MOVECO

CIRCULAR ECONOMY INNOVATION TOOLS
Different Business Models based on Circular Economy

Qualification Programme Handbook

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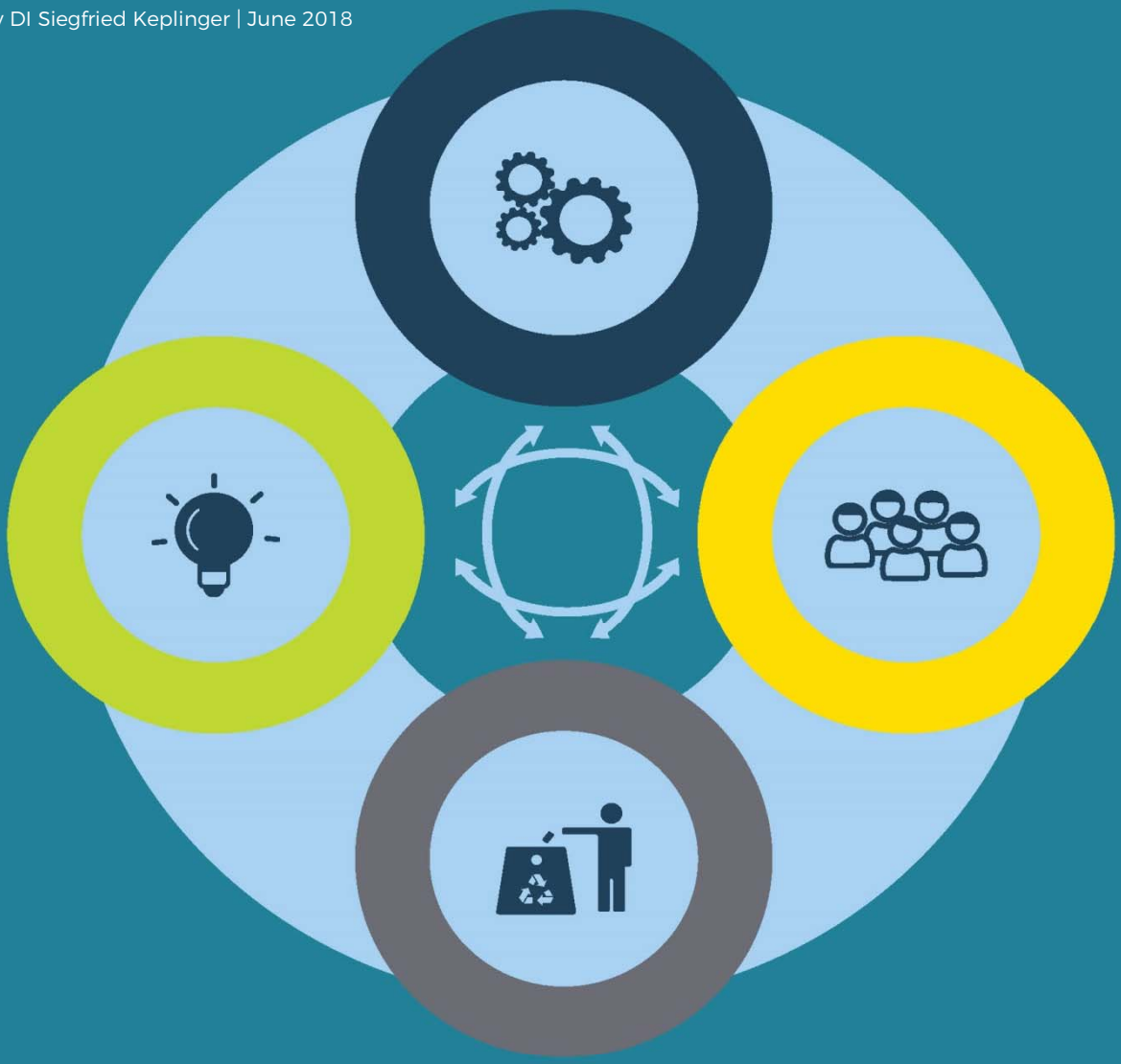

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1. TABLE OF CONTENTS

2. INTRODUCTION

2.1. INTRODUCTION TO THE DIFFERENT BUSINESS MODELS BASED ON CIRCULAR ECONOMY SECTION OF THE MOVECO TOOLBOX

This handbook is part of the circular economy toolbox of the MOVECO project. Its main goal is to establish awareness that classic linear sales model can be replaced by new business models based on the principles of circular economy.

This document can either be used as background material for trainers and participants in a **workshop** or also by individual readers (**self-study** or within a self-formed study-group). For both cases, there are notes provided that guide through the material.

Indicative questions encourage you to reflect what you have just read.

In addition, throughout the text, you will find some indicative questions framed and marked by "?" that encourage to reflect what you have just read.

Cross-references to the case studies and further MOVECO materials help to deepen your knowledge about circular economy.

Moreover, there are cross- references to the case studies or other MOVECO material (such as the fact sheets) marked by "💡".

Practical exercises are pointed out for trainer-led workshops or self-study by individual readers or a self-formed study group

Further, the pencil sign points out practical exercises that can be done as part of a trainer-led workshop or in self-study by individual readers or a self-formed study group.

For the **practical** work, there are several **case studies** that invite discussion or reflection – paired with empty templates for worksheets that encourage looking at a self-chosen practical product example. In the end, there is a short quiz to test the knowledge gained in this section of the toolbox. You will find any specific terminology explained in the **glossary**. If you use this section as part of a workshop, there is an **evaluation form** at the very end that can be used to collect feedback at the end of the workshop.

3. DIFFERENT BUSINESS MODELS BASED ON CIRCULAR ECONOMY

3.1. GENERAL INFORMATION

If we look at the business models used today and the associated sales models, it is striking that the incentive for a manufacturer to implement circular economy methods is very small. Why is that so? Now, with the sale of a product in a classic linear economy the ownership claim is transferred to the customer, the business relationship is concluded, except for the legally required warranty. The producer can only add value by replacing the product with a new one, which can lead to rampant business practices such as planned obsolescence.

All advantages resulting from modular construction, reparability or recyclability no longer benefit the manufacturer, but exclusively the consumer or another service provider who will later be part of the value chain. The beneficiaries of a product's longevity are therefore the consumer, of reparability the service technician, of modularity and reusability the recycling industry.

In a linear economy, the further development or improvement of a product by the manufacturer in order to achieve higher sales figures is directly linked to the replacement of the original product. There is therefore no benefit for the manufacturer to justify investments in circular economy.

However, there are also other business models in the concepts of circular economy to replace the classic linear sales model. These allow an extension of the value chain for the producer and thus allow the creation of additional added value. These business models will be explained in more detail in this section.

3.2. DEFINITIONS

But before the most important business models of the circular economy are described here, what is a business model respective why do we actually need a business model? I like this answer most:

“The interest in business models comes from two opposing sides:

- Established companies have to find new and innovative business models to compete against growing competition and to fend off insurgents
- Entrepreneurs want to find new and innovative business models to carve out their space in the marketplace

Within this context the business model concept is a particularly helpful unit of strategic analysis tailored to today's competitive business environment. It helps executives as well as entrepreneurs increase their capacity to manage continuous change and constantly adapt to rapidly changing business environments by injecting new ideas into their business model.”[1]

A straighter and more easily to understand definition would be: “A business model is a company's plan for how it will generate revenues and make a profit. It explains what products or services the business plans to manufacture and market, and how it plans to do so, including what expenses it will incur.”[2]

What is your definition of business model? You can look up Wikipedia or search other sources!

Please also have a look at the MOVECO "Fact Sheet Circular Economy: Terms & Definitions" in the design section

With this in mind we can start our course and step into details!

3.3. 5 BUSINESS MODELS BASED ON CIRCULAR ECONOMY

In an article of the consulting firm Accenture[3] 5 central business models of the circular economy were presented for the first time:

- Product Life Extension - the lifecycle of a product can be extended by repairing, upgrading & reselling
- Resource Recovery - modularity and material maximize economic value of product return flows
- Circular Supplies - supply fully renewable, biodegradable or recyclable resource inputs
- Product as a Service - products are used by customer by means of lease or pay-for-use
- Sharing Platforms - customer collaboration among product use

3.3.1. PRODUCT LIFE EXTENSION

The business model of product life extension intends to extend the lifecycle of a product to ensure it remains economically useful. Through remanufacturing, repairing, upgrading or re-marketing material, that otherwise would be eliminated from the life circle, is maintained or even improved. By extending the lifespan of the product for as long as senseful (not as long as possible!), companies can keep material out of the landfill and discover new sources of revenue.

Please also have a look at the MOVECO "School of Thinking: Cradle to Cradle" in the training handbook

.Depending on the customer's needs, bearing in mind market and regulatory bodies' viewpoints, a specification has to be developed where the product's major technical parameters and its main functional aspects are defined. In the detailed design phase the development of the product is predeterminated, materials and modularity are defined, life span of the final product is fixed.

What does your product / service look like? What is its planned life span? Is it modular designed?

As soon as the manufacturing is done, the product is sold and delivered, the final lifecycle starts including a various number of actions to pay attention to: Use, operate, maintain, support, sustain, phase-out, retire, recycle! This of course includes providing support and information to customers and service engineers which are required for maintenance and repair as well as correct handling of retiring and recycling. Recycling is the last component of the "Reduce, Reuse, and Recycle" philosophy.

Do you offer a service handbook for your product? Is your product designed to be disassembled? Can parts of your product be reused?

Please also have a look at the MOVECO brochure "Your Trash is my Treasure" and the best practise examples you can find there!

3.3.2. RESOURCE RECOVERY

The business model of resource recovery uses technological innovations and capabilities to recover and reuse resources. In this case is it necessary to eliminate material weaknesses and maximize economic value. Important approaches serving this business model are closed loop recycling and Cradle-to-Cradle design.

Please also have a look at the MOVECO "New Material Pathways" in the training handbook

Resource recovery creates products of value using wastes as an input material. The key feature of resource recovery is to reduce the amount of waste generated and extract the maximum additional benefit from retired products. Resource recovery minimises the need of new raw materials in the manufacturing process.

Recycling is one of the most important resource recovery practices. It presupposes the collection for a possible reuse of disposed materials. Material for recycling optimally should be collected separately from general waste using dedicated containers and collection vehicles, or, if this is not available has to be sorted directly from mixed waste streams. The most common consumer products recycled include aluminium like beverage cans, steel food and aerosol cans, copper from wires, old steel furnishings or other equipment, glass bottles and jars, polyethylene and PET bottles, newspapers, magazines and light paper, paperboard cartons and corrugated fiberboard boxes.

Is waste collected in dedicated containers in your company / in your private environment? Do you know regulations for waste regimes in your country? Do you prefer reusable containers for food and drinking to through

Valuable resources can be recovered not only from materials used to manufacture products but also from operating resources like energy, water or industrial gases. Beyond this fertilizing nutrients like nitrogen, phosphorus, potassium, as well as micro-nutrients such as sulphur and organic matter can be recovered.

Disposed materials of organic nature like food scraps or plant material can be recycled using biological composting. The resulting organic material can be used as mulch or compost for agriculture and landscaping. Waste gas from the composting process can be used for generating electricity and heat.

Is water processed in your town? Do you know projects about recovery of phosphorus or other fertilizing nutrients from waste water?

Please also have a look at the MOVECO EPR study where you can find information on waste schemes and recycling materials!

3.3.3. CIRCULAR SUPPLIES

The business model of circular supplies solves the problems of scarce commodities. Companies facing scarce resources will replace these with fully renewable, recyclable or biodegradable resource inputs to ensure their availability to future generations.

Please also have a look at the MOVECO "New Material Pathways" in the training handbook

Circular supplies offers companies a possibility to provide renewable, recyclable or biodegradable materials in its production process. In a world of finite resources, this secures a company not only in the supply of scarce (and maybe environmentally destructive) raw materials but for ALL raw materials. The supply chain of raw materials becomes predictable and sustainable, on the long run even at lower costs.

Do you use scarce materials in your production process? Have you ever thought about replacing them?

Circular supplies require the replacement of previously available or used conventional materials by new and improved materials. Anyway materials undergo constant development, material properties are designed for special applications. The continuous development of plastics, metals, glass, ceramics, textiles or composites give birth to a wide variety of material substitutes. In the focus stand innovative materials like nanomaterials and hybrid materials besides the already mentioned renewable, recyclable or biodegradable ones.

Is your product developing? Thinking about a product improvement, do you think only about scarce material or maybe also about usual material?

On the other hand, there is a considerably higher development risk in the complete substitution of proven construction materials. New materials require of course some development effort which may be considerable higher and need comprehensive testing before being released.

3.3.4. PRODUCT AS A SERVICE

The business model product as a service tries to convince customers to use a product through a lease or pay-for-use arrangement instead of the usual buy-to-own approach.

Please also have a look at the MOVECO brochure "Your Trash is my Treasure" and the best practise examples you can find there!

In the linear economy manufacturers typically focus on selling their product in a one-time transaction. And sometimes selling the product is followed by a warranty contract or a service agreement to keep the product useable. The business model product as a service changes this approach to a new concept where the buyer no longer owns a physical thing, instead the product is delivered as a service. The customer subscribes to the service and pays a recurring fee for using the product in case he needs it.

Most of us have used a rental car already, maybe on a business or holiday trip. It makes no sense to buy a car for some days! Can you think of another service you would like to subscribe?

Another example of product as a service is a leasing program like offered by car dealers. The customer subscribes a leasing contract, the car stays property of the car dealer. Insurance and maintenance work stays with the customer or is included during the lifetime of the lease, depending of the kind of contract.

Please also have a look at the MOVECO "Financing Tools" and the mapping of funding schemes as well as the match-making tools you can find there!

Product as a service allow producers to create a long-term relationships fostering recurring revenue. For companies which are able to develop a service mentality, this leads to a differentiated position in the market. Of course starting the journey can be disheartening. It may decrease the former sale performance and show revenue losses. But experience in other cases show that manufacturers can expect more stable and profitable overall revenues than with one time sales moving from a physical sale to a recurring service fee.

If a product is moved to a product as a service also a new business opportunity can be utilized: Pooling of own and external services. In case of the leasing of a car very often 3rd party insurance and roadside assistance are added.

Think of washing clothes, you could combine offering a washing machine together with detergents. Can you find other combinations of internal and external services?

The cream of the product as a service altogether is that it can increase the manufacturers market potential. The entry price for the buyer gets reduced dramatically so new classes of buyers with less capital expenditure can be gained.

3.3.5. SHARING PLATFORM

The business model sharing platform is focused on sharing a product that has a low ownership or use rate. Low use rate means that the time over which products or service lay idle is wasted value. This idle time can be reduced if groups of users or organizations use a business model based on sharing to better utilize a product or service. The classic example are cars. They stay unused 90% of the time. This significant resource can be used by car sharing platforms, an opportunity for new economic solutions.

Cross-reference: Please also have a look at the MOVECO handbook, section "Principles of Circular Economy" and innovation and stewardship principles you can find there!

Unlike earlier generations we face increasing cities and more and more people living in urban areas providing a critical mass of providers and consumers who are sufficiently close to each other. In this constellation it is easier to develop other commonly used sharing models besides car sharing like sharing of living room in shared flats or sharing of office services like printers, phones or conference rooms for small and new enterprises.

Think of Uber as a new local transportation form or AirBNB offering living space. Can you find even more sharing examples?

3.4. CONCLUSION / TAKE-HOME-MESSAGES

Sharing data, knowledge and memory is already common business in IT systems, internet provides shared information and Wikipedia is the biggest shared lexica in the world. This shows that in a lot of cases circular economy and its business models are often not exotic future but standard business.

The ultimate goal of the circular economy is to keep materials in the loop as long as possible and to bring waste streams back into the supply chain as a resource. The business models of the circular economy provide new ways and solutions.

- Anyway which business you are in, which service or product you offer, always think about
- Product Life Extension
- Resource Recovery
- Circular Supplies
- Product as a Service
- Sharing Platforms

4. NOTES

4.1. FOR TRAINERS: HOW TO WORK WITH THIS SECTION IN THE WORKSHOP

The material of the Different Business Models based on Circular Economy section of the MOVECO toolbox is designed in a modular way, so that you can tailor the workshop to the SMEs in the audience and the time available. Here is how:

1) Go through the PowerPoint presentation and choose the examples you would like to include and remove the others from the presentation. Make sure you also read the "notes for trainers" notes that are included in the notes of the presentation (below the slides in the notes view) to prepare your session.
2) Select the matching case studies from the handbook to work with in the workshop.
3) Prepare your introductory lecture; you can use the information from the notes in the presentation as well as from the handbook. In addition, there are links and reading recommendations that can help you. You may choose to direct your participants/readers to those for further reading at the end of the workshop as well.
4) Prepare the basic outline for the discussion of the case studies (starting questions, time frame, etc.) and start the discussion with the participants. Then make sure to step back a little and encourage the discussion among the participants. You may choose to take notes yourself for a concluding summary or assign the task to the group members.
5) Direct the participants to their own analysis with the empty worksheet templates, encouraging them to get creative and think outside the box. Make sure you stress that there are no "wrong" answers, but that this is an exercise for coming up with new ideas and possibilities – which naturally do not all lead to success eventually. Be ready to assist and answer questions. Depending on the background of the participant, this can be done in individual work time or as group work – decide.
6) Give the participants enough time to sum up their own analysis and then encourage them to present it to the group. Make sure the group respects the individual ideas by stressing again that this is about creative ideas and not "right" or "wrong", invite them to add comments or suggestions to the individual contributions.
7) Finish the session with the quiz, point to additional reading and take up comments and suggestions (also to improve further editions of the workshop)
8) Do not forget to ask the participants for an evaluation with the evaluation form.

4.2. FOR WORKSHOP PARTICIPANTS AND SELF-STUDY READERS: HOW TO WORK WITH THIS SECTION IN THE WORKSHOP OR ON THEIR OWN

There are **two ways** that you can work with this section of the MOVECO toolbox. Here is how:

In a workshop

The material of the Different Business Models based on Circular Economy section of the MOVECO toolbox is designed in a modular way, so that the trainer will put together a workshop that is tailored to the audience and guide you through it. This section of the toolbox is hands-on, which means that will be plenty of room for **discussions** and **bringing in your own ideas**. The focus is on the creative process to come up with new ideas and creative solutions – there are no "right" or "wrong" answers, so please **contribute lively** with your own ideas and suggestions. We encourage you to **take notes** in case you want to come back to the material later. The handbook in the end will serve as your repository, where you can look up information and find suggestions for **further reading**.

Self-study

If you do not have the possibility to attend a workshop, you can nevertheless use the materials provided for self-study and find out all about material pathways for yourself. It is suggested that you proceed in the following order and take notes as you go along.

1) Read the **introduction** in the handbook
2) Look at the **presentation** with all the examples
3) Go back to the handbook and read the background information provided for each **case study** (or a selection, as you with).
4) Take an empty **worksheet template** to look at your product or production process (or, if you do not have an own example, choose one that you are somewhat familiar with). Read through the section of the handbook that explains the individual phases in chapter 2 and follow the guiding questions set there in the exercises and on the worksheet templates. The aim here is to get creative and think outside the box – just go ahead!
5) Look at the **further readings** section and the links to dig deeper into the topic

It would be a good idea to find somebody to team up with and discuss your findings – either via skype or in person. You can also try to set up your own mini-workshop by using the notes for the trainers above to guide you.

5. CASE STUDIES

In the following, there are several case studies for selection to work with in the workshop to foster discussion or in individual study to learn more.

Please also have a look at the MOVECO brochure "Your Trash is my Treasure" and the best practise examples you can find there!

5.1. CASE STUDIES PRODUCT LIFE EXTENSION

ReVital stands for ecologically, favorably and socially and is the premium brand for high-quality used goods in Upper Austria. The project is funded by the environmental department of the country.

The declared objectives of the Volkshilfe and ReVital partnership are the prevention of waste, the provision of cheap shopping for high-quality second-hand goods and the creation of jobs in the region. Collection points for well-preserved housewares, furniture, electrical, sports and leisure equipment are the waste collection centers. A direct delivery in the shop is possible or if necessary, the goods are picked up.

Examples of work and further information can be found on the internet following this link

http://www.revitalistgenial.at

A general overhaul from Rosenbauer quickly updates your fire-fighting vehicle with the latest technology. Municipal and initial attack vehicles as well as industrial and air crash tenders can be fitted with the latest fire-fighting equipment. Even individualized suggestions for modernization are possible. All installed modules come from the latest product lines and reflect the best quality.

Examples of work and further information can be found on the internet following this link

https://www.rosenbauer.com/en/de/rosenbauer-world/service/in-use-around-the-world/repairs-and-general-overhauls

5.2. CASE STUDIES RESOURCE RECOVERY

PDR has been an established player for material and substance-based recycling and recovery for more than 20 years. Their utmost priorities are resource conservation and sustainability. Based in the town of Thurnau in Upper Franconia, they also work for global players such as HP. As a medium-sized company with a workforce of around 60 employees, they are known for expertise in PU chemicals and handling of hazardous waste.

PDR has many years of experience in the treatment of spent PU foam cans. The nation-wide PDR industry solution has become well established in the market. They are proud of a recovery rate of around 80%. These recovered raw materials are returned to the production cycle.

Examples of work and further information can be found on the internet following this link

https://www.pdr.de/en/cover-page/

As the world market leader in stamp products, Trodat sees itself as having a special obligation and has been setting a good example for climate protection for years. Already in 1993, when the Kyoto Protocol was not on everyone's lips yet and the strict Austrian environmental laws were not yet up to date, Trodat set measures for a better use of energy.

Approximately 80% of all production waste is recycled, 100% recycling of mechanically unclaimed parts.

Examples of work and further information can be found on the internet following this link

http://www.trodat.net/de-DE/uebertrodat/nachhaltigkeit_umwelt/Pages/Wir-tragen-Verantwortung.aspx

5.3. CASE STUDIES CIRCULAR SUPPLIES

The company Fabula C Ltd. Produces pencils that are made of recycled organic waste from coffee, tea and flowers. Fabula calls him the most sustainable pencil in the world.

The pencil is not only made from organic waste, its spiky waste also serves as plant nutrients (gentle fertilizer) and it can grow a new plant from the used Fabula pin.

If the pen has become too short to write, it must be dissolved in water for two days. The seeds embedded in the end of the pen are released in this way. The solution of seeds and nutrients can then be poured into soil so that a seedling can grow in two to three weeks.

Examples of work and further information can be found on the internet following this link

http://www.fabulaorganicpencil.com/

Feplo manufactures waterproof ECO boards. This building material consists of pressed parts of recycled beverage cartons, which would otherwise end up in landfills.

Not only are these panels 100% ecological, they also meet the very high requirements in terms of dimensional stability, homogeneity and little change in product properties. The numerous advantages of the ECO boards include their excellent workability, low weight, fair price and outstanding thermal insulation properties.

Unlike other materials used to make sheets, the ECO boards are waterproof. Therefore, they offer optimal possibilities for use in modern construction - for interior and exterior - and various other applications. This is a big advantage in the market.

Examples of work and further information can be found on the internet following this link

http://www.feplo.rs/en/index.html

5.4. CASE STUDIES PRODUCT AS A SERVICE

Iskraemeco is one of the leading manufacturers of smart meters. When switching from a linear to a circular economic model, Iskraemeco enters into new relationships with suppliers and customers.

As part of the Elsewedy Electric Group, Iskraemeco managed to successfully transform from a product-oriented business to a smart metering solution provider. Within the ten-years period, the company established itself as the second largest smart metering solutions provider in Europe, Middle East and Africa and has a leading position in Germany and in the Netherlands.

Examples of work and further information can be found on the internet following this link

http://www.iskraemeco.com/en/

Architect Thomas Rau worked with Philips to purchase light as a service. The end result was a bespoke 'pay-per-lux' intelligent lighting system to fit the requirements of the space, at a manageable price. Philips retain control over the items they produce, enabling better maintenance, reconditioning and recovery.

Examples of work and further information can be found on the internet following this link

https://www.ellenmacarthurfoundation.org/case-studies/selling-light-as-a-service

5.5. CASE STUDIES SHARING PLATFORM

Modo is a Vancouver-based consumer car sharing co-op. Launched in 1997, with just two cars and 16 members, Modo has grown to 16,000 members and a fleet of over 500 sports cars, sedans, trucks, SUVs, vans and hybrids—all available to share at $4/hour through a smartphone app and website. Member-owners are shareholding members of the co-op which means they get a vote as well as the best rates for carsharing.

Examples of work and further information can be found on the internet following this link

https://www.modo.coop/

Stocksy is a stock photo site where contributing photographers are also owners. A “highly curated collection” of royalty-free stock photos, the platform is a cooperative that believes in creative integrity, fair profit sharing, co-ownership, and every voice being heard. It’s a new twist on traditional co-ops. As they state on the website, “Think more artist respect and support, and less patchouli.”

Contributing Stocksy photographers receive 50% of a Standard License Purchase and 75% of an Extended License Purchase. Every Stocksy contributor receives a share of the company.

Examples of work and further information can be found on the internet following this link

https://www.stocksy.com/

6. TEMPLATE OF WORKSHEET

Template of worksheet

In the following, there is an empty worksheet template to work with in a workshop or individually. Select a heading and design your individual business model!

1. Product Life Extension
2. Resource Recovery
3. Circular Supplies
4. Product as a Service
5. Sharing PlatformsThink

Current situation

Product / Service	Materials and resources used	Repair / reuse potential	Service / sharing potential

Potential future situation

Product / Service	Materials and resources used	Repair / reuse potential	Service / sharing potential

7. QUESTIONS & ANSWERS

7.1. QUIZ – QUESTIONS

This quiz can be used at the end of the workshop to check whether the key content has been understood and to sum up the most relevant take-home-messages.

Where is the ownership after the sale of a product in a classic linear economy?

☐ It stays with the producer

☐ It is transferred to the customer

☐ This is not determined and can change from case to case

What do we understand with the term business model?

☐ A business model is a company's plan for how it will generate revenues and make a profit.

☐ Girl on the cover of a business magazine.

☐ Form of an artist to produce sculptures.

What intends the Cradle to Cradle concept?

☐ Material should be kept in a life circle as long as possible.

☐ Waste should be used for energy recovery.

☐ Cradle can be reused by next generation.

Which resources can be recovered?

☐ Glass, paper and steel.

☐ Water and energy.

☐ Nitrogen, phosphorus and potassium.

Which character should materials for circular supplies have?

☐ Character doesn't matter.

☐ Cheap and everywhere available.

☐ Renewable, recyclable or biodegradable.

What could motivate a customer to use product as a service?

☐ Needs less money to afford the service.

☐ Is proud to have an own car.

☐ Gets a bundle of services out of one hand.

Is Uber a taxi company?

☐ Yes, it's just a new enterprise offering taxis.

☐ Uber is a sharing system offering the bundle driver and car.

☐ I don't know Uber.

7.2. QUIZ – SOLUTIONS

Where is the ownership after the sale of a product in a classic linear economy?

☐ It stays with the producer.

☑ It is transferred to the customer.

☐ This is not determined and can change from case to case.

What do we understand with the term business model?

☑ A business model is a company's plan for how it will generate revenues and make a profit.

☐ Girl on the cover of a business magazine.

☐ Form of an artist to produce sculptures.

What intends the Cradle to Cradle concept?

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Which character should materials for circular supplies have?

☐ Character doesn't matter.

☐ Cheap and everywhere available.

☑ Renewable, recyclable or biodegradable.

What could motivate a customer to use product as a service?

☑ Needs less money to afford the service.

☐ Is proud to have an own car.

☑ Gets a bundle of services out of one hand.

Is Uber a taxi company?

☐ Yes, it's just a new enterprise offering taxis.

☑ Uber is a sharing system offering the bundle driver and car.

☐ I don't know Uber.

8. GLOSSARY

Glossary

- **Bio-based material:** ""Bio-"is Greek for life. Bio-based material refers to a products main constituent consisting of a substance, or substances, originally derived from living organisms. These substances may be natural or synthesized organic compounds that exist in nature. This definition could include natural materials such as leather and wood, but typically refers to modern materials. Many of the modern innovations use bio-based materials to create products that biodegrade. Some examples are: cornstarch, derived from a grain and now being used in the creation of packaging pellets; bio-plastics created with soybean oil, now being used in the creation of many modern products like tractors, water bottles, and take away cutlery." [1] **Biodegradable material**: "A material which microorganisms can break down into natural elements (i.e. water, biomass, etc.)."[2]
- **Biological metabolism** - The natural processes of ecosystems are a biological metabolism, making safe and healthy use of materials in cycles of abundance[3]
- **Biological Nutrient** - A material used by living organisms or cells to carry on life processes such as growth, cell division, synthesis of carbohydrates and other complex functions. Biological Nutrients are materials that can biodegrade safely and return to the soil to feed environmental processes[4]
- **Cascading**: see MOVECO fact sheet "Circular Economy: Terms & Definitions"
- **Compostable material**: "Materials that can be disposed with biological materials and decay into nutrient-rich material."[5] **Circular economy** - regenerative economy in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops
- **Cradle-to-Cradle®:** see MOVECO fact sheet "Supporting Tools for a Circular Economy"
- **Cradle to Grave** – "A Cradle to Grave system is a linear model for materials that begins with resource extraction, moves to product manufacturing, and, ends with a "grave" – when the product is disposed of in a landfill or incinerator"[6]
- **Decision** – "shall be binding in its entirety. A decision which specifies those to whom it is addressed shall be binding only on them"[7]

[1] https://sustainabilitydictionary.com/2006/02/17/bio-based-material/ (26.03.2018) // "A material that is partially, or entirely made of biomass." https://www.ceguide.org/Glossary (26.03.2018)
[2] https://www.ceguide.org/Glossary (26.03.2018)
[3] Cradle to Cradle terminology – MBDC-http://www.c2cproducts.com/detail.aspx?linkid=1&sublink=26
[4] Cradle to Cradle terminology – MBDC-http://www.c2cproducts.com/detail.aspx?linkid=1&sublink=26
[5] https://www.ceguide.org/Glossary (26.03.2018)
[6] Cradle to Cradle terminology – MBDC-http://www.c2cproducts.com/detail.aspx?linkid=1&sublink=26
[7] European Network of Environmental law Organizations 2012 Implementation of the Waste Framework Directive in the EU Member States

- **Directive** – "shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods"[8]
- **Down-cycle** - to recycle (something) in such a way that the resulting product is of a lower value than the original item : to create an object of lesser value from (a discarded object of higher value)[9] see: MOVECO fact sheet "Circular Economy: Terms & Definitions"
- **Eco-Effectiveness** – "The central strategy in the cradle-to-cradle development method and seeks to create industrial systems that emulate healthy natural systems. The central principle of eco-effectiveness is that "waste equals food." The concept was developed in response to some of the perceived limitations of eco-efficiency which critics claim only slow down the rate of environmental depletion and don't reverse the production of unused or non-recycled waste".[10]
- **Eco efficiency** – "Management philosophy that aims at minimizing ecological damage while maximizing efficiency of the firm's production processes, such as through the lesser use of energy, material, and water, more recycling, and elimination of hazardous emissions or by-products."[11]
- **Ecological sustainability** – "a bio-centric school of sustainability thinking that, based on ecology and living systems principles, focuses on the capacity of ecosystems to maintain their essential functions and processes, and retain their biodiversity in full measure over the long-term contrasts with technological sustainability based on technical and engineering approaches to sustainability"[12]
- **Ecosystem** - the interactive system of living things and their non-living habitat[13]
- **Ecosystem redesign** - a coherent framework for redesigning our landscapes, buildings, cities, and systems of energy, water, food, manufacturing and waste through the effective adaptation to and integration with nature's processes[14]
- **Energy efficiency**: "Energy efficiency improvements refer to a reduction in the energy used for a given service (heating, lighting, etc.) or level of activity. The reduction in the energy consumption is usually associated with technological changes, but not always since it can

[8] European Network of Environmental law Organisations 2012 Implementation of the Waste Framework Directive in the EU Member States

[9] Merriam Webster dictionary

[10] https://sustainabilitydictionary.com/2005/12/03/eco-effectiveness/visited 26/02/2018

[11] http://www.businessdictionary.com/definition/eco-efficiency.html -visited 01.03.2018

[12] Orr D (1992) Ecological literacy: education and the transition to a post-modern world. State University of New York Press, Albany.

[13] Tansley AG (1935) The use and abuse of vegetational concepts and terms. Ecology 16:284–307 doi:10.2307/1930070

[14] with adaptations from https://www.researchgate.net/publication/301966198_Regenerative_Development_regenerative_development_and_Design (26.06.2018)

also result from better organization and management or behavioral changes ("non-technical factors").”[15]

- **Energetic use**: incineration of waste material that includes the use of the generated heat and energy for other processes
- **(Final) disposal**: see MOVECO fact sheet “Circular Economy: Terms & Definitions”
- **Incineration**: Waste destruction in a furnace by controlled burning at high temperatures. Incineration removes water from hazardous sludge, reduces its mass and/or volume, and converts it to a non-burnable ash that can be safely disposed of on land, in some waters, or in underground pits. However, it is a highly contentious method because incomplete incineration can produce carbon monoxide gas, gaseous dioxins, and/or other harmful substances.[16]
- **Innovation** - production or adoption, assimilation, and exploitation of a value-added novelty in economic and social areas[17]
- **Landfilling**: “The disposal and burying of solid waste. The degradation of the waste results in the creation of local air and water pollution.”[18]
- **Lean production** - approach to management that focuses on cutting out waste, whilst ensuring quality[19]
- **Life-cycle** - series of stages in form and functional activity through which a system passes between successive recurrences of a specified primary stage[20]
- **Life-cycle analysis**: see MOVECO fact sheet “Supporting Tools for a Circular Economy”
- **Life-time** - the duration of the existence of a given particular system[21]
- **Locational patterns** - the patterns that depict the distinctive character and potential of a place and provide a dynamic mapping for designing human structures and systems that align with the living systems of a place[22]
- **Negative externality** - occurs when production and/or consumption imposes external costs on third parties outside of the market for which no appropriate compensation is paid[23]
- **Optimization** - finding an alternative with the most cost effective or highest achievable performance under the given constraints, by maximizing desired factors and minimizing undesired ones[24]

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[15] https://hub.globalccsinstitute.com/publications/energy-efficiency-recipe-success/definition-and-scope-energy-efficiency (26.03.2018)
[16] http://www.businessdictionary.com/definition/incineration.html (27.06.2018)
[17] with adaptations from http://www.ericshaver.com/the-many-definitions-of-innovation/ (27.06.2018)
[18] https://www.ceguide.org/Glossary (26.03.2018)
[19] with adaptations from https://www.tutor2u.net/business/reference/introduction-to-lean-production (27.06.2018)
[20] https://www.merriam-webster.com/dictionary/life%20cycle (26.06.2018)
[21] With adaptations from https://en.wikipedia.org/wiki/Lifetime (26.06.2018)
[22] https://www.researchgate.net/publication/273379786_Regenerative_Development_and_Design (25.06.2018)
[23] with adaptations from https://www.economicshelp.org/micro-economic-essays/marketfailure/negative-externality/ (26.06.2018)
[24] http://www.businessdictionary.com/definition/optimization.html (26.06.2018)

- **Permaculture** - a system of agricultural and social design principles centered around simulating or directly utilizing the patterns and features observed in natural ecosystems[25]
- **Place** - the unique, multi-layered network of ecosystems within a geographic region that results from the complex interactions through time of the natural ecology (climate, mineral and other deposits, soil, vegetation, water and wildlife, etc.) and culture (distinctive customs, expressions of values, economic activities, forms of association, ideas for education, traditions, etc.)[26]
- **Recommendations and opinions** - shall have no binding force [27]
- **Recycling:** see MOVECO fact sheet "Circular Economy: Terms & Definitions"
- **Refurbishment:** "The refurbishment of something is the act or process of cleaning it, decorating it, and providing it with new equipment or facilities."[28]
- **Regenerative design** - a system of technologies and strategies, based on an understanding of the inner working of ecosystems that generates designs to regenerate rather than deplete underlying life support systems and resources within socio-ecological wholes[29]
- **Regenerative development** - a system of technologies and strategies for generating the patterned whole system understanding of a place, and developing the strategic systemic thinking capacities, and the stakeholder engagement/commitment required to ensure regenerative design processes to achieve maximum systemic leverage and support, that is self-organizing and self-evolving[30]
- **Regulation** - shall have general application. It shall be binding in its entirety and directly applicable in all Member States. – Source - Article 288 TFEU, [31]
- **Remanufacturing:** "The process of cleaning and repairing used products and parts to be used again for replacements."[32]
- **Restorative design** - sometimes called restorative environmental design; a design system that combines returning polluted, degraded or damaged sites back to a state of acceptable health through human intervention[33]
- **Resource efficiency**: "A percentage of the total resources consumed that make up the final product or service."[34] re-use: see MOVECO fact sheet "Circular Economy: Terms & Definitions"
- **Secondary resource/ secondary raw materials:** "Waste materials that are recovered, recycled and reprocessed for use as raw materials."[35]

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[25] https://en.wikipedia.org/wiki/Permaculture (27.06.2018)
[26] https://www.researchgate.net/publication/273379786_Regenerative_Development_and_Design (25.06.2018)
[27] http://eur-lex.europa.eu/summary/chapter/environment.html?root_default=SUM_1_CODED%3D20,SUM_2_CODED%3D2003&locale=en
[28] https://www.collinsdictionary.com/de/worterbuch/englisch/refurbishment (26.03.2018)
[29] Mang, Pamela & Reed, Bill. (2017). Update Regenerative Development and Design 2nd edition.
[30] https://www.sciencedirect.com/science/article/pii/S2212609015300327 (26.06.2018)
[31] http://eur-lex.europa.eu/legal-content/en/TXT/HTML/?uri=CELEX:12016E288
[32] https://sustainabilitydictionary.com/2005/12/03/remanufacturing/ (26.03.2018)
[33] https://www.researchgate.net/publication/273379786_Regenerative_Development_and_Design (24.06.2018)
[34] https://sustainabilitydictionary.com/2005/12/03/remanufacturing/ (26.03.2018)
[35] https://sustainabilitydictionary.com/2005/12/03/remanufacturing/ (26.03.2018)

- **Servitization** - refers to industries using their products to sell "outcome as a service" rather than a one-off sale[36]
- **Source to sink** - simple linear flows from resource sources (farms, mines, forests, watershed, oilfields, etc.) to sinks (air, water, land) that deplete global sources and overload/pollute global sinks[37]
- **Stewardship** - ethic of companies, organizations and individuals that embodies the responsible planning and management of resources[38]
- **Sourcing:** "the act of getting something, especially products or materials, from a particular place"[39]
- **System thinking** - holistic approach of analysis and planning that focuses on the way the parts of a system interrelate each other and how systems work over time and within the context of larger systems[40]
- **Technical metabolism** - "Modelled on natural systems, the technical metabolism is MBDC's term for the processes of human industry that maintain and perpetually reuse valuable synthetic and mineral materials in closed loops"[41]
- **Technical nutrient** – "A material that remains in a closed-loop system of manufacture, reuse, and recovery called the technical metabolism, maintaining its value through infinite product life cycles "[42]
- **Upcycle** – "to recycle (something) in such a way that the resulting product is of a higher value than the original item: to create an object of greater value from (a discarded object of lesser value)"[43]
- **Upcycling**: see MOVECO fact sheet "Circular Economy: Terms & Definitions"
- **Waste**: see MOVECO fact sheet "Circular Economy: Terms & Definitions"

More: https://www.ceguide.org/Glossary

[36] https://www.k3syspro.com/servitization/ (24.06.2018)
[37] https://www.researchgate.net/publication/273379786_Regenerative_Development_and_Design (25.06.2018)
[38] https://en.wikipedia.org/wiki/Stewardship (24.06.2018)
[39] https://dictionary.cambridge.org/dictionary/english/sourcing (26.03.2018)
[40] https://searchcio.techtarget.com/definition/systems-thinking (27.06.2018)
[41] Cradle to Cradle terminology – MBDC-http://www.c2cproducts.com/detail.aspx?linkid=1&sublink=26
[42] Cradle to Cradle terminology – MBDC-http://www.c2cproducts.com/detail.aspx?linkid=1&sublink=26
[43] Merriam Webster dictionary

9. REFERENCES

Sources

1 http://businessmodelalchemist.com/blog/2005/11/what-is-business-model.html

2 https://www.investopedia.com/terms/b/businessmodel.asp

3 https://www.accenture.com/no-en/new-applied-now)

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Further reading / links

- Business Model Canvas, Alex Osterwalder https://strategyzer.com/canvas
- Open Source Tools https://community.oscedays.org/t/solution-videos-tool-on-open-source-business-models-for-circular-economy/4625
- GreenBiz - The 5 business models that put the circular economy to work by Jennifer Gerholdt https://www.greenbiz.com/article/5-business-models-put-circular-economy-work
- PRé - 5 Roads To A Circular Economy by Anne Gaasbeek https://www.pre-sustainability.com/news/5-roads-to-a-circular-economy-part-v-circular-supplies
- Danish Environmental Protection Agency - Best Practice Examples of Circular Business Models by Eva Guldmann, University of Aalborg https://www2.mst.dk/Udgiv/publications/2016/06/978-87-93435-86-5.pdf
- wbcsd - 8 Business cases for the circular economy https://www.wbcsd.org/Clusters/Circular-Economy-Factor10/Resources/8-Business-Cases-to-the-Circular-Economy
- Rytec - Case studies of Business Models that stimulate Circular Economy by Raphael Fasko http://www.wrforum.org/wp-content/uploads/2015/10/SS2-Fasko.pdf
- Institute for Ecological Economics Wirtschaftsuniversität Wien (WU) – Regionale Kreislaufwirtschaft, Inputpapier für die Implementierung von RESET2020 by Stephan Lutter, Stefan Giljum und Matthias Randles https://www.wu.ac.at/fileadmin/wu/d/i/ecolecon/PDF/RESET2020_Regionale_Kreislaufwirtschaft_Report.pdf
- Cradle to Cradle: Remaking the Way We Make Things by William McDonough and Michael Braungart http://www.powells.com/book/cradle-to-cradle-remaking-the-way-we-make-things-9780865475878

MOVECO documents

- MOVECO 2017. Brochure "Your trash is my treasure". http://www.interreg-danube.eu/approved-projects/moveco/section/best-practice
- MOVECO 2018. Checklist to support SMEs. http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/18/d80bd307d6bb83b4d1afe341dae0b177a96a2259.pdf
- MOVECO 2018. Fact Sheet - Supporting Tools for a Circular Economy. http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/14/572a016a8d386225c44c5870f4cb3188461d299b.pdf
- MOVECO 2018. Fact Sheet - Circular Economy: Terms and Definitions http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/14/b61410d76c124dcc94d55ff624be01f53972e29f.pdf
- MOVECO 2018. Fact Sheet - Information on Circular Economy. http://www.interreg-danube.eu/uploads/media/approved_project_output/0001/14/b61410d76c124dcc94d55ff624be01f53972e29f.pdf

EU circular economy key documents

- Circular Economy - Implementation of the Circular Economy Action Plan http://ec.europa.eu/environment/circular-economy/index_en.htm
- Towards a circular economy https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/towards-circular-economy_en
- Circular economy https://ec.europa.eu/growth/industry/sustainability/circular-economy_en
- Circular economy - overview http://ec.europa.eu/eurostat/web/circular-economy

10. IMPRINT

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