



Future of the civil service: Making the most of scientists and engineers

Executive summary

This executive summary provides an overview of a review of the Science & Engineering Profession and its role in the future Civil Service. The full report offers a more detailed discussion of the approach taken and where the evidence for our conclusions and recommendations came from: www.bis.gov.uk/go-science/

As the UK Civil Service has evolved, so have its science and engineering needs

Over the years, professional occupations available to scientists and engineers in the Civil Service, and the skills and capabilities required, have changed. The availability of management information about people in the profession also varies, but generally numbers of scientists and engineers track the overall size of civil service.

The Government Science and Engineering (GSE) community was established in 2008 to help identify and draw together scientists and engineers from across all government organisations. It is open to any civil servant with a science or engineering background.

In 2012 the Government Office for Science undertook a review of the future of the Civil Service and the implications for the science and engineering profession in government. The review involved extensive engagement across our profession. It proposes a vision for the future of the profession and highlights priorities for action.

A key purpose of this review was to learn more about our professional community and to create a shared context, language and vision to describe ourselves as a profession and the value that we offer the future Civil Service.

Timeline of Science and Engineering in Government

- 1930** Carpenter Committee investigated the organization of civil service scientific and technical staff
- 1943** Barlow Committee on Scientific Staff in Government Departments: led to the Scientific Civil Service white paper
- 1945** Scientific Civil Service established to 'regularise ad hoc arrangements made by Government for employing scientists during the war.' Organized into three classes: scientific officer, experimental officer, and assistant experimental officer.
- 1960** Select Committee Report on the work of the Scientific Civil Service
- 1964** Appointment of first Government Chief Scientific Advisor (Sir Solly Zuckerman)
- 1968** Fulton Report. *'Many scientists, engineers and other professional specialists were not given the responsibility or authority they deserve... these specialists should be given more policy-making and management opportunities, and training to equip them for their new work.'* Also recommended abolition of 'classes' to promote career mobility.
- 1980** Holdgate Review – recommends greater interchange between civil service scientists and policy makers
- 1980s** Cuts to government R&D spending
- 1987** Ibbotson report - policy core with implementation through executive agencies (including many civil service scientists and engineers)
- 1991** Civil Service operations and services opened up to private sector contractors
- 2000s** Growth in government R&D spending
- 2008** Government Science and Engineering (GSE) community established



The purpose of our profession is to work across the Civil Service to improve Government decisions and delivery through high quality, integrated and transparent evidence

Civil Service scientists and engineers play a wide range of roles, using their knowledge, skills and networks to:

- **understand and anticipate** the implications of a wide range of science and technology developments for the organisation's business;
- **interpret** the political and practical implications of policy objectives and **commission, manage and quality assure** research and analysis;
- **analyse** science and engineering evidence, **assess risks and opportunities** and provide impartial **advice** to inform policy, strategy and delivery;
- **design, develop, test and evaluate** science and engineering services;
- **monitor, inspect, enforce and advise** on regulations to protect society, health and the environment and support economic growth;
- **commission, contract, manage and motivate** technical expertise to deliver the organisation's business;
- work with colleagues **across disciplines** (including other analytical disciplines); and
- **facilitate engagement and collaboration** with expert in the wider science and engineering community.

Over the past 4 years, the GSE community has been developed successfully...



Large

Highly Skilled

Diverse

34% have a PhD

58% are members of professional bodies

37% hold a professional qualification (eg chartered)

56% are in the grade/range HEO to grade 7

3500+

members

(~**12,000** posts across government)

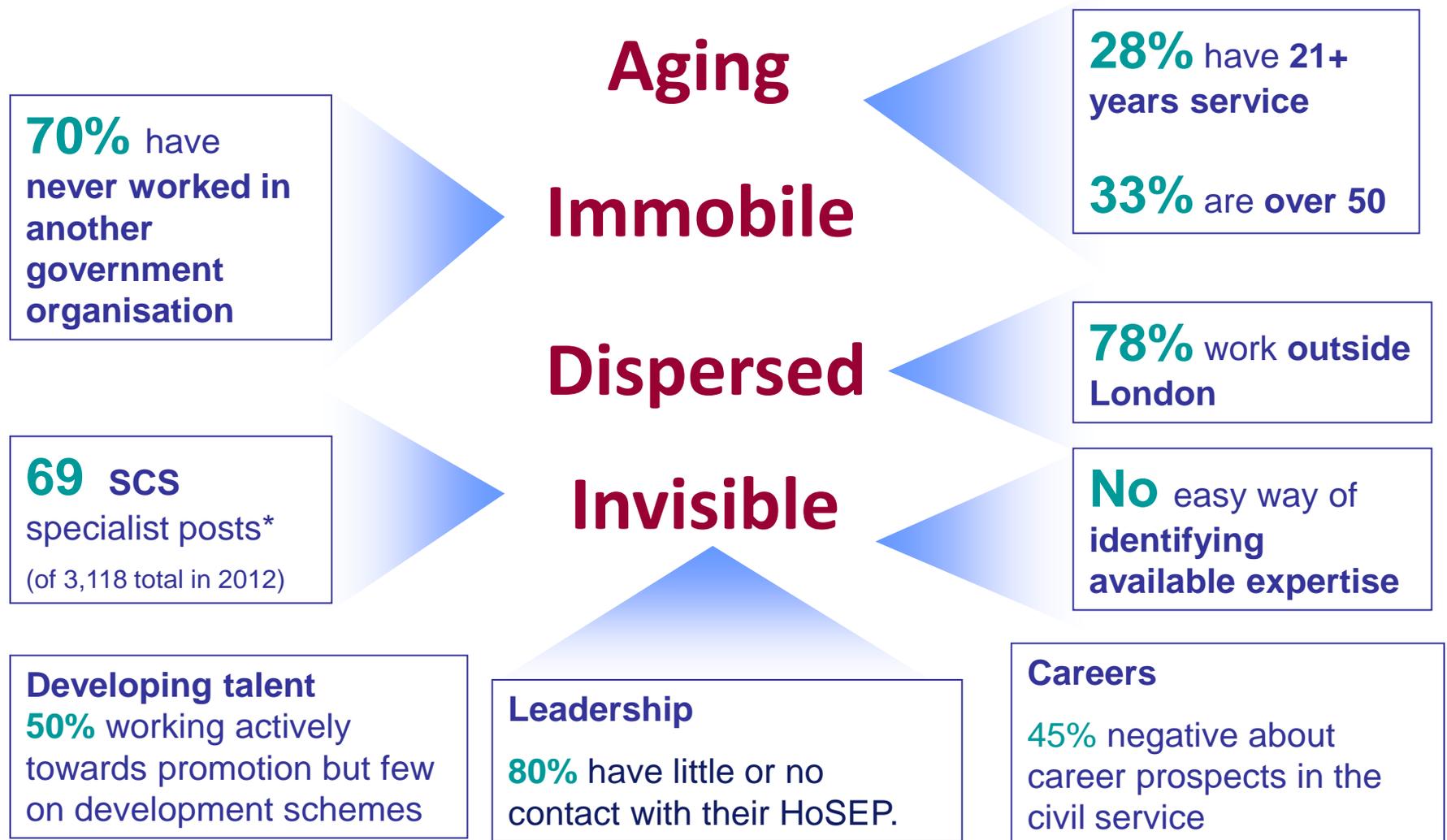
100+

different areas of expertise

Wide range of functions

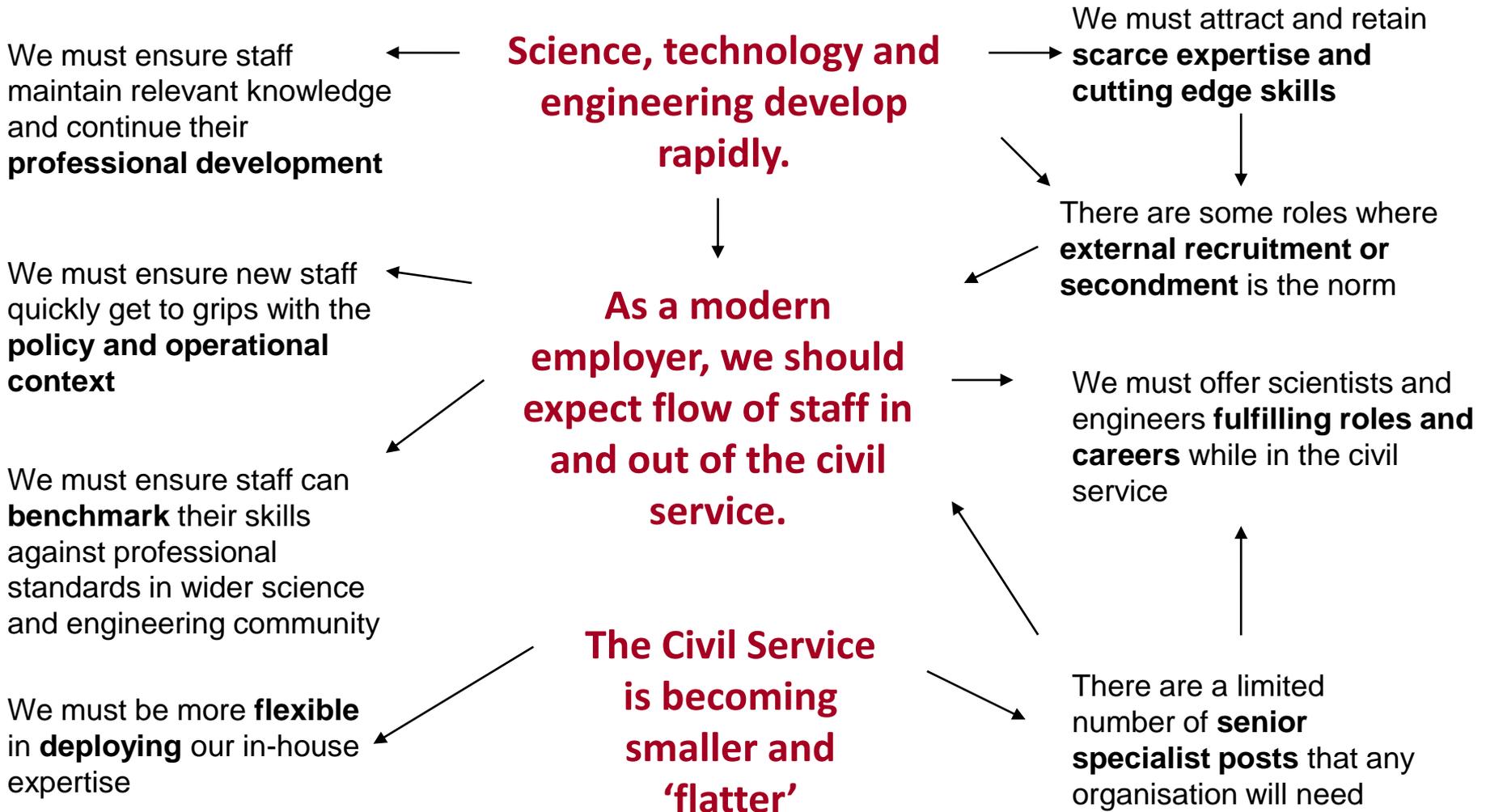
...in the context of Civil Service reform, we have an opportunity to better harness this potential.

We face challenges that affect our ability to access and harness expertise



*Compared to 80 senior civil service economist posts, a profession about 10th the size

We also face challenges as a STEM employer that have implications for how we develop our science and engineering capability



We need to reassess how we manage the profession to meet the challenges of Civil Service Reform

“flatter, faster, more digital, more unified, with better capabilities and performance management, focused on outcomes not process, with modern terms and conditions, and which is more enjoyable to work for.”

Francis Maude on Civil Service Reform

Better performance management

- No universal framework for standards of entry/performance: Performance tends to be measured against core civil service competencies rather than depth or application of their professional expertise. Wider indicators of professional ability not consistently recognised or rewarded. People often affiliated to more than one profession and need a strong understanding of the policy or operational context and the ability to work with other Civil Service professions.

Better capabilities

- Never had detailed management information on available capabilities (across the profession). Extensive use of wider scientific community for deep expertise and senior appointments.

Faster and more flexible

- Diverse occupations, disciplines are not usually interchangeable. Domain knowledge is often critical. Individual roles need a combination of relevant professional training and experience.

This review considered how our profession must evolve to meet the needs of the future civil service

Scope of the review

How we can best meet the needs of the future civil service:

- What the future civil service will look like and what will it need from its scientists and engineers?
- What knowledge, skills and expertise do we have and how can we make the most of it?
- What do our people want from the profession?

Steering Group

Sir John Beddington (Chair)

Debbie Alder (HR)

Ian Dodge (Policy)

Mark Downs (Science Council)

Sue Ferns (Prospect)

Jil Matheson (GSS)

Miles Parker (Defra)

Jeremy Watson (DCLG)

What we did:

2172 survey respondents from the civil service

2165 respondents from wider science and engineering community (as benchmark)

More than **150** participants in 11 careers workshops, across the country

22 Interviews across a wide range of departments and agencies

2 policy workshops completed (DfT and Defra) with more planned.

Workshops on scope and scenarios for the future civil service

Note: Our analysis is based on a self-selected group of government scientists and engineers. This sample is sufficiently large and diverse to be reasonably representative of scientists and engineers across the civil service.

From the evidence, we have some clear headlines

The civil service is a great place for scientists and engineers to work. The roles, careers and development opportunities are often quite different from those available in academia and industry but there is a wide range of pathways to building a career and the opportunity to make a contribution to interesting and important work.

Scientists and engineers in the civil service exemplify many of the principles of the civil service reform agenda.

Our approach to professionalism, openness, collaboration and flexibility, and the commercial and project management experience we offer are particularly valuable. We have the potential to make an even greater contribution in the future.

Scientists and engineers need to become both more visible and better integrated in the day-to-day business of government.

In doing so, we can ensure the civil service remains a place where scientists and engineers of all disciplines want to work and where the contribution of science and engineering are sought and valued across the civil service.

In the future, we will maintain the openness and diversity of the GSE community, but will recognise the distinct and wide range of roles played by its members.

We found that our in-house scientists and engineers offer distinctive value to the Civil Service across CSR themes

It is hard to find a problem in government that could not benefit from the application of science or engineering advice

Accountability

Professional integrity (speak truth to power)

Motivated by public service and intellectual challenge

Assurance of science and engineering activity

Pipeline of people with critical thinking and analytical perspective into Civil Service leadership positions

Openness

Networks with wider science and engineering community for learning, collaboration and advice

Communication of government science and engineering activity for transparency and growth

World renown, credible and respected - gateway for dialogue with industry, academia and international expertise

Unified

HoSEP network across all major science and engineering civil service organisations

GSE – excellent foundation for sharing knowledge and know-how

Roles in all spheres of Civil Service activity (operations, policy, PPM)

Professional identity emphasising collaboration, openness and transparency

Skills

Applying deep technical knowledge in a wide range of areas and broad understanding of the political, legislative and operational context for relevant advice

Integrating evidence from multiple disciplines and analysis of implications

Influencing research agenda and policy impacts

Able to pursue wide range of career pathways 11

We considered what the Civil Service will need from our people in the future

We drew on current thinking in and outside government to develop scenarios for the future Civil Service and considered implications for different types of scientists and engineers, the profession and Civil Service organisations.

No	Working Title	Summary	Use of expert skills
X	Lean Government	Continuous improvement and automation deliver year-on-year increases in workforce productivity	Efficiency through technology and cross-departmental working
Y	Slim down and divest	Slimmed down government through divesting functions and comprehensive outsourcing	Many skills and services have been outsourced to specialist providers
Z	Investment for growth	The focus of government changes to public investment.	Expertise needed to prioritise and de-risk investment programme and act as intelligent partner

Across all scenarios, we expect the civil service will need a balance of deep specialist expertise and people with broader analytical and evidence 'brokering' skills. Career pathways depend significantly on individuals own motivations and flexibility as well as the demand for their expertise in the civil service or in the wider employment market.

Strengths – we have strong foundations as experts and civil servants

Large, skilled, diverse profession

Valuable expertise - it is hard to find a problem in government that could not benefit from the application of science or engineering advice

Openness and collaboration - connected to industry, academia and international expertise

Impartiality and integrity – we exemplify the civil service code

Weaknesses – we must make our expertise more visible and agile

Aging

Immobilised

Dispersed

Invisible

Seen as advisers not leaders

Opportunities – Civil Service Reform

Our profession has many of the skills sought by Civil Service Reform

Harmonised HR systems and processes

Increasing focus on developing professional skills and talent management

Other Civil Service professions face many of the same challenges

HoSEP network established, GSE community shows potential for linking up further

People with science and engineering background across the Civil Service

Threats – can we offer scientists and engineers fulfilling roles and careers while in the Civil Service?

The Civil Service is becoming smaller and 'flatter'

Limited number of specialist senior posts

Perceptions that you must leave the profession to progress

Competition from other employers for STEM skills

Can we keep up with the pace of science and technology developments?

In the future, our profession must offer the civil service:

Knowledge and expertise in science and engineering disciplines relevant to Civil Service priorities, plus:

Harness our expertise:

Agility - effective and agile cross-department networks with sharing of knowledge and collaborative working, well supported by departments;

Integration – awareness and ability to work across disciplines and with other analysts;

Improve our impact:

Visibility – being there for colleagues, ensuring customers and partners can easily identify what expertise is available and how to access it, assertive in discussions about evidence;

Pace – available to inform development of options at an early stage, proactive in identifying issues, responsive to requests for support and integrated throughout the process;

Boost our skills:

Relevance – applying understanding of the operational or policy context in the way we take decisions or communicate advice;

Foresight - able to anticipate the implications of a wide range of science and technology developments for the organisation, adept at appraising and communicating risks and uncertainties and their implications;

Build on our strengths:

Impartiality – professional advice for public good; and

Openness - able to work with a wide range of stakeholders, handle differing perspectives or alternative interpretations of evidence.

Underpinned by skills in: Influencing, risk appraisal, communicating, building networks and forging wider collaborations.

Our vision: Scientists and engineers at the heart of excellence in government decisions and delivery

For the civil service this means

- Government decisions and delivery are informed by high quality, integrated and transparent evidence base
- Can attract, retain and procure the expertise and skills it requires, including a diverse leadership

For the profession this means

- Having effective and agile cross-department networks of science and engineering expertise, with participation well supported by departments.
- Members of the profession are visible and highly regarded
 - within the civil service, with at least proportionate numbers in the SCS
 - by their peers in academia and industry.
- Engaging with other professions to support delivery of Civil Service reform (eg open policy making)

For individual scientists and engineers this means

- Having a high standard of professional knowledge as benchmarked against similar roles outside the civil service, accredited by professional bodies where relevant.
- Being clear about the skills and competencies required at each grade and in each type of function
- Having access to training relevant to their profession and are supported in their development by their department (both continuing professional development and opportunities to gain wider civil service experience)
- Being central to decision making, feeling their professional expertise is valued and that their contribution has an impact
- having a realistic and positive perception about opportunities for progression, both within their professional function and in the civil service more widely

Government decisions and delivery
informed by high quality, integrated and transparent evidence base

Profession
Expert, agile, and influential, in and outside government

Scientists and Engineers
Knowledgeable, skilled and motivated, credible and confident

We propose 4 priorities for actions to help realise this vision

Leadership: nurture our talent and strengthen the networks

- within departments
- with other professions

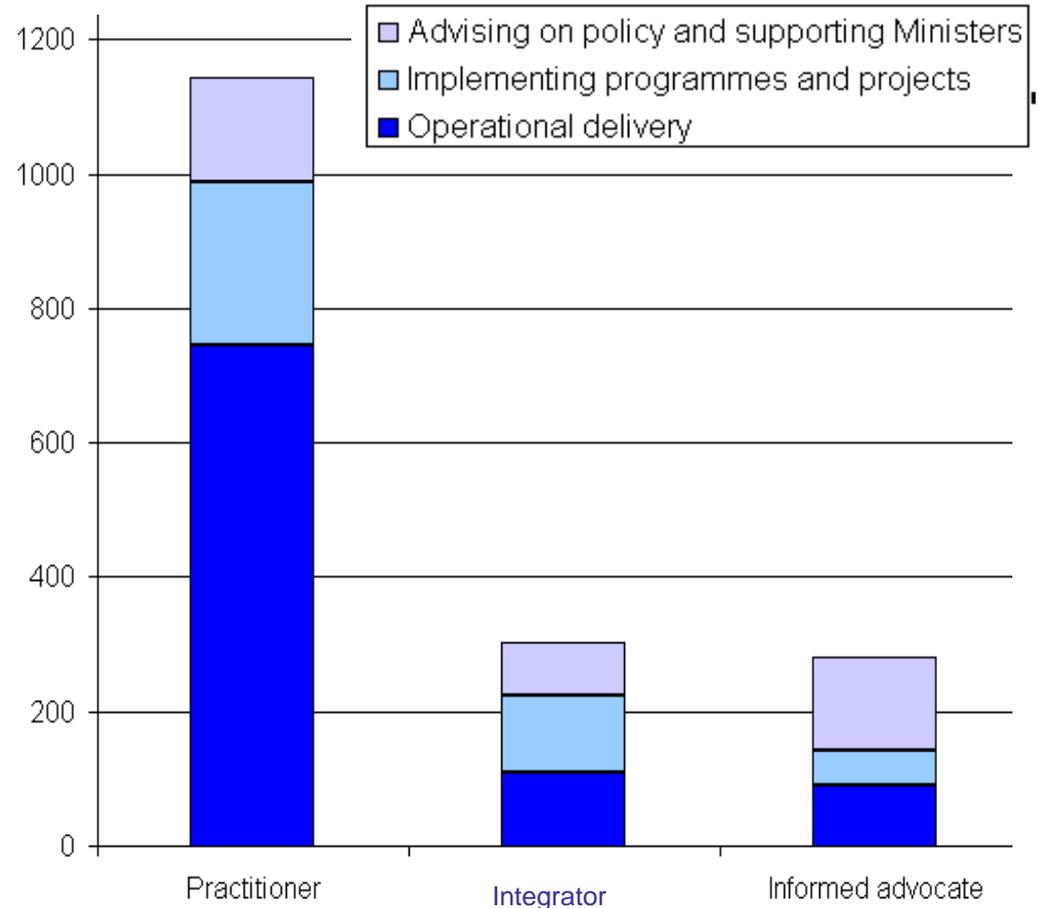
Agility: working across civil service organisations to solve challenges

Openness: engaging external expertise and use science and engineering to engage widely

Professionalism: clearer, focussed guidance on skills and career pathways

Professionalism: We will tailor what we do to accommodate different segments of our profession

- the **Practitioner**, who provides specialist advice or services and is likely to become or remain a deep expert in their field;
- the **Integrator**, who manages science or engineering programmes or works closely with researchers, and whose expertise depends on understanding both policy or operations *and* the wider landscape of science and engineering expertise and knowing how to engage with both; and
- the **Informed Advocate**, who works in policy or operations and retains a lively and informed interest in science or engineering.



Other segmentation:

In the course of discussions with our people about roles and careers, we found that experience and **occupational domain knowledge** (for how science or engineering is applied) is often just as important as discipline or broad function.

Professionalism: We will offer clearer guidance on skills and career pathways

Given the diversity of our profession, formal standards across all entry points are not appropriate or realistic. However, we can promote high professional standards by offering more tailored guidance on skills required and providing suitable benchmarks for professional standards to help people maintain and develop professional skills that meet the requirements of their role in the Civil Service and are recognisable and marketable outside the Civil Service.

- We will review our professional framework to ensure it is suitable for use in recruitment and performance appraisal, aligns with the Civil Service core competency framework and key functional areas of the Civil Service (policy, project management and operational delivery)
- To further develop capability we will work with leading experts in the civil service and academia to expand the professional development offered to scientists and engineers in communications and influencing, horizon scanning and leadership.
- To showcase excellence I will establish Government Chief Scientific Adviser prizes for communication of government science and engineering activity and cross-disciplinary, cross-boundary working.

Career pathways are diverse - Scientists and engineers need to be adaptable and build on their broader skill sets to be able to progress generalist positions, including gaining experience of the policy environment. Currently this is not happening enough. Support is needed to help scientists and engineers maintain current knowledge when they are working in generalist roles.

- Joint with Prospect, the profession will host a careers event in Spring 2013 for scientists and engineers in the Civil Service to illustrate the diverse career pathways and the support available for career development.

Agility: we will promote cross-departmental working to solve challenges and share learning

In a contracting civil service, we face the challenge of having the right skills in place, knowing where they are and being able to deploy people rapidly and efficiently. Across our professional community there is a broad range of functions and occupations, often requiring specialist and distinct combinations of knowledge, skills and experience. This diversity means that a centralised shared services model is not appropriate but also means we will need to be particularly agile.

The network of departmental Chief Scientific Advisers demonstrates how we can link up across government to give departments access to extended networks of expertise. There is a strong appetite for developing communities of practice at more operational levels to allow people to contribute across government and learn from others working in the same field, wherever they might be based. Knowing how to identify people with the right skills is the single biggest barrier to cross-departmental working.

- We will develop an online directory to make it easy to find and access specialist qualifications, experience and skills across Civil Service organisations as and when we need them. This will provide the profession's leadership with the management information needed to identify skills gaps and spot opportunities for sharing knowledge and know-how across Civil Service organisations.

Leadership: nurture our talent and strengthen the networks

Our devolved approach to management of the profession makes the role of departmental heads of science and engineering profession crucial. We must also do more to nurture those within the profession that can make a significant contribution as senior leaders in the civil service and we must engage more effectively with the wider civil service leadership.

- ensure that Heads of Profession are consistently recognised within departments and get the support and challenge they need, through contribution to departmental Head of Science and Engineering Profession appraisals.
- develop a talent management and leadership development programme specifically targeted at scientists and engineers who can lead on service delivery, provision of advice and are central to Civil Service decision making.

Application of science or engineering expertise requires a strong understanding of the policy or operational context for their work. The Heads of Analysis group shows the power of the analytical professions working together. Segmentation of our profession will help us engage more effectively with the other civil service professions.

Openness: engaging external expertise and use science and engineering to engage widely

Government scientists and engineers are often skilled collaborators, facilitators and integrators, helping the civil service access expertise through links with academia and business, relationships with the research community and through direct commissioning of research or scientific service. Working with the policy profession, we have a major contribution to make to open, collaborative and transparent development of policy.

- Work with policy and analytical professions to develop a programme of activities on the theme of evidence and evaluation for policy to share case studies of good practice from a range of civil service organisations and leading thinkers in this area, and to take the next step in connecting policy and analytical leaders in government.
- Provide guidance for policy professionals on engagement with academia

Science, technology and engineering develops rapidly. While the analytical approaches and broader skills developed from having a science or engineering background can be applied across a wide range of civil service roles, maintaining relevant knowledge and continuing professional development requires effort. There are some roles where the need for cutting edge knowledge, broader experience or a fresh perspective means we will need to recruit or 'second' in external expertise. The civil service also needs to invest in developing and retaining the right blend of in-house skills.

- Scale up the exchange of skills and knowledge by developing a coordinated programme of external placement opportunities for civil servants into science and engineering employers in academia and business.
- Provide learning and development to help scientists and engineers understand the policy or operational context for their work and can provide more relevant and effective advice.

Anticipated timeline for implementing recommendations

GCSA bilaterals with departmental HoSEPs	from 2013 onwards
Guidance on engagement with academia	publish January 2013
Review GSE professional framework	working group to report April 2013
Online directory	specification by April 2013
GSE careers event	May 2013
Evidence for open policy	Spring 2013 (date TBC)
Talent and leadership development programme	working group to report July 2013
GCSA prizes	nominations open summer 2013
Placement programme	pilot summer 2013

The science and engineering profession has an important role to play in making the Civil Service a more open, flexible organisation, able to anticipate and tackle future challenges.

- We will build on our strengths as an open, collaborative and diverse profession.
- We will make our in-house expertise more visible, better connected and better integrated across government organisations.
- We will strengthen our leadership networks and offer clearer guidance on skills and career pathways to ensure our people are knowledgeable, skilled and motivated.

This review has involved close working with others, notably the policy profession, analytical professions, Prospect and the external scientific community. Some 5,000 people, in and outside the civil service, have contributed by answering one of our surveys, participating in one of a range of workshops or being interviewed. We are grateful to all, and particularly to those that participated on the project's High Level Steering Group.

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