HACKTEX VIRTUAL TRAINING MATERIALS
ADVANCED TEXTILES MANUFACTURING INDUSTRY
Learning unit 1:Introduction to smart textiles
Lesson 1

Definition and evolution of smart textiles

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DEFINITION AND EVOLUTION OF SMART TEXTILES

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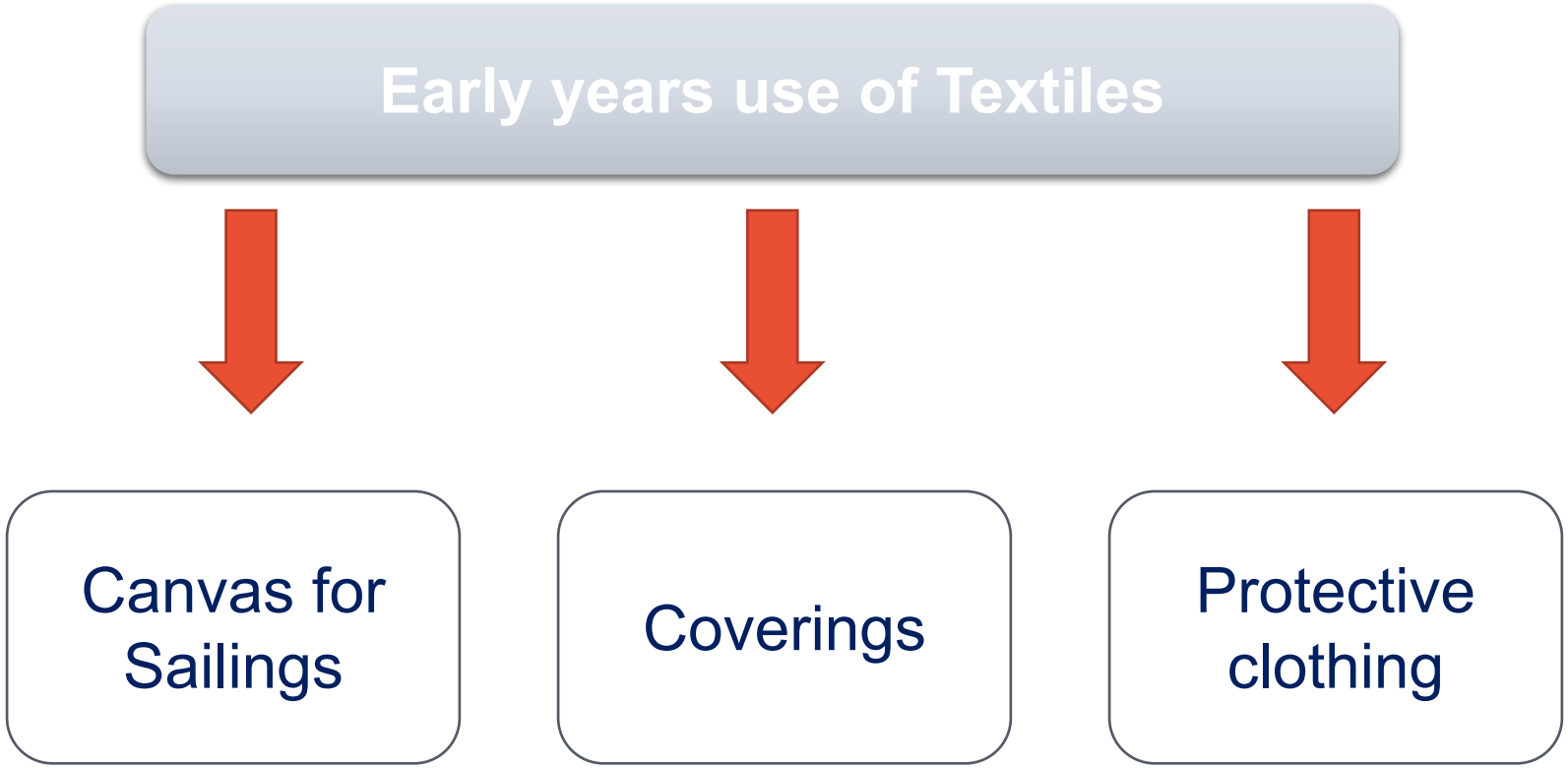
Introduction to Smart Textiles



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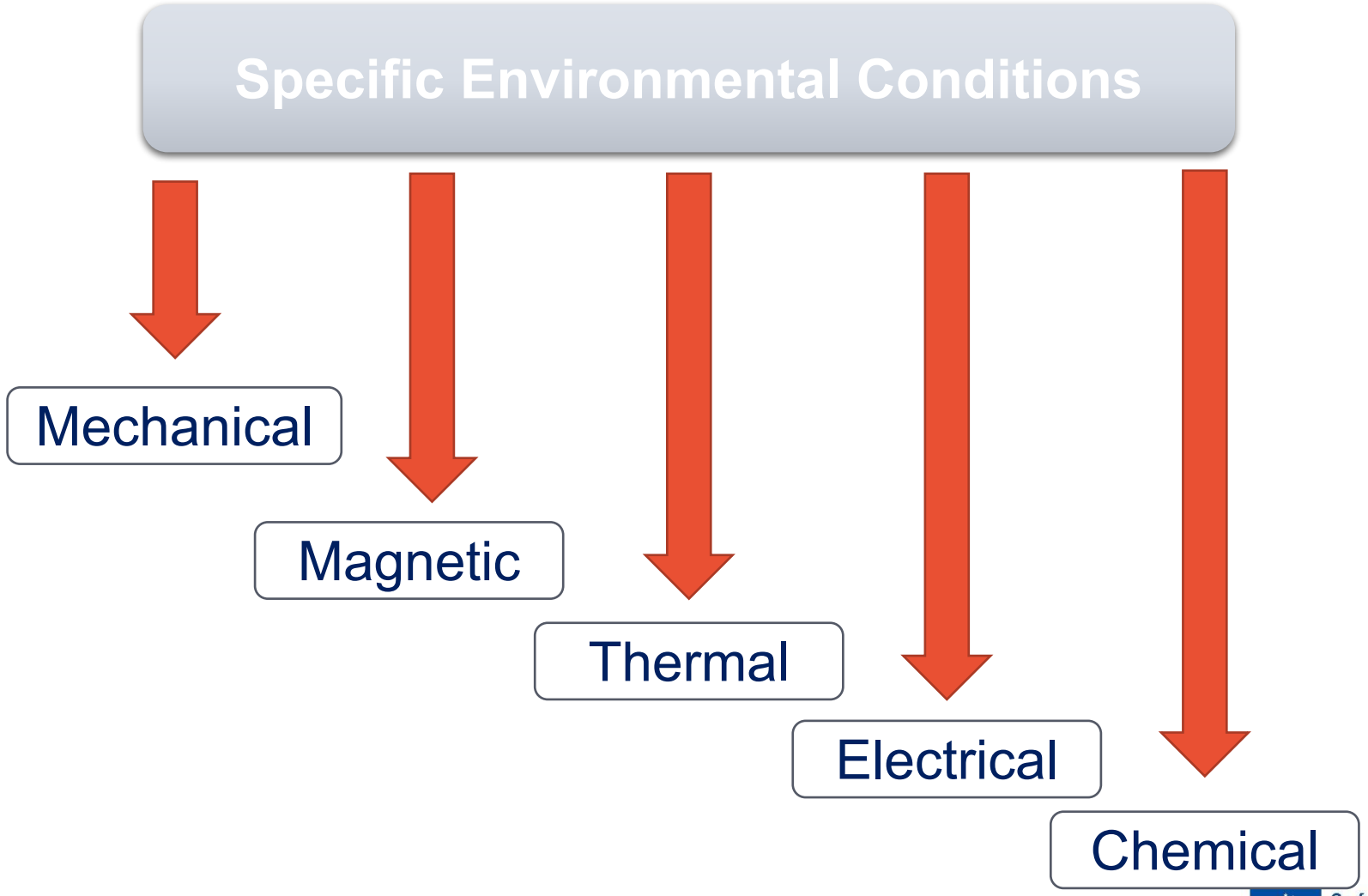
Smart textiles reactivity and sensitivity



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Definition of smart textiles

Smart (intelligent) textile materials are functional textile materials actively interacting with their environment

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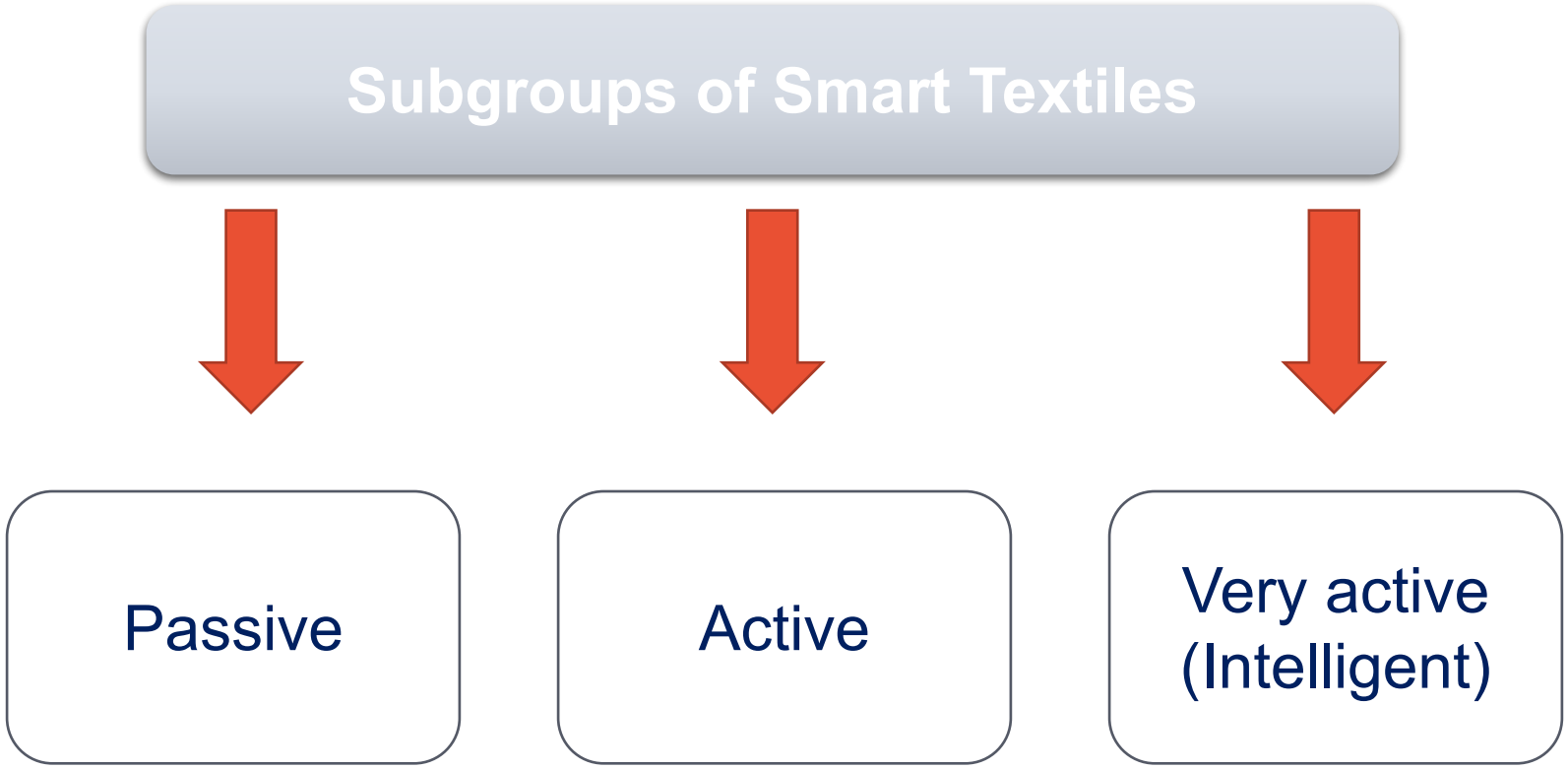
Smart Textiles classification



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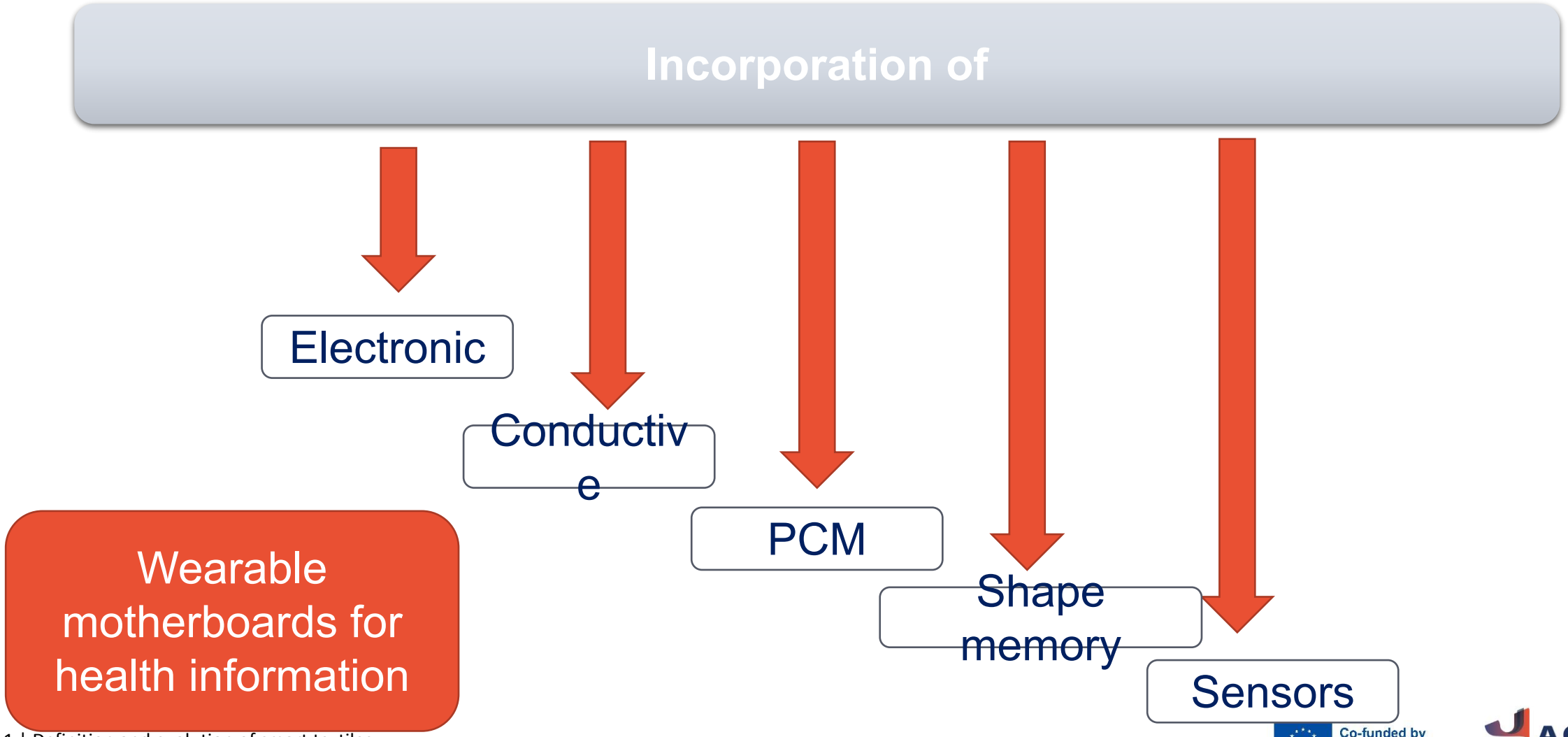
Intelligent smart textiles



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Evolution of smart textiles

E-textiles based on conductive threads for over 1000 years

Artisans have been wrapping fine metal foils, most often gold and silver, around fabric threads

At the end of the 19th century, began to combine electricity with clothing and jewelry

Medical applications of electricity in clothing such as corsets and belts as early as the 1850s

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Evolution of smart textiles

In 1968, the Museum of Contemporary Craft in New York City

Body Covering - Interaction between technology and clothing

Astronauts' space suits

- **Inflate and deflate light up**
- **Heat and cool themselves**

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Evolution of smart textiles

In 1985, Harry Wainwright designed the first total animated sweatshirt, to control individual frames of animation resulting in a full-color cartoon on the surface of clothing

Wainwright continued with the invention of the first machine **in 1995** enabling fiber optics to be machined into fabrics, the process needed for manufacturing enough for mass markets

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Evolution of smart textiles

MIT staff purchased many fully animated jackets for their researchers to bring attention to their “Wearable Computer” research

- Researcher Wainwright on June 5th, 2012 , present his fabric creations that change color
  by using any smartphone

- In the mid-1990s a group of MIT researchers , began to develop what they called wearable
  computers. These devices consisted of traditional computer hardware attached to and carried on the body.
- Maggie Orth and Rehmi Post, created a method for embroidering electronic circuits

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Difficulties in smart textiles design

Mechanical Properties

Fibers under High Tensile Strength

Washability

Take out all electronic components

Power Supplies

Large and bulky rechargeable batteries

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Product development and commercialization

Electronics Section

- Incorporate microchip and computer systems into clothing
- Solve washability problems

Challenging to achieve full adoption of electronics and fashion trends

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Product development and commercialization

Smart textiles are difficult to differentiate themselves both from normal clothing and existing electronic devices

- Successful design and development need a multidisciplinary group of technicians
- Common point and sorting out the jargon associated with each section
- Limitation in the coherent vision between different research laboratories and universities
- Product development can also have a high cost

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