

INDUSTRIAL SYMBIOSIS IN THE CIRCULAR ECONOMY

INTERMEDIATE LEVEL



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In this video, you will be introduced to industrial symbiosis, industrial ecology, eco-innovation, and the importance of stakeholders and establishing partnerships when implementing eco-innovation models in your business.



EXPECTED LEARNING OUTCOMES

KNOWLEDGE	<ul style="list-style-type: none">• Knowledge of industrial symbiosis related to industrial ecology (how to foster eco-innovation through collaboration with other organisations)• Knowledge of how to plan for eco-innovation in a collaborative environment.• Knowledge of how to plan for culture change through collaboration with other actors in the industry.
SKILLS	<ul style="list-style-type: none">• Discuss the role of networks and collaborators in industrial symbiosis.• Examine case studies of successful industrial symbiosis.• Complete a mapping exercise to identify suitable actors and collaborators to support industrial symbiosis in your region.
ATTITUDES	<ul style="list-style-type: none">• Appreciate the competitive advantage of industrial symbiosis.• Engage with stakeholders, collaborators, and networks to foster eco-innovation and culture change.



SELF-REFLECTION EXERCISE

This self-assessment exercise will help you reflect on your current knowledge!

[Click here to be taken to the exercise.](#)



INDUSTRIAL SYMBIOSIS AND INDUSTRIAL ECOLOGY

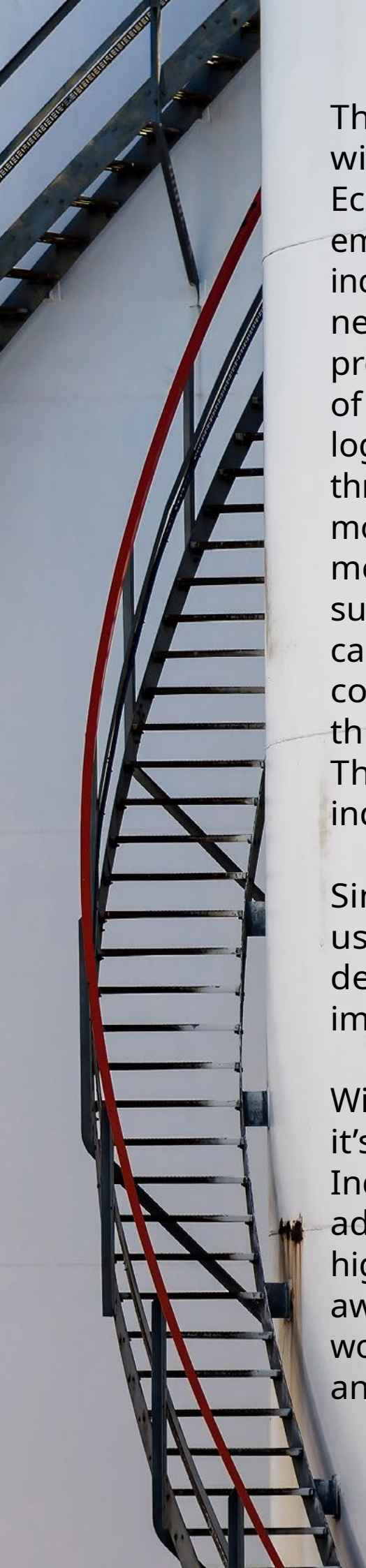


Industrial symbiosis is defined by the Organization for Economic Cooperation and Development (OECD) as “an alternative for the reuse of products and waste produced in an industry by another industry” (OECD, 2001)

In other words, industrial symbiosis aims to integrate economic activity, environment, and community welfare, through the exchange of waste, raw materials, energy, and water, in order to reduce the impacts resulting from industrial activity and its operating costs.

Industrial symbiosis is closely related to Industrial Ecology. Industrial Ecology is the study of materials and energy flows through industrial systems (Ali, 2019). The global industrial economy can be modelled as a network of industrial processes that extract resources from the Earth and transform those resources into commodities that can be bought and sold to meet the needs of humanity. Industrial ecologists are often concerned with the impacts that industrial activities have on the environment, the use of the planet’s supply of natural resources, and the problems of waste disposal.





There are four major benefits associated with Industrial Symbiosis and Industrial Ecology: economic growth, resource saving, employment growth, and innovation. The GDP increases as a result of increased revenue from new circular activities and higher resource productivity. Employment grows as a result of new jobs in recycling, maintenance, and logistics. And new businesses can be created through innovative services and new business models. The potential for savings is huge. This means not only savings for the businesses, such as the costs of remanufacturing, which can be significantly reduced, but also for the consumer that can happen, for example, through leasing and recycling of products. The positive impact is also extended to industrial sectors and national economies.

Since, as countries learn to extend their use of resources, they will reduce their dependence on raw materials and other imported products.

With all of this potential for a positive impact, it's clear that adopting a model based on Industrial Symbiosis gives a business a clear advantage in the market, which is further highlighted by the increase of environmental awareness of the costumers, who, in today's world, often prefer to opt for more sustainable and environmental-friendly choices.

ECO-INNOVATION



WHAT IS ECO-INNOVATION?

Eco-innovation is any form of innovation with the aim of creating sustainable development by reducing impacts on the environment or achieving an efficient and responsible use of natural resources, including energy.

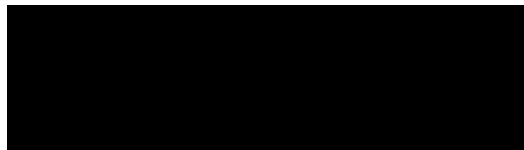
The scale of environmental problems, along with social inequalities and competitiveness challenges in the global economy have raised awareness of the need for change in businesses nowadays.

This awareness is important to produce innovative responses that gradually move society onto a more sustainable path.

Is your business sustainable?

Did you know that many businesses that consider themselves sustainable do not actually meet the requirements to be considered as one?

A sustainable company is one that successfully integrates environmental, economic, and social issues into its business operations (MJV, 2020).



So, do you think that your business complies with all the requirements to be recognised as sustainable?

No matter your answer, remember that the sustainability of a business requires constant work and updating, but when joined together with innovation, it's a powerful combination for increased success in the market. Eco-innovation can be the answer for both new or established businesses to keep up with the current need for the adoption of more sustainable measures and for them to get a prominent position as a business.



INDUSTRIAL SYMBIOSIS AND COLLABORATION

Creating a dynamic and thriving circular economy requires systemic thinking and cooperation. Coming together to redesign the production processes and resource flows of different businesses is a challenging path to take and will only be successful with commitment, knowledge of the options for your business and a plan for collaboration.

Identifying a network of businesses that have resources that can be used in your own business is essential for the development of an industrial symbiosis.

These resources are not necessarily just physical. Your network might even include:

- Customers
- Investors
- Suppliers and vendors
- Communities
- Governments

Whether internal or external, each stakeholder carries interests and demands that impact directly or indirectly the decision-making processes. It is not enough just to know who the people and groups impacted by the activities carried out by an organization are. It is necessary to accompany them and understand how to deal with each one of them. That's why stakeholder mapping and establishing a strategy to communicate and collaborate with each agent is necessary.



When you are putting time into mapping your networks and resources, it's important to not forget your internal networks, those who can have a role "from the inside". Fostering internal entrepreneurship can accelerate the process of innovation and sustainability within your external partnership. For an existing successful business change is challenging. Giving autonomy and power to people to come together and test ideas that normally would not be explored drops the internal barriers and strengthens your ability to innovate within an external partnership.



The background is a solid teal color with several large, overlapping, curved shapes in a slightly lighter shade of teal, creating a modern, abstract design.

KALUNDBORG: A CASE STUDY



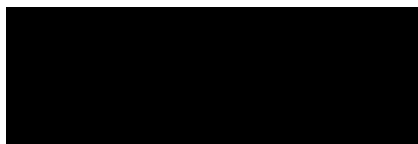
Kalundborg, in Denmark, is a small port city that has become a major reference in industrial ecology and is considered the pioneering model, of industrial symbiosis.

This model has been gradually evolving since 1962 when the Kalundborg municipality and Esso (now Statoil) began partnering to supply water.

The physical proximity facilitated contacts and resulted in a collaborative spirit among companies, cooperating, buying and selling waste to each other in a closed industrial production cycle.

Driven by the volatility and costs of materials and energy, this is a system of grassroots, entrepreneurial initiative, but with the support of the Kalundborg municipality. Currently more than 30 exchanges of water, energy and other by-products are identified between Kalundborg municipality and 7 other entities (Novo Nordisk, Novozymes, Gyproc, Dong Energy, Statoil, Kara/Novoren, Kalundborg Forsyning A/S).

According to expert Mette Skovbjerg, “the partner companies in Kalundborg have managed to reduce CO2 emissions by 275,000 tons, saving about 80 million euros a year.”



FINAL ASSESSMENT TASK

TITLE OF THE TASK:

Stakeholders mapping

AIM OF THE ACTIVITY:

To identify suitable actors and collaborators to support industrial symbiosis in your region through a mapping exercise.

TIME REQUIRED:

90 minutes

MATERIALS REQUIRED:

Device with Internet access for research

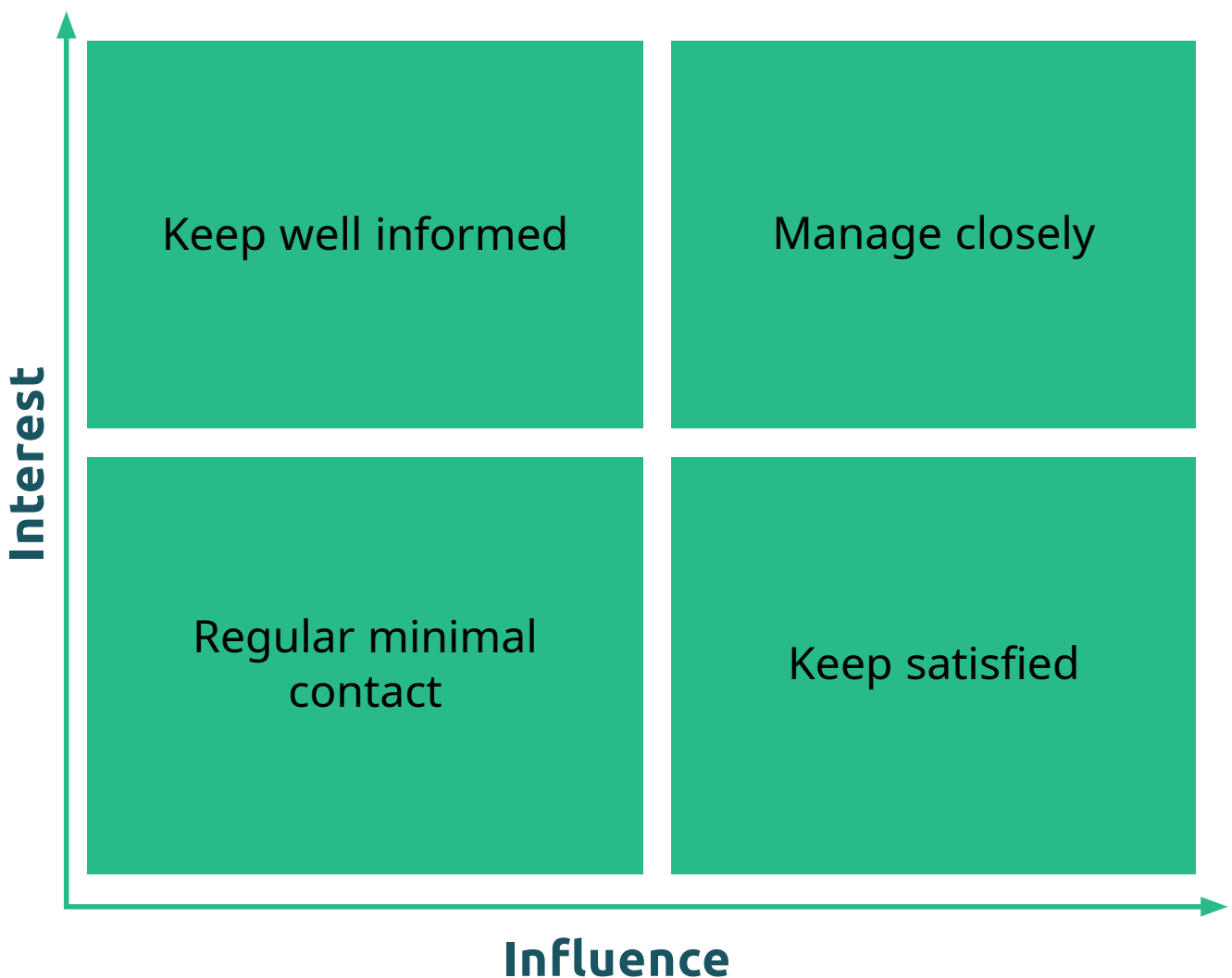
Stakeholders mapping matrix (Annex 1) printed or in digital format.



FORMAT FOR THE PRESENTATION:

Printed or digital stakeholders mapping matrix. Alternatively, you can also create a slide presentation.

1. Identify any interested parties that might benefit from and/or contribute to your business.
2. Distribute your stakeholders in the stakeholder mapping matrix (Annex 1).
3. Establish a communication strategy (how frequently you will communicate with each stakeholder and communication tools to be used), with the support of the matrix



FINAL TEST

This quiz aims to assess your knowledge upon the completion of the EduZine.

[Click here to be taken to the final quiz.](#)





LEARNING CIRCLE



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cultura



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