

# EIT RawMaterials

## e-M@S

### Ethics Module – Part I

**Adolfo Villafiorita**  
ICT4G - Bruno Kessler Foundation



This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation



# 贵屿



# Impact and Consequences

- Long-term effects:
  - sustainability
  - climate change
- Short-term effects:
  - environmental impact
  - social impact



# Linear Economy



# • Linear Economy



- Losses along the entire chain (21 Gt/year)
- Dependence on raw materials
- Energy waste (landfill products)
- Sustainable?



# • Sustainable?

- 2.7 Gt/year in landfill
- Exhaustion of natural “capital”  
(debt to the future; environmental footprint; increased costs to extract resources)
- Population growth  
(11 G in 2050)
- Growth in spending capacity  
(in China, it doubles every 12 years; the UK took 154 years for the same result)



# •... and its WHYs

- Model as old as man
- The resources are abundant; when a resource becomes precious, we find a way to replace it (e.g., copper/aluminium, oil crisis of the Seventies)
- Throwing costs less than reusing (\$ 28/ton vs. \$ 150/ton)
- Recycling costs more than mining (Only partly true: e.g., PET)
- Gives employment and generates wealth (see, planned obsolescence)



# • Planned obsolescence

- A way to reduce the life of a product
- Theory dating back to 1930:
  - Alfred Sloan Jr. (Automotive sector)
  - Bernard London (Great Depression)
- How to do it:
  - **perception**: fashion, design
  - **technological innovation**: performance,...
  - **design**: perishability, non-repairability,...





# Planned obsolescence

- **perception:** fashion, design
- **technological innovation:** performance,...
- **design:** perishability, non-repairability,...



WEEE	Average life	Life
LCD TV	7	?
Camera	6	?
Laptop	6	10
Smartphone	2-3	5
Light bulb	1000 hours	2500 hours

Source:  
Wikipedia



# • Electronics and Electronic Waste

- In Europe:

- about 8 Mt of electronic devices every year in the market
- between 10% and 80% is recovered (in Italy 40%)
- In the world 50 Mt (7 kg/inhabitant)

- The rest ends up:

- In a landfill or burned
- In another country to be reused or, more probably, disposed of in an inappropriate manner (Europe estimates between 250 kt and 1.2 Mt)



- Some substances:
  - Lead, mercury, cadmium, arsenic and retardants (a CRT can contain 3 kg of lead)
- 贵屿 Guiyu
  - 100 trucks of electronic waste every day
  - 60,000 workers
  - work in dangerous conditions
  - toxic dust, earth pollution, health damage



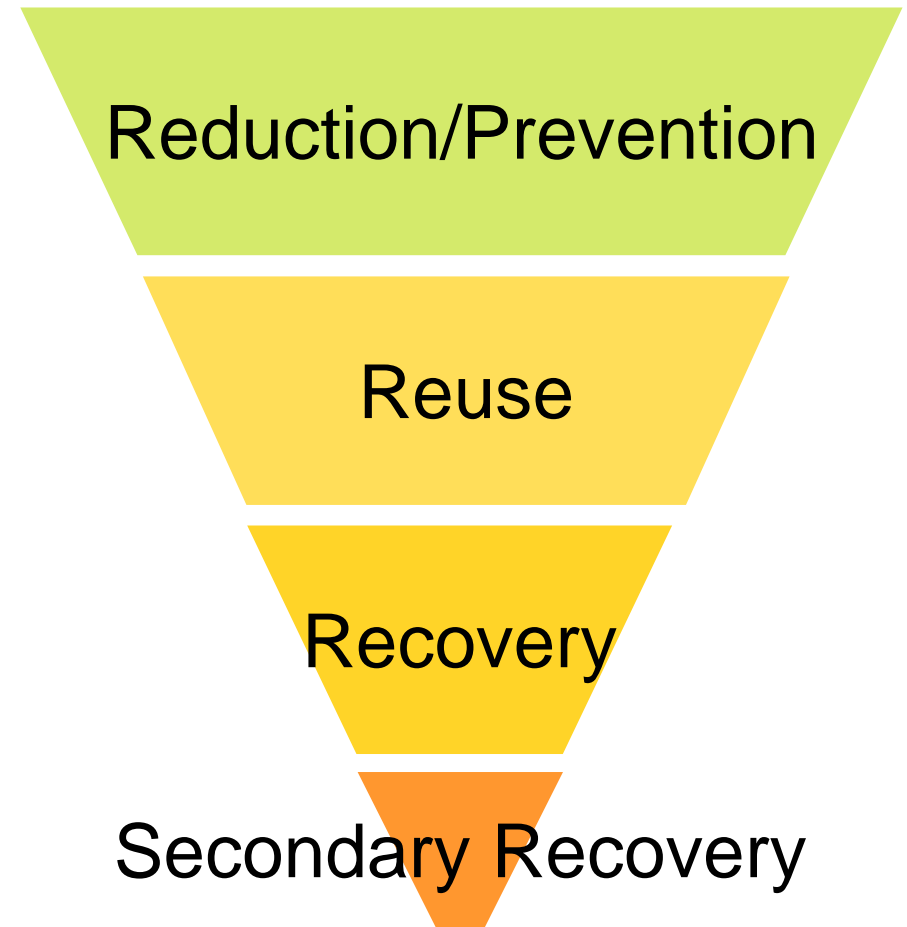


is there another model?



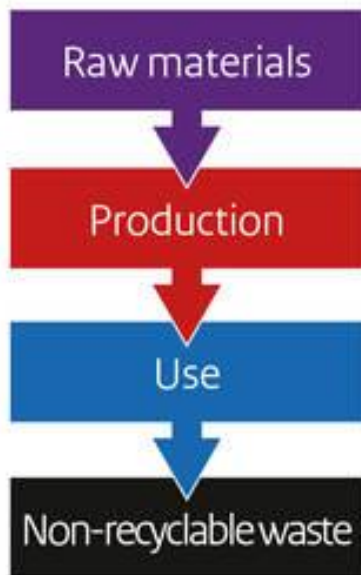
# •Circular Economy

- Reuse Pyramid
- Give priority to renewable sources and materials
- Think about the entire product life cycle (design out waste)

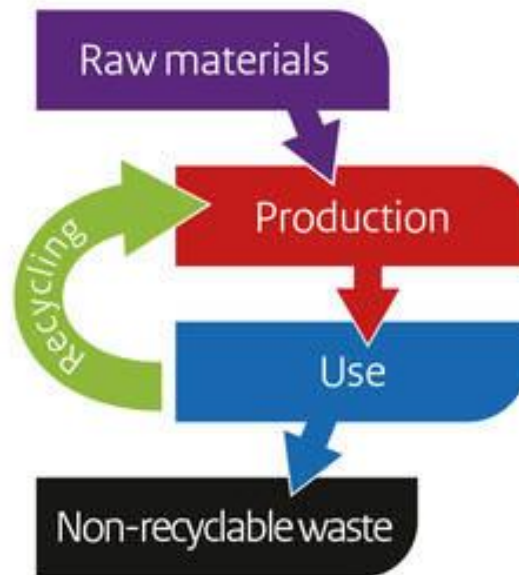


# From a linear to a circular economy

Linear economy



Reuse economy



Circular economy





# R1

Freddo e Clima



# R2

Altri Grandi Bianchi



# R3

TV e Monitor



# R4

Informatica, Elettronica di Consumo, Piccoli Elettrodomestici, Apparecchi di illuminazione



# R5

Sorgenti Luminose



COME RICICLARLI



# • Electrical and electronic equipment waste

- **R1 (Cold and Climate)**, for example, refrigerators, freezers, air conditioning appliances
- **R2 (Great Whites)**, for example, washing machines, dishwashers, microwave ovens, cheap cooktops, etc.
- **R3 (TV and Monitors)**, for example, old CRT cathode ray tube screens, modern LED screens, plasma screens, and new technologies
- **R4 (PED, CE, ITC and others, including lighting equipment and all other equipment belonging to other groups)**, for example, vacuum cleaners, sewing machines, irons, fryers, blenders, computers (central unit, mouse, keyboard), printers, fax machines, cellular phones, video recorders, radio equipment and ceiling lights
- **R5 (light sources)**, lamps that contain gas (such as, incandescent bulbs), fluorescent neon tubes, energy-saving, mercury vapor, sodium, iodides, or vacuum bulbs.



# Alternative Consumption Choices

- **Manufacturer Refurbished / Brand Refurbished** products are generally as good as new, might have minor cosmetic issues, but no hardware issues, as a round of testing (and repair if required) would have already been performed by the manufacturer; these products are covered by a reliable warranty.
- **Open-Box** are items once purchased and eventually returned in an open box condition for a reason other than a defect. These products are in perfect working order and might/might not have been returned to the manufacturer. These products mostly look as new, though there may be issues with hardware/software, and may not be covered by warranty, as it is not certain whether any warranty would be honoured by the manufacturer or the seller. If you buy one of such products, you can try registering the product for warranty on the manufacturer website.
- **Pre-owned or Used** are just second-hand products and there is no certainty about period of usage and product conditions. Few sellers are honest in providing snapshots of the product and its working condition, but warranty, if provided, is provided under the seller's own terms and conditions. Buying these products would carry a higher risk for the buyer.
- **Imported** items are generally sold on eBay and are brought mostly from the US, they would have a different pin configuration in the adapter and might not carry a manufacturer warranty if the product warranty is not global. In such cases, the seller might provide a warranty under their terms and conditions.
- **Surplus Stock / Excess Stock** are items manufactured by the brand, but remained unsold when a newer model is introduced. If more such old models remain in stock, they are sold through third parties at a lower price and carry manufacturer warranty.



Supported by:



RawMaterials

Connecting matters



This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation