constant series of high profile incidents that have significantly eroded public trust in the use of computing in public services. Here we list those examples and then summarise the findings from two national surveys BCS commissioned YouGov to conduct that show how badly public trust has been eroded.

MAY: In May there were a series of high profile articles in the national press, such as for example in the Telegraph[7], that asserted computer code developed by Professor Niel Ferguson to model the spread of COVID-19, and which was key to government decisions about imposing national lockdown, was highly flawed and implied it was not fit for purpose.


The Telegraph

Coding that led to lockdown was 'totally unreliable' and a 'buggy mess', say experts

The code, written by Professor Neil Ferguson and his team at Imperial College London, was impossible to read, scientists claim

By Hannah Boland *and* Ellie Zolfagharifard

16 May 2020 • 1:32pm

Figure 4: example of highly critical national press item on computer code underpinning epidemiological model

Since then Professor Ferguson's epidemiological computer code has been shown to be fit for purpose, for example in articles[8] in the scientific journal Nature. The general public however do not read Nature and are mostly only aware of articles such as those in the Telegraph that were highly critical.

What became apparent during this episode is that the scientific community[9] has not in general adopted software development standards that would ensure their computer code is easy to reproduce and be understood by the wider scientific community. This has become a major issue across the global scientific community[10]. Such standards do exist, such as those developed by the Software Sustainability Institute (SSI). BCS is now collaborating with the Society of Software Research Engineers and SSI on increasing the adoption of these software development standards across all of science.

MAY: The NHS COVID-19 contact tracing app was meant to launch in May, but was pushed back to September because of a series of technical difficulties and issues with ensuring ethical data gathering and processing[11]. Additionally, it didn't work as Public Health England

[7] https://www.telegraph.co.uk/technology/2020/05/16/coding-led-lockdown-totally-unreliable-buggy-mess-say-experts/
[8] Nature reproducibility: Critiqued coronavirus simulation gets thumbs up from code-checking efforts
[9] https://www.bcs.org/media/5780/professionalising-software-development.pdf
[10] https://www.bbc.co.uk/news/science-environment-47267081
[11] https://www.bbc.co.uk/news/technology-53114251

wanted because of Google and Apple privacy concerns that meant the technology was prevented from collecting data as intended.

Figure 5: public trust was eroded by ongoing difficulties with launch of the contact tracing app

BCS prior to the launch of the app had laid out the ethical practicalities that would need to be addressed in a policy paper[12].

AUGUST: In August Ofqual used an algorithm to estimate GCSE and A-level grades that resulted in widespread public mistrust in algorithms making high stakes decisions about people[13], which resulted in the Secretary of State for Education having to make a public apology.

Figure 6: BBC News item of public apology from the Secretary of State for Education about 'Ofqual algorithm'

BCS published a policy paper[14] after the incident explaining why data driven algorithm design is challenging and requires interdisciplinary teams of professionals working collaboratively and to the right professional standards in order to make algorithms work as intended.

OCTOBER: In October Public Health England lost 16,000 COVID-19 test results due to human error when importing data from a CSV[15] file into an Excel spreadsheet.

[12] https://www.bcs.org/media/5689/contact-tracing-report.pdf
[13] https://www.bbc.co.uk/news/uk-53815089
[14] https://www.bcs.org/media/6135/algorithms-report-2020.pdf
[15] CSV: comma separated values, which is a standard format used for sharing tables of data between different proprietary spreadsheet and database applications.

Figure 7: https://www.bbc.co.uk/news/technology-54423988

Members of the public understandably questioned the apparent inability of Public Health England to automate such a routine but vital part of their data handling, which affected the public's perception of the digital competency of PHE.

NOVEMBER: In November the Public Accounts Committee published a highly critical report[16] on progress with NHS Digital Transformation. The committee commented that:

- The Department and National Health Service have a poor track record for transforming NHS IT and have made insufficient progress against national ambitions
- The Department's previous attempt to reform how the NHS uses IT, running between 2002 and 2011, was both expensive and largely unsuccessful
- The use of digital services within the health and social care system has increased during the COVID-19 pandemic—including providing more services remotely—showing the substantial potential for organisations to use digital services more and adapt quickly

Such a report from one of the most respected parliamentary select committees significantly added to the general sense that there is a lack of competence around digital programmes within the public sector. The report follows on from a NAO report[17] with similar conclusions.

Figure 8: Front page of NAO report on NHS Digital Transformation

NOVEMBER: Also in November more highly critical national media stories appeared concerning IT problems with the test and trace system, such as for example in the Daily Mail on November 12th shown in the following figure.

[16] https://publications.parliament.uk/pa/cm5801/cmselect/cmpubacc/680/68002.htm
[17] https://www.nao.org.uk/wp-content/uploads/2019/05/Digital-transformation-in-the-NHS-Summary.pdf


Daily Mail

Bungling Test and Trace scheme was hit by 'huge' IT problems last month 'that led to delays in squashing outbreaks in care homes' - as official data suggests system is finally getting better

Figure 9: Daily Mail story on IT problems with test and trace system

YouGov national surveys on public trust in September and October

BCS became seriously alarmed by the above incidents as it became clear the public were beginning to distrust the very notion of using algorithms to deliver public services. We commissioned YouGov to conduct two national surveys of representative samples of the UK adult population across all devolved nations to find out how badly public trust had been eroded.

The headline results from those surveys were:

- Over half (53%) of UK adults have **no faith** in any organisation to use algorithms when making judgements about them[18], in issues ranging from education to welfare decisions.
- 63% of UK adults **disagree** with the statement "*Students graduating with a computer science university degree are qualified to write software that makes life decisions about people*"
- 62% of UK adults believe someone who for a living develops computer software that can significantly affect people's lives should be qualified as a government-approved **Chartered professional**

The following lists the detailed questions and responses from those surveys.

Question: Which, if any, of the following organisations do you trust to use algorithms to make decisions about you personally:

Base: All UK adults	2076
The Government	10%
Social media companies (e.g. Facebook, Instagram etc.)	8%
'Big Tech' companies (e.g. Apple, Google etc.)	11%
Financial services (e.g. banks, insurance companies etc.)	16%
Health and social care (e.g. the NHS, private health care, the council etc.)	17%
Armed Forces	7%

[18] https://www.bcs.org/more/about-us/press-office/press-releases/the-public-dont-trust-computer-algorithms-to-make-decisions-about-them-survey-finds/

The education sector	7%
The police	11%
Social Services	7%
National Security and Intelligence services	12%
Housing associations	6%
Other	1%
Don't know	16%
I do not trust any organisations to use algorithms to make decisions about me	**53%**

Question: Who, if anyone, do you think should be responsible for ensuring that digital technology is used to solve ethical issues?

Base: All UK adults	2063
Politicians	22%
Universities	18%
Technology companies (e.g. Apple, Google etc.)	23%
An independent regulating body	**59%**
The individual computer programmer	13%
Other	3%
Don't know	13%
I do not think anyone should have responsibility for this	14%

Question: To what extent do you agree or disagree with the following statement?

"Students graduating with a computer science university degree are qualified to write software that makes life decisions about people"

Base: All UK adults	2063
Strongly agree	2%
Tend to agree	16%
Tend to disagree	32%

Strongly disagree	31%
Don't know	19%
Net: Agree	**18%**
Net: Disagree	**63%**

Question: To what extent do you agree or disagree with the following statement:

"Someone who develops computer software for a living that can significantly affect people's lives, should be qualified as a government-approved Chartered professional"

Base: All UK adults	2063
Strongly agree	22%
Tend to agree	40%
Tend to disagree	11%
Strongly disagree	6%
Don't know	21%
Net: Agree	**62%**
Net: Disagree	17%

Who we are - BCS, The Chartered Institute for IT

BCS is the UK's Chartered Institute for IT. The purpose of BCS as defined by its Royal Charter is to promote and advance the education and practice of computing for the benefit of the public.

We bring together industry, academics, practitioners and government to share knowledge, promote new thinking, inform the design of new curricula, shape public policy and inform the public.

As the professional membership and accreditation body for IT, we serve over 60,000 members including practitioners, businesses, academics and students, in the UK and internationally.

We also accredit the computing degree courses in ninety eight universities around the UK. As a leading IT qualification body, we offer a range of widely recognised professional and end-user qualifications.