

Agata Rudnicka

University of Lodz
e-mail: agata.rudnicka@uni.lodz.pl

BUSINESS MODELS IN CIRCULAR ECONOMY CONCEPT

MODELE BIZNESOWE W KONCEPCJI *CIRCULAR ECONOMY*

DOI: 10.15611/pn.2018.520.09

JEL Classification: M11; M19

Summary: It seems that in the 21st century business needs to adapt faster than ever to the expectations of the external environment. This makes it necessary to look for new solutions that give the opportunity to reconcile the needs and expectations of consumers who are increasingly aware and enterprise which are trying to meet new requirements. As a result there is a change in the perception of existing business models and a move beyond the linear economic model. The new optics of looking at business is both legitimate and necessary. One of such concepts is Circular Economy (CE) which incorporates the existing management concepts into the strategic idea of natural resources protection. What is more, the assumptions of the CE are coherent with the postulates of sustainable development and, in particular, environmental aspects, which constitutes its additional value. The aim of the article is to present the idea of CE in terms of business models.

Keywords: business model, Circular Economy, circular business models, sustainability.

Streszczenie: Wydaje się, że w XXI w. biznes szybciej niż kiedykolwiek musi dostosowywać się do oczekiwań płynących z otoczenia zewnętrznego. Powoduje to konieczność poszukiwania nowych rozwiązań dających sposobność pogodzenia potrzeb i oczekiwań coraz bardziej świadomych konsumentów i próbujących odnaleźć się w nowej sytuacji przedsiębiorstw. Skutkiem jest zmiana postrzegania dotychczasowych modeli biznesowych i wyjście poza linearny model ekonomiczny. Nowa optyka patrzenia na biznes jest zarówno zasadna, jak i konieczna. Jedną z takich koncepcji jest *Circular Economy* (CE, Gospodarka Obiegu Zamkniętego), która włącza dotychczasowe koncepcje zarządzania w strategiczną ideę ochrony zasobów środowiska. Co więcej, założenia Gospodarki Obiegu Zamkniętego wpisują się w postulat zrównoważonego rozwoju, a w szczególności aspektów środowiskowych, co stanowi o jej dodatkowej wartości. Celem artykułu jest przybliżenie idei CE w ujęciu modeli biznesu.

Keywords: modele biznesowe, *Circular Economy*, biznesowe modele cyrkularne, *sustainability*.

1. Introduction

The issues of environmental protection and the necessity to take further actions for the protection of non-renewable resources and limiting the negative impact on the environment are nothing new. Over the last decades, many ideas have been created to improve the quality of the environment by reducing pollution and limiting the use of non-renewable resources with sustainable development at the forefront. It is also worth mentioning such concepts as e.g. cleaner production, eco-design, return logistics or closed loop supply chains. It is thanks to these solutions and legal regulations that entrepreneurs have received know-how in dealing with environmental challenges. However, as the statistical data show, the quality of the environment is not improving. For example, world plastic production increased 20 times from the 1960s, and only in 2015 reached the volume of 322 million tons per year [European Commission 2018]. It is estimated that by 2050 in the oceans will be more plastic garbage than fish [MNiSW 2018] and the South Pacific Garbage Patch covers an area of Germany and France combined [Plastic Soup Foundation 2017]. There are also problems with the availability of raw materials or deteriorating quality of environment because of pollution. The world society lives on ecological debt [WWF 2017].

Entrepreneurs produce goods that consumers buy and then throw away, thus increasing the already large amount of waste. Economy in the linear model does not work anymore. Hence the proposal of a Circular Economy (CE) concept that changes the way of thinking about the production cycle and the approach to consumption. Its value is to go beyond the exploitation of further resources and to pay attention to maintaining the value and usability of products for as long as possible. In other words, the idea is to make manufactured products as durable as possible and when they cease to fulfill their functions, they can be recycled, so that you use the same resources without the need for further interference in the environment. Resources, including energy, are saved by using renewable energy sources while reducing waste production.

The Circular Economy concept has also been noticed in the European Union. Already in 2015, the European Commission presented the entire circular economy regulations package. Additionally, in January 2018, supplementary documents were presented for the earlier package specifying, among others, goals for recycling and handling of plastic waste. EU is going to “move towards a genuinely consumption based, sustainable materials management or a “circular economy”, where waste becomes a resource, a more efficient use of minerals and metals will result [European Commission 2011, p. 13]. In Poland, in response to the guidelines of the European institutions, the Transformation Road Map project for a circular economy was prepared. CE requires changes in production and consumption patterns. The paper has theoretical character and gives general overview on the analyzed concept. The

literature review was based mainly on the research of EBSCO database. The article discusses the problem of business models that are integral part of the CE assumptions.

2. The concept of Circular Economy

Business needs Circular Economy to achieve the sustainability goals. Circular economy is next to such concepts as: dematerialization, zero-waste, eco efficiency, eco-design or industrial ecology one of sustainability approaches aiming at sustainable production and consumption through closing the production and energy cycles [Iacovidou et al. 2017]. It evolved as an idea from different historical, ecological and economic fields [Murray et al. 2015]. The concept is spreading around the world including especially these countries where the waste management and shortage of natural resources and energy is getting an important challenge [Yuan et al. 2006]. The New Sustainable Development Goals (Agenda 2030) underlines the role of sustainable production and consumption in achieving the expected level of growth and development [ONZ 2015] what is direct connection with the analyzed concept.

The definition of circular economy, proposed by the most recognized foundation which works on developing the concept: “refers to an industrial economy that is restorative by intention. It aims to enable effective flows of materials, energy, labor and information so that natural and social capital can be rebuilt. It seeks to reduce energy use per unit of output and accelerate the shift to renewable energy by design, treating everything in the economy as a valuable resource. The idea goes beyond the requirements of the production and consumption of goods and services. The concept of the circular economy is grounded in the study of real-world, non-linear, feedback-rich systems, particularly living systems” [Ellen MacArthur Foundation 2013, p. 27] Other definition puts emphasis on zero-waste approach as: “a concept used to describe a zero-waste industrial economy that profits from two types of material inputs: (1) biological materials are those that can be reintroduced back into the biosphere in a restorative manner without harm or waste (i.e., they breakdown naturally); and (2) technical materials, which can be continuously re-used without harm or waste” [Scott 2015 p. 6]. One of the latest definitional construct based on the analysis of 114 different definitions presents CE as “an economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. [...] with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers” [Kirchherr et al. 2017].

It is a shift from “produce-use-waste” to “produce-use/repair/dematerialize/recover/share-recycle”. It assumes the closing loops of production process. To make the transition to a CE model it is required to achieve “a systemic multi-level change, including technological innovation, new business models, and stakeholder

collaboration” [Witjes, Lozano 2016, p. 42]. The role of the entrepreneurs and their responsibility for transforming the existing production patterns as well as consumers who will adapt and sometimes initiate changes should be emphasized.

The change in the importance of the essence of a product as a raw material collection, which on the one hand should serve customers for as long as possible, and on the other hand be suitable for recycling, results in specific effects in current business models. It seems that the linear economic model has given entrepreneurs more space to decide on the responsibility for offered products. In a circular model, the entrepreneur is expected to be involved in the final product already at the design stage, up to the final phase. It requires to make different decisions regarding the whole life cycle aimed at new values creation. Transformation concerns the production cycle and the circulation of matter and energy.

In practice it could be achieved by:

- “reducing the quantity of materials required to deliver a particular service (lightweighting);
- lengthening products’ useful life (durability);
- reducing the use of energy and materials in production and use phases (efficiency);
- reducing the use of materials that are hazardous or difficult to recycle in products and production processes (substitution);
- creating markets for secondary raw materials (recyclates) materials (based on standards, public procurement, etc.);
- designing products that are easier to maintain, repair, upgrade, remanufacture or recycle (ecodesign);
- developing the necessary services for consumers in this regard (maintenance/repair services, etc.);
- incentivising and supporting waste reduction and high-quality separation by consumers;
- incentivising separation, collection systems that minimise the costs of recycling and reuse;
- facilitating the clustering of activities to prevent by-products from becoming wastes (industrial symbiosis);
- encouraging wider and better consumer choice through renting, lending or sharing services as an alternative to owning products, while safeguarding consumer interests (in terms of costs, protection, information, contract terms, insurance aspects etc.)” [European Commission 2014, p. 4].

The issue of business models in CE concept appears as an crucial element of new business value proposition. Value creation goes beyond the economic aspect [Schenkel et al. 2015]. As T. Wautelet [2016, p. 7] states, based on Schenkel et al. [2015], there are four types of business values:

- sourcing value,
- environmental value,
- customer value,
- informational values.

This means that business needs to look at managerial processes and pay particular attention to the phases that can be crucial for added value of the product. CE generates changes at the level of a single organization as well as entire supply chains.

3. Business models in Circular Economy

The CE concept aims to generate new value for various stakeholders. This means that entire business models are transformed towards closing the supply chain loop and delivering high quality and durable products. There are different definitions of business models but all are aiming at answering the question how business is done, who are customers, how company is going to generate value and profits [Beattie, Smith 2013; Casadesus-Masanell, Ricart 2010; Boons, Lüdeke-Freund 2013; Zott et al. 2011]. Worth mentioning, for example, is one of the most well-known structure of business model which helps to collect the information about company and its strategy proposed by A. Osterwalder. Business model in this approach is: “A conceptual tool containing a set of goals, concepts and their connections in order to express the business logic of a particular company” [Osterwalder et al. 2005]. Moreover, business model “articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value” [Tece 2010, p. 173]. By transferring the definition of a business model to circular business model, we get a new definition which include the dimension of circularity in business perspective. For M. Lewandowski, this is “a tool to accelerate the transition from linearity to circularity on a micro-level” [Lewandowski 2016]. Circular business models can be treated as: “the rationale of how an organization creates, delivers and captures value with and within closed material loops” [Mentink 2014, p. 35]. This definition is very similar to the general understanding of business model. Other authors propose to understand the circular business model as “a business model in which the conceptual logic for value creation is based on utilizing the economic value retained in products after use in the production of new offerings” [Linder, Williander 2015, p. 2].

As a result of literature review different propositions of circular business model were identified. Table 1 presents exemplary approaches to the interpretation of circular business models.

The CE concept has been translated into the business practice for several years. There are already many business examples showing a mature approach to environmental issues in business. It is possible mainly due to the concept of sustainable development, which in the field of environmental protection is very similar to the circular economy. Both approaches focus on reducing resource consumption and generating value for the environment and society. There are also some companies in Poland that skillfully use basics of the concept in their business models. There are different types of crowdsharing businesses including: space, cars, food or clothes

Table 1. Exemplary circular business models

Business model	Short description
ReSOLVE framework	<p>Regenerate (shift to renewable energy and materials, reclaim, retain, and restore health of ecosystems, return recovered biological resources to the biosphere)</p> <p>Share, (share assets, reuse/secondhand, prolong life through maintenance, design for durability, upgradability, etc.)</p> <p>Optimize (increase performance/efficiency of product, remove waste in production and supply chain, leverage big data, automation, remote sensing and steering)</p> <p>Loop (remanufacture, products or components, recycle materials, extract biochemical from organic waste)</p> <p>Virtualize (dematerialize directly and indirectly)</p> <p>Exchange (replace old with advanced non-renewable materials, apply new technologies (e.g. 3D printing), choose new product/service (e.g. multimodal transport)</p>
Circular Supplies	Provide renewable energy, bio based- or fully recyclable input material to replace single-lifecycle inputs
Resource Recovery	Recover useful resources/energy out of disposed products or by-products
Product Life Extension	Extend working lifecycle of products and components by repairing, upgrading and reselling
Sharing Platforms	Enable increased utilization rate of products by making possible shared use/access/ownership
Product as a Service	Offer product access and retain ownership to internalize benefits of circular resource productivity

Source: [Accenture 2014, p. 12; Ellen MacArthur Foundation 2015, p.5.]

(clothes library). The idea of sharing instead of possessing is getting more and more attention on B2B market as well. Companies aiming at waste reduction and seek for innovative ways of production (like e.g. fashion industry which develops technologies for materials recycling and improving new materials which are more environmental friendly like pinatex, recycled plastic in shoes production or the production based on upcycling). Companies are willing to digitalize some products like e-books or e-music or even business processes. Both companies and consumers begin to use renewable energy sources and use biodegradable materials where possible, such as in packaging.

Development of circular business models is required to achieve the maximum values. In the report of Accenture there are four areas where new business models can create values: These are [Accenture 2014, p. 6]:

- lasting resources – usage of resources that can be regenerated and avoiding of resources that are not renewable;

- liquid markets – elimination of idle time of products in the system markets to increase this number users who use the same the amount of goods;
- linked value chains – maximization of resources values by putting them to new production cycles;
- longer life cycles – keeping products in economic use for longer to satisfy a greater demand and provide more utility without needing additional natural resources.

Circular business models are very diverse. It seems, however, that the optimal solution is their combination allowing to save resources through diversified business activities such as e.g.: mentioned virtualization, regeneration, etc., and responsible consumption by users enabling further use of resources.

Business need to re-analyze current business model, map out points where the greatest loss of value occurs and initiate the transformation. There are already examples showing that thinking about business in a circular way is possible, brings business effects and generates value to stakeholders.

4. Conclusions

The focal point of the CE concept is to solve environmental problems that prevent from achieving sustainable development. For this reason, it can be treated more as a set of practical rules of conduct that help in the development of new business models. This concept departs from the traditional approach to the production and consumption process, which requires the company to take a new look at business processes and goals. The generated value should also take into account the non-economic dimensions. In the current economy model, the quantity of goods sold is the most crucial, which lead to excessive consumption and irresponsible production patterns. This way of understanding business begins to run out. Enterprises are beginning to see the limits of production and environmental capabilities. Circular business models are potential answer on how business retaining the existing competitive advantage can adapt to the upcoming changes. This does not mean, however, that the change will take place quickly. Taking into account the activities of the corporation for sustainability so far and a list of deepening environmental problems, it is difficult to imagine an easy adaptation to new expectations. What is more, some business models need to be transformed also at the supply chain level and this involves additional challenges along the entire value chain (such as changing raw materials and their suppliers, implementing new the distribution process, new communication strategy with consumer etc.). Circular business models directly affect consumers who will not always respond favorably to the solutions they are offered. While the digitization or sharing can be favorably received, the offer associated with the delivery of products with extended durability, suitable for recycling or from alternative materials may arouse resistance. This is partly due to the lack of awareness and the need to change habits. But also costs, which in some

products or services may turn out to be higher than in the linear model may provoke negative behavior. Propositions of new business models at the theoretical level are very interesting but there is still not much research, in particular in Poland, which shows how the companies translate them into concrete actions.

We know possible business models and methods for transformation, but there is still a lack of knowledge about the minimum conditions needed to initiate and sustain new models of production and consumption. This scientific question will be the subject of further analysis and research.

References

- Accenture, 2014, *Circular Advantage: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth*, https://www.accenture.com/t20150523T053139_w_us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_6/Accenture-Circular-Advantage-Innovative-Business-Models-Technologies-Value-Growth.pdf (29.03.2018).
- Beattie V., Smith S.J., 2013, *Value creation and business models: Refocusing the intellectual capital debate*, *British Accounting Review*, vol. 45, no. 4, pp. 243–254.
- Boons F., Lüdeke-Freund F., 2013, *Business models for sustainable innovation: State-of-the-art and steps towards a research agenda*, *Journal of Cleaner Production*, vol. 45, pp. 9–19.
- Casadesus-Masanell R., Ricart J.E., 2010, *From strategy to business models and onto tactics*, *Long Range Planning*, vol. 43, no. 2, pp. 195–215.
- Ellen MacArthur Foundation, 2013, *Towards the Circular Economy, Vol. 2: Opportunities for the Consumer Goods Sector*, <https://www.ellenmacarthurfoundation.org/publications/towards-the-circular-economy-vol-2-opportunities-for-the-consumer-goods-sector>.
- Ellen MacArthur Foundation, 2015, *Delivering the Circular Economy: A Toolkit for Policymakers, Selection of Key Exhibits*, https://www.ellenmacarthurfoundation.org/assets/downloads/government/EMF_TFPM_KeyExhibits_11-9-15.pdf (29.03.2018).
- European Commission 2011, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions. Roadmap to a Resource Efficient Europe, COM/2011/0571 final.
- European Commission, 2014, Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: Towards a circular economy: A zero waste programme for Europe, COM/2014/0398 final.
- European Commission, 2018, *A European Strategy for Plastics in a Circular Economy*, <http://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf> (20.03.2018).
- Iacovidou E., Millward-Hopkins J., Busch J., Purnell P., Velis C.A., Hahladakis J.N., Zwirner O., Brown A., 2017, *A pathway to circular economy: Developing a conceptual framework for complex value assessment of resources recovered from waste*, *Journal of Cleaner Production*, vol. 168, pp. 1279–1288.
- Kirchherr J., Reike D., Hekkert M., 2017, *Conceptualizing the circular economy: An analysis of 114 definitions*, *Resources, Conservation and Recycling*, vol. 127, pp. 221–232.
- Lewandowski M., 2016, *Designing the business models for circular economy – towards the conceptual framework*, *Sustainability*, vol. 8, no. 1, pp. 1–28.
- Linder M., Williander M., 2015, *Circular business model innovation: Inherent uncertainties*, *Business Strategy and Environment*, vol. 26, pp. 182–196.

- Mentink B., 2014, *Circular Business Model Innovation: A Process Framework and a Tool for Business Model Innovation in a Circular Economy*, Master's Thesis, Delft University of Technology & Leiden University, Leiden.
- MNiSW, 2018, *Fundacja MARE: w 2050 r. w morzach będzie więcej plastiku niż ryb*, Nauka w Polsce, <http://naukawpolsce.pap.pl/aktualnosci/news%2C410016%2Cfundacja-mare-w-2050-r-w-morzach-bedzie-wiecej-plastiku-niz-ryb.html> (20.03.2018).
- Murray A., Skene K., Haynes K., 2015, *The circular economy: An interdisciplinary exploration of the concept and application in a global context*, Journal of Business Ethics, vol. 140, no. 3, pp. 369–380.
- ONZ, 2015, Rezolucja przyjęta przez Zgromadzenie Ogólne w dniu 25 września 2015 r.; A/70/L.1, Przekształcamy nasz świat: Agenda na rzecz zrównoważonego rozwoju 2030; http://www.unic.un.org/pl/files/164/Agenda%202030_pl_2016_ostateczna.pdf (30.03.2018).
- Osterwalder A., Pigneur Y., Tucci C.L., 2005, *Clarifying business models: Origins, present, and future of the concept*, Communications of the Association for Information Systems, vol. 15, [https://www.kth.se/social/files/546b8d75f276546614d2dffc/Osterwalder+\(2005\).pdf](https://www.kth.se/social/files/546b8d75f276546614d2dffc/Osterwalder+(2005).pdf).
- Plastic Soup Foundation, 2017, <https://www.plasticsoupfoundation.org/en/2017/07/garbage-patch-larger-than-france-and-germany-discovered-the-south-pacific-ocean/> (20.03.2018).
- Schenkel M., Caniëls M.C., Krikke H., van der Laan E., 2015, *Understanding value creation in closed loop supply chains – Past findings and future directions*, Journal of Manufacturing Systems, vol. 37, pp. 729–745.
- Scott J.T., 2015, *The Sustainable Business: A Practitioner's Guide to Achieving Long-Term Profitability and Competitiveness*, Greenleaf Publishing, Sheffield.
- Teece D.J., 2010, *Business models, business strategy and innovation*, Long Range Planning, vol. 43, no. 2-3, pp. 172–194.
- Wautelet T., 2016, *Circular Economy as part of the corporate strategy: Competitive advantage or contemporary trend?* Working Paper.
- Witjes S., Lozano R., 2016, *Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models*, Resources, Conservation and Recycling, vol. 112, pp. 37–44.
- WWF, 2017, *Od dziś ludzkość żyje na ekologiczny kredyt. Jedna Ziemia nam nie wystarczy*, <https://www.wwf.pl/aktualnosci/od-dzis-ludzkość-żyje-na-ekologiczny-kredyt-jedna-ziemia-nam-nie-wystarczy> (25.03.2018).
- Yuan Z., Bi J., Moriguichi Y., 2006, *The circular economy: A new development strategy in China*, Journal of Industrial Ecology, vol. 10, pp. 4–8.
- Zott C., Amit R., Massa L., 2011, *The business model: Recent developments and future research*, Journal of Management, vol. 37, no. 4, pp. 1019–1042.