

Innovation in the Circular Economy

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Abstract: The circular economy (CE) is an area that is increasingly resonating across different sectors. This is one of the principles of the sustainability strategy. CE deals with ways to improve the quality of the environment and human life by increasing production efficiency. In the future, it is intended to replace the linear economy, in which a large percentage of products, in the first place, end up unnecessarily after consumption in landfills or incinerators. It is necessary to deal with the observance of the principles of the circular economy, mainly for the sake of nature protection in connection with the visibly changing climate and stocks of raw materials. In the context of global trends, sustainability strategies are a necessity for more and more companies. It is therefore a presentation of the concept of environmentally sustainable economy, technology and production chain in today's globally burdened environment. Accessing CE in terms of cost, material and energy savings can be a great motivation for companies. Companies are trying to reduce costs associated with production and waste management and are looking for new business models. As part of the transition from linear to CE principles, procedures and opportunities for a step improvement compared to the existing competition in the form of the implementation of innovative proposals can be recommended. There are not only ecological but also economic arguments in favor of CE. The economy requires resources to produce goods and services and ultimately to create value for society. Unless companies radically use recyclable materials more often and adhere to CE principles, they will face a shortage of resources that will complicate their operations in the medium to long term. In order for companies to become part of the circular economy, they must carry out a complete overhaul of their business models. Based on analyzes of the economic and social environment, the presented article provides an overview of the possibilities of innovation and eco-innovation within CE. The subject was to determine the development of the implementation of innovations in CE in today's society, as one of the latest approaches to the production, consumption and subsequent processing of waste.

Keywords: circular economy, shared economy, digital technologies, innovation, sustainability, ecodesign, European Union, green deal, life cycle assessment

1. Introduction

The aim of the presented text is to state a more detailed characteristic of CE, including an outline of the concept, principles, advantages and disadvantages. Furthermore, determining the possibilities of innovation in CE. Information for the processing of the submitted text was drawn from secondary sources, mainly from printed professional Czech and foreign literature, professional articles and Internet sources. Circular economics is a current concept today, not only in a societal context, but across all disciplines that affect us all ethically and in principle, not only as individuals. Therefore, this area is important because it represents the concept of an environmentally sustainable economy, technology and production chain in today's globally burdened and destroyed environment. There has long been talk about the current method of production, which is, however, environmentally unsustainable. It is estimated that in 2050, production from the three planets would not be enough to cover all global consumer demand. Consumption is enormous and current resources are no longer enough. The solution can be just CE (found.cz, 2020). Companies are expected to behave innovatively. This means using natural resources wisely, minimizing waste generation, supporting each other on the path to sustainability, and requesting services or raw materials from partners who have already implemented circular and sustainable principles in their products. In fact, the CE is primarily about tangible results, sensible use of resources and, above all, cooperation between entities. Without cooperation, one company would not be able to turn the rest of the company's material into a completely new source. CE is primarily about closing material cycles and minimizing waste. Products that have reached the end of their useful life can be disassembled and used as a raw material for further production. Companies already understand that it also pays off economically, especially in the current shortage of plastics, wood or metals. For this system to work, however, we need to think about the whole operation of the business in an innovative way - to address product design, financing and the supply chain. Partnerships help companies innovate, invent and move. This is the CE principle. Combining an idea and an implementer, often a smaller entity, with a major player in the market. However, a good example is the connection of the academic community where the proposal of innovation can take on completely new dimensions and move business thinking forward.

2. Literature review

The content of the article deals with the topic "Innovation in the circular economy". In the field of circular economics, you can find mainly professional articles and studies at the level of the European Commission - EU Environmental Management and Audit Scheme (EMAS), Green Public Procurement (GPP), Life Cycle Costs, etc .. among the authors are Morlet, A., Sherratt, A., Brkljac, M., Sudarevic, T .. It should be noted that there is not yet a large number of professional publications focused directly on this particular issue. Especially in relation to the researched issues (combination of the importance of innovation and CE). On the other hand, there is enough professional literature in the field of innovation theory. Among them are well-known personalities such as Schumpeter, J.A, Valenta, F. and Drucker, P.F.. A detailed overview of the used literature and authors is given at the end of the article.

3. Methodology, goal and purpose of research

The stated goal of the paper was achieved by implementing the following scientific methods and organizational principles. Information for the processing of the submitted text was drawn from secondary sources, mainly from printed professional Czech and foreign literature, professional articles and Internet sources. To achieve the output, a search of available relevant literature and studies dealing with issues of innovation, concept and principles of CE and Life Cycle Assessment was performed. Furthermore, a meta-analysis was performed, which summarizes data from several partial independent studies. Extensive documents prepared by the European Commission were also used. The aim is to make recommendations to companies that will want to move from linear to circular operation and, as part of this change, to improve dramatically through innovation. Specific areas of innovation are defined in the text. This article is the initial output of research conducted at the University of Finance and Administration (Prague, Czech Republic). The name of the project is "Innovation in the circular economy", where the main goal is to estimate the possible use of innovation in CE. CE is one of the basic pillars of sustainable development, as it helps the market to function better, raises awareness of prices and quality of services, but also gives everyone better access to the market. It is necessary to monitor, research, analyze and focus on identifying positive and negative impacts. It follows from the above that in the areas mentioned in this paper, both in theory and in practice, there is great potential for the corporate sector and for future research. Now the author presents the first output within the researched issues.

4. Circular economics - definition, model

The term CE can be characterized as intentionally renewable management, the aim of which is to maintain products, materials and other components for the life of the highest potential for use. CE aims to streamline the flow of material, information, labor and energy in such a way that social and natural potential can be restored (Morlet, 2016). CE is a concept of closing material loops in order to preserve and preserve products, materials and parts and strive to extract their maximum utility value. The idea of replacing secondary production with a lower environmental impact with intensive primary production gives the circular economy a strong environmental appeal (Zink, Geyer, 2017). According to Jonášová, director of the Institute of Circular Economics for the Czech Republic (jit.cz, 2018), this is a system in which we behave respectfully to nature and at the same time generate profit thanks to the reuse of valuable materials that are kept in circulation for as long as possible.

Assumptions of circular economics

According to (Sherratt, 2013), there are six key approaches and principles:

- **industrial symbiosis** - waste of one can be the source of the other (eg use of waste heat)
- **shared economy** - in case of occasional use, the possibility of using rent instead of buying (eg sharing cars or production machines),
- **3R = reduce, recycle, reuse** - methods of re-inclusion of end-of-life products in the system (eg take-back of cans by the manufacturer),
- **ecodesign** - product design to minimize the negative impact on the environment (eg use of degradable materials),

- **Cradle to Cradle** - product design with absolute respect for natural cycles, when at the end of its life
- it is fully recycled or returned to nature in the form of safe and non-toxic substances
- **biomimicry** - inspiration for the emergence of new solutions sought in nature (eg buildings in desert areas with a construction inspired by cacti).

As follows, the shared economy is part of the CE and can be defined as: "an economic system based on the sharing of underused assets or services, free of charge or for a fee" (Brkljac, Sudarevic, 2018). Or, as Blažek states, "a modern shared economy can generally be defined as prioritizing access to durable goods and factors of production through digital platforms without personal ownership of these assets. It is a free online market that helps to make more efficient use of currently free production factors with economic, ecological and social benefits" (Blazek, 2020).

5. Principles and model of circular economy

According to Stahel (2016), there are two models of circular economics:

- A model that supports re-use, where life is extended through upgrades, repairs or refurbishments,
- A model that transforms old goods into new ones through material recycling.

Although the main goal of CE is considered to be economic prosperity and environmental quality, none of the characteristics mention the impact on future generations and social justice (Kirchherr, Reike, Hekkert, 2017).

The CE concept is based on the effort to replace the direct current that prevails in the current economic system (Moldan, 2021). In 2017, global plastics production reached almost 350 million tons. Some estimates suggest that plastics and waste generation could double by 2035 (Walker, 2020). According to Schulz (2016), the introduction of the principles of the circular economy for individual states would mean not only social but also environmental benefits and, of course, the ability to generate significant savings, savings of primary resources and a positive impact on employment.

Circular economics uses this principle (Morseletto, 2018):

recovery - recycling - reuse - refurbishment - renovation - repair - reuse - re-evaluation – disposal

Circular economics requires:

- cooperation of the whole spectrum of various fields,
- perception of waste as a valuable resource,
- the use of eco-design in the production of new products,
- use of renewable resources,
- inclusion of modern digital technologies,
- preserving the value of manufactured products, including extending their life cycle,
- change of business models (Rifkin, 2022)

Circular principles should in any case take into account the life cycle analysis in terms of production and environmental impacts. It is important to define the advantages and disadvantages of CE.

Table 1: Advantages and disadvantages of the circular economy

Advantages	Disadvantages
almost zero waste production, supply chain elimination, separation of economic growth from raw material extraction, less burden on the environment, saving resources and energy, reduction of material and raw material costs, preventing the loss of biodiversity and conserving natural resources,	relatively complex feasibility, lack of legislation in most countries, the need to think about the product from the very beginning, product design change,

Advantages	Disadvantages
lower price fluctuations in global markets, new job opportunities, new business opportunities, efficient production method	

Source: Adjusted by found.cz (2020) and Rifkin (2022)

6. Innovations and their importance

The concept of innovation has become very popular in recent years. A pioneer in the field of innovation is Josef A. Schumpeter, who is considered the founder of the modern theory of innovation. Schumpeter (Schumpeter and Elliot, 2011) describes innovation: "the creation and commercial or industrial application of something new — a new product, process or method of production; a new market or source of inputs; a new way of managing an organization, business or financial management." We can mention Professor F. Valenta, an economist and academic, who defines innovation somewhat more broadly as: "any change in the internal structure of a production organism" (Valenta, 1969). For the definition of innovation, we can also use the Oslo Manual of OECD (2005), which characterizes innovation as follows: "Innovation means the implementation of a new or significantly improved product (goods or services) or process, new marketing methods or new organizational structures." method in business practice, workplace organization or external relations'. All definitions have one thing in common, and that is the idea of something new. However, this is what causes high risk, an unclear outcome and a very vague approach to successful innovation.

7. Innovation in the circular economy and the support of the European Union in practice

Many companies have already made a public commitment to resource management. For example, IKEA wants to use only certified wood and promote the quality and reparability of its products. The clothing company H&M would like to be completely circular by 2030. Already in 2017, Philips accounted for 60% of total revenues in the circular economy (jic.cz, 2018).

The European Union (EU) supports the strategic plan for the transition to a circular economy through specific instruments. In addition to support in the form of, for example, eco-labeling of products and services, new tools are emerging in response to the increased interest in CE. Based on the type of support, these instruments can be divided into financial and non-financial.

Under the **financial support of CE**, which is provided as part of the EU's cohesion policy, EUR 150 billion was allocated in the budget period 2014-2020. This appropriation was intended to support CE in the areas of waste management, strengthening the bioeconomy, new ecodesign solutions, low-carbon investments and resource efficiency. The water reuse project was also supported. Several regions in the EU already recycle wastewater to irrigate parks, clean the streets, or replenish groundwater supplies. In addition to cohesion policy, Horizon 2020, LIFE and COSME (ec.europa.eu, 2021) also provide financial support.

Specifically, for example, LIFE funds a wide range of **eco-innovation** projects and implementations, which are becoming the most important driver of a competitive economy based on sustainable progress. It helps fund nature and landscape, environment and climate protection projects across the EU. Since 1992, it has supported the implementation of 5,000 top projects worth more than EUR 5 billion. In addition, the budget was increased to EUR 5.4 billion for the new programming period (2021-2027). The program aims to contribute to the transition to a sustainable, circular, energy-efficient economy based on renewable energy, climate change neutral and resilient. Another of the program's goals is to improve the quality of the environment, its protection and restoration, and last but not least, to support biodiversity. The program funds eco-innovation projects involving science, industry and public administration, but also supports environmental management and information and awareness-raising campaigns.

The program is divided into 4 sub-programs, within which individual projects are implemented. Specifically, these are sub-programs:

- Nature and biodiversity
- Circulating economy and quality of life
- Climate change mitigation and adaptation

- Switch to clean energy

In addition, the program also offers financial instruments for environmental investors to show that environmental investments can be repayable (ec.europa.eu, 2021).

In 2017, the European Commission announced the launch of the CE Financial Support Platform. The platform aims to strengthen the links between existing financial instruments or, where appropriate, to create new ones. The purpose is to connect investors with innovators and find a suitable solution for financing CE projects. The platform will be composed of representatives of the European Commission, the EIB, national banks, Member State Ministries, investors, NGOs and other key CE stakeholders. The platform contains three pillars, consisting of coordination and awareness-raising on CE, consultancy and funding (ec.europa.eu, 2021).

Support for innovation in CE is the possibility of obtaining funding at the level of the European Union (EU). The specific conditions of individual programs are being adjusted on an ongoing basis, but it will be possible to obtain subsidies, for example, for:

- research, development and innovation,
- Industry 4.0, increasing digitization and automation,
- energy savings, renewable resources,
- reconstruction of real estate and brownfields,
- introduction of a circular economy and new circular solutions,
- eco-innovation, use of secondary raw materials, waste minimization,
- avoidance of water waste,
- building high-speed internet networks.

Non-financial instruments of EU support consist in setting criteria for assessing the environmental impact. These tools help organizations define their strategies and also aim to improve public awareness. One of the tools is the so-called Level (s), which focuses on the field of construction. It focuses on building and renovating in an energy and resource efficient way based on the Green Deal policy. It further emphasizes the importance of greening the construction sector, reducing material and energy consumption and increasing resource learning while maintaining affordability (ec.europa.eu, 2020). Another tool is EMAS, which was developed for companies and other organizations to evaluate and improve their environmental impact. It covers all economic sectors and is applicable worldwide. The aim is to reduce environmental impact, strengthen compliance while saving resources and money (ec.europa.eu, 2021).

Consumption is an important area for CE, and especially for waste reduction. According to the EU Commission, one of the problems at this stage of the product life cycle is too many labels and environmental claims, which are difficult for consumers to find and which do not always meet legal requirements. For this reason, the EU Commission has committed itself to ensuring better enforcement in the fight against unfair commercial practices, and a method has been developed to determine the Environmental Product Footprint (PEF) and the Organization's Environmental Footprint (OEF). The Product Environmental Footprint (PEF) and Organization Environmental Footprint (OEF) tools monitor the environmental impact of products and organizations over the entire life cycle (LCA). In this way, they contribute both to better public awareness and to organizations with the definition of circular strategies. An equally important tool is the concept of GPP (Green Public Procurement), which deals with public procurement. The concept is based on clear, verifiable and ambitious environmental criteria, for products and services based on the LCA approach (ec.europa.eu, 2021).

When creating a comprehensive CE model tool, it is necessary to deal with the entire life cycle from design, through production and subsequent consumption to waste management.

Although ecodesign is constantly evolving, its main principles, first published in the American magazine Innovation in 1992, remain the same. It is about:

- **1. Promoting safe products and services** - These are products and services that are safe for human health and at the same time have the least possible negative impact on the environment.

- **2. Biosphere protection** - There is a need to significantly reduce the release of any substances that could harm the air, water or soil.
- **3. Sustainable use of natural resources** - Must strive for the sustainable use of renewable natural resources and for the protection of vegetation, native nature, undeveloped areas and wildlife.
- **4. Reducing waste and increasing recycling** - This is an effort to minimize waste. To this end, the product design must pay attention to durability, adaptability, repairability and the possibility of recycling. These criteria must also be part of the contracts and technical conditions.
- **5. Wise energy use** - Environmentally safe energy sources must be selected and energy-saving means put in place.
- **6. Risk reduction** - Ecodesigners must find a way to eliminate the health risk of both their employees and customers.
- **7. Information transfer** - There is a need to share information that can help in the selection of the most suitable material and production processes (Remtová, 2003).

The concept of LCA (Life Cycle Assessment), or life cycle assessment, is closely linked to ecodesign. The LCA method is a tool that allows you to assess the environmental impact of a product or service in terms of the entire life cycle. The aim is to identify and quantify all the environmental impacts associated with a product from the extraction of raw materials, its production, consumer use to the end of the product's life and subsequent recycling. This approach is also known as "Cradle to grave".

LCA can be defined as the collection and evaluation of inputs, outputs and potential environmental impacts of a product system, throughout the life cycle. LCA works with data that allow us to assess the use of resources and the amount of pollution, such as solid waste and emissions (Krečmerová, Kovaříková, 2006).

The most commonly used LCA tools include:

LCI - Life Cycle Inventory - this is the collection and analysis of data on environmental interventions (eg air emissions, waste production, resource consumption), which are associated with the product from the extraction of raw materials through its production and use to final disposal. , including recycling, reuse and energy recovery. It focuses on the quantitative description of life cycle input and output flows. However, it cannot provide information on actual environmental impacts on its own (Frankl, Rubik, 2000).

LCIA - Life Cycle Impact Assessment - follows the life cycle inventory and is an estimate of environmental pressure indicators in terms of climate change, summer smog, resource depletion, human health effects, etc., which are related to environmental interventions caused by the product life cycle (ec.europa.eu, 2021).

SLCA - Streamlined Life Cycle Assessment and **BLCA (Bottleneck LCA)** aims to provide very basic and accessible information on the main environmental impact of the product. SLCA is often performed when relevant data to perform a true LCA will not be available. E.g. SLCA has been used by the Dutch government as a basis for defining ecological criteria under the Ecolabel scheme (Frankl, Rubik, 2000).

LCC - Life cycle costs - can be described as an inventory and analysis of the impact of environmental impacts during the life cycle. The LCC tool takes into account all costs during the life cycle of a product, work or service. It includes the acquisition price with additional costs, such as the cost of delivery, installation, insurance, etc., it also includes operating costs, which are energy, fuel, water, spare parts or maintenance, as well as externality costs (eg greenhouse gas emissions) and finally end-of-life costs (decommissioning, disposal, etc.). In applying the LCC, contracting authorities take into account costs that are not taken into account in the purchase price. This often results in a "win-win" situation where the organic product, work or service is generally cheaper. The main potential for life-cycle savings is energy, fuel and water savings, maintenance savings and consequent disposal costs (ec.europa.eu, 2021).

From the above it is possible to try your own draft definition of Innovation in CE:

"Innovations in CE represent a new way of using existing natural, intellectual and financial resources for the development of new opportunities in private and public space, in the context of circular economy

development with the application of overall synergy in sustainability, for the development of products and services to satisfy customers with common "to protect the planet and its limited resources".

8. Conclusion

Information for the processing of the submitted text was drawn from secondary sources, mainly from printed professional Czech and foreign literature, professional articles and Internet sources. As the paper shows, applying the principles of circular economics is not entirely simple and requires a multidisciplinary approach. In practice, it is necessary to start with the design of products, which should be created so that their material can be well recycled at the end of its life, or the entire product can be used directly elsewhere (upcycling). Within CE, emphasis is also placed on the efficient use of products. For example, according to the consulting company McKinsey (2015), the average European car is parked 92% of the time, 31% of food is wasted and we use offices only 30% to 50% of the time. Sharing and renting lead to the efficient use of products - ie a shift from traditional ownership to the form of using products as services. It is also very important to promote waste recycling, which generally has large reserves around the world. In the European Union alone, 2.5 billion tons of waste are produced annually, half of which ends up in landfills or incinerators (Nalez.cz, 2020).

Future perspective research of innovations in the field of circular solutions in companies can be realized, for example, in the following specific areas:

- reduction of material intensity of production
- use of secondary raw materials
- replacement of primary input raw materials by secondary ones
- ecodesign of products
- realization of industrial symbiosis
- waste recycling
- acquisition of innovative technologies for the processing of own waste material and its further use in production
- water saving in industry
- innovative technologies, setting up vegetation roofs, retention reservoirs, etc.
- transition to clean energy sources
- acquisition of photovoltaic power plants
- digitization (introduction of digitization elements in manufacturing and non-manufacturing companies)

Such innovations can be called "green development". It is based on not neglecting any of these categories: efficiency of resources used, sensitivity to the environment, attention to people's satisfaction and financial success. The consequence of such an effort will be economic growth with ever lower resource consumption. According to a study for Natural Capitalism, it is possible to achieve a 90-95% reduction in material and energy consumption without reducing the quantity or quality of services that people require (Lovins, Lovins, & Hawken, 2003). This opens up great potential for research in various fields and the possibility of effectively connecting the academic and business environment.

In conclusion, it is possible to recapitulate that the production of new products should be based on resource efficiency, the need to prevent waste, prefer renewable energy sources and the design of products in such a way that they can be put back into circulation. I agree that in order to meet the described areas of CE competence, it is necessary to introduce higher-order innovations so as to help increase the competitiveness of companies in the market. On the other hand, customers (end consumers and business customers) will need to be educated so that they too can use environmentally friendly products and services.

References

Blazek, L., The Future Of Shared Economy In The Economic System. In Margarethe Überwimmer, Robert Füreder, Michael Schmidthaler, Markus Vorderwinkler. Cross-Cultural Business Conference 2020. 1. Vyd. Düren: Shaker Verlag, 2020. S. 219-232, 11 S. Isbn 978-3-8440-7301-0.

- Brkljac, M., Sudarevic, T., (2018). Sharing Economy And „Industry 4.0“ As The Business Environment Of Millennial Generation - A Marketing Perspective, Proceedings Of The 29. Daaam International Symposium, Pp.1092-1101, B. Katalinic (Ed.), Daaam International, Isbn 9783-902734 -20-4, ,Wien, Austria
- Cirkulární Ekonomika Je Výzva Pro Podnikatele A Inovátory [Online]. 2018 [Cit. 2022-04-27]. Available At: <https://www.jic.cz/magazin/cirkularni-ekonomika-je-vyzva-pro-podnikatele-a-inovatory/>
- Cirkulární Ekonomika – Řešení Pro Udržitelnou Společnost [Online]. 2020 [Cit. 2022-04-27]. Available At: <https://www.nazeleno.cz/cirkularni-ekonomika-%E2%80%93-reseni-pro-udrzitelnou-spolecnost/>
- Co Je Cirkulární Ekonomika? [Online]. 2022 [Cit. 2022-04-26]. Available At: <https://www.cirkularnidotace.cz/clanky/co-je-cirkularni-ekonomika>
- Circular Economy: Commission Delivers On Its Promises, Offers Guidance On Recovery Of Energy From Waste And Works With Eib To Boost Investment. European Commission [Online]. 2017 [Cit. 2021-8-4]. Available At: https://ec.europa.eu/commission/presscorner/detail/en/memo_17_105
- Circular Economy Missions To Third Countries. European Commission [Online]. 2020 [Cit. 2021-8-9]. Available At: https://ec.europa.eu/environment/international_issues/missions_en.htm
- Cohesion Policy Support For The Circular Economy. European Commission [Online]. [Cit. 2021-8-4]. Available At: https://ec.europa.eu/regional_policy/en/policy/themes/environment/circular_economy/
- Drucker, P. F. Innovation And Entrepreneurship: Practice And Principles. New York: Harper & Row, 1985. 277 S. Isbn 0887306187
- Frankl, Paolo A Frieder Rubik. Life Cycle Assessment In Industry And Business: Adoption Patterns, Applications And Implications [Online]. Berlin: Springer, 2000 [Cit. 2021-8-6]. Isbn 978-3-642-08574-1. Available At: <https://books.google.cz/books?id=Zdytbaaaqbaj&pg=Pt31&lpg=Pt31&dq=Bottleneck+Lca&source=Bl&ots=1afimftm2&sig=Acfu3u0qld3celrgsf7pyneaxtzrdhkasq&hl=Cs&sa=X&ved=2ahukewjcppt78zvyahuugf0hhwntb1qq6af6bagveam#v=Onepage&q=Bottleneck%20lca&f=False>
- Gpp Criteria: Background And Approach. European Commission [Online]. [Cit. 2021-8-5]. Available At: https://ec.europa.eu/environment/gpp/gpp_criteria_en.htm
- Kirchherr, Julian; Reike, Denise; Hekkert, Marko. Conceptualizing The Circular Economy: An Analysis Of 114 Definitions. Resources, Conservation And Recycling, 2017, 127: 221-232.
- Krečmerová, Tatiana A Terezie Kovaříková. Metoda Posuzování Životního Cyklu Výrobků Či Procesů V Podnikové Praxi. Enviprofi.cz [Online]. 2006 [Cit. 2021-8-5]. Available At: https://www.enviprofi.cz/33/Metoda-Posuzovani-Zivotniho-Cyklu-Vyrobu-Ci-Procesu-V-Podnikove-Praxi-Uniqueidgoke4nvrwuokaqdkuox_zxoonflpyekntmfciu4hoa0/
- Level(S): Building Sustainability Performance. European Commission [Online]. 2020 [Cit. 2021-8-5]. Available At: https://ec.europa.eu/environment/system/files/2020-10/Levels%20newsletter_2020_January.pdf
- Life-Cycle Costing. European Commission [Online]. [Cit. 2021-8-6]. Available At: <https://ec.europa.eu/environment/gpp/lcc.htm>
- Lovins, Amory, Lovinsova, L. Hunter, Hawken, Paul. Přírodní Kapitalismus: Jak Se Rodí Další Průmyslová Revoluce - Orig.: Natural Capitalism, Praha : Mladá Fronta, 2003. - 476 S. ,Isbn 80-204-1078-3
- Mckinsey & Company Studies 2015: Europe's Circular-Economy Opportunity, Available At: <https://www.mckinsey.com/business-functions/sustainability/our-insights/europes-circular-economy-opportunity>
- Moldan, Bedřich. Životní Prostředí V Globální Perspektivě. Vydání Druhé, Doplněné. Praha: Univerzita Karlova, Nakladatelství Karolinum, 2021. Isbn 9788024649672.
- Morlet, Andrew, Et Al. Intelligent Assets: Unlocking The Circular Economy Potential. Ellen Macarthur Foundation, 2016, 1-25.
- Morseletto, Piero. Targets For A Circular Economy. Resources, Conservation And Recycling, 2020, 153: 104553.
- Oecd, 2014. Oecd Reviews Of Innovation Policy: France 2014. Paris: Oecd Publishing. 280 P. Isbn 978-92-642-1402-6.
- Remtová, Květoslava. Ekodesign [Online]. 2003. Praha: Ministerstvo Životního Prostředí [Cit. 2021-8-5]. Isbn 80-7212-230-4. Available At: [https://web.archive.org/web/20110617071413/http://www.mzp.cz/osv/edice.nsf/7907a38f19e1d57ec1256fc0004fe74d/\\$File/Ekodesign.pdf](https://web.archive.org/web/20110617071413/http://www.mzp.cz/osv/edice.nsf/7907a38f19e1d57ec1256fc0004fe74d/$File/Ekodesign.pdf)
- Rifkin, Jeremy. Green Deal: Strašák, Nebo Jediněčná Šance? Walden Press, 2022. Isbn 9788090801554.
- Sherratt, A. (2013) Cradle To Cradle. In: Idowu S.O., Capaldi N., Zu L., Gupta A.D. (Eds) Encyclopedia Of Corporate Social Responsibility. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-28036-8_165
- Schulze, Günther. Growth Within: A Circular Economy Vision For A Competitive Europe. Ellen Macarthur Foundation And The Mckinsey Center For Business And Environment, 2016, 1-22.
- Schumpeter, Josef A. And John E., Elliott, 2011. The Theory Of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, And The Business Cycle. New Brunswick: Transaction Publishers. 244 P. Isbn 978-14-128-1592-5.
- Stahel, Walter R. The Circular Economy. Nature, 2016, 531.7595: 435-438.
- Valenta, F. Tvůrčí Aktivita - Inovace - Efekty. Praha: Svoboda, 1969. 255 S. Isbn 25-093-69.
- Walker, Thomas; Gramlich, Dieter; Dumont-Bergeron, Adele. The Case For A Plastic Tax: A Review Of Its Benefits And Disadvantages Within A Circular Economy. Sustainability, 2020.
- What Is Emas? European Commission [Online]. [Cit. 2021-8-5]. Available At: https://ec.europa.eu/environment/emas/index_en.htm
- Zink, Trevor; Geyer, Roland. Circular Economy Rebound. Journal Of Industrial Ecology, 2017, 21.3: 593-602.