Government Digital Sustainability Alliance

Overcoming barriers to drive the circular economy in digital technologies.

Recommendations from the Government Digital Sustainability Alliance Circular Economy Working Group

June 2025

Contents

Foreword

This paper has been written by the Government Digital Sustainability Alliance (GDSA) Circular Economy working group. The GDSA is a group of UK government suppliers, academics, third sector organisations and other experts that collaborate to share knowledge and capabilities to improve the sustainability of the digital sector.

The Circular Economy working group is made up of a selection of suppliers from end-of-life disposal to multinational telecommunications providers.

This paper details how we can create a better, more sustainable future, by realising a circular economy. An economy that addresses major global challenges such as poverty, inequality, climate change and environmental degradation. The newly formed Governments Secretary of State, for Defra, has announced his priorities for the environment. Number 2 is “Create a roadmap to move to a net zero waste economy.”

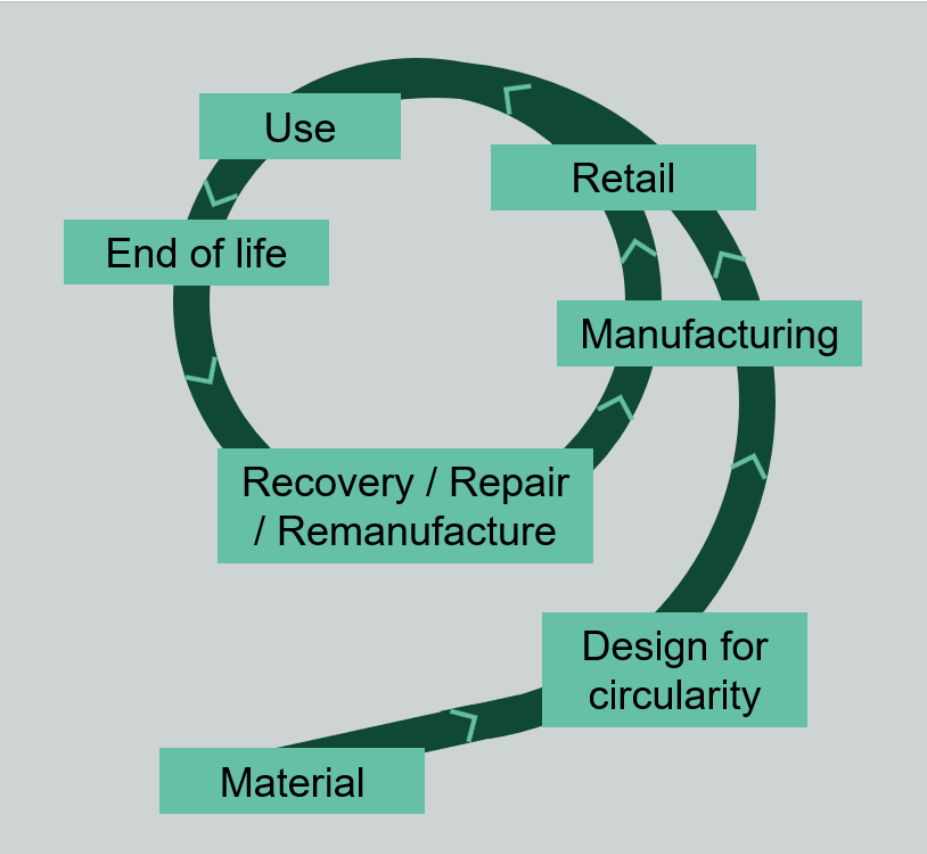

Figure 1 Circular economy diagram – green spiral with circular economy stages in the following order; Material, Design for circularity, Manufacturing, Retail, Use, End of life, Recovery / Repair / Remanufacture

“The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance reuse, refurbishment, remanufacture, recycling and composting.” – Ellen MacArthur Foundation

Executive summary

The digital sector can overcome barriers to a circular economy by addressing the blockers of security and finance whilst tackling the urgent issues of resource scarcity, over consumption and climate change.

A key enabler of the circular economy is behavioural change, this, coupled with guidance on the practical application of circularity can realise great benefits to society, the economy and the environment.

The GDSA Circular Economy Working Group, along with industry partners, conducted research to suggest recommendations aligned to the Greening Government: ICT and digital services strategy 2020 to 2025 and United Nations Sustainable Development Goals to overcome the barriers to the circular economy.

This paper details the following recommendations:

- encourage the holistic and centralised handling of legacy ICT estates to encourage higher value recovery and to prevent hoarding
- UK government to increase its awareness of new processes coming online for material recovery and availability of refurbished and remanufactured devices
- purchasing for Circularity: encouraging buyers to procure products with longer life spans that are also easier to repair, refurbish, and recycle
- utilising standards like BS 8887-220, and BS 8887-211 in the refurbishment and remanufacturing of technology devices offers material trust in those devices
- designing for longevity and focusing on a product's conception to ensure that resource allocation post-design aligns with circular economy practises and reduces the negative impacts of the linear 'take-make-waste' model
- by requiring technology companies to disclose the 'ingredients' that make up their products, we can educate and empower buyers to make informed choices that align with their values
- increase education and awareness about the circular economy by launching targeted awareness campaigns, provide practical training sessions, establish a centralised knowledge hub, and facilitate dialogues with industry leaders
- to measure circularity through Scope 3 emissions, public sector entities must implement a standardised methodology

Conclusion

Transitioning the ICT industry towards circularity is essential for reducing its environmental footprint and ensuring long-term sustainability for people and planet. Overcoming barriers

and implementing considered changes will enable the ICT industry transition to a lower carbon and more circular model.

1. Introduction

1.1 Background

The rapid evolution of technology presents both challenges and opportunities for sustainable development within the Information and Communication Technology (ICT) sector. Existing laws and regulations often favour linear economic models. This makes it cumbersome for companies to switch to a circular approach without legislative support.

The ICT industry plays a pivotal role in today's global economy, driving innovation, efficiency, and connectivity. However, the rapid pace of technological advancement, coupled with the industry's resource-intensive nature, has raised concerns about its environmental impact and long-term sustainability. A key issue that has arisen is the increasing generation of significant amounts of electronic waste (e-waste).

The newly published ISO circular economy (CE) framework, BS ISO 59010:2024, presents a promising approach to mitigate these challenges by emphasising the reduction, reuse, refurbishment and recycling of products and resources.

The concept of circularity, aimed at creating a regenerative and sustainable economic system, has gained significant attention across various industries. The ICT sector, despite its transformative capabilities, faces numerous barriers to achieving circularity.

Although achieving genuine 'closed loop' circularity in materials and manufacturing remains a distant goal, this paper examines some of the key challenges that hinder the ICT industry's transition towards a circular economy model today. It also proposes strategies and solutions to address these barriers and foster a more sustainable and circular ICT ecosystem.

The circular economy concept puts a circular model at the front of a new vision to enable sustainable decision making to benefit all, which is not achievable through our current business as usual linear economic model, often referred to as the ‘take-make-waste’ process.

The circular economy model emphasises a zero-waste vision through the circulation of resources, providing an innovative prospect to deal with sustainability challenges (Zhang et al., 2019).

The three primary circular economy principles are ‘design out waste and pollution,’ ‘keep products and materials in use,’ and ‘regenerate natural systems’ (Ellen MacArthur Foundation, 2017).

Figure 2 Circular economy principles – green circle split into three sections showing the three circular economy principles; design out waste, keep products in use and regenerate natural systems

1.2 Objectives

The newly appointed Secretary of State for Environment, Food and Rural Affairs has identified a zero-waste economy and the recovery of nature as key priorities. Both are closely aligned with the principles of the circular economy.

This paper identifies and examines some of the major barriers to implementing the circular economy in the technology sector, and proposes actionable solutions to overcoming these barriers, supporting the Secretary of States prioritises to realise a zero-waste economy, recover nature whilst demonstrating the fiscal and planetary benefits of realising circularity.

1.3 Research framework

A qualitative desk-based research method was used to review and identify opportunities for improvement in the application of circularity, by reviewing information security and procurement policies and processes, and exploring the role of original equipment manufacturers (OEMs), and end-of-life technology management companies, and gaining survey responses from seven UK public sector ICT suppliers.

The survey responses were analysed by assigning specific codes to certain words and phrases found in survey responses. This coding process helped to identify recurring themes and patterns, providing insights into the respondents' perspectives and experiences.

2. Legacy Technology, E-Waste and Value Recovery

2.1 History and current landscape

The Circular Economy (CE) surfaced in the 1970s and was born from the idea of efficiency and a recognition of overconsumption. Since then, the model has gained popularity,

although it remains difficult to apply to many sectors. Moving from an ‘extraction-production-disposal’ model of the linear economy to a value added one of circularity, where materials stay in use through repair, remanufacture or reuse is increasingly necessary. With populations growing exponentially since the 1970s and resource scarcity becoming a more common occurrence through this growth, coupled with our consumption habits, the world economic system must change to a circular one.

“The UK is the largest producer of e-waste per capita in northern Europe” – The Global E-waste Monitor 2024

Suggested actions

- Encourage the holistic and centralised handling of legacy ICT estates within an organisation, where higher value recovered in one area supports the recovery of low to zero value equipment in another to prevent hoarding and increase component reuse and recycling.
- Investigate the results of the Defra Technology Amnesty to look for the process gaps needed to prevent the stockpiling of legacy technology.

2.2 Security Policies and Legislative Restrictions

Security protocols often necessitate the destruction of data-bearing devices and components, thereby posing a barrier to reuse. While these processes are well-intentioned, there is often an overemphasis on destructive outcomes such as shredding hard disk drives (HDDs) and equipment. However, with the right partner, certified alternatives exist that can meet security requirements without the need for destruction. It is these outdated or inadequate legislation and regulations that hinder circular practices in the ICT sector and can lead also to the hoarding of devices and reduction in value return, harming both the planet and the organisation’s bottom line.

The public sector must enact policies that encourage product lifespan alongside security protocol to build a more environmentally effective end-of-life management.

Changing policy to recover value - A recent case study saw an ICT asset disposition (ITAD) challenge the process for mobile phone disposal with a central government department who had a policy to shred legacy mobile phones. On challenging this with an internal advocate within the department it was discovered that numerous processes take place to remove 100% of the data and the shredding was not necessary. The result was the recovery of £60,000 worth of value from an estate of around 3,000 phones. There was also a significant carbon benefit, as emissions weren’t produced in the disposal of the handsets and neither were they produced manufacturing new devices as the component parts could be reused in refurbished kit, negating the need for new manufacturing. This example demonstrates the possibilities of value currently being lost.

The ITAD industry has a variety of industry standards from International Standard Organisation (ISO), National Cyber Security Centre (NCSC) to private recognised bodies

such as Adisa. Bringing the context and reasoning of sustainability and circularity into these standards would not only widen the responsibility of sustainability but also act as an educational foundation for departments such as security that have not previously been involved.

Departmental collaboration and meeting of both sustainability and security outcomes as a blended policy rather than two that stand separately would deliver innovation in process and policy change that is required for meeting net zero goals. A blended security and sustainability focus group - sharing case studies, alternatives and proven suppliers delivering alternative solutions to destruction or to combat hoarding to give confidence to data owners to challenge and change processes so they are both secure and sustainable.

Security and sustainability teams need to come together and collaborate on outcomes that improve sustainability without compromising security" – Mimi Moll, GDSA member

2.3 Advancements in UK Recycling Infrastructure in the UK

Investing in advanced recycling facilities can have a significant positive impact on both the environment and the economy, particularly when it comes to managing e-waste which includes discarded electronic devices and appliances (Holdway et al., 2021).

The predominant method of e-waste recycling in the UK is mechanical. A high proportion of processed e-waste such as printed circuit boards (PCBs) are being forcibly shipped overseas to refineries due to the lack of facilities in the UK. Mechanical processes involve breaking down materials into smaller pieces through various methods such as smashing up kit and then using techniques like magnets, eddy currents, and float tanks to separate different materials based on their properties. While mechanical recycling has been effective to a certain extent, there is recognition that it may not be the most efficient or sustainable method in the long run, especially in terms of its own carbon footprint and the overall yield of recycled materials.

To address these concerns, there needs to be increased investment in lower carbon and higher yield recycling and refining technologies. Lower carbon technologies refer to methods that produce fewer greenhouse gas emissions throughout the recycling process, from collection to processing and manufacturing of recycled materials into new products. This aligns with broader environmental goals aimed at reducing carbon emissions and combating climate change.

On the other hand, higher yield recycling technologies focus on maximising the number of usable materials recovered from the recycling process. This includes improving the efficiency of sorting and separating different types of materials, as well as developing innovative techniques for recycling materials that are traditionally harder to process or have lower recycling rates.

Linking to the UK government's Critical Minerals Strategy (2023), there is a recognition of the importance of securing a sustainable supply of critical minerals and materials necessary for various industries, including the recycling sector. Investing in lower carbon and higher yield recycling and refining technologies can contribute to achieving the goals outlined in the Critical Minerals Strategy by reducing the reliance on virgin materials and minimising the environmental impact of resource extraction and processing.

A new UK green refining plant for the processing of PCB's which employs bioleaching, a branch of biotechnology (a novel method using bacteria to recover metals such as gold, platinum, nickel, tin and up to 40 different metals) is now operational. The solution is set to revolutionise the processing of e-waste for the zero-carbon recovery of metals and materials using bacteria and low energy processes.

These advancements in recycling technologies can help alleviate supply chain vulnerabilities and enhance the UK's resilience to disruptions in the global supply of critical minerals. By promoting innovation and investment in more sustainable recycling practices, the UK can move towards a circular economy model where resources are used more efficiently, waste is minimised, and environmental impacts are reduced.

Moreover, the growth of innovation in material recovery in the UK aligns with the broader goals of transitioning to a circular economy and is intrinsically linked to net zero - material handling and use accounts for the vast majority (70%) of GHGs emitted. The circular economy has the power to shrink global GHG emissions by 39% and cut virgin resource use by 28% (Haigh et al., 2021).

In addition to environmental benefits, the innovation in material recovery in the UK has the potential to create green jobs and stimulate economic growth. Alvis and Avison (2021) produced some positive insights on this opportunity, stating that:

> [A] plan to transform the circular economy would create thousands of new jobs in those occupations suffering higher rates of unemployment. This could mean opportunities for engineers at a new biorefining plant in the Northeast, skilled repairers of machinery and electronics finding new roles in the West Midlands and more recycling operatives across the country, along with the associated new administrative jobs required, including administrators and purchasing managers.

As per the report, recycling electricals has the potential to generate thousands of jobs across the recycling value chain, from collection and transportation to processing and manufacturing. This demonstrates how investing in advanced recycling facilities contributes to a more sustainable and prosperous future, supporting both environmental conservation and economic development.

Ultimately, e-waste poses significant challenges globally. However, the UK's innovation in material recovery, highlighted in Holdway et al. (2021), is playing a crucial role in addressing this issue. These advanced recycling facilities that came online in 2024 will not only reduce the carbon footprint associated with e-waste, but also promote resource conservation, keep valuable materials within UK borders, and support the UK

Government's strategy on green growth and critical minerals. This aligns with global efforts to transition to a circular economy, where sustainability and innovation go together.

Whilst improving recycling and recovery is key, the future of a circular economy relies on the first two pillars; reduce and reuse. Refurbished and remanufactured devices offer dramatically lower carbon and waste impacts than a new device.

Suggested actions

- UK public sector to increase its awareness of new processes coming online for material recovery and availability of refurbished and remanufactured devices and include in procurement strategy at contract outset and policies around device lifecycle.

3. The Linear Nature of Procurement and Budgets

Public sector procurement traditionally follows a linear capex model. Budgets are allocated and spent with a focus on immediate needs without significant consideration for the end-of-life of procured goods with a "use it or lose it" ethos that leads to overspending and over provision.

This results in inefficiencies, waste, and a missed opportunity for value recovery.

The new Technology Products and Associated Services (TePAS) 2 Lot 7 for sustainable and Circular ICT should help departments have more control over the lifecycle of their ICT and is a huge step forward in offering compliant lifecycle services to extend the life of technology, enable refurbished devices to be procured and select a lifecycle management partner that can support ambitions to increase circularity.

Embracing a circular procurement model is crucial for the public sector to lead by example in sustainability, drive innovation, and generate long-term economic and environmental benefits. Transitioning from a linear to a circular approach requires fundamental rethinking of budgets and commercial controls. While challenging, this is essential for the resilience and responsibility of public sector operations.

Suggested actions

Purchasing for Circularity
To support a circular economy, buyers should prioritise products designed for longevity, repairability, refurbishment, and recyclability. Achieving this shift requires updates to traditional budgeting practices. For instance, budgets should focus on total cost of ownership rather than just upfront costs. Procurement officers should be incentivised to select circular options, and success metrics should evolve from short-term cost savings to long-term sustainability and value creation. Government must also create a pathway for value recovery so funds from value recovery can be absorbed back into the organisation and used to support further sustainable procurement models and decisions.

Circular Procurement Contracts and Device-as-a-Service (DaaS)
Procurement contracts can be structured to encourage suppliers to take back or repurpose products at the end of their life. Models like Device-as-a-Service (DaaS) support this approach, as the vendor retains ownership of the device. Leasing through DaaS offers access to higher-spec technology at lower overall costs and includes built-in end-of-life management. Shorter replacement cycles, often seen as negative, can benefit circularity. Devices passed through multiple users in shorter, well-managed cycles often last longer overall than those used by a single owner until failure. In this way, DaaS promotes a more sustainable reuse market.

Regulatory Frameworks
Policies are essential to drive the adoption of circular procurement. One approach is to mandate incremental year-on-year increases in the use of refurbished devices within ICT estates by building it into contractual obligations at the outset of the contract. These frameworks can create accountability and accelerate the transition to more sustainable procurement practices.

4. Trusting refurbished and remanufactured devices

Including a percentage of refurbished and/or remanufactured devices in government and public sector policy spend is a forward-thinking approach that can yield numerous benefits.

Whilst the latest Greening Government ICT 2020-2025 states an increase year on year, there is no ambition set. By mandating the allocation of a portion of the technology budget to refurbished devices, policymakers can promote sustainability, cost-effectiveness, and resource efficiency (circularity).

This not only aligns with environmental goals but also allows public sector organisations to allocate resources to other critical areas. This would demonstrate a commitment to responsible procurement, setting an example for sustainable technology adoption, contributing to a more resilient and cost-effective public sector.

Public sector entities often hesitate to purchase refurbished devices due to concerns about their reliability and lifespan, therefore building trust around refurbished devices involves demonstrating transparency, reliability, and a commitment to sustainability. This could be done in several ways.

Suggested actions

- Warranty and Support: Suppliers should be committed to offering robust warranties and after-sales support for refurbished devices. Providing a warranty demonstrates confidence in the product's reliability and reassures customers that any issues will be promptly addressed.
- Utilising standards like BS 8887-220, and BS 8887-211 in the refurbishment and remanufacturing of technology devices offers several significant benefits in bolstering trust in the refurbished products. These standards provide a framework for quality assurance, ensuring that refurbished devices meet stringent safety, performance, and reliability criteria. By adhering to these standards, consumers can

have confidence that the refurbished technology they purchase has undergone thorough testing and meets industry-recognised benchmarks. This not only enhances trust but also extends the lifespan of devices, reduces e-waste, and contributes to sustainability, making refurbished technology a more appealing and reliable choice for consumers and businesses alike.

- Case Studies: Highlight the environmental benefits of refurbished devices, such as reduced e-waste, reduced mineral mining and carbon footprint. Share statistics and case studies showcasing the positive impact on sustainability - success stories and testimonials from public sector organisations that have successfully adopted refurbished devices. Real-world examples can inspire trust.
- Public Awareness Campaigns: Launch awareness campaigns to inform public sector stakeholders about the benefits of refurbished technology, emphasising cost savings, environmental impact, and reliability.

By implementing these strategies, trust can be built within the public sector and refurbished devices positioned as a viable and dependable option for their technology needs.

5. Need for Circular Product Design

CE principles dictate that a product's lifecycle must encompass not only the production, use and disposal of a product but also its potential for reuse and resource recycling. Circular product design is an approach gaining traction, emphasising the longevity of products and materials while minimising resource usage and waste. Public sector involvement in circular product design is crucial due to its extensive consumption of a range of goods and services. This chapter will focus on the need for standardisation and labelling, modular design and strategic decision-making.

While Original Equipment Manufacturers (OEM) should aim to manufacture more repairable and lower-impact products to facilitate a CE, public sector entities can play a significant role in driving this change. By incorporating circular product design principles, products can become part of the waste solution rather than the problem (Preston, 2012). This change is critical for responsible end-of-use and end-of-life management, feeding product and resources back into society for reuse thus reducing waste.

Suggested Actions

- Designing for longevity and focusing on a product's conception is essential. By doing so, we can ensure that resource allocation post-design aligns with CE practises and reduces the negative impacts of the linear 'take-make-waste' model. Circular product design is a practical step towards achieving this, and it plays a critical role in promoting sustainability and resource efficiency in the public sector. We recommend a product labelling 'traffic light system' that clearly shows repairability, upgradeable, longevity in order of best to worse

- Further demand for these requirements from OEMs instigated by the public sector may also signal to the market that granular product information which enables designing for longevity is the direction of travel going forwards and manufacturers must meet stringent requirements to maintain business.

5.1 Learning from other industries - Food and Clothing

Just as we have ingredient lists on food packages and fabric content labels on clothing, it is crucial that we bring transparency to the technology industry by requiring detailed listings of the materials and resources that make up laptops, servers, and other tech products.

If we are to replicate such transparency within ICT, we ought to draw parallels with the food and clothing industries to foster a circular economy and facilitate informed and ethical decision-making.

In the food industry, ingredient lists, and nutritional information are mandatory, providing consumers with the knowledge they need to make informed choices based on health, ethical considerations, and personal preferences. Similarly, clothing labels must disclose fabric content, allowing consumers to make decisions based on comfort, durability, and ethical considerations related to material sourcing and labour practices.

These standards have not only influenced consumer choice but also shaped industry practices, as companies strive to meet the demands of an increasingly informed and discerning customer base. This has led to positive changes, such as the growth of organic and fair-trade food markets, and the emergence of sustainable and ethical fashion brands. This includes positive action and demands from consumers despite concerns about affordability (Olwoch, et al. 2023)

When it comes to technology, consumers are largely in the dark about the materials and resources that go into the products they purchase and the impact on the people and planet.

Laptops and servers, for example, contain a complex mix of metals, plastics, and other materials sourced from around the world. The extraction and processing of these materials have significant environmental and social impacts, from the degradation of ecosystems to the violation of human rights. For example, the mining of minerals like cobalt (used in batteries) has been linked to human rights abuses in regions like the Democratic Republic of Congo (Baumann-Pauly, 2022).

Suggested actions

- By requiring tech companies to disclose the "ingredients" that make up their products, we can educate and empower buyers to make informed choices that align with their values. This transparency will also foster a circular economy by highlighting the need for sustainable design and the importance of recycling and

reusing materials and will go a huge way in creating the much-needed awareness. We appeal to the public sector to demand greater transparency from OEMs.

Moreover, as in the food and clothing industries, transparency can drive positive change within the tech industry, encouraging companies to source materials responsibly, improve working conditions in their supply chains, and design products with end-of-life in mind. In conclusion, the requirement for transparency in the technology industry is not only necessary but also has the potential to drive significant positive change. By drawing on the lessons learned from the food and clothing industries, we can create a framework that empowers “consumers”, supports a circular economy, and fosters ethical and sustainable practices within the tech industry from the design stage to closed loop material recovery.

5.2 Modular Design

Many ICT products are designed with a short lifespan, making repair and refurbishment difficult or uneconomical. This results in a higher rate of disposal, leading to significant e-waste accumulation. While recyclability is an essential aspect of sustainable product design, maintaining the integrity of the product is more significant so devices are more durable and last longer, as well as designing them for individual part repair if damage does occur. That’s why designing ICT products with modular components is crucial to taking a more sustainable approach than current linear design models. For example, some Tower PCs are modular, allowing users to replace every element within them, such as hard drives, RAM, and graphics cards. Modularity extends product life cycles by allowing for easy disassembly, repair, and component replacement. This not only reduces the consumption of resources but also aligns with the principles of a CE, fulfilling the goal of minimising waste and maximising the utility of products and resources.

Ultimately, a modular approach can significantly improve the longevity of electronic devices, making it a more circular approach.As highlighted by Wang, Burke, and Zhang (2021) in their research on supply chain collaborations and remanufacturing, it is crucial to support these initiatives with a design philosophy centred on disassembly. Incorporating a ‘Design for Disassembly’ approach will play a pivotal role in ensuring that ICT products can be repaired and upgraded after disassembly. When you can dismantle a device into its component parts, repair and maintenance processes become much easier. Products designed with modularity in mind are therefore more likely to have their lifecycles maximised through upgrades and repair processes (Mestre and Cooper, 2017).

Public sector entities have a crucial role to play in encouraging suppliers to incorporate modular design principles into their ICT products. Setting standards around the uptake of modularity ensures that specific components such as processors, memory or data centre components are upgraded when they become obsolete, damaged or end-of-life (as opposed to replacing the entire device). By embracing modularity, ICT products and devices can better fit within the framework of a CE, ensuring that they don’t become obsolete or end up in landfills before their time. A modular approach reduces the need for frequent replacements of entire devices, resulting in both significant cost and resource reductions, creating a win-win scenario.

6. The Role of Education – knowledge and context to drive change

Education already plays and will continue to play a pivotal role in the adoption and promotion of circular economy principles in addition to wider sustainability principles. From a public sector standpoint, the importance of education is twofold: it involves enlightening both policymakers and the public sector workforce to drive systemic change at all levels of the organisation, to not only benefit the organisation but also to benefit UK society.

Policy makers, at the forefront of decision-making, need a comprehensive understanding of the environmental and human consequences associated with not embracing a circular economy. Issues, including more than 90% biodiversity loss (Ellen MacArthur Fountain 2021) and the use of conflict minerals, are directly correlated with linear production and consumption models. Through targeted educational initiatives, policy makers can gain insights into the relation between economic systems and ecological well-being, fostering informed policy decisions that prioritise sustainable consumption.

Currently, there is a significant knowledge gap within the public sector workforce regarding the circular economy, which leads to misconceptions about the benefits of adopting circular principles. It is imperative to bridge this knowledge gap through educational campaigns, workshops, and collaborations with educational institutions and industry experts. These initiatives can empower the public sector workforce with the information needed to make environmentally conscious choices in their professional capacities.

Raising awareness about the environmental impact of ICT consumption is hugely important given the escalating rates of e-waste generation - approximately 50 million tonnes per year (UNEP 2019). Educational efforts can shed light on the material content of electronic devices and encourage individuals to extend the life of products or repurpose them to mitigate such waste. By showcasing the magnitude of resource use and waste generation, these campaigns can communicate a sense of responsibility and urgency among the public sector workforce.

Education can act as the catalyst for change, driving a paradigm shift in mindset and behaviour. By equipping policy makers and the public sector workforce with the knowledge needed to comprehend the circular economy's significance, society can transition towards more sustainable practices as everyone takes responsibility for embedding CE principles.

There is a significant knowledge gap around why we ought to adopt circular economy principles, as the benefits of doing so aren’t widely known.

Suggested actions

- To overcome the knowledge gap on circular economy benefits in the public sector, launch targeted awareness campaigns, provide practical training sessions, establish a centralised knowledge hub, and facilitate dialogues and learning

sessions with industry leaders. These measures will empower public sector officials to understand, implement, and share circular practices effectively.

7. Measuring circularity through Scope 3 emissions

In the landscape of UK public sector procurement, an essential aspect is the measurement of circularity through Scope 3 emissions. While Scope 1 and 2 emissions cover direct and indirect emissions from owned or controlled sources and purchased energy, Scope 3 emissions widens the perspective to encompass all other indirect emissions within the value chain including purchased goods and operational waste.

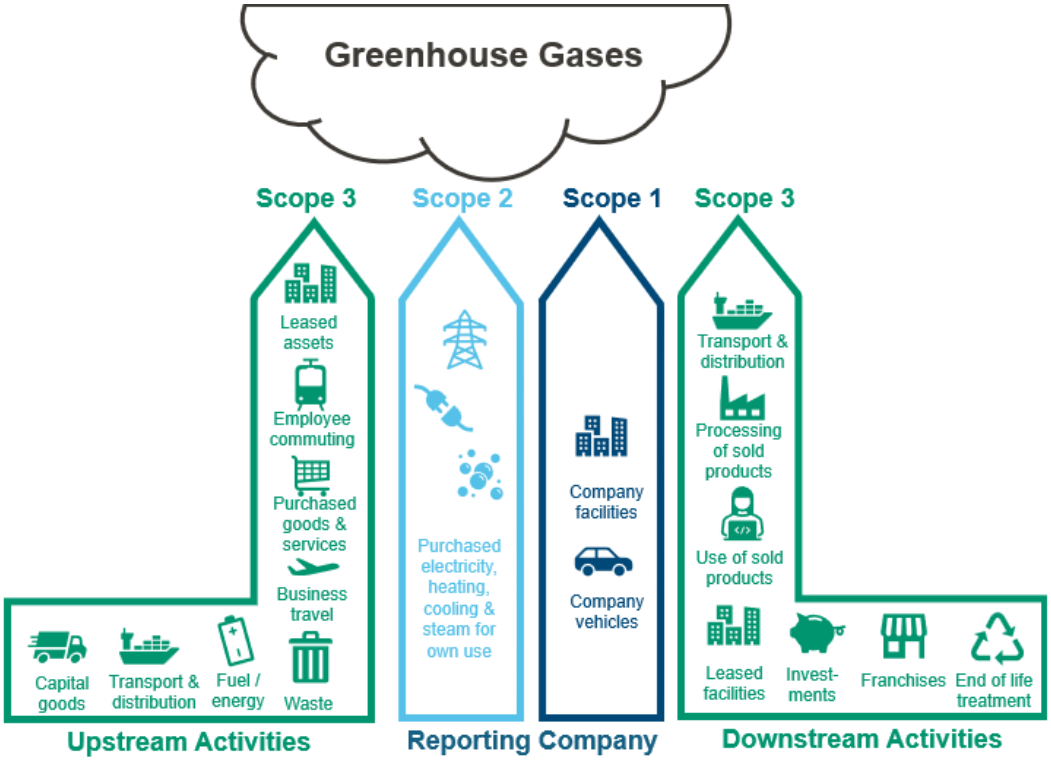

Figure 3 Sources of Scope 1, 2 & and 3 emissions – Cloud with 'Greenhouse Gas' sits above 4 coloured pillars which show the emissions reporting categories; Upstream Activities, Scope 1 emissions, Scope 2 emissions and Downstream activities

Public sector entities with high ICT footprints, are increasingly recognising the importance of addressing Scope 3 emissions in their procurement processes. The entire value chain, spanning manufacturing, transportation, in-life use phase and end-of-life stages, contribute substantially to environmental impacts of procurement choices. By incorporating Scope 3 emissions in measurement frameworks, public sector organisations gain a comprehensive view of the environmental footprint associated with their procurement activities.

This must become a foundational element in procurement, allowing entities to set realistic and achievable goals for carbon reduction, aligning public sector procurement with broader environmental objectives.

Identifying hotspots within the value chain is a key outcome of measuring circularity through Scope 3 emissions in public sector procurement. Public sector organisations can then focus on choosing suppliers who optimise manufacturing processes, improve transportation efficiency, create low carbon in-use products and enhance end-of-life product management to minimise their environmental footprint.

In the UK, public sector entities are increasingly committing to sustainability and circularity considerations in procurement decisions. Initiatives like the Greening Government Commitments (GGCs) play a pivotal role in guiding these efforts. While the GGCs underscore the importance of sustainability, the broader focus on measuring circularity through Scope 3 emissions empowers public sector organisations to make informed choices about suppliers, products, and procurement strategies.

A barrier to measuring circularity through Scope 3 emissions lies in the complexity and variability of supply chains and the absence of standardised emissions reporting. The GDSA Scope 3 workstream is approaching this topic as a recognised issue.

Suggested actions

To measure circularity through Scope 3 emissions, public sector entities must implement a standardised methodology. For instance, leveraging the life cycle assessment (LCA) model, as seen in initiatives such as the EU Product Environmental Footprint (PEF), can provide a comprehensive approach. This requires defining clear criteria for assessing environmental impacts at each stage of ICT product procurement, from manufacturing to end-of-life across all public entities.

By incorporating proven models, the public sector can ensure consistent, comparable, and accurate measurement of Scope 3 emissions, fostering a more circular and sustainable ICT procurement landscape.

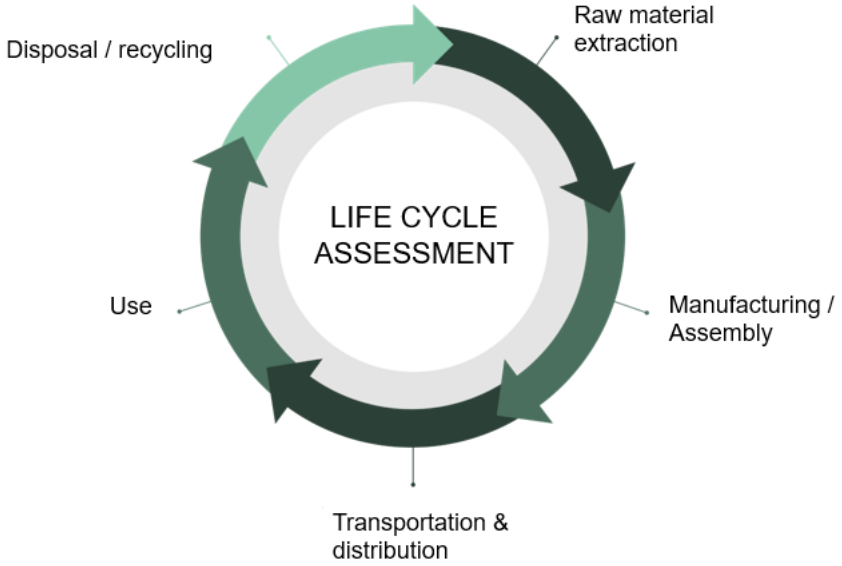

Figure 4 LCA model – green circle with arrows going anti-clockwise, with the 5 stages of the lifecycle assessment at different stages round the circle

8. The Sustainability Engine

A graphical representation of key barriers to circularity can be seen in Figure 5. The major cogs represent primary areas to address to overcome these barriers. All aspects need to be integrated into a fully collaborative approach to drive the circular economy.

Figure 5 The sustainability engine, devised by the CE working group – engine cogs representing the needed actions for a circular economy in IT; Challenge security policies,

Afterword

Transitioning the ICT industry towards circularity is essential for reducing its environmental footprint and ensuring long-term sustainability. Overcoming barriers like design for disposability, rapid obsolescence, and complex supply chains requires a collaborative effort involving governments, businesses, consumers, and other stakeholders. By implementing strategies such as circular procurement models, sustainable and secure policies around hardware and data handling, encouraging the use of modular/repairable designed devices and equipment, and raising awareness, the ICT industry can pave the way for a more circular and sustainable future.

The government should invest the time and resources to explore these ideas further and implement and build upon the recommendations made.

Appendix

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Research

“It’s been critical for us to digest primary and secondary data so that we have a full understanding of the key barriers faced by the public sector to enable a circular economy” – Emily Watson-Breeze, GDSA member

Identifying Circular Economy blockers questionnaire – response from 7 government suppliers 2023

Question 1: Thinking about bidding for, or the delivery of, a Circular Technology or Service - Please state where procurement strategy has inhibited your organisation in providing solutions.

Responses to question 1:

1. Mix of cost
2. Own remanufactured equipment
3. Pooling of resources
4. Cost of products
5. Lack of awareness
6. Incentive for companies
7. Not enough legislative incentives for companies demand of technology

Question 2: In terms of Question 1 - What do you feel was given as the main blocker to the circular proposals? (I.e. security, budget, communications, organisations etc.)

Responses to question 2:

1. Reliability
2. Budget
3. Maintenance
4. Lack of understanding
5. Security
6. Poor previous experience

7. Business model

Question 3: What would you like to see change (and how) to facilitate a more Tech Circular Economy friendly procurement angle? Please provide your ideas for tackling any identified issues/blockers.

Responses to question 3:

1. Standard productivity tool
2. BYOD solution
3. Consistent approach
4. Circular economy clause
5. Centralised capacity and simplified device capacity
6. Business model
7. Proactive inclusion/target for circularity

Barrier Themes:

1. Backwards legislation/regulation
2. Higher cost/lack of budget (investment)
3. Lack of education/awareness (don't understand impacts of e-waste streams)
4. Not a primary strategic objective
5. Increasing demands of technology advancement
6. Security concerns
7. Poor performance/reliability concerns (pre-conception about performance of circular technology)
8. Lack of contractual agreements with suppliers
9. Accessibility and availability (some bids haven't accepted remanufactured offerings because it would be putting other suppliers at a disadvantage)
10. Lack of BYOD solutions (security worry about using one device for personal and professional interactions)

Unblocking Circular Economy in ICT – response from 15 government employees 2023

Question 1: When thinking especially about Circular ICT - Please state your Departmental sustainable ICT maturity level (Delivery of your specific sustainable ICT Strategy/Policy and Resources in place across your Dept/Agency/Body to deliver them)

Response to question 1:

- Not started
- Under review / In progress
- Planned
- Achieved

Question 2: Please select from the list below any actual or perceived barriers that you face in your department to delivering the circular economy objective. Please select all that apply.

Response to question 2:

- Security
- Re-use blockers
- Demand outweighing supply
- Commercial issues
- Capability / Poor performance / reliability
- Governance or legal issues
- Preferred branding / suppliers

Question 3: Please select from the same list as question three, (up to) your top three actual/perceived barriers that you face in your department to delivering the circular economy objective.

Response to question 3:

- Security
- Commercial Issues
- Capacity