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Progetto standard co-finanziato dal Fondo europeo di sviluppo regionale
Standardni projekt sofinancira Evropski sklad za regionalni razvoj

Gospodarska zbornica Slovenije
Chamber of Commerce and Industry of Slovenia

Enabling technologies for the circular economy

Reverse logistics, traceability of plastic products and their waste, the ReSOLVE method

Conference: Towards the circular economy:
the traceability of Fibre Reinforced Composite Products

29 January 2018, Friuli Venezia Region Giulia

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FRC (FRP) waste classification?

- The European waste list 2000/532/EC
  - Virgin FRP – from the moulding shop
    - Chapter 07 waste from organic chemical processes
    - Sub-category 07 02 waste from manufacture, formulation, supply and use (MFSU)
    - Sub-sub-category 07 02 13 – non hazardous (no *)
  - FRP shavings and turnings
    - Chapter 12 waste from shaping and physical and mechanical surface treatment of metals and plastics
    - Sub-sub-category 12 01 05 – non hazardous (no *)

Source: Cefic guidance 12, Technical bulletin, Classification and handling of FRP waste within current EC legislation

FRC (FRP) waste classification?

- Chapter 16 waste not otherwised specified
  - Sub-category 16 01 - end-of-life vehicles from different means of transport
  - Sub-sub-category 16 01 19 – plastic
- Chapter 17 construction and demolition waste
  - Sub-category 17 02 wood, glass and plastic
  - Sub-sub category 17 02 03 plastic or
  - Sub-sub category 17 02 04* plastic contaminated with dangerous substances

Source: Cefic guidance 12, Technical bulletin, Classification and handling of FRP waste within current EC legislation

FRC (FRP) waste classification?

- Chapter 19 waste from waste management faclities
  - Sub-category 19 12 wastes from mechanical waste treatment (i.e. sorting, crushing, compacting, pelletising)
  - Sub-sub-category 19 12 04 – plastics and rubber
- Chapter 20 municipal waste
  - Sub-category 20 01 – separately collected fractions
  - Sub-sub category 20 01 39 -plastics

Source: Cefic guidance 12, Technical bulletin, Classification and handling of FRP waste within current EC legislation

FRC in the circular economy

- Durable, long life products √
- Systematic collection, recognition of consummer goods in municipal waste streams and processing…?

- A European Strategy for Plastic in a circular economy published 16.1. 2018

  „The EU potential for recycling plastic waste remains largley unexploited. Reuse and recycling of end-of-life plastics is very low with 31% going to landfills and 39 % being incinerated“

*COM (2018) 28 final

Leakage to sea

- In the EU, 150 000 to 500 000 tonnes of plastic waste enter the oceans every year

- Recent studies show plastics accumulate in the Mediterranean at a density comparable to the areas of highest plastic accumulation in the oceans

*COM (2018) 28 final

Curbing plastic waste and literring

- The Commission will develop targeted measures for reducing the loss or abandonment of fishing gear at sea

- Possible measures include deposit schemes, extended producer responsibility schemes and recycling targets

*COM (2018) 28 final

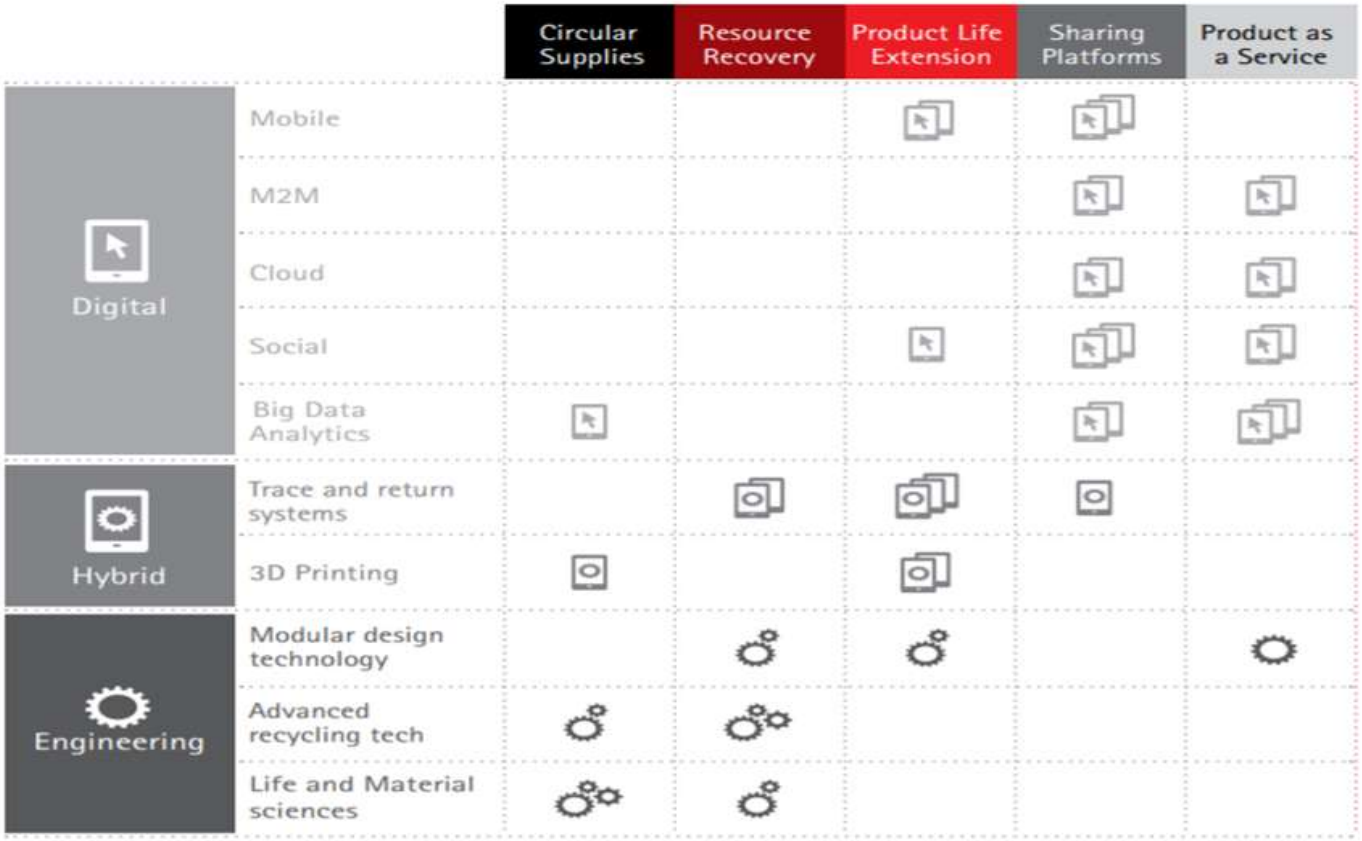
Staff working doument to ESPCiE

- End of life recreational boats

„It is thought that between 1% and 2% of the 6 million boats kept in Europe, in other words 80,000 boats reach their „end-of-use“ each year. However, only around 2,000 of those are dismantled. A significant number of the remaining boats are left abandoned, potentially ending up in the ocean and becoming marine litter“

Product passports

Figure 6: Disruptive technologies used by pioneers to launch and operate circular business models with speed and scale



*Based on 120+ case studies and 50+ interviews

Number of icons in respective boxes indicate relative importance

Source : Accenture-Circular-Advantage-Innovative-Business-Models-Technologies-Value-Growth.pdf

ReSOLVE - Framework

- **RE**GENERATE
- **S**HARE
- **O**PTIMISE
- **L**OOP
- **V**IRTUALISE
- **E**XCHANGE

Source: The Ellen MacArthur Foundation

ReSOLVE - Framework

- **Re**GENERATE
  - Shift to renewable energy and materials
  - Reclaim, retain and restore health of ecosystems
  - Return recovered biological sources to the biosphere
- **S**HARE
  - Share assets (e.g. cars, rooms, appliances
  - Reuse/Secondhand
  - Prolong life through maintenance, design for durability, etc.

Source: The Ellen MacArthur Foundation

ReSOLVE - Framework

- OPTIMISE
  - Increase performance/efficiency of product
  - Remove waste in production and supply chain
  - Leverage big data, automation, remote sensing and steering
- LOOP
  - Remanufacture products or components
  - Recycle materials
  - Digest anaerobically
  - Extract biochemicals from organic waste

Source: The Ellen MacArthur Foundation

ReSOLVE - Framework

- VIRTUALISE
  - Dematerialise directly (e.g. books, CDs, DVDs, travel
  - Dematerialise indirectly (e.g. online shopping)
- EXCHANGE
  - Replace old with advanced non-renewable materials
  - Apply new technologies (e.g. 3D printing)
  - Choose new product/service (e.g. multimodal transport))

Source: The Ellen MacArthur Foundation

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