

## **Are you ready for a circular economy?**

### **Society's needs and policy developments toward a circular economy as a driver for scientific research**

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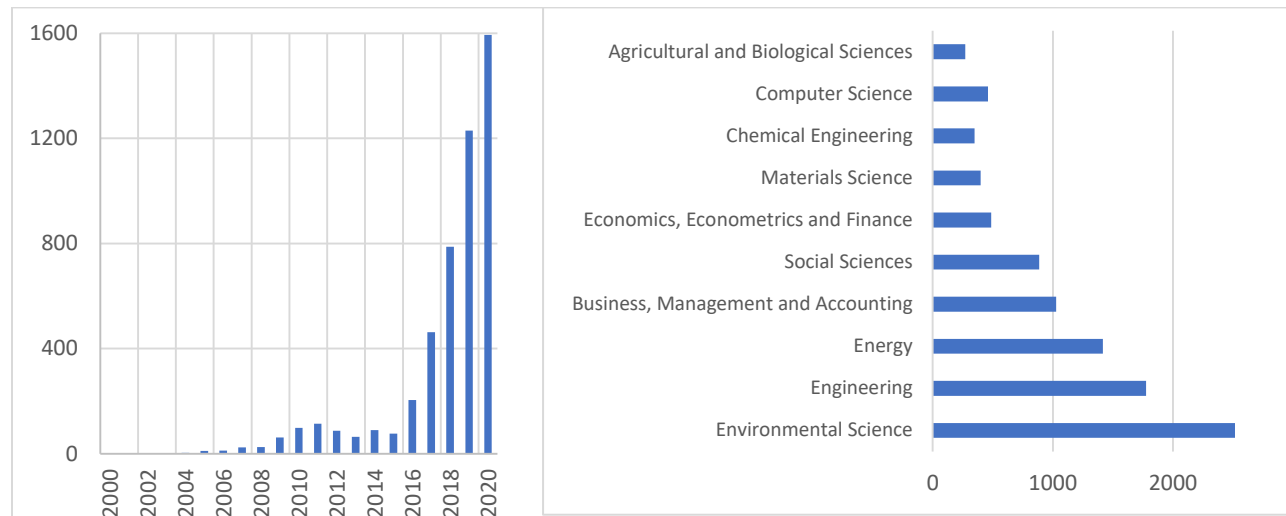
Environmental science and environmental engineering are areas of applied science where society's needs and policy developments play an important role in directing the research. One of the emerging research fields is a circular economy, aiming to prevent rolling into resource scarcity and to interrupt increasing environmental pollution, especially with plastic waste. Politicians have reacted to this need by incorporating the principles of a circular economy in policies – one can see such developments in the European Union, China, Japan, and other countries. A circular economy offers a way to reach the Sustainable Development Goals formulated by the United Nations, especially the Sustainable Consumption and Production goal.

The main intention of a circular economy is to provide the same comfort and functionality of modern life by reducing the material footprint and eliminating waste production. A circular economy is related to the “cradle to cradle” principle where the life cycle of a product ends with transformation into high-quality raw materials for new products. Sometimes a circular economy is misunderstood, mainly as better waste management, i.e. better sorting and recycling of waste. The circular economy starts with waste prevention by changing the business approach from producing products to providing functions. This requires reshaping the behaviour of economic systems by interrupting the endless race for producing more and cheaper, using products and then wasting them, i.e. the so-called linear economy. The circular economy instead focuses on the provision of functions and services with a reduced intensity of materials used and wasted, among others, also increasing the longevity and use intensity of products by better circular design.

A circular economy is an interdisciplinary field, and the development here can benefit from co-operation among policymakers, businesses, and academia to find sustainable solutions creating a field for innovative pilots. One such pilot was an Interreg Baltic Sea Region program financed Project called “Using Innovation Procurement and Capacity Building to Promote a Circular Economy” (Circular PP) bringing together municipalities, consultants, universities, state agencies from various Baltic Sea Region countries and the Netherlands. The procurement examples of circular furniture during the Circular PP project illustrated the interdisciplinarity and complexity of circular approaches starting from the behaviour of clients and suppliers (are municipalities mature enough to require and the industry to supply more circular furniture?) until technical details on how to measure and verify the circularity of solutions, for example, the life cycle impact of furniture starting from a material footprint to the toxicity of ingredients and forecast economic implications, i.e. the life cycle costs of furniture.

The increasing interest of the academic world about a circular economy can be illustrated by the number of scientific articles. The first articles mentioning a “circular economy” as a combined

keyword appear in the SCOPUS data base in the year 2001. Until 2015 one can find just a few articles a year, but since then, the number of articles have experienced rapid growth.



**Figure. The number of articles mentioning "circular economy" as the keyword in SCOPUS per years of publication and the branch of science (2000-2020).**

According to a search of the SCOPUS data base, not only scholars in environmental sciences and engineering, but many other scientific areas are devoting their research to expand their knowledge base about a circular economy. Also, the Journal of Environmental Research, Engineering and Management has publications in areas related to a circular economy, although not always mentioning this term.

Thus, a circular economy offers an emerging research field where scientists from various fields can come together and contribute to finding solutions and providing knowledge that meets society's demands.