

# PRODUCT LIFE EXTENSION OR UPCYCLING

WHAT IS A PRODUCT LIFE EXTENSION OR  
UPCYCLING BUSINESS MODEL?



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# INTRODUCTION

By watching this video you are going to learn about the basics of resource recovery.

The video introduces the definition of resource recovery and provides examples of it, explaining how it can contribute to sustainability and circular economy.



# EXPECTED LEARNING OUTCOMES

<b>KNOWLEDGE</b>	<ul style="list-style-type: none"><li>• Knowledge of the product use extension business model</li></ul>
<b>SKILLS</b>	<ul style="list-style-type: none"><li>• Discuss the practicalities of the product use extension business model</li><li>• Examine how products can be designed for repairability</li><li>• Assess how products can be designed to be reused</li></ul>
<b>ATTITUDES</b>	<ul style="list-style-type: none"><li>• Appreciation of how product life can be extended through appropriate design</li></ul>



# SELF-REFLECTION EXERCISE

Welcome to the Product life extension or Upcycling self-reflection exercise! You will face 5 questions that will test your initial knowledge of product life extension or upcycling business models before exploring the content of this EduZine. How much do you know?

<https://forms.gle/X1yFGHNPRdbcRDMp9>



# **AN INTRODUCTION TO PRODUCT LIFE EXTENSION AND UPCYCLING**

Upcycling is taking waste products from businesses and using them to create a product of greater value than the original product. An example would be the work of designer Arthur Huang, who used recycled aluminium and plastic medical waste to create the MAC system - a modular building kit with a collection of interlocking parts designed for air shipping that allow state of the art medical wards to be assembled within 24 hours in existing spaces. Or UK company ReFactory that holds PPE in quarantine for 24 hours before shredding it, heating it to over 200 degrees Centigrade and then pressing it into solid boards for use in construction and shopfitting.

Product Life Extension is simply about lengthening the time that a product can be used. Product life extension is a business model that is increasingly being developed by companies looking to future proof their business and mitigate the business risks of new regulations and green competitors.

Product Life Extension means **saving, maintaining, repairing, remanufacturing, improving or remarketing** a product whenever it is possible.

An example of how the life of a product can be extended is the practice of remanufacturing heavy equipment components to be used again, as if it were a new product. By returning end of life components to good as new condition, companies have increased the value they extract from the resources that went into creating them.





There is no one size fits all when it comes to developing a product life extension business model and there are many different approaches companies are currently evolving to extend the life of their products.

Why should you bother developing a model like this in your business? Embedding product life extension in your business model means that you have a usp to offer that is more in line with current consumer concerns about the economy and the environment, creating a new path towards brand loyalty with Corporate Social Responsibility (CSR) at its core.

Adopting this new approach to maintaining brand loyalty will therefore benefit the business, the customer and the environment. It will obviously be key from the businesses point of view to ensure that the new product does not get discarded, that it can be easily adapted or reconfigured to maintain and increase its value, and has ongoing revenue opportunities. If you are wondering where you might start, focusing on the product life cycle, and taking responsibility for it, is key. With this commitment, the design process is obviously critical to achieving any circular economy goals.



# HOW TO DESIGN PRODUCTS TO BE REPAIRABLE

In the product life extension business model ensuring product reparability through design efficiency is critical and your product designers are therefore key players. While their design decisions are rooted in material selection, availability, cost and future assemblage possibilities, adding in the extended use of the product will require a fundamentally user-centred design process.

One of the strengths of user-centred design is to capitalise on the emotional value of the product to the end user. With an emotionally appealing product the chances of it being repaired and staying out of landfill go up.

Security-centred design is another aspect to consider. The user should be able to safely assemble and disassemble the product so that the broken part cannot only be identified but also replaced when need be. In essence, security-centred design should be clear on how the parts come together and how they can be disassembled.

Robustness and modular design moves up the list of priorities in this model. Wouldn't it be better to have a product whose lifestyle can be extended because the design is not complex for the consumer to figure out and repair?

Ultimately taking responsibility for the product beyond the consumer purchase period attracts consumer loyalty and trust. A basic example comes from the fashion company Patagonia. They design their clothes to be more robust, but they also provide repair guides and repair shops to keep their clothes in a good, usable condition.



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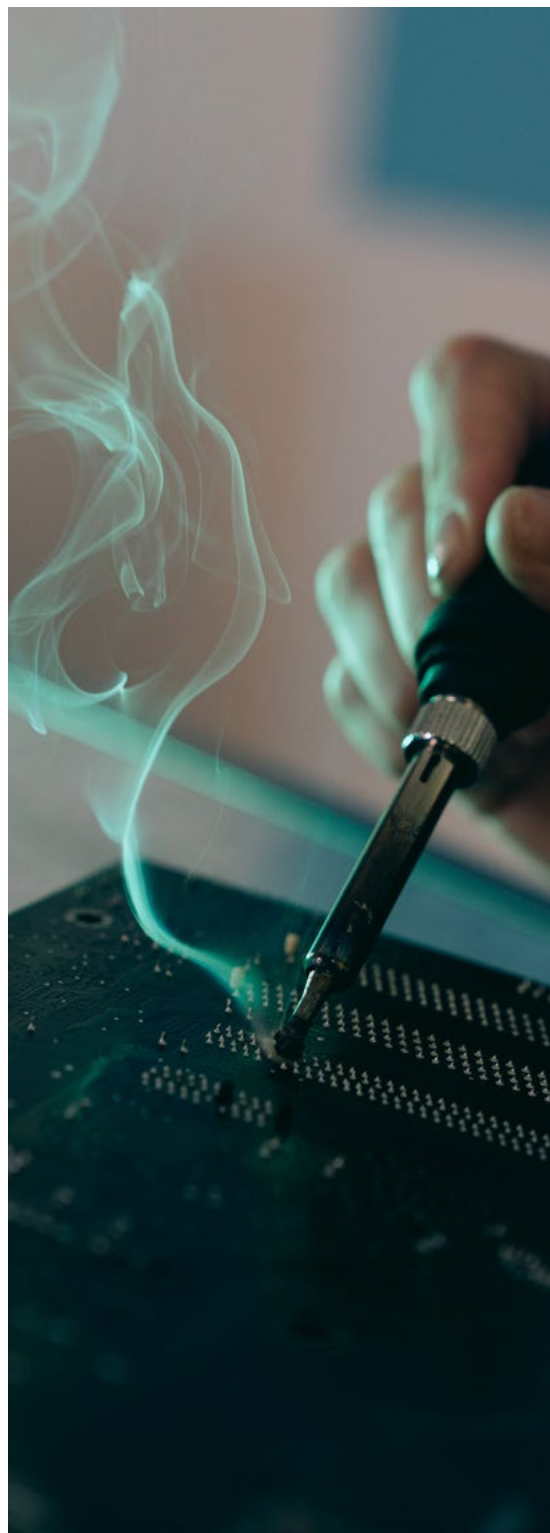
# **DESIGNING PRODUCTS TO BE REUSABLE**

A large area of potential opportunity in the Product Life Extension business model is taking goods that are usually disposed of and designing them to be more durable. An example would be making razors out of stainless steel instead of plastic and constructing them to take a replaceable razor blade.

To design a product to be reusable, you will be thinking about whether you can tweak your existing products or opt for a complete redesign.

The benefits of adapting a product is obvious, you have existing components and you know the market you have built can still be satisfied with the product. If your components can be swapped to make existing products upgradable then you have a long term market for your product.

Your design strategy would then be to incorporate minor changes while building new features or product applications. Principally, the current problems with the previous design will also have been identified and minimized or eradicated from the new design.

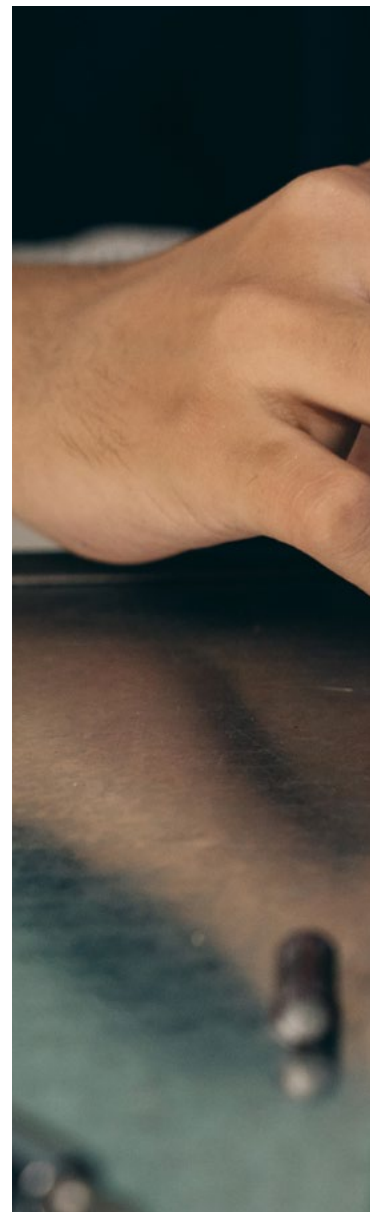


**THE  
ENVIRONMENTAL  
AND ECONOMIC  
BENEFITS OF  
PRODUCT LIFE  
EXTENSION**

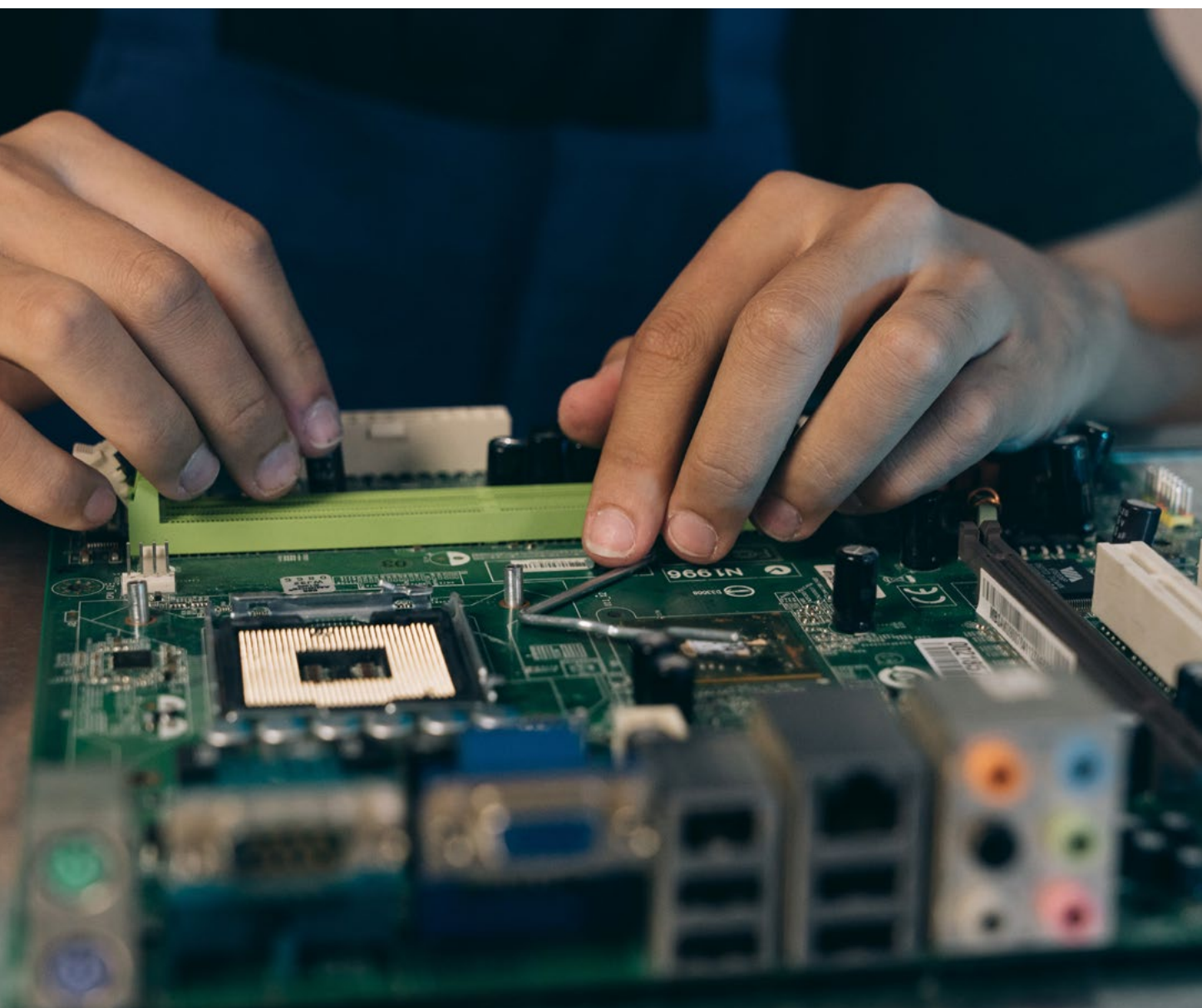
If you want to understand and focus on product life extension in your business, consider an environmental and economic impact assessment for your products. An obvious environmental benefit of life extension is the reduction of waste. For example, globally, 26 billion pounds of used clothes end up in landfills every year. Research further indicates that 95% of these clothes can still be reused. From an environmental sustainability viewpoint, making a single shirt using cotton requires 2,700 litres of water. Multiplying these litres of water with the billions of clothes in landfills translates to water misuse. Not only that, the resources used to make the product have also gone to waste.

The economic impact of this waste is that firms and businesses will continue to use a lot of energy in production and this embodied energy also goes to waste when the clothes are not reused. The high cost of energy due to fluctuations in supply and increasing limitation on its use because of climate change should prompt managers to consider upcycling as part of greening the business.

In the landfill, most of these wastes are burnt to provide space for more waste. During burning, soil carbon and other macro and micro nutrients gets released into the atmosphere, and consequently we now have micro particles of plastic in the air we breathe. Extending product life cycle therefore cuts back on air pollution and water misuse by limiting the amount of waste that ends up going to landfills.



Resource preservation such as fossil fuel in production and cotton is also achieved. This saves on operational cost, tools and repair cost for the business allowing for the finances to be reassigned to other essential dimensions of the business. Product life extension also allows for environmental credibility which secures the future for the next generations while resale of products creates employment potential for others. The reuse market has been estimated to be worth more than €40 billion in revenue output, and individual GDP, a major indicator of the strength of the business sector, will also be improved as the economy grows through resale.



**DISCUSS THE  
PRACTICALITIES  
OF THE PRODUCT  
USE EXTENSION  
BUSINESS MODEL**



Changing the business model of a business like a fashion manufacturer to create upcycling and product extension paths can involve a complex set of decisions about materials, design, manufacturing processes and infrastructure. These may be driven by evolving business environments where the practicality of a traditional approach is swept away by unforeseen events. (Vogue article summary <https://www.vogue.co.uk/fashion/article/upcycling-trend-ss21>)



The practicalities for a business like electronics, where maintenance and after-sale services already have to be financed by the company to ensure their brand reputation and value are also complex and likely to be dynamic, bearing in mind changing regulations. Remanufacturing products which consumers have attached value to is a practical strategy in this context for financial, reputational and legal reasons.

Whatever sector your business is involved in, a full product lifecycle analysis will make the practical decisions much easier when fundamentally changing the business model.



# **FINAL ASSESSMENT TASK**

### **Title of the Task:**

Product life extension business model

### **Aim of the Activity:**

Introducing the product life extension business model via a voice-over presentation

### **Time Required:**

Participants will require 4-6 hours to achieve this task.

3 or 4 hours to think of an idea, research, and develop the presentation.

1 or 2 hours to record and upload the presentation.

### **Materials Required:**

Articles, links, and videos in EduZine

Microsoft PowerPoint or Google slides

Editing Software

Laptop

Internet Access

Microphone

### **Format for the Presentation:**

PowerPoint or Google slides presentation



## Steps to Complete the Task:

- **Step 1:** Develop a few concepts for your presentation. Your task is to develop a short voice-over presentation to promote the product as a service business model.
- **Step 2:** Clarify your concepts to 1 or 2 you like the most or that have promising potential, and then decide which you will use.
- **Step 3:** Your voice-over presentation should include an introduction to what the Product life extension business model is, successful examples of the business model in action, and how the product life extension business model is more sustainable and connects to the circular economy.
- **Step 4:** It is up to you to choose the style and structure of the voice-over presentation, but remember, it must be interesting or fascinating enough for individuals to want to watch and listen to it. So, be creative and think outside the box!
- **Step 5:** It is time to record. Remember you are presenting a presentation. People will not be interested if you don't sound interested in the topic. Be enthusiastic!
- **Step 6:** Edit the voice-over presentation so that the sounds and slides are corresponding.
- **Step 7:** Once completed, participants are invited to share their work. Good luck!



**FINAL TEST**

Please fill the Final Test quiz exercise to test your knowledge about Product life extension recycling for sustainable business and circular economy. There are 10 questions, be careful, there are questions where the right answers are more than one.

<https://forms.gle/5wjYhY3W6xmYY1966>



# **FURTHER READING AND RESOURCES**

Allwood, J., Ashby, M., Gutowski, T., & Worrell, E. (2011). Material Efficiency: A White Paper. Resources conservation and recycling, 55, 362-381. <https://doi.org/10.1016/j.resconrec.2010.11.002>

Andrews, D. (2015). The circular economy design thinking and education for sustainability. Local economy, 30(3), 305-315. <https://doi.org/10.1177/0269094215578226>

Bocken, N., Pauw, D., Bakker, C & Van, G. (2016). Product design and business model strategies for circular economy. Journal of industrial production engineering, 33, 308-320.

<https://doi.org/10.1080/21681015.2016.1172124>

Calisto, F., Vermeulen, W., & Salomone, R. (2020). A typology of circular economy discourse: Navigating the diverse visions of a contested paradigm. Resources, conservation and recycling, 161, 104917. <https://doi.org/10.1016/j.resconrec.2020.10497>

Upcycling in fashion: Upcycling Is The Biggest Trend In Fashion Right Now. Vogue

(2021) <https://www.vogue.co.uk/fashion/article/upcycling-trend-ss21>







# LEARNING CIRCLE



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