2023

MANAGING E-WASTE IN ITU'S DIGITAL TRANSFORMATION CENTRES

Digital Transformation Centres

ITU

Digital Transformation Centres

The Digital Transformation Centres (DTC) Initiative was introduced in September 2019 as a collaboration between the International Telecommunication Union (ITU) and Cisco. Its main purpose is to enhance the digital skills and capabilities of individuals, especially those in underserved communities, across various countries. The selected DTCs form a global network of institutions that aim to expedite the adoption of digital technologies among citizens. Additionally, the initiative strives to empower young entrepreneurs and small and medium-sized enterprises (SMEs) to thrive in the digital economy.

About the guide

This Guide aims to provide an understanding of the key considerations and components for e-waste management in ITU's Digital Transformation Centers. The Guide provides a roadmap to build or fine-tune an organizational strategy to ensure the responsible usage of electronic and electrical equipment (EEE) and the correct channelling of the EEE at its end-of-life as e-waste, ultimately leading to a circular economy.

The **circular economy** is a system where resources are kept in use for as long as possible by promoting reuse, repair, and recycling. It aims to reduce waste, conserve resources, and minimize environmental impact. (ITU and WEF, 2021)

The DTCs are invited to use the Guide as a foundational document, laying out approaches for e-waste management within their operations.

While the Guide takes the operational context of all DTCs into consideration, the document includes general best practices to develop or improve e-waste management protocols in many applicable scenarios.

Background

The e-waste challenge:

> **E-waste** is a term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use. (StEP, 2014)

Rapid innovation and increasing affordability of electronic and electrical equipment (EEE) have dramatically increased access to EEE, and consequently e-waste. E-waste has become one of the fastest-growing waste streams in the world. According to the Global E-waste Monitor 2020, it is forecasted that by 2030, the global generation of e-waste will reach 74.7 Mt. However, in 2019, only 17.4% of e-waste was collected and recycled.

When electronic devices are improperly disposed of, they release toxic chemicals such as lead, mercury, and cadmium into the environment. These chemicals can contaminate the air, water, and soil, leading to serious health problems for humans and wildlife alike.
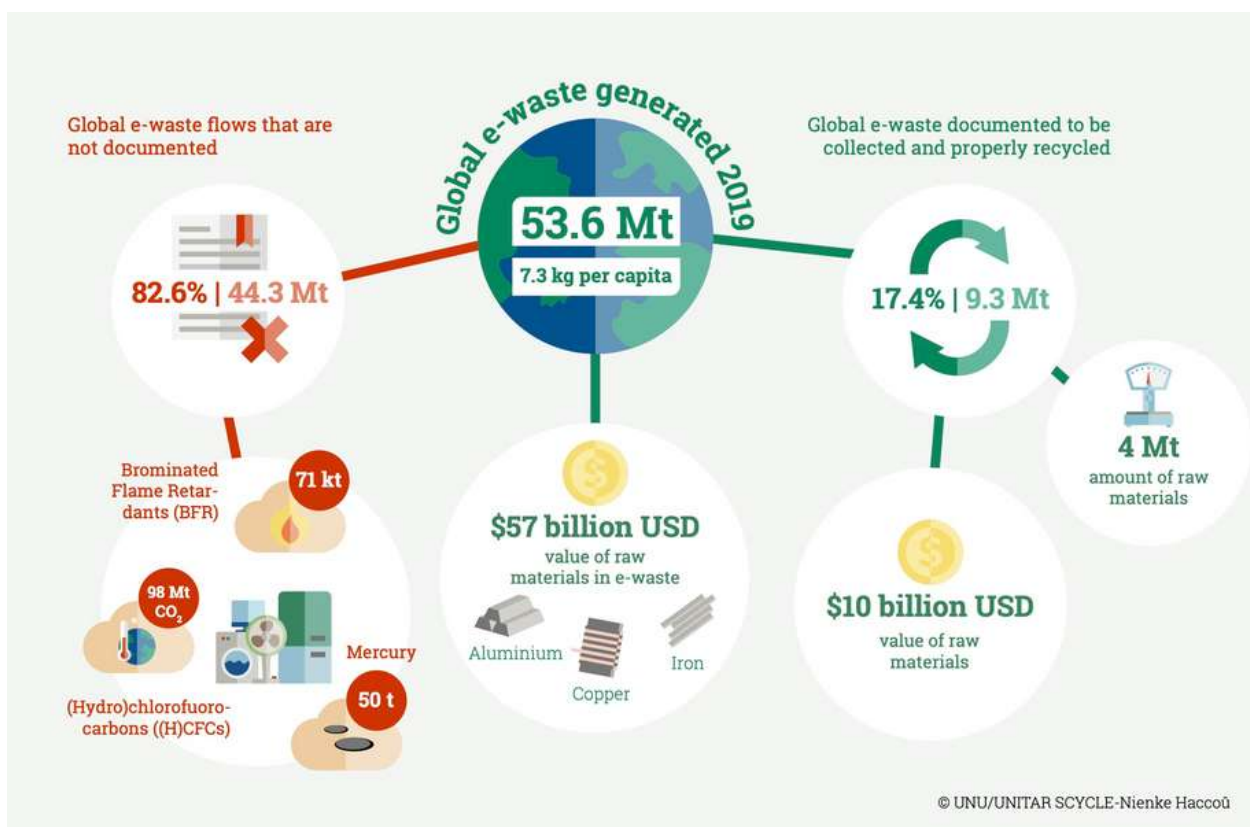

Fig 1: Global e-waste statistics in 2019 (Forti et al., 2020)

Additionally, e-waste components offer a high potential for material recovery. Only 10-billion-dollar worth of the estimated USD 57 billion in raw minerals, such as silver, copper, and gold contained in e-waste was recovered in 2019 (Forti et al., 2020). This is especially relevant now as crucial material supply chains are becoming more and more vulnerable.

Components and materials Daisy recovers

Main Logic Board
Tin
Gold
Copper
Silver

Receiver
Steel
Copper
Rare earth elements

Taptic Engine
Tungsten
Rare earth elements
Steel
Copper

Wireless Charging Coil
Gold
Copper

New Enclosures (iPhone 8 and later)**
Aluminum
Copper
Steel

Old Enclosures (iPhone 7 and earlier)
Aluminum
Steel

Battery
Cobalt

Speaker
Steel
Copper
Rare earth elements

Dock Flex
Tin
Gold
Copper

Rear Camera
Copper
Tin
Gold
Rare earth elements

Front Camera and Face ID
Copper
Tin
Gold
Steel

For every 100,000 iPhone devices, Daisy has the potential to recover:*

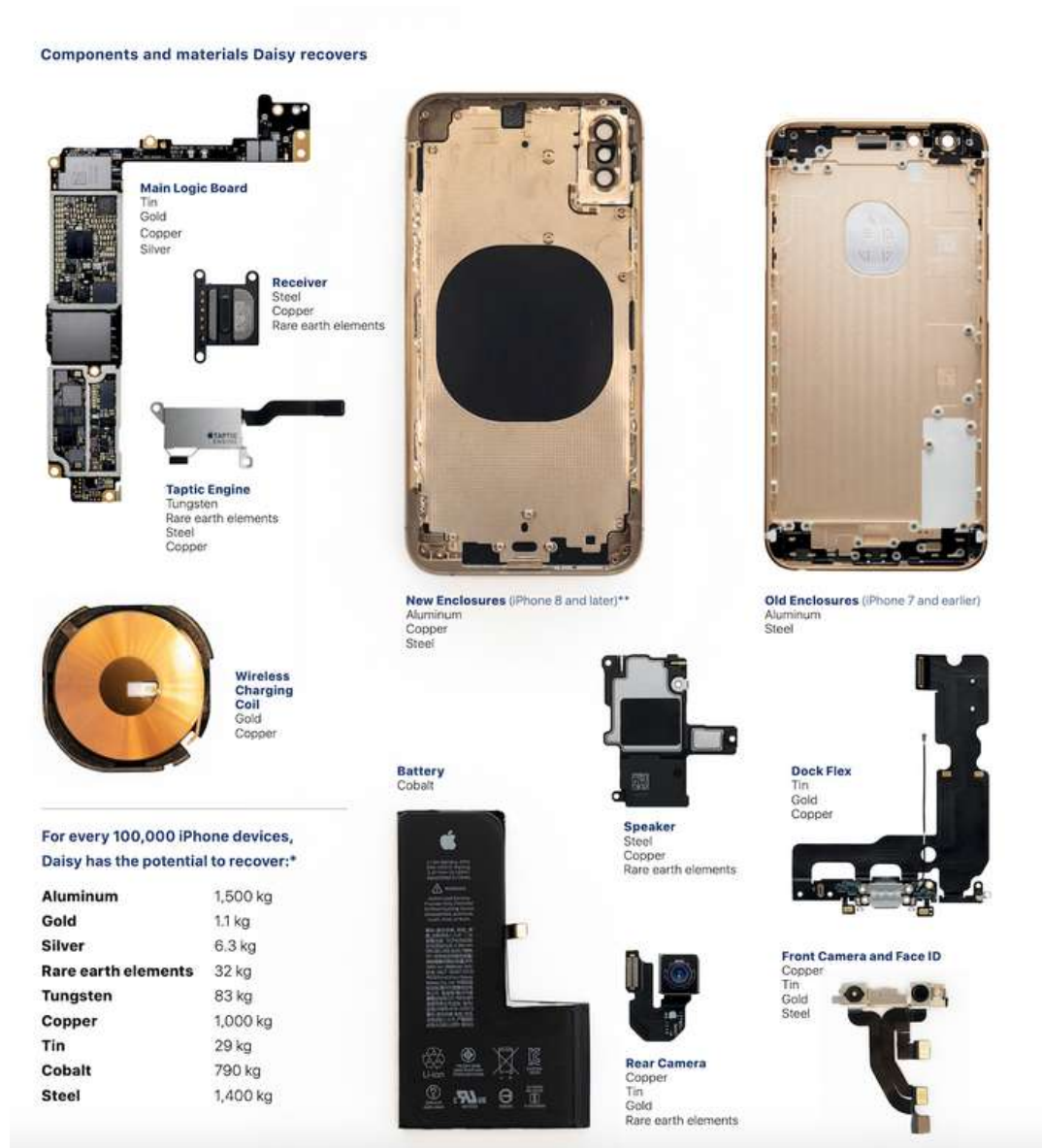|	
Aluminum	1,500 kg
Gold	1.1 kg
Silver	6.3 kg
Rare earth elements	32 kg
Tungsten	83 kg
Copper	1,000 kg
Tin	29 kg
Cobalt	790 kg
Steel	1,400 kg

Fig 2: Materials recovered from an iPhone by Daisy, Apple's disassembly robot. (Apple, 2019)

It is imperative for governments and societies to take the growing e-waste issue seriously. As a circular economy for electronics involves many stakeholders such as producers, consumers, collectors and recyclers throughout the cycle, each stakeholder needs to play his/her part.

Background

The role of DTCs as a stakeholder

Small and large consumers play a key role in e-waste management as they determine the use phase of EEE and if/how it is diverted into the proper end-of-life channels. The DTCs by their very nature are small to medium-sized consumers of EEE. Through training and engagements with communities across DTC countries, each DTC also has the opportunity to create awareness and action to help reduce this quickly growing waste stream.

> A **consumer** includes any natural or legal person who acquires and is using EEE individually or in bulk (ITU and WEF, 2019).

Today, even countries with seemingly well-developed e-waste systems have relatively low collection rates. For example, despite having the highest collection and recycling rate, Europe's collection of e-waste stands only at 42.5 % (Forti et al., 2020).
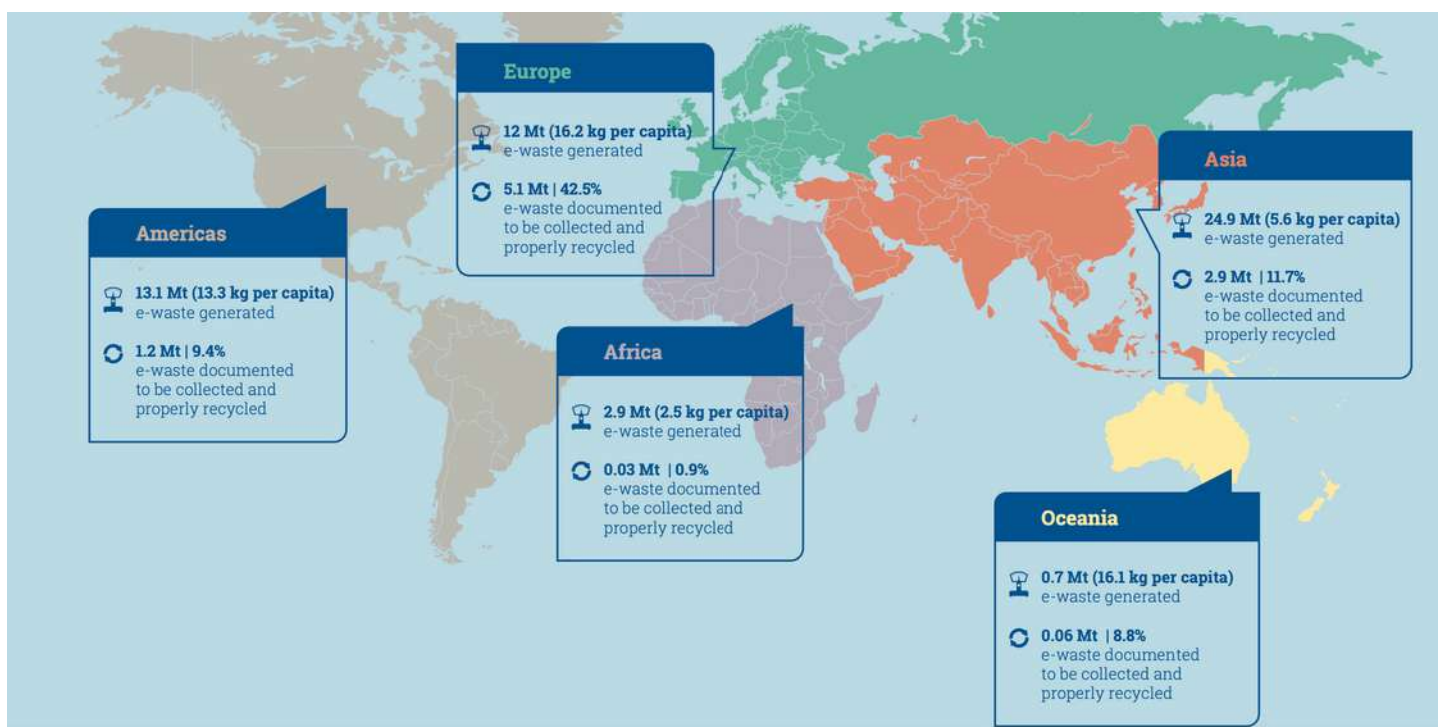

Europe
- 12 Mt (16.2 kg per capita) e-waste generated
- 5.1 Mt | 42.5% e-waste documented to be collected and properly recycled

Asia
- 24.9 Mt (5.6 kg per capita) e-waste generated
- 2.9 Mt | 11.7% e-waste documented to be collected and properly recycled

Americas
- 13.1 Mt (13.3 kg per capita) e-waste generated
- 1.2 Mt | 9.4% e-waste documented to be collected and properly recycled

Africa
- 2.9 Mt (2.5 kg per capita) e-waste generated
- 0.03 Mt | 0.9% e-waste documented to be collected and properly recycled

Oceania
- 0.7 Mt (16.1 kg per capita) e-waste generated
- 0.06 Mt | 8.8% e-waste documented to be collected and properly recycled

Fig 3: E-waste generation and collection around the world. (Forti et al., 2020)

Background

It was estimated that there were around 10 million metric tons of hoarded electronics in the EU, with an estimated value of €42 billion (European Parliament, 2017). In Africa, the collection and recycling figure stands at 0.9% (Forti et al., 2020).

Governments play a key role in a circular electronics value chain by setting up regulations and monitoring the system to ensure that stakeholders such as producers and recyclers work together to ensure that e-waste is properly disposed of. However, it is crucial that e-waste management protocols are set up in-house in organizations such as DTCs to ensure that every consumer plays their part.

Basics of EEE and e-waste

EEE is generally divided into 54 different product categories that are grouped into 6 general categories as seen above (Forti et al., 2018).

Note: Accessories like cables and wires are e-waste too!

1. Temperature exchange equipment: more commonly referred to as cooling and freezing equipment. Typical equipment includes refrigerators, freezers, air conditioners, and heat pumps.

2. Screens and monitors: typical equipment includes televisions, monitors, laptops, notebooks, and tablets.

3. Lamps: typical equipment includes fluorescent lamps, high intensity discharge lamps, and LED lamps.

4. Large equipment: typical equipment includes washing machines, clothes dryers, dishwashing machines, electric stoves, large printing machines, copying equipment, and photovoltaic panels.

5. Small equipment: typical equipment includes vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring, and control instruments.

6. Small IT and Telecommunication equipment: typical equipment includes mobile phones, Global Positioning System (GPS) devices, pocket calculators, routers, personal computers, printers, and telephones.

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Fig 4: Six general e-waste categories (Forti et al., 2020)

Background

In DTCs, the most used EEE is desktop computers, printers, monitors, routers, and laptops in categories 2 and 6 as seen in Figure 4. However, note that even other EEE such as air conditioners, lamps, vacuum cleaners, kettles, and calculators should be taken into account in the e-waste management strategy.

E-waste legislative framework

A legislative framework for e-waste is vital in order to understand the roles and responsibilities among all stakeholders in e-waste management. Legislation holds parties accountable, sets a level playing field for responsible recycling practices and establishes monitoring and enforcement channels for environmentally sound e-waste management. Most DTCs operate in countries with some form of e-waste legislation. Make sure you understand the e-waste laws and regulations in your country.

Look out for the following things:

Definition of e-waste: The definition of e-waste varies from country to country, so it is important to understand which electronic devices are considered e-waste in your country, and how they are to be treated.

Responsibility of producers : Many e-waste laws place responsibility on producers of electronic devices to finance and manage the collection and recycling of their products at the end of their useful life. Nations vary in how goods are brought into the economy, some countries have large manufacturers, while some have mostly importers that bring in the EEE. Therefore, the stakeholders included in the term "producers' can vary. This then influences how e-waste is collected, such as through producer take-back, authorized e-waste collectors, mobile network operator take-back, and e-waste drop-off points.

Background

Collection and recycling programs: Look for information on the e-waste collection and recycling programs available in your country, including authorized collectors, recycling centres, and drop-off points. There may also be guidance on how to safely dispose of your electronic devices.

Producer: Any natural or legal person, who manufactures or markets or resells electrical and electronic equipment (EEE) under the person's own name or trademark; places on the market of that country EEE from a third country or from another state; or sells EEE by means of distance communication and is established in another state or in a third country. (ITU and WEF, 2021)

Waste hierarchy
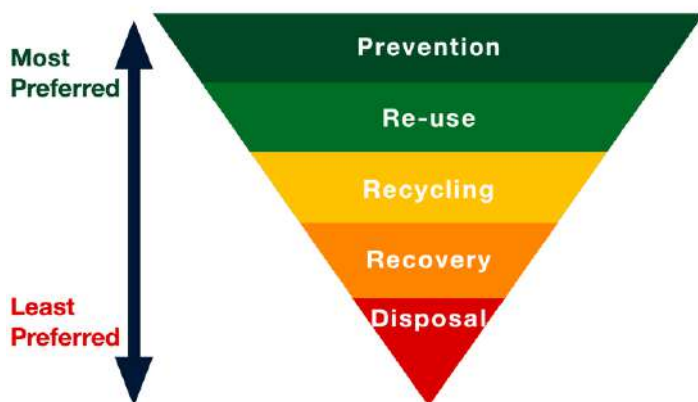
Fig 5: Waste hierarchy

In a circular economy, the waste hierarchy is a system that prioritizes actions to reduce waste generation and resource loss from most preferred to least. As shown in Figure 5, reducing unnecessary consumption is the best way to reduce waste in the first place. When an EEE device is acquired, it should then be a priority to ensure that the product's life is extended to the maximum possible. This entails proper usage, maintenance, and when required, repair, reuse, and repurposing. Finally, when a device is no longer usable, it must be diverted to the proper recycling and recovery channels. Disposal is the least preferred, and improper disposal can be harmful to the environment and health and lead to the loss of valuable resources.

Practical guidelines

The following chapter lays out practical tips and guidelines for DTCs to adopt in their e-waste management strategies. Using the e-waste heirachy as a starting point, the chapter identifies best practices to lower EEE consumption, extend EEE life and make sustainable decisions when the EEE reaches its end of life. Using examples from DTCs, the chapter also looks at on-the-ground solutions or scenarios for added considerations.

The decision tree below will help identify where to start when electronic equipment is no longer usable.
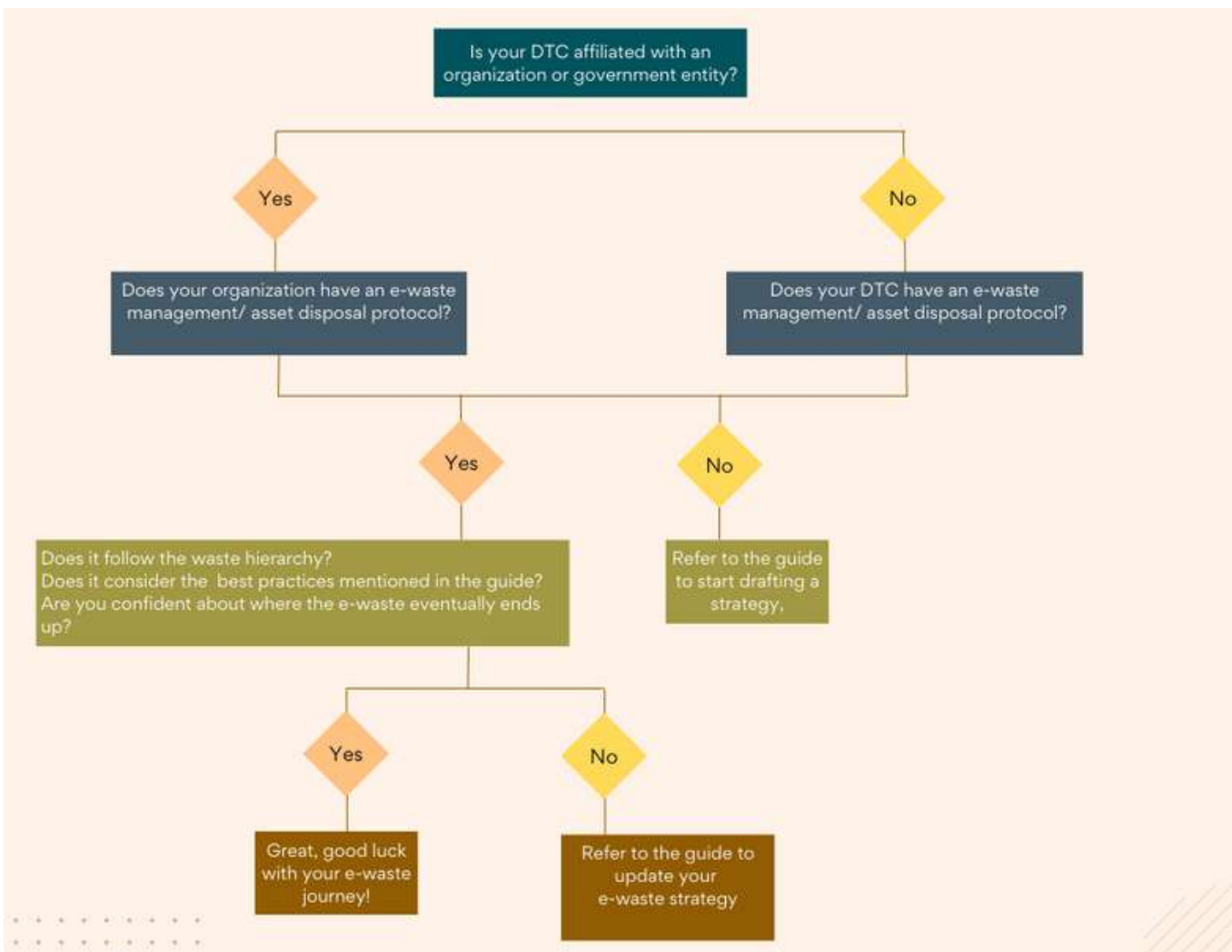
Fig 6: E-waste management decision tree for DTCs.

Practical guidelines

Prevention of e-waste

In the waste hierarchy, the prevention of e-waste is the most effective and environmentally responsible approach. By implementing measures before acquiring more EEE, we can significantly reduce the generation of electronic waste, leading to a more sustainable future.

Conduct an audit of existing devices: Before purchasing new electronic devices, conduct an audit of existing devices to determine which devices are still functional and meet your needs. This can help prevent the purchase of unnecessary new devices. If the DTC is affiliated with a large organization, check for usable devices currently in storage to avoid unnecessary purchases.

Share resources: Several DTCs already share space and devices with computer labs in universities, or local community centres etc. rather than procuring their own EEE. This not only ensures that new devices are not procured, but DTCs can also plug into existing maintenance and repair facilities in these organizations or can introduce such facilities to extend the life of EEE.

Leasing devices: According to the leasing model, instead of purchasing a device outright, a consumer can lease it for a set period, paying a fee to use the device during that time. Once the lease period is over, the device is returned to the designated service provider. Such providers usually also support the maintenance and repair of the devices, reducing costs in the long run. If you choose to use a provider, make sure they have proper sustainability measures in place to dispose of EEE after it becomes e-waste.

Practical guidelines

Maintenance of EEE

To extend the life of electronics, staff in the DTCs should be well-trained in the maintenance of electronic devices, as proper treatment and care can significantly affect their life span.

Here are some general tips that should be followed in all DTCs by staff as well as the participants:

Keep electronics clean: Dust and debris can cause electronics to overheat and malfunction. Use a soft cloth to clean the surfaces of electronics regularly.

Avoid spills: Liquids can damage electronics. Make sure that drinks and food are kept away from electronics, and if spills do occur, immediately turn off the affected electronics, unplug them, and dry them completely before attempting to turn them on again.

Keep electronics well-ventilated: Electronics generate heat, and if they don't have enough ventilation, they can overheat and malfunction. Make sure that electronics have enough space around them to allow for proper airflow.

Protect electronics from power surges: Power surges can damage electronics. Use surge protectors to protect electronics from power surges. Turn off electronics that are not in use.

Use electronics properly: Follow the manufacturer's instructions for using electronics. Avoid overloading outlets or using electronics in ways that are not designed to be used.

Regularly update software: Keep electronics' software up to date with the latest security patches and bug fixes to prevent vulnerabilities and improve performance.

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Schedule regular maintenance: Arrange for regular maintenance checks by a qualified technician to ensure that electronics are working properly and catch any issues before they become serious problems.

Monitor usage: Establish clear rules for users of the DTC devices during orientation and put up the rules in the centre using understandable and non-technical wording.

> *Note : The geographical setting of the centre can have a significant impact on electronic life. Temperature and humidity through overheating, corrosion, and condensation can damage electronics. To prevent these issues, it's important to keep electronics in a controlled environment that is neither too hot nor too cold. Ideally, the temperature should be between 15°C and 24°C with low humidity. If electronics are moved from one environment to another, it's important to allow them to acclimate slowly to prevent condensation from forming.*

Repair

Most DTCs have centre managers/staff who are trained to conduct basic repairs. When a device is faulty or stops working, assessing for repair opportunities should be the first step. Often, a small replacement or minor repairs can fix the device. However, if it still does not work, the EEE should be taken to a repair centre that can check for larger issues. Do not dispose of the EEE without checking that the product is not repairable.

Fig 7: Enviroserve Rwanda repair center

Some DTCs have designated repair partners that take the devices for regular maintenance and address larger hardware issues. Having a designated repair company can lead to more efficient and effective diagnosis and repair, as they are already familiar with the history and

previous repairs of the device. Official repair partners are also more likely to use manufacturer repair instructions and designated spare parts, which can be valuable in the device's life in the long run.

Re-sell

It is common for institutions such as government offices to have a regular cycle of EEE replacements to keep systems up-to-date and secure.

DTC highlight : Equipment Replacement Policy

The Virtual University of Pakistan (which is the designated DTC in Pakistan) employs an equipment replacement policy. The policy lays out the regular intervals in which different types of "outdated, out-of-warranty, unsupported, obsoleted, inefficient, and incompatible" EEE are to be replaced (although there are exceptions such as budgetary cuts).

For instance, servers and personal computers are replaced every 5-7 years, and monitors are replaced every 7-10 years. According to the policy, once the EEE passes the given timeframe, they are to be auctioned, repurposed, or donated appropriately.

In these scenarios, including when EEE is resold or auctioned, it is vital to consider the following:

1.   Are the electronics still fully functional?

If used devices are sold near the end of their lives or with faults, it is not advisable to sell them for re-use. It is less likely that individual consumers will dispose of the e-waste correctly or dismantle it for parts.

Note: Many DTCs are affiliated with the government or an organization and thus have set auctioning protocols. However, ministries often auction off EEE without proper functional tests. To create an effective strategy for e-waste, it is vital that DTCs take the step to add functional test protocols in collaboration with the relevant asset management teams of the Ministry or parent organization.

Practical guidelines

2. Does your tender include sustainability requirements?

If you put out a tender for bids, ensure that participating entities are vetted on their sustainability metrics. The following considerations should be taken into account:

- Do the bidders have a history of responsible disposal practices, such as partnering with certified e-waste recycling facilities or offering take-back programs?
- Can they document compliance with relevant regulations regarding hazardous substances and waste disposal?
- Do the bidders have a demonstrated commitment to labour standards such as fair wages, safe working conditions, and the prohibition of child labour, throughout their operations and supply chains?

Note: Remember to wipe all data before reselling EEE such as computers and phones. Before deleting any data, make sure to create a backup of all the important files and documents you want to keep. Most electronic devices, such as smartphones, tablets, and computers, have a built-in option to perform a factory reset. This process restores the device to its original settings, erasing all user data. Ensure you follow the specific instructions for your device to initiate a factory reset.

When selling a computer, it is essential to securely erase the hard drive to ensure all data is irrecoverable. You can use specialized software designed for data wiping or perform a secure erase process recommended by the manufacturer.

Repurpose

When EEE has been assessed to be no longer functional, an option before recycling is to repurpose them. Electronics can be repurposed in several ways to extend their lifespan and give them new functions.

Practical guidelines

Here are some ideas on how to repurpose electronics:

Education and DIY Projects: Electronics can be excellent resources for learning and experimenting. Repurpose old circuit boards, wires, and components for educational purposes or use them in do-it-yourself electronics projects. Once the repurposed electronics are no longer tools for learning, ensure that they are diverted to the correct disposal channels.

DTC highlight : Repurposing electronics for learning

The Uganda Digital Transformation Centre repurposes end-of-life computer parts as materials in their computer assembling and ICT maintenance courses. The courses dive into concepts of computer hardware and software to train students as IT technicians.

Fig 8: Ongoing course at the Uganda DTC

Parts Harvesting: Disassemble old electronics to salvage valuable components. For instance, you can extract capacitors, resistors, or integrated circuits from old circuit boards and use them in your future electronic projects.

Practical guidelines

> *Note: Remember to exercise caution when repurposing electronics, especially when working with high voltages or potentially hazardous components. It is vital that the dismantling is done by a trained professional.*

Recycling

When EEE reach their end-of-life and are no longer usable, it is vital that the e-waste is diverted to the correct channels. The DTCs vary in size and consequently, in the amounts of EEE they use and e-waste produced. Therefore, while some DTCs might be able to work with large recycling facilities to routinely (usually annually) recycle their e-waste, many DTCs reported storing their e-waste in storage to collect significant volumes that recyclers are willing to take.

Depending on the sophistication of the e-waste management system in a country, the availability of recyclers and the way the market is set up will vary.

Here are a few common scenarios when it comes to finding a recycler.

Free recycling: Policy and regulation on e-waste management are implemented. Recyclers are officially registered with the Government and are mandated to collect all e-waste without charging a fee.

Recycling at a charge: Recyclers are officially registered with the Government but charge a fee to recycle certain types of electronics while others are accepted for free.

No regulation: There is no formal e-waste management regulation and recyclers are not registered with the government. In this case, they may or may not charge a fee to recycle.

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DTC highlight : Tenders for e-waste recycling

The Ghana Investment Fund for Electronic Communications, which is the designated DTC in Ghana, generates a significant amount of e-waste annually as it operates through 151 centres across the country. The e-waste is collected centrally, and the government collects bids from recyclers to take the e-waste and appropriately recycle them.

In this case, the government covers the costs of recycling for e-waste that is not profitable for the recycler to recycle.

It is always a good choice to check whether the government registers official e-waste recyclers as these companies will have to pass sustainability and other criteria.

Some places to look:

Government Websites: Visit the relevant government website, usually the Ministry of ICT or Environment. Many governments maintain lists or directories of authorized e-waste recyclers.

If there are no government-registered recyclers, the following options should be explored:

Environmental Organizations: Check the websites of reputable environmental organizations or NGOs in your country or region. Some organizations compile lists or provide recommendations for reliable e-waste recyclers.

E-Stewards or R2 Certifications: Look for e-waste recyclers that have obtained certifications such as the e-Stewards or R2 (Responsible Recycling) certifications. These certifications indicate that the recycler meets specific standards for responsible e-waste recycling practices.

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Note: In many countries, the informal sector can play a large role in the collection and recycling of electronics. Although in some settings, it might be more convenient to sell or give e-waste to informal workers, it is important to note that the informal e-waste recycling sector generally employs poor and marginalized groups who have little or no formal training. This entails the lack of proper and safe dismantling and recycling procedures, leading to contaminated workplaces and poor material recovery.

As a responsible operation, it is vital that the DTCs are aware of where their e-waste ends up and how it will be treated.

Fig 9: Informal sector in Ghana (ITU, 2020)

Sustainable procurement

While procuring electronics for the DTCs, buyers should keep sustainability as a consideration. In the DTCs EEE are usually procured through government-regulated procurement procedures, donations or general procurement.

Circular and sustainable procurement is a key step in ensuring that the generation of e-waste is addressed during the purchase of ICTs. This entails considering the generation of positive environmental and societal impacts and stimulating the circular economy while

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making ICT purchases. Elements such as purposeful design, production, sale, use, re- use, and recycling processes throughout the life cycle are assessed.

Here are some of the considerations that procurers should consider:

Environmental Standards: Include environmental criteria and certifications in the procurement process. Look for electronics that meet recognized environmental standards.

Energy Efficiency: Prioritize electronics with high energy efficiency ratings.

Product Longevity and Durability: Consider the lifespan and durability of the electronics. Look for products that are built to last and have a lower likelihood of early obsolescence. Warranty of products are a good indicator.

Materials and Chemicals: Consider the use of hazardous substances in the EEE. Prioritize products that comply with regulations such as the Restriction of Hazardous Substances (RoHS) directive, which limits the use of certain hazardous materials in electronic products.

Repairability and Access to Spare Parts: Evaluate the repairability of the electronics and the availability of spare parts. Choose products that can be easily repaired, thereby extending their lifespan and reducing electronic waste. Ensure that suppliers or manufacturers provide access to spare parts and repair services in the region.

End-of-Life Management and Recycling: Some suppliers have e-waste management and recycling programs in place. This should be prioritized.

Refer to ITU's Circular and Sustainable Public Procurement ICT Equipment Guide for more information.

Practical guidelines

Relevance of protocols – KPIs

Establishing Standard Operating Procedures (SOPs) for monitoring and maintaining electronics in DTCs can help ensure that these devices are used efficiently, effectively, and safely. As most DTCs have a central office that supervises all centre managers or staff, SOPs are useful to regulate EEE usage across the program.

Here are some potential SOPs that could be established for this purpose:

1. **Establish a cleaning schedule:** Set a schedule for cleaning devices in the office, including keyboards, mice, screens, and other EEE. This could be done on a weekly, biweekly, or monthly basis, depending on the usage and environment of the devices.

2. **Set up automatic updates and maintenance:** Ensure that all electronic devices in the office are set up to receive automatic updates for software and security patches. Also, ensure that routine maintenance tasks such as disk cleanup and virus scans are scheduled to occur regularly.

3. **Control access to electronic devices:** Establish policies and procedures for controlling access to electronic devices, such as password-protected login screens, restricting access to certain functions, and logging in/out of shared devices.

4. **Implement power management settings:** Configure power management settings on electronic devices to optimize energy efficiency. This can include turning off devices when not in use, setting monitors to enter sleep mode after a certain period of inactivity, and configuring power-saving settings on printers.

5. **Label and track equipment:** Create a system for labeling electronic devices and tracking their location and usage. This can help prevent loss or theft of devices, as well as enable effective inventory management and disposal of devices.

6. **Train employees on proper device use**: Establish a training program for employees on the proper use and care of electronic devices in the office. This can include guidelines

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for handling devices, troubleshooting common issues, and reporting malfunctioning devices.

E-waste awareness for students

With the objective of supporting countries to strengthen the digital capacities of citizens, DTCs should include a learning component on the awareness of the circular economy for electronics and the sustainable use of electronics as a priority in their programs. This could be programmed in conjunction with the training for the proper use of EEE.

This component should include information on:

- Definition and types of EEE.
- Environmental impact of improper disposal.
- Health risks and social implications of improper disposal.
- Consumer responsibility - include information on proper usage and life extension.
- Responsible disposal options for consumers - include the waste hierarchy as a learning material.

The E-waste Challenge Massive Open Online Course (MOOC)

The MOOC includes online learning materials on the e-waste challenge featuring audio, video, and links to a range of online updated resources to explore the topic. All the materials have been endorsed by international e-waste specialists and experts.

Explore the MOOC here!

An introduction to the e-waste challenge

The course delves into the critical issue of e-waste on a global scale. It aims to provide a comprehensive overview of the issue, incorporating the latest statistics and legislative developments.
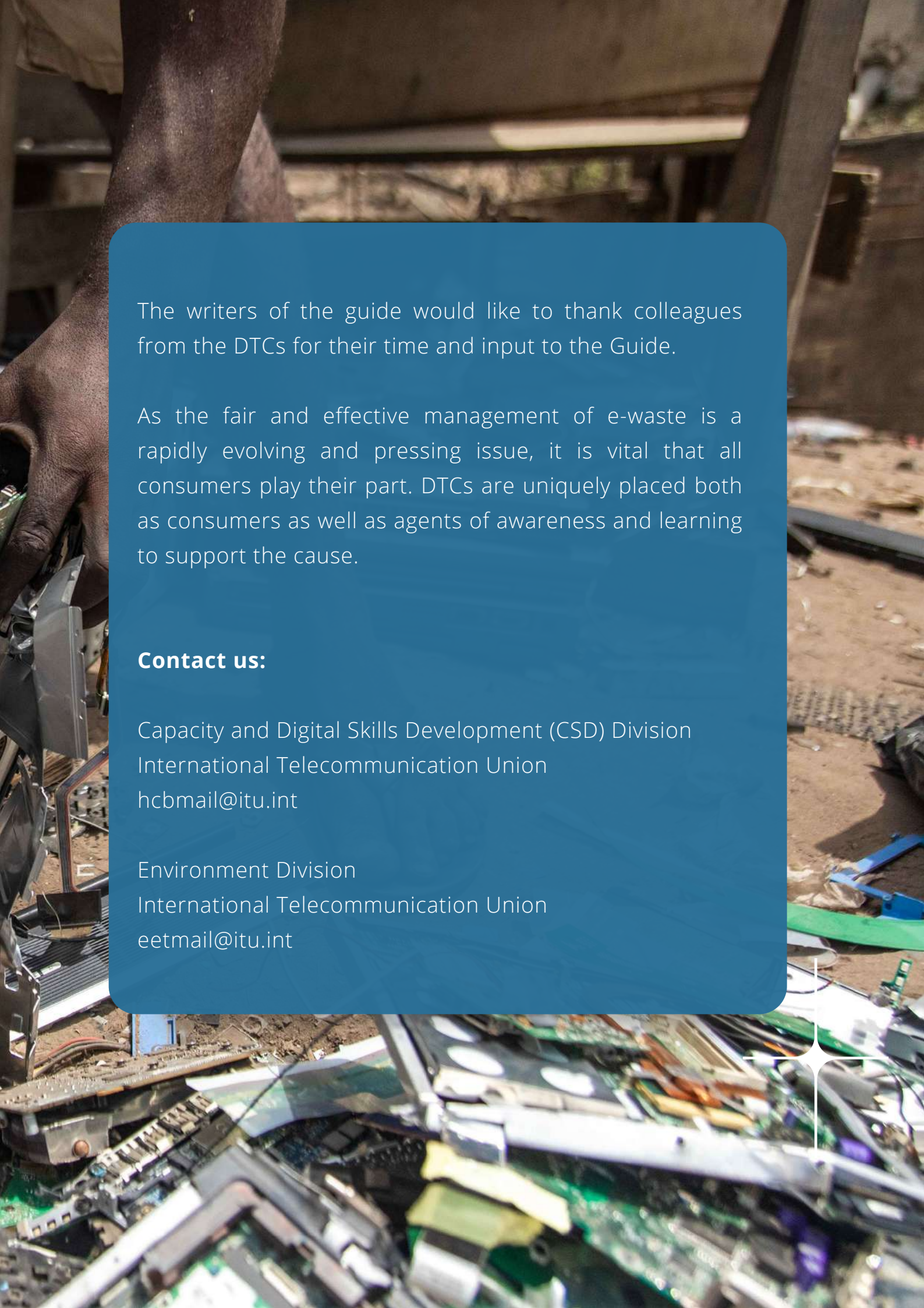
Register to the course here!

Conclusion

Implementing an e-waste strategy in DTCs is an important step towards promoting environmental responsibility, reducing electronic waste, and demonstrating a commitment to sustainable practices. Establishing a strategy allows tracking of progress and accountability within those that are directly responsible for the EEE use.

By following the roadmap outlined in this Guide, DTCs can develop or fine-tune a comprehensive plan that addresses the challenges associated with e-waste management.

Here's a quick summary of guidelines covered in the Guide:

✓ **Prevention of e-waste:** DTCs can prevent e-waste by conducting audits of existing devices before purchasing new ones and sharing resources with other organizations. They can also consider leasing devices, that can ensure proper sustainability measures for disposal.

✓ **Maintenance:** Extending the life of electronics is crucial, and DTCs can achieve this by keeping devices clean and well-ventilated, protecting them from spills and power surges, updating software regularly, and scheduling maintenance checks.

✓ **Repair:** DTCs should assess faulty devices for repair opportunities before disposing of them, and consider designated repair partners for more efficient diagnoses and repairs.

✓ **Resell:** Before reselling devices, DTCs must ensure they are fully functional and securely erase all data.

✓ **Repurpose:** Exploring educational and DIY projects or parts harvesting can repurpose old electronics, extending their useful life.

✓ **Recycling:** DTCs need to identify appropriate e-waste recycling channels based on government regulations and registered e-waste recyclers that comply with sustainability criteria.

The writers of the guide would like to thank colleagues from the DTCs for their time and input to the Guide.

As the fair and effective management of e-waste is a rapidly evolving and pressing issue, it is vital that all consumers play their part. DTCs are uniquely placed both as consumers as well as agents of awareness and learning to support the cause.