Petar Borisov
Georgi Petkov

Petar Borisov

Prof., DcS

Department of Management and Marketing, Faculty of Economics, Agricultural university of Plovdiv, Bulgaria

Corresponding author:

e-mail:
peterborisov@gmail.com

ORCID:
https://orcid.org/0000-0003-4236-9482

Georgi Petkov

PhD student at Department of Management and Marketing, Faculty of Economics, Agricultural university of Plovdiv, Bulgaria

e-mail:
georgipetkov@tutanota.com

ORCID:
https://orcid.org/0009-0002-3936-7363

Published First Online:
24.06.2024

Pages: 4 – 21

DOI:
https://doi.org/10.37075/JOMSA.2024.1.01

THE ROLE OF CIRCULAR ECONOMY IN THE MANAGEMENT OF ENTERPRISES PROFITABILITY - THEORETICAL FORMULATIONS AND LIMITATIONS

ABSTRACT

The purpose of current research is to analyse the main definitions regarding the essence of the concept of "circular economy" and summarize a general approach for defining scientific principles for evaluating the potential of the circular economy in the agricultural sector of Bulgaria. Compiling an objective and credible methodology for the analysis and evaluation of the contribution of the circular economy approach in the management of the profitability of enterprises in the sector is a complex process that must begin with the definition of the boundaries of scientific research, as well as the determination of the main limitations, as well as in terms of the information characterizing the object and the subject of research, as well as in terms of the influence of other "random" events (phenomenon) on the level of profitability achieved in the investigated enterprises.

KEYWORDS: circle economy, profitability, bio economy, management of enterprise

INTRODUCTION

In recent years, the principles of the circular economy in enterprise management have been increasingly proclaimed. Both at the level of entrepreneurial activity and at the political level, man's desire to mitigate the pressure on nature resulting from the intensive development of a number of industrial sectors is palpably felt. Agriculture is one such sector that directly affects nature and generates a number of negative effects. On the other hand, agriculture is a sector that makes it possible to quickly and effectively impose the principles of the circular economy due to the presence of a number of factors favourable to this process. These factors are: (1) agriculture generates a huge amount of biomass that can be used as an input again in the next production cycle; (2) farmers in our country are already experienced and highly adaptable to

environmentally friendly subsidizing policies; (3) has already accumulated experience in the field of circular economy in the past of the country's economic development.

The purpose of current research is to analyse the main definitions regarding the essence of the concept of "circular economy" and summarize a general approach for defining scientific principles for evaluating the potential of the circular economy in the agricultural sector of Bulgaria. A number of scientific studies prove that the implementation of the principles of circularity in the management of the production process has a direct positive impact on the profitability of the enterprise from various sectors of the economy (Moore, 1951; Lazarevic & Valve, 2017; Kumar & Brown, 2020; Moreau et al. 2017; Müller-Christ, 2011; Blomsma & Brennan, 2017; Blum et al, 2020). Based on these conclusions and summaries of previous research, our aim is to create and present a scientifically based methodology for the analysis and assessment of the contribution of the circular economy in the overall management of the profitability of the agricultural enterprise.

Circular economy - essence and main theoretical propositions

In Bulgaria, the circular economy approach is not a new tool for the economic development of the sectoral economy. In the last years of the last century, the approach was intensively used to deal with resource shortages in a number of industries. In enforcing this approach, through a number of government initiatives and policies, the population was encouraged to collect and hand over to designated points waste products with the official name of "secondary raw materials". In this process, separate social strata were involved, which were required to show their contribution to the social and economic development of certain industries and regions.

Of course, this approach today has a more modern sound, namely the circular economy. The approach to motivation is slightly different, but the goal remains the same, namely to motivate the population and think about the principles of the circular economy in their daily activities. Under a different approach, it is understood that the state, through its instruments, strives through financial and other incentives to form a new attitude to the reuse of waste in production use.

It should not be denied that a big role in imposing the "circular economy" approach "can be played by the entrepreneurial factor" (Blum et al, 2020). But this factor initiated changes in its business models mainly in the search for higher profitability and return. The state should be the one to determine the rules of the game, namely to create appropriate institutional conditions for the enforcement and development of the circular economy.

This is the place to get to know and study in depth what the circular economy is and what benefits it can provide in the management of profitability in the agricultural sector.

Since the more joint industrialization of Europe, there has been a sharp increase in labour productivity in industrial enterprises. In the 60s of the last century, the so-called "green revolution" took place in European agriculture, namely a sharp increase in the volumes of agricultural production, thanks to the principles of automation, the imposition of "unmanned" production technologies and the systematic use of intensive production factors, a product of the research and development activities of scientific institutes and universities in the field of

agriculture. This leads to the so-called "mountains" of agricultural production. The main inducing factor for this process was, of course, subsidies in agricultural production. Their power is so significant that farmers become permanently addicted to these financial "bonuses". They get them based on the amount of output produced and their drive to produce ever greater volumes of agricultural output is economically understandable and leads to overproduction and hence to a crash in prices and massive negative effects as a result of the shortsightedness of politicians. In addition to mass bankruptcies, protests and the high tax burden of Europeans, the green revolution leads to the following negative effects: (1) natural capital is quickly wasted, which damages the future production of agrarian products; (2) a large amount of waste accumulates, which is not used and is simply thrown into nature; (3) people are taught to waste and not think rationally about their consumption.

The Green Revolution is realized by mainly using the linear approach of economic development, namely - the use of the maximum amount of input resources to achieve the maximum amount of production, as the generated biomass and unsold agricultural products are thrown away without thinking about how to use them again. included in the next production cycle.

These are the main reasons why today there is more and more talk about the circular economy, which can be an effective tool for dealing with the mentioned problems in the agricultural and related sectors.

The circular economy approach to achieving economic growth is one of the most frequently discussed approaches today. There are many definitions of the nature of the circular economy and its role in the economic development of countries. Below we will look at the most common and popular in practice definitions of circular economy.

According to the European Commission, “the circular economy is a model aimed at extending the life cycle of products. In practice, this means sharing, borrowing, reusing, repairing and recycling existing materials and products as long as possible. When a product reaches the end of its life, the materials from which it is composed can continue to be used in another way. This can be done over and over again, thus minimizing waste disposal."

"The circular economy is a model for economic development that is based on the principles of renewing, reusing and recycling resources, with the aim of reducing waste and the burden on the environment." (The circular economy: what it is and why it matters)

"The circular economy is an economic system in which resources are used efficiently and the reverse flow of materials and products is encouraged in the production process, rather than being discarded as waste after their use." (Fitch-Roy, 2019)

"The circular economy is defined as a model of economic management that emphasizes opportunities to reuse materials and resources, thus minimizing waste and the burden on the environment." (Geissdoerfer et al, 2018)

"The circular economy is characterized by a variable approach to production and consumption that focuses on creating a closed loop where waste is turned into resources and recycled or reincorporated into the economic system." (Haas, 2015)

"The circular economy is an economic system in which production processes are organized so that waste from one process is used as input for other processes or products, creating a closed loop of materials and resources." (Khan, 2021)

"The circular economy characterized by minimizing the use of non-renewable resources and energy, emphasizing the transition to renewable sources and energy-efficient technologies." (Mah, 2021)

The circular economy seeks to create “a balance between economic growth, social well-being and environmental protection, achieving this goal through the sustainable management of resources and materials." (Linder, M., & Williander, 2017)

From all these definitions, it can be summarized that the circular economy is an attempt by man to move to a new economic order in which there is no waste. The idea is gaining a lot of popularity due to the fact that resources are becoming increasingly scarce on the one hand, and humanity's needs are increasingly due to an increase in the number of the human population and the level of disposable income. Under these conditions, managers, entrepreneurs and politicians are looking for an alternative to deal with the problem called "scarce resources". It is becoming clear that the linear approach of economic development is exhausting its potential and the future belongs to another alternative.

According to the European Commission, it is high time that the concept of the circular economy is "a counterbalance to the traditional linear model where raw materials are used, things are created from them, they are consumed and the leftovers are thrown away. This model relies on large quantities of cheap and accessible materials and energy sources" (Linder, M., & Williander, 2017).

Until now, the evolution in economic theory and practice has been based on the linear approach, namely resource→product→waste. In this approach, the motives for achieving higher profitability from production are the leading principle, rather than environmental protection. Admittedly, in both the planned economy and the market economy, the linear approach is dominant, as it allows for easier management of the profitability of the activity. "The circular economy enables, to refer to, the ability of an economic system to grow successfully while the use of resources decreases." (Pehlivanov, 2022) This statement is relevant for economic systems that develop in conditions of scarce resources, but due to globalization, such systems almost do not exist.

History proves that the planned economy has greater success in applying the circular economy than the market one. The main contribution to this success is the use of optimization models in the design and rationalization of economic sectors in a country whose political leadership is the originator of a planned economy. A prominent representative of the optimization economic model is Leontiev (Mirokovich, 2000). Leontiev's main idea is that resource flows between individual economic branches can and should be designed in such a way as to minimize the waste of resources. These resource flows are called in his theory "inter-industry linkages". By optimizing cross-industry linkages, maximum effect can be achieved from the use of minimum input resources. Leontiev's theory goes even further, as the author implies that a part of the resources can be modified so that they have a dual character, namely the goods resulting from one production can be used as an input resource for another production. In essence, the theory

represents an attempt to present and popularize the idea of economic development in which waste and waste are minimized. The main shortcoming of Leontiev's theory is that it ignores, even excludes the role of the market as a mechanism that should be included in the model.

Another theory that implies some of the principles of the circular economy is the concept of "industrial ecology". In this theory, the idea is to create a closed-loop production process in which waste serves as an input resource, thereby eliminating the creation of an unwanted by-product, which is waste (Frosh, 1989).

"In industrial ecology, production processes are designed according to local environmental constraints, while also considering their global impact from the very beginning of the production processes. The goal is to design production processes to be as close as possible to natural systems and to restore natural capital." (What is a circular economy? A framework for an economy that is restorative and regenerative by design.).

Table1. Basic theories sharing the principles of the circular economy

Theory	Main idea	Source
Leontiev's model of inter-industry connections	Resource flows between individual economic sectors can and should be designed to minimize resource wastage	Mirkovic (2000)
Industrial ecology	a closed-loop production process in which waste serves as an input resource, thereby eliminating the creation of an unwanted by-product, which is waste	Kruglov (2019)
Biomimicry	Dealing with the problem of waste from human economic activity can be done by looking for ready-made solutions in nature.	Luke (2014)
From cradle to cradle	The use and accelerated implementation of waste-free technologies to ensure the generation of "0" amounts of waste.	Braungart (2002); Toxopeus (2015)
The concept of eco-efficiency	The use of production approaches and technologies that spare natural resources or limit their excessive exploitation; Changing production methods and looking for ways to create more end products from a unit of resource, which will make it possible to produce more output and satisfy the needs of more consumers.	York, R., EA Rosa, and T. Dietz. (2004)
Sustainable Development	Changes in the regulatory sector policy, which changes are based on an integrative approach in the future development of agriculture. This integrative approach is based on the idea that agriculture must be developed in such a way that this process does not harm the production needs of future generations.	Ivanov B., T. Radev, D. Vachevska, P. Borisov. (2009)
Closed loop	Using resources in a circular process where the waste of one	Moore (1951)

Theory	Main idea	Source
	product is converted into raw materials for another. Instead of being discarded or treated as waste, the materials are recycled or reintegrated into a repeated production cycle. The theory borrows the idea from another theory explaining the theoretical existence of a self-sufficient "autarchy" economic system.	
Extracting value	The process of maximizing the value of input resources must be carried out while avoiding losses and waste. The idea is to use resources in a way that generates the most value for society.	Izzo (2014)
Re-engineering	This process includes recycling or other forms of reuse of products and materials. The theory is based on the principle of recycling and reorganizing the production processes so as to achieve maximum efficiency from the use of the production resource within the applied technology.	Varun Grover, Seung Ryul Jeong, William J. Kettinger & James TC Teng (1995)
Theory of the sharing economy	Using resources more efficiently by sharing assets, such as cars, homes or tools, between users, which reduces the need for new production and therefore resources.	Altinay, L.andTaheri, B.(2019),
The product-as-service theory	The theory focuses on moving from a model where only a product is sold to a model where a service is offered instead.	Li, AQ,Rich, N.,Found, P.,Kumar, M.andBrown, S.(2020)

Source: Own

Another theory that also shares the principles of the circular economy is "biomimicry". The founder of this theory is Janine Benyus. In his book "Biomimicry: Innovation Inspired by Nature" (Benyus, 2003), first published in 1997, the author considers nature as the main source of ideas for solving human problems. According to this theory, dealing with the problem of waste from human economic activity can be done by looking for ready-made solutions in nature. Nature, thanks to its evolution, has built efficient methods for recycling and reuse of resources and elements in ecosystems. All these mechanisms can be used as a benchmark for building economic and business models that have a minimal footprint and impact on the environment. Of course, putting this theory into practice requires man to work not as an individual, but as a society developing in obedience to the idea that natural systems are the most valuable source of value and their preservation should be a primordial value in human behaviour. Of course, the human mentality is still very far from professing this doctrine, which in the short-term dooms to failure the imposition of the idea of more jointly introducing the principles of biomimicry in all economic sectors and human activities. However, there are societies like the Japanese that take advantage of the gifts of biomimicry successfully and prove that the idea really works in practice.

Another theory that shares the circular economy idea is called the cradle-to-cradle approach (Braungard & McDonagh, 2009). This theory was created by Brundgaard and McDonough and is basically based on the idea that "all materials involved in industrial and commercial processes can have a positive impact and reduce negative impacts on the environment". The idea behind the presented theory is too radical, namely in the use and accelerated implementation of waste-free technologies to guarantee the generation of "0" amounts of waste. This theory builds on biomimicry as a source of ideas for the design of waste-free technologies. Manufacturing processes must be designed to mimic the mechanism of "biological metabolism" in nature. In organisms, the bio-chemical processes are organized in such a way that with a minimum energy resource, a maximum metabolic effect is achieved, by releasing minimum amounts of waste substances, the organic nature of which allows their immediate recycling by other organisms along the food chain.

The main points of support on which the "from cradle to cradle" theory is built are the following:

- "Waste is a type of food - in fact, in natural systems there is no waste. Engineered products and materials have a long life cycle, are safe for human health and the environment, and can be used repeatedly through biological and technical metabolism. Establish management systems for the collection and recovery of the value of materials after their use, which will lead to the elimination of waste' (What is a circular economy? A framework for an economy that is restorative and regenerative by design);
- Use of energy from renewable sources - in nature, the main source of energy is the sun. Conventional sources of energy, coal, oil and natural gas, on the one hand, seriously pollute the environment, and on the other hand, negatively affect the efficiency of the economic cycle, as they increase the costs of the production of final products" (What is a circular economy? A framework for an economy that is restorative and regenerative by design);
- "Diversity is strength - the modern world is characterized by great dynamics and changes, which naturally leads to changes in people's needs. More and more often, products are abandoned in favour of new ones, which turns them into waste. Environmental pollution can be limited by recycling waste, or by reducing its quantity by creating products suitable for long-term use, repair or upgrading, rather than discarding them because they are functionally obsolete, damaged or not conform to fashion trends. It is essential not only to have the right design, but also to change the attitudes of the users. The implementation of appropriate local policies aimed at promoting the positive effects of reducing waste generation on ecosystems, as well as in the direction of increasing social responsibility, by stimulating reuse." (Balinov, 2018)

Another theory that complements the circular economy theory is the "eco-efficiency concept" (Schaltegger & Sturm, 2000). This theory appeared at the end of the last century as an answer to the question "How long can the economic development of the world last?" Both in the planned economy and in the market economy, no answer is sought to the question of what humanity will do when natural resources are exhausted. The presented theory provides guidelines for dealing with the mentioned case study, using production approaches and

technologies that spare natural resources or limit their overexploitation. "The problem can be solved by changing production methods and finding ways to create more end products from a unit of resource, which will enable more output to be produced and meet the needs of more consumers." (Zhelyazkova, 2019)

The genesis of the current reading of the essence of circular economy theory is laid mostly in the "sustainable development theory" of agriculture in Europe. This theory is presented as an idea in the document Brutland Commission Report (Brutland, 2015). Due to the negative consequences of the "Green Revolution", the commission proposes changes in the regulatory sector policy, which changes are based on an integrative approach in the future development of agriculture. This integrative approach is based on the idea that agriculture must be developed in such a way that this process does not harm the production needs of future generations. The radical idea of the theory is to care for unknown people who will be born in the future. This theory was first presented as a framework of principles in the Brutland Commission Report. The Commission declares that the future development of agriculture needs to be built on three components, namely: (1) economic expediency; (2) the environmentally friendly; (3) social responsibility. The combination of these ideals in a unified approach to the economic development of agriculture aims at sustainable and progressive development of the sector, taking into account future production needs. From a political point of view, things sound plausible and humane, but from the point of view of economic theory, the combination of ecological compliance with economic efficiency in the current social development is a utopia. Why is it a utopia? An answer to this question has long been given by the science of "cybernetics, namely in cybernetics, the sustainability and sustainable development of a system depends both on the state of its building blocks, its input/outputs, and the surrounding environment. A major role for the sustainable development of a system is the environment. This environment is characterized by the following features - complexity, uncertainty and mobility. This requires the system to possess the properties: resilience, flexibility and adaptability. The environment creates conditions of uncertainty threatening the steady state of the system. It seeks to destroy the orderliness and hierarchical subordination of the elements that make up the system. According to Pamukchiev M., 1978 “a system in which the output position remains unchanged or changes within strictly regulated limits regardless of the interaction received at the input is considered stable." Closely related to the stability of a given system is the concept of homeostasis. According to Pamukchiev M., 1978 and Dimitrov D, 1991 it reveals "the system's ability to adapt to changes in the environment." Homeostasis is the ability of the system to free itself from the influence of the environment, to maintain its equilibrium state regardless of the impact of its input. An equilibrium state of a system exists when it maintains its state unchanged, and the substances and energy entering it change. Therefore, the achievement of a sustainable state of the agricultural enterprise is carried out by preserving its homeostasis over time. In practice, the natural system "environment" preserves its homeostasis by maintaining biological diversity, which guarantees a multifunctionality of the system. On the other hand, the man-made "economic system - agriculture" develops and preserves its homeostasis by maintaining uniformity. The principle of diversity contradicts the principle of uniformity in the system construction, which determines the collapse of the idea of sustainable development of agriculture. In other words, sustainable development is just wishful thinking that will not work in the long run. This statement is proven by a number of studies that prove that, despite the

established environmental standards in the last 20 years, the use of chemicals and fertilizers in agriculture has significantly increased, thanks to subsidies.

Another theory that can be defined as one of the main principles of the circular economy is the "closed loop theory". This theory focuses on the idea of using resources in a circular process where the waste of one product is converted into raw materials for another (Moore, 1951). Instead of being discarded or treated as waste, the materials are recycled or reintegrated into a repeated production cycle. The theory borrows the idea from another theory explaining the theoretical existence of a self-sufficient "autarchy" economic system. “It is a state in which a society or country is able to obtain all necessary resources and goods internally, without significant dependence on imports or foreign aid. A basic approach to the realization of this economic system is the utilization of every single resource without losses and achieving maximum efficiency from the invested resource" (Johnson, 1935). In summary, we should note that the theory of the closed cycle, as well as the theory of the autarchic system, aim at maximum resource efficiency in order to overcome the scarcity of available resources in the system. Accordingly, the circular economy as an approach may be required under conditions of scarce resources in an economic system.

Another theory that shares the principles of the circular economy is the theory of the "value extraction" principle. In this theory, the hypothesis is proclaimed that "the process of maximizing the value of the input resources should be carried out while avoiding losses and waste." (Izzo, 2014) The idea is to use resources in a way that generates the most value for society.

Sharing other principles from the circular economy approach is seen in reengineering theory. Re-engineering theory is an approach that focuses on “managing the reverse flow of goods from the end user to the manufacturer. This process includes recycling or other forms of reuse of products and materials. The theory is based on the principle of recycling and reorganizing production processes in such a way as to achieve maximum efficiency from the use of the production resource within the framework of the applied technology" (Grover, 1995).

The circular economy cannot happen without the widespread promotion of the principle of sharing both resources and consumption of products on the demand side. These principles stand out most clearly in the theory of the sharing economy. Sharing economy theory focuses on "using resources more efficiently by sharing assets, such as cars, homes or tools, between users, which reduces the need for new production and, accordingly, resources" (Altinay & Taheri, 2019). The main idea of the theory is that solidarity is one of the possible ways to overcome the scarcity of resources in different economic sectors. Of course, sharing should be considered as an even deeper philosophy, which should be proclaimed among the population at an early age and, through various marketing approaches, implanted in the consumer's consciousness as one of the leading methods for satisfying needs.

Another theory sharing the idea of the circular economy is the Product-as-a-Service theory. This theory focuses on "moving from a model where only a product is sold to a model where a service is offered instead" (Li et al, 2020). Instead of owning a good, consumers pay for the use or access to it, which can include maintenance, repair and renovation.

The presented theories are only a small part of the group of theories that are used to explain and apply the concept of the circular economy. In fact, in modern practice, different approaches and strategies are combined to achieve maximum efficiency and sustainability in economic systems.

The review of theories relevant to the circular economy is an attempt to familiarize ourselves with the basic principles on which the theory of the circular economy is built.

In conclusion, it can be summarized that the circular economy is a concept that seeks to optimize the use of resources by minimizing waste and changing the way goods and services are produced and consumed. It is based on various theories and models that present ways to achieve a more sustainable and efficient economic functioning of enterprises, industries and sectors in an economic system.

From all the considered definitions of the essence of the circular economy, the following basic principles emerge: (1) closing the production cycle; (2) recycling and (3) reuse.

Applying these principles in practice requires a new way of thinking in organizing business processes and the overall presentation of the business model on the market.

The most common principles in individual definitions of the essence of the circular economy are:

- Use of product design suitable for recycling and reuse of resources and components. Products are designed so that at a later stage in the value chain, their components can be more easily disassembled, recycled and reused. "The use of this principle reduces the amount of waste and resources that are consumed during production" (Baxter et al, 2017);
- Use of renewable energy sources in organizing business processes. Such renewable energy sources include solar, wind and hydroelectric power, which have "a smaller carbon footprint and lower harmful emissions than burning fossil fuels." (Bimpizas-Pinis et al, 2021);
- Promotion of the shared economy in the consumption of goods and services (Sharing economy). This principle proclaims "imposing the need on consumers instead of owning products, such as cars, homes or tools, to encourage their sharing through sharing economy platforms" (Flynn & Hacking, 2019);
- "Production of durable and quality products that are remotely suitable" (Johansson & Henriksson, 2020). Producing products that are durable and maintainable reduces the need for frequent replacement and the generation of waste;
- Industrial symbioses. "Different industries are integrating to share resources, energy and even waste, leading to more efficient use of resources and reducing harmful emissions and waste" (Ghisellini, 2016);
- Enforcing circular supply chains. The principles of the circular economy are applied "not only in the organization of production, but also throughout the supply chain, encouraging the inclusion of materials, waste and products in a repeated production cycle" (Friant et al, 2020).

- Waste management and the recycling process. "Improved waste management, including separate collection, recycling and processing to reduce environmental impact" (Acerbi & Taisch, 2020) and to increase the efficiency of the use of resources.

Of course, these principles are not universal and cannot be blindly applied to every single economic system. This is because each such system functions under different specific conditions. But by creating an appropriate environment, the adaptation of the economic system from a linear type to a circular model can take place. The adaptation process should be smooth and by convincing users, circular business models should be encouraged in different economic sectors.

Role of circular economy in profitability management

One of the essential questions, which may appear to be a significant barrier to the imposition of the circular economy approach both in our country and on a global scale, is whether the circular economy can increase the profitability of the investments made? As we have already mentioned, the linear model of organizing business processes has proven to be cost-effective and preferred by most countries. It can even be said that thanks to the linear approach, today the world economic system has become globalized and enables every single entrepreneur to achieve the profit he wants regardless of where he is in the world. The linear method of organizing business chains is appropriate and does not burden the entrepreneur with what the imprint is on the nature of the business model he manages.

Profitability is an economic category that represents a principle, approach and goal for managing the business model. Profitability can be defined as a complex economic category that is influenced by many factors and can hardly be measured with a single indicator. Our aim is not to go into depth about the nature of the category[1], but only to define the main features and characteristics that are important in clarifying the impact of the circular economy on profitability. In this context, we can identify the following important characteristics:

- Profitability is a measure of efficiency. "It is a measure of excellence in business process management" (Borisov et al, 2017);
- Profitability is a measure of profitability. Profitability is presented "as a rate of return" (Borisov et al, 2017), ability of an asset to bring income to its owner;
- Profitability is a measure of return. It measures and reports "the ability of a resource invested in production to recover its value" (Borisov, 2013);
- Profitability is a measure of fairness. Profitability “measures the benefits of using a factor of production in production. It gives an answer to the question to what extent the generated income from the activity should be appropriated by the entrepreneur" (Borisov et al, 2014);

[1]Profitability as an economic category has long been studied, defined and objectively presented in scientific theory. The first documented attempt to clarify the nature of profitability is the researcher David Ricardo, who defends the thesis that not only land, but also other factors of production can generate rent for their owners. Source: Danailov, D. (1996). Financial Management, ed. Luren, pp. 95-96.

- Profitability is a tool for objective analysis of various economic alternatives. Through profitability "an objective analysis of various investment alternatives can be carried out and an objective and justified investment decision can be made" (Borisov & Radev, 2012);

All these characteristics define profitability as an important aspect in the management of the business model. The imposition of the circular economy approach in the development of individual economic sectors is necessary to create conditions for increasing the profitability of the business model, or at least "not to reduce the achieved levels of profitability" (Babbitt et al, 2018).

There are a number of scientific studies and publications (Calisto et al, 2021), which prove that the approach can significantly affect the profitability of the business model that the entrepreneur imposes on the market. Below we present key findings and summaries from these research studies:

- ***Reduction of costs for acquisition of raw materials***. In the automotive industry, "evidence of positive effects from the application of the circular economy" is seen (Casson & Welch, 2021). In this industry, the principles of the circular economy have contributed to "reducing the cost of purchasing new raw materials and materials for production" (Casson & Welch, 2021), which leads to lower production costs and, respectively, to an increase in profitability:
- ***Improved efficiency of production processes.*** Designing products and production processes that enable "resource optimization and recycling leads to more efficient use of energy and resources" (Fellner et al, 2017). This leads to a reduction in operating costs and an increase in business profitability;
- ***Reducing waste also leads to lower costs for its processing***. The implementation of circular economy principles helps to reduce these costs. This "leads to lower operating costs and increased profitability" (Gregson et al, 2015).
- ***Improved competitiveness and better customer service.***A number of business models that have adapted to circular economy principles "generate greater competitiveness by offering more sustainable and environmentally friendly products and services" (Manninen et al, 2018). By moving to the new business model, they have been able to increase their market share and hence their profitability from sales;
- ***Increased life cycle of the products offered***. A number of business models applying the principles of the circular economy have managed to "conquer lasting market positions by offering long-lasting and quality products that can be repaired and reused" (Mcdowall et al, 2017). These business models have been able to generate long-term revenue by increasing the value realization of the products and hence the profitability of the operation.

Agriculture involves living organisms (Borisov & Radev, 2012), which also determines the peculiarities of profitability management in agricultural holdings. The seasonality of production, caused by the participation of plants and animals in the production process, are the main factors that account for the pronounced seasonality in the profitability of production. This

seasonality is so pronounced that it is one of the main motivations for introducing subsidies and financial incentives to overcome this huge deficiency in the management of business models in the agricultural sector. In contrast to other economic branches, in agriculture, a synergistic effect can be realized from the investments made, namely, with the same resources, several products (effect) are obtained. Biomass is one of the products that can be valued and marketed. These products can contribute to the management of farm profitability by diversifying sources of income.

According to a number of publications (Millar & Mclaughlin, 2019; Reike et al, 2018; Kama, 2015; Laser & Stowell, 2020a; Zhu et al, 2019; Schröder et al, 2019; Murray et al, 2017; Genovese & Pansera, 2020) the biomass that is generated in agriculture is a potential that is not yet fully utilized.

Researchers of the problem are of the opinion that the circular economy needs to be combined with the "bioeconomy" (Inigo & Blok, 2019), so that the approach can be implemented in practice.
Bioeconomy is "a multidisciplinary field that studies the sustainable use of biological resources to produce a variety of materials, energy and services" (Veleva et al, 2017). It covers various aspects of biology, agriculture, ecology, engineering, economics and other fields of human activity. The goal of the bioeconomy is "to create an economic system that is in harmony with nature and that uses biological resources in a way that does not harm the environment and is sustainable in the long term" (Luke, 2014). This includes "developing new technologies and methods for using biomass, including plants, microorganisms and animals, to produce food, energy, medicines, materials and other products" (Luke, 2014). According to a number of publications, “the bioeconomy has great potential to contribute to solving some of humanity's greatest challenges, such as climate change, biodiversity loss and natural resource limitations. It can also contribute to economic growth and the creation of new jobs in high-tech sectors related to biology and innovation" (Braungart & McDonough, 2002).

From all that has been said so far, it is clear that the circular economy and the bioeconomy as approaches to economic development intersect in the agricultural sector. This is the sector that provides the greatest opportunity to introduce the mentioned approaches with a view to achieving sustainable and competitive development.

Table 2 summarizes both the positive and negative effects of applying circular economy principles in business model profitability management. The summarized information in the table gives an idea that the impact of the circular economy on profitability is complex and requires careful planning on how to introduce the approach in business model management so that the positive effects dominate over the negative ones.

Table2. Influence of the principles of the circular economy on the profitability of the activity

Principles of circular economy	Positive impact on profitability	Negative impact on profitability
Reduction of costs for acquisition of raw materials	Reducing costs, other things being equal, creates an "opportunity to realize a larger margin"	
Improved efficiency of production processes	The higher efficiency causes savings in materials and raw materials, which creates an	

Principles of circular economy	Positive impact on profitability	Negative impact on profitability
	"opportunity for a greater rate of profit"	
Reducing waste	The reduction of waste, by re-inclusion in the production cycle, "creates conditions for minimizing costs within the applied technology."	"Additional investments are required to move to a new technological level, which in the short term lowers profitability due to higher investment costs", necessary to implement the new technology. The process of implementing the new resource-saving technology requires time, which can negatively affect profitability.
Increased life cycle of the products offered		"Longer product life cycles can create conditions for reduced sales turnover and hence sales revenue". All other things being equal, this could result in lower profitability on a sales revenue basis. The product can quickly tire of the consumer and he prefers a competitor, thereby shrinking sales, and therefore revenue and profitability based on sales revenue.

Source: Ambec & Lanoie, 2008; D'Amato & Korhon, 2021; Flachenecker & Kornejew, 2019; Cainelli et al, 2020; Hizarci-Payne et al, 2021

CONCLUSION

Compiling an objective and credible methodology for the analysis and evaluation of the contribution of the circular economy approach in the management of the profitability of enterprises in the sector is a complex process that must begin with the definition of the boundaries of scientific research, as well as the determination of the main limitations, as well as in terms of the information characterizing the object and the subject of research, as well as in terms of the influence of other "random" events (phenomenon) on the level of profitability achieved in the investigated enterprises.

The main constraints identified as critical are:

- Reliability of the selected metrics (indicators) assessing the degree of introduction of circular economy principles in the investigated enterprises;
- Analyticity of the selected measures – they must be scientifically based, i.e. be defined using established scientific terms and approaches;
- Metrics of the chosen measures – they should be easy to measure and interpret in the scientific study;
- Relevance of the metrics – they should help to account for the effect of the application of the circular economy approach on the level of profitability of the enterprise.

Another important aspect of the scientific research is to define a reliable approach for differentiating business industry enterprises into separate groups according to their level of

implementation of circular economy principles. Such an approach can be built using the approach to identify the technological readiness levels of enterprises - TRL (technology readiness levels). Using this approach in the scientific research, the investigated business industrial enterprises are grouped according to their degree of readiness to introduce the principles of the circular economy. For this purpose, a 4-level scale is used to analyse and evaluate the readiness of enterprises to implement the circular economy approach as follows:

- **Level 1**– enterprises that have introduced or are in the process of introducing technologies allowing them to close the production cycle;
- **Level 2**– enterprises that have introduced technologies that enable them to recycle resources, products or waste from a previous production-technological cycle;
- **Level 3**– enterprises that have introduced technologies that enable them not only to recycle, but also to have the opportunity to reuse recycled resources in the next production-technological cycle.

Sponsorship

This publication was financed and is part of a project of the Scientific Research Fund entitled "Models for the valorisation of the landscape for the development of regions (KP06-K65/11 of 12.12.2022)

REFERENCES

Acerbi, F., & Taisch, M. (2020). A literature review on circular economy adoption in the manufacturing sector. Journal of Cleaner Production, 273, 123086

Altinay, L.andTaheri, B.(2019), "Emerging themes and theories in the sharing economy: a critical note for hospitality and tourism",International Journal of Contemporary Hospitality Management, Vol. 31 no. 1, pp. 180-193.https://doi.org/10.1108/IJCHM-02-2018-0171

Ambec, S., & Lanoie, P. (2008). Does it have to be green? A systematic overview. Academy of Management Perspectives, 22(4), 45–62.

Babbitt, CW, Gaustad, G., Fisher, A., Chen, W.-Q., & Liu, G. (2018). Closing the loop on circular economy research: From theory to practice and back again. Resources, Conservation and Recycling, 135, 1–2.

Balinov, B. Sustainable business and circular economy. XVI International Scientific Conference MANAGEMENT AND ENGINEERING '18. 24-27.06.2018. Sozopol. p. 504-511, p. 510 http://iscme.tu-iiim.org/uploads/2018/ISCME18_VOL2_2018_d.pdf

Baxter, W., Aurisicchio, M., & Childs, P. (2017). Contaminated interaction: Another barrier to circular material flows. Journal of Industrial Ecology, 21(3), 507–516

Benyus, M. Janine. Biomimicry: Innovation Inspired by Nature by. 2003.https://biomimicry.org/janine-benyus/first-chapter-biomimicry-innovation-inspired-nature/

Bimpizas-Pinis, M., Bozhinovska, E., Genovese, A., Lowe, B., Pansera, M., Alberich, JP, & Ramezankhani, MJ (2021). Is efficiency enough for a circular economy? Resources, Conservation and Recycling, 167

Blomsma, F., & Brennan, G. (2017). The Emergence of circular economy: A new framing around prolonging resource productivity. Journal of Industrial Ecology, 21(3), 603–61

Blum, NU, Haupt, M., & Bening, CR (2020). Why “Circular” doesn't always mean “Sustainable.” Resources, Conservation and Recycling, 162, 105042.

Borisov, P. (2013). Investments in green innovations in the business sector and achieved secondary effects thereof. Scientific works of the Agricultural University - Plovdiv, Volume LVII, pp. 159-165.

Borisov, P., T. Radev, B. Ivanova. (2017) Contribution of subsidies to crop farm profitability. Agricultural Economics and Management. 2017, No. 1 pp. 11-17.

Borisov, P., T. Radev, D. Nikolov, (2014). Analysis of strategic factors for the development of small farms in Bulgaria, Economy and Management of Agriculture magazine, issue 59/№2-2014, 33-43.

Borisov, P., T. Radev. Analysis and assessment of the factors determining the economic profitability of business-growing enterprises in southern Bulgaria. Sp. Agricultural Sciences, Plovdiv, issue 9/2012, pp. 49-52.

Borisov, P., T. Radev. Investment regulations in viticulture. "Beloprint" Publishing House, Pazardzhik, 2012, p. 120. /Monograph/ ISBN 978-954-684-451-4

Braungard, M., McDonagh, W. From cradle to cradle. To rethink the way we produce. Ed. Book tiger. Sofia. 2009.

Braungart M, McDonough W. Cradle to Cradle: Remaking The Way We Make Things. New York, North Point Press, 2002

Brutland, G. Report of the World Commission on Environment and Development. Ed. Classic style, Sofia. 160-161

Cainelli, G., D'Amato, A., & Mazzanti, M. (2020). Resource efficient eco-innovations for a circular economy: Evidence from EU firms. Research Policy, 49(1), 103827.

Calisto Friant, M., Vermeulen, WJV, & Salomone, R. (2020). A typology of circular economy discourses: Navigating the diverse visions of a contested paradigm. Resources, Conservation and Recycling, 161, 104917

Calisto Friant, M., Vermeulen, WJV, & Salomone, R. (2021). Analyzing European Union circular economy policies: Words versus actions. Sustainable Production and Consumption, 27, 337–353.

Casson, C., & Welch, D. (2021). Histories and futures of circular economy. In RB Swain & S. Sweet (Eds.), Sustainable consumption and production, volume II: Circular economy and beyond (pp. 35–54). Springer International Publishing

D'Amato, D., & Korhonen, J. (2021). Integrating the green economy, circular economy and bioeconomy in a strategic sustainability framework. Ecological Economics, 188, 107–143

De Jesus, A., & Mendonça, S. (2018). Lost in transition? Drivers and barriers in the eco-innovation road to the circular economy. Ecological Economics, 145, 75–89

Dimitrov, D. General theory of management. Ed. UNSS, Sofia. 1991. p. 16.

Fellner, J., Lederer, J., Scharff, C., & Laner, D. (2017). Present potentials and limitations of a circular economy with respect to primary raw material demand. Journal of Industrial Ecology, 21(3), 494–496.

Fitch-Roy, O., Benson, D., & Monciardini, D. (2019). Going around in circles? Conceptual recycling, patching and policy layering in the EU circular economy package. Environmental Politics, 29, 983–1003

Flachenecker, F., & Kornejew, M. (2019). The causal impact of material productivity on microeconomic competitiveness and environmental performance in the European Union. Environmental Economics and Policy Studies, 21(1), 87–122.

Flynn, A., & Hacking, N. (2019). Setting standards for a circular economy: A challenge too far for neoliberal environmental governance? Journal of Cleaner Production, 212, 1256–1267

Frosh, R. (1989). Strategies for Manufacturing. Snentific American. 105-110.https://www.scientificamerican.com/article/strategies-for-manufacturing/

Geissdoerfer, M., Morioka, SN, De Carvalho, MM, & Evans, S. (2018). Business models and supply chains for the circular economy. Journal of Cleaner Production, 190, 712–721.

Genovese A., & Pansera M. (2020). The circular economy at a crossroads: Technocratic eco-modernism or convivial technology for social revolution?. Capitalism Nature Socialism, 1–19.

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11–32

Gregson, N., Crang, M., Fuller, S., & Holmes, H. (2015). Interrogating the circular economy: The moral economy of resource recovery in the EU. Economy and Society, 44(2), 218–243.

Haas, W., Krausmann, F., Wiedenhofer, D., & Heinz, M. (2015). How circular is the global economy?: An assessment of material flows, waste production, and recycling in the European Union and the world in 2005. Journal of Industrial Ecology, 19(5), 765–777.

Hizarci-Payne, AK, İpek, İ., & Kurt Gümüş, G. (2021). How environmental innovation influences firm performance: A meta-analytic review. Business Strategy and the Environment, 30(2), 1174–1190.

Inigo, EA, & Blok, V. (2019). Strengthening the socio-ethical foundations of the circular economy: Lessons from responsible research and innovation. Journal of Cleaner Production, 233, 280–291.

Izzo M. (2014). Bringing theory to practice: how to extract value from corporate social responsibility. Journal of Global Responsibility, 1065-1066, ISSN 2041-2568

Johansson, N., & Henriksson, M. (2020). Circular economy running in circles? A discourse analysis of shifts in ideas of circularity in Swedish environmental policy. Sustainable Production and Consumption, 23, 148–156.

JOHNSON, ALVIN. "THE RATIONALE OF AUTARCHY." Social Research, vol. 2, no. 2, 1935, pp. 138–47. JSTOR, http://www.jstor.org/stable/40981427. Accessed 5 Mar. 2024.

JR Moore, "Combination Open-Cycle Closed-Cycle Systems," in Proceedings of the IRE, vol. 39, no. 11, pp. 1421-1432, Nov. 1951, doi: 10.1109/JRPROC.1951.273606. keywords: {Control systems;Automatic control;Actuators;Feedback loop;Open loop systems;Interference;Polarization;Apertures;Transient response;Nonlinear distortion}

Khan, O., Daddi, T., & Iraldo, F. (2021). Sensing, seizing, and reconfiguring: Key capabilities and organizational routines for circular economy implementation. Journal of Cleaner Production, 287, 125565.

Laser, S., & Stowell, A. (2020a). Apple's recycling robot 'Liam' and the global recycling economy of E-Waste: What "The Guardian" does, and what he misses out on. In R. Ek & N. Johansson (Eds.), Perspective on waste from the social sciences and humanities: Opening the bin (pp. 261–275). Cambridge Scholars Publishing. ISBN13: 978-1-5275-4674-5

Lazarevic, D., & Valve, H. (2017). Narrating expectations for the circular economy: Towards a common and contested European transition. Energy Research & Social Science, 31, 60–69.

Li, AQ,Rich, N.,Found, P.,Kumar, M.andBrown, S.(2020), "Exploring product–service systems in the digital era: a socio-technical systems perspective",The TQM Journal, Vol. 32 no. 4, pp. 897-913.

Linder, M., & Williander, M. (2017). Circular business model innovation: Inherent uncertainties. Business Strategy and the Environment, 26, 182–196

Luke, El. (2014). Product and technology innovation: What can biomimicry inspire? Biotechnology Advances, vol. 32, Issue 8, December, 2014, 1494-1505

Mah, A. (2021). Future-proofing capitalism: The paradox of the circular economy for plastics. Global Environmental Politics, 21(2), 121–142

Manninen, K., Koskela, S., Antikainen, R., Bocken, N., Dahlbo, H., & Aminoff, A. (2018). Do circular economy business models capture intended environmental value propositions? Journal of Cleaner Production, 171, 413–422.

Mcdowall, W., Geng, Y., Huang, B., Barteková, E., Bleischwitz, R., Türkeli, S., Kemp, R., & Doménech, T. (2017). Circular Economy policies in China and Europe. Journal of Industrial Ecology, 21(3), 651–661.

Millar, N., Mclaughlin, E., & Börger, T. (2019). The circular economy: Swings and roundabouts? Ecological Economics, 158, 11–19

Mirokovich, K. (2000). Macroeconomics. Trakia M. Sofia, First Edition. pp. 99-100

Moreau, V., Sahakian, M., Van Griethuysen, P., & Vuille, F. (2017). Coming full circle: Why social and institutional dimensions matter for the circular economy. Journal of Industrial Ecology, 21(3), 497–506

Müller-Christ, G. (2011). Sustainable management: Coping with the dilemmas of resource-oriented management. Springer. ISBN 978-3-642-19165-7

Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. Journal of Business Ethics, 140, 369–380

Pamukchiev, M. Introduction to Economic Cybernetics. Svishtov. 1978. p. 36.

Pehlivanov, R. (2022). Managing the transition from a linear to a circular economy. Dissertation for the award of degree - "Doctor" page 52

Reike, D., Vermeulen, WJV, & Witjes, S. (2018). The circular economy: New or refurbished as CE 3.0? — Exploring controversies in the conceptualization of the circular economy through a focus on history and resource value retention options. Resources, Conservation and Recycling, 135, 246–264.

Schaltegger, St., A. Sturm. Ökologieorientierte Entscheidungen in Unternehmen. 2000, 105-120

Schröder, P., Bengtsson, M., Cohen, M., Dewick, P., Hofstetter, J., & Sarkis, J. (2019). Degrowth within: Aligning circular economy and strong sustainability narratives. Resources, Conservation and Recycling, 146, 190–191

Varun Grover, Seung Ryul Jeong, William J. Kettinger & James TC Teng (1995) The Implementation of Business Process Reengineering, Journal of Management Information Systems, 12:1, 109-144, DOI:10.1080/07421222.1995.11518072

Veleva, V., Bodkin, G., & Todorova, S. (2017). The need for better measurement and employee engagement to advance a circular economy: Lessons from Biogen's "zero waste" journey. Journal of Cleaner Production, 154, 517–529.

What is a circular economy? A framework for an economy that is restorative and regenerative by design.https://www.ellenmacarthurfoundation.org/circular-economy/concept

Zhelyazkova, V. Emergence and development of the concept of circular economy. Proceedings of the International Conference "Circular Economy and Sustainable Finance". 24.20.2019. VUZF. Sofia. 2020 p.15file:///C:/Users/Admin/Desktop/RP%20rykopis%20dec%202020/Krugova-ikonomika-i-ustoichivi-finansi- SBORNIK-2020_Edit_2019.pdf

Zhu, J., Fan, C., Shi, H., Shi, L. (2019). Efforts for a circular economy in China: A comprehensive review of policies. Journal of Industrial Ecology, 23(1), 110–118.