National Audit Office

REPORT

Modernising ageing digital services

Department for Environment, Food & Rural Affairs

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Key facts

£2.6bn

funding for investment in cyber and legacy IT across government for the period 2022-23 to 2024-25

£871mn

Defra's funding for digital investment for the period 2022-23 to 2024-25 including investment in major programmes

76%

Defra's estimate of its total IT spend between 2021-22 to 2024-25 needed to update legacy IT

10 years	Defra's estimate of the time needed for the full transformation of its business applications
1,962	estimated number of different applications in use across Defra Group (including small locally developed spreadsheets and databases)
30%	proportion of Defra's applications that were not supported by their supplier in July 2022
37	number of similar applications Defra runs and maintains that give permission for something or grant a license
21 million	number of customer transactions handled by Defra each year
One-third	proportion of Defra's customer transactions that are fully digital (ie do not require paper forms)

Summary

Introduction

1 The Department for Environment, Food & Rural Affairs (Defra) provides many digital services that are critical to the country's trade, disease prevention, flood protection, air quality monitoring and many other aspects of our daily lives. Many of these services are based on ageing IT systems and infrastructure. Landowners can use Defra's digital services to apply for grants to plant trees or to provide environmental benefits. Defra provides a range of services for businesses. Businesses can register plant health certificates for import and export, obtain an export health certificate to export or move live animals and animal products, or report the movement of cattle, pigs, sheep, goats and deer. The Digital Assistance Scheme supports businesses moving food and animals from Great Britain to Northern Ireland.

2 Across the whole of government, ageing IT systems are a key source of inefficiency and create a major constraint to improving and modernising government services. These ageing systems are commonly referred to as 'legacy'. Many departments have legacy systems with similar characteristics: having been built to support one specific business activity, they lack flexibility and keep data siloed for just one purpose; they are difficult and expensive to run and maintain; and there are further hidden costs arising from the need for additional business processes to overcome their limitations. As in most government departments, some of the greatest risks to the services Defra provides arise from legacy systems and technology.

3 In 2020, the Cabinet Office reviewed the legacy systems of eight departments, including Defra. It identified that government had limited visibility and understanding of the risks, compounded by a historical lack of focus on legacy systems during the budgetary process. The Cabinet Office concluded the primary barriers to improvement were that departments found it difficult to articulate the indirect benefits in business cases and had a tendency to cut funding part way through the budgetary cycle.

4 Legacy systems are becoming increasingly expensive to maintain. In July 2021, the Cabinet Office reported that nearly half of all technology expenditure across government in 2019 was dedicated to keeping outdated legacy systems running. This potentially reduces the amount of funding that could otherwise be available for modernising and enhancing such systems or contributing to business transformation. Making the transition from legacy systems to modern replacements is complex. We have found that departments typically do not have a good understanding of their IT estate and its interdependencies, and legacy systems are often poorly understood because of their age.[1]

1 National Audit Office, *The challenges in implementing digital change*, July 2021. Available at: www.nao.org.uk/insights/the-challenges-in-implementing-digital-change/

5 There are two main elements in Defra's approach to tackling legacy: infrastructure modernisation and a Legacy Applications Programme. The Legacy Applications Programme has a four-year funding allocation of £78.5 million. It received funding of £32.2 million for the first year (2021-22) in the 2020 Spending Review.

6 In parallel with its work on legacy, Defra is embarking on a fundamental business transformation process, including consideration of potentially major structural changes to Defra Group. However, this is at an early stage and Defra has not yet developed a clear vision for how its business will operate.

Scope and purpose of this report

7 This report examines whether Defra is addressing its legacy challenge effectively. The report is based on our work specifically with Defra and Defra Group.[2] However, our findings and recommendations are relevant to all government departments that are seeking to address an ageing IT infrastructure and facing challenges similar to those that Defra faces.

8 Our review included assessing progress made in the Legacy Applications Programme and examining links with Defra's business transformation programme. The report sets this out in two parts:

- Part One assesses the scale of Defra's legacy challenge and how it has arisen, and the risks to value for money and resilience. It highlights the funding challenges that Defra, in common with all government departments, faces.
- Part Two assesses Defra's plans to tackle its most pressing risks and whether plans for wider digital transformation will achieve value for money.

Key findings

The scale of Defra's legacy IT challenge

9 Defra has one of the most significant legacy IT challenges of all government departments. In the 2021 Spending Review, which set departmental budgets for the three-year period 2022-23 to 2024-25, the government committed to spend £2.6 billion in cyber and legacy IT. In an early submission for the 2020 Spending Review, Defra estimated that it needed to spend £726 million on legacy over the four-year period from 2021-22, the second largest legacy spend requirement after the Home Office. Defra estimated that legacy accounted for 76% of its total digital, data and technology spend requirement and that it would take until 2030 to resolve all its legacy issues (paragraphs 1.12 and 1.18, and Figure 1).

2 Defra Group is the core department plus the 20 bodies that produce joint reports and accounts with it.

10 Legacy business applications have proliferated across the Group, resulting in around 2,000 applications. Defra Group has many duplicated and overlapping applications with different versions of products that perform the same or similar functions. Many of these applications were built using software that is now outdated and 30% of them are unsupported. Unsupported applications have a higher security risk, are less reliable and are more expensive to run and maintain. The proliferation of applications is in part because, in the past, there was no centralised digital function for the Group. Digital, Data and Technology Services, Defra's central team, was established in 2014 and now delivers the large majority of IT for the Group. As well as the large number of applications, there are many databases and spreadsheets that have been developed locally outside the mainstream technology function (these are known as 'grey IT'). Defra does not know the full extent of these but has allocated funding to investigate sources of grey IT and begin addressing those that present the highest risk (paragraphs 1.13 to 1.15).

11 Years of low investment in Defra's technology have resulted in a serious risk of critical service failure or cyber-attack. Major security incidents and risks to business resilience are the two top risks on Defra's corporate risk register. Defra has been trying to deal with its legacy issues for more than a decade, but it was not until the 2021 Spending Review that it had the funding to start to tackle the problem in a strategic and planned way. Defra's funding for digital investment in the 2021 Spending Review period, 2022-23 to 2024-25, amounted to £871 million. In addition to funding for some of Defra's largest programmes such as the Future Farming and Countryside Programme, HM Treasury agreed funding of £366 million for general digital investment across Defra Group for the three-year period. This compares with just under £100 million for the three-year period, 2016-17 to 2018-19 (paragraphs 1.4, 1.17, 1.19 and Figure 2).

12 Defra has not assessed the full extent of the additional service costs of continuing to operate its legacy services. Like other departments, Defra does not record the business and people costs incurred as a result of continued use of legacy services, where outdated technology is adding to the costs of operating services. In its strategic outline business case for the Legacy Applications Programme, for example, Defra did not quantify the business-side operational efficiency increases that the programme would bring (paragraph 1.8).

Funding and resourcing challenges

13 Government has not yet addressed the barriers to maintaining and improving digital services created by its funding and business case approval processes. While departments need capital funding to build new digital services, they also need sufficient resource funding to maintain them. The comparative ease of getting capital funding compared with resource funding can lead to departments providing digital services without funding for maintenance costs, which they often omit from their business cases. As departments increasingly use cloud hosting, this introduces new financial and operating models involving more flexible approaches such as 'pay as you go' and requiring a shift away from capital to resource expenditure. One of the government's six missions in its Digital and Data Roadmap for 2022-25 is to develop "a system that unlocks digital transformation". Sponsored by HM Treasury, this mission aims to address barriers to digital transformation including in business case approval and other financial processes (paragraphs 1.20 and 1.21).

14 Defra has found it hard to develop and maintain long-term plans for tackling legacy because IT budgets are often cut to meet other departmental priorities. The Cabinet Office acknowledged in 2020 that new systems and services are often prioritised above fixing legacy IT. Funding provisions for legacy IT are often insufficient and, in some cases, cut during a budget cycle. Defra obtained funding from the 2015 Spending Review settlement to make efficiency savings in its supplier portfolio, to refresh some infrastructure and to transform some business applications. However, the budget for this was subsequently reassigned to work on EU Exit. Defra told us it designed some of these applications as common platforms, thereby reducing the impact of this. The Environment Agency faced similar challenges in 2016, when its work to rationalise the wide range of regulatory services it provides was curtailed because funding and resources were diverted to EU Exit preparations (paragraphs 1.21 and 1.22).

15 Defra is finding it difficult to recruit and retain people with the right digital skills. There is a digital skills shortage across UK industry and the public sector, and Defra finds it hard to recruit and retain digital talent. One reason for this is that government departments cannot match private sector pay. Over the period from October 2021 to October 2022, Defra ran recruitment campaigns for 244 digital, data and technology roles but could not fill 76 (31%) of these roles (paragraph 1.23).

Defra's immediate plans for tackling the problem

16 Defra is making steady progress towards completing the initial phase of the Legacy Applications Programme. Defra's focus for the initial phase of the programme is to reduce security risk and end the use of outsourced data centres as contracts expire. It is stabilising existing applications by moving them to modern, cloud-based hosting but has not been able to make other changes that would take full advantage of the benefits a cloud environment can offer, such as increased efficiency and flexibility. Defra aimed to complete this stabilisation phase by April 2022 but made a slower start than anticipated, in part due to technical problems and software licensing issues. While some improvements to existing systems will be carried out in the initial phase, Defra plans further work to enhance and transform its legacy systems and processes. It expects this to take 10 years, but has not yet developed any detailed plans (paragraphs 1.12 and 2.4 to 2.7).

17 Defra cannot deliver all its aspirations with the funding it has available. Defra received 58% of the funding it bid for in the 2021 Spending Review. According to Defra, this was sufficient to resolve some major operational and cyber risks and automation. However, it was not enough to fund a broader digital transformation of all legacy services or reduce cyber security and resilience risks to an acceptable level. Currently, only 34 of Defra's 101 transactional services (those that allow users to exchange money for services or update official records) can be used fully online – the majority require users to phone helplines or complete offline forms. Defra Group handles about 21 million customer transactions each year and only around one-third of these are fully digital (those that do not involve paper forms). Defra employs more than 500 staff in contact centres to assist service users. As part of its business transformation programme, Defra has an ambition to fully digitise its top 20 services by 2024-25 (paragraphs 2.8 and 2.15).

Achieving transformation

18 Defra has carried out a comprehensive exercise to identify legacy spending priorities across Defra Group. Defra and its largest arm's-length bodies (ALBs) have worked together in a formal process to set priorities for its work on legacy. In November 2021, it established a Digital Prioritisation Board, comprising Defra's senior leaders and representatives from each of its largest ALBs. This allowed a Group-wide consensus on priorities to be reached. In March 2022, after six meetings, it selected 109 projects that it will fund. Defra received £132.3 million for 2022-23 for these projects, and it has identified 97 of the 109 to fund in this first year. By September 2022, it had spent £24 million on these projects. Spending is managed as a single portfolio and progress reported to the Digital Prioritisation Board, which can decide to reallocate funds where underspends occur (paragraphs 2.8 to 2.11).

19 Defra is not yet taking full advantage of opportunities to save money and streamline its business by creating applications that can be re-used across the Group. There are many instances where different parts of Defra Group carry out broadly similar activities and, as a consequence, there are many applications across the organisation that do a very similar job. For example, Defra runs and maintains 37 applications to give permission for something or grant a licence. To avoid duplication and to help share data, Defra has started to create applications which can be re-used across Defra Group. Defra's principles for digital transformation include deploying common and re-useable platforms, components and functionality and organising and delivering transformation through capability groups that reflect Defra's core functions such as payment of grants, granting of licences and incident response. However, business areas may still develop new systems and services based on their own specific requirements. Defra's central digital team encourages collaboration between business areas but it is hard to enforce as each individual project has its own requirements, timelines and budget. Business and technology choices made in one part of Defra Group have implications elsewhere and without stronger oversight of the products and solutions chosen, it will not be straightforward to share applications for similar activities (paragraphs 2.17 to 2.19 and 2.21).

20 Many different technologies are in use across Defra Group, limiting opportunities to standardise and rationalise. The existence of a wide range of technologies is a consequence of how Defra Group has grown and changed over time. Systems were originally developed by different organisations that had their own approach to technology. Different business areas are still making different technology choices based on what they already have, and are not always taking wider corporate considerations into account. Defra has started to develop a set of principles, standards and guidelines to bring greater standardisation but has more work to do to cover all areas where these are needed (paragraphs 2.20 to 2.22).

21 Defra cannot make full use of its data because its data standards have not been applied to its legacy systems. One of Defra's principles for digital transformation is for all datasets to be centrally catalogued and managed by established data owners. However, the data standards that Defra applies to new digital developments cannot be easily retrofitted to legacy systems. As a result, it is difficult to link databases together for greater depth of analysis. Defra recognises it is not making best use of the data it holds and has recently established a Data Exploitation Board to assess the situation (paragraph 2.23).

Conclusion on value for money

22 Across government, risks to public services posed by ageing technology have been allowed to build up over many years and Defra has been affected more than most departments. Its systems and services are out of date, creating high risks of operational failure and cyber-attack, inconvenience for service users and additional staff and maintenance costs. With the increase in funding in the 2021 Spending Review, Defra has now established a well-designed portfolio of work to deal with its most pressing legacy issues and is beginning to make progress in delivering it. Defra has been pragmatic about what it can achieve for now with a focus on stabilising its position and reducing the most immediate risks. But Defra will only get real value from its digital endeavours when it can start the process of genuine digital transformation and modernisation. Successful digital transformation extends beyond the replacement of business applications and will need engagement and contribution from the whole of Defra. It must be an integral part of the business transformation process and supported by a Group-wide data and digital strategic vision.

Recommendations

23 The following recommendations are addressed to Defra but are likely to be relevant to all departments and government bodies with legacy IT issues.

24 Defra should:

a develop an overall strategic digital vision to apply to the whole Defra Group and put in place governance and management structures to ensure that digital and data considerations are at the heart of the business transformation process. This should include providing a stronger steer on what design and architecture are needed to support business transformation to avoid opportunities for standardisation and rationalisation being missed;

b establish the senior leadership needed, for example through the appointment of a chief data officer, to develop common data models and standards that can be used to support better use of data where there are common capabilities such as grant payments;

c when new applications are being designed and built, ensure that opportunities for re-use across Defra Group are understood and built into the design;

d develop long-term priorities, timelines and funding requirements that extend beyond the stabilisation phase to maintain the momentum currently driving the Legacy Applications Programme as it progresses into the enhance and transform phase;

e carry out an analysis of the reasons recruitment is failing and work with Defra Group HR, the Central Digital and Data Office and suppliers to develop solutions; and

f develop a better understanding of the additional business and people costs of the continued use of unmodernised digital services, focusing initially on its most used digital services, to help inform investment priorities.