Transformation of Business Models of Agricultural Holdings on the Basis of the Circular Economy

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Abstract. *The article conceptualises the theoretical and applied provisions of transformation of business models of agricultural enterprises on the basis of circular economy. It is noted that the strategies of the circular economy include the development of product processing (closing the cycle), increasing resource efficiency (narrowing the use of resources), extending the phase of product use (expansion), more intensive use of products (intensification), and replacing products with services and software solutions (dematerialisation), and it is proposed to understand the circular model as a business model that allows for product processing, expansion of the use of materials and energy, and dematerialisation. The main ways of forming circular business models are identified, including start-up, business model diversification, business model transformation, business model acquisition (take-over). A list of tools for creating a business model based on the principles of the circular economy has been compiled: business cycle canvas, sustainable innovative circular business model framework, circular business model framework, adapted sustainable business model framework, circular business model mapping. The tools for forming a business model based on the circular economy provide companies with a structured approach to the development and implementation of circular business models, promoting sustainable development and increasing the efficiency of resource use. The author proves that agriholdings, as the main players in the agricultural sector, have a significant impact on the environment. Implementation of the principles of circular economy allows minimising this impact by reducing waste and using resources more efficiently. This is in alignment with global sustainable development goals aimed at preserving natural resources for future generations. Successful cases of transformation of agriholdings' business models based on the circular economy are studied, which demonstrate how agriholdings can successfully transform their business models based on the circular economy, achieving sustainable development, economic benefits and reducing negative environmental impact.*

Keywords: *business model, circular economy, diversification, transformation, startup, business model framework.*

JEL Classification: *D20, O12, O52, Q20, Q32*

1 Introduction

Today, circular economy models are gaining support in the business community and at government level around the world as a model for economic growth that helps overcome resource constraints and stops the growth of negative environmental impacts of economic activity. Business has a crucial role to play in the development of the circular economy. Without businesses and organisations moving towards circular models, conscious consumer behaviour alone cannot change the economic model. Changing consumer behaviour is an individual responsibility, but manufacturers can become leaders in this process. However, implementing even proven circular business models is not an easy task for companies.

All modern business tools have been shaped by the linear economic model and are limited to achieving two goals: reducing production costs and increasing sales. This model is completely unsuitable for doing business in a circular economy. The concept of a circular economy requires the development and implementation of business models that use as few resources as possible for as long as possible, while maximising value and benefits. Companies and organisations that want to adopt a circular economy model need to adopt new types of business models. Innovations in business

models are the most important condition for the successful implementation of the main ideas of the circular economy at the organisational level of an enterprise, as they allow changing the basic logic of business processes, aligning and developing the incentives of various stakeholders. Therefore, the issues of developing new business models and adapting existing ones to work in a circular economy are relevant and have attracted the attention of an increasing number of researchers in the field of management, innovation management, business economics, industrial ecology and other related fields in recent years. Given that circular economy models are based on an ecological approach, agriculture is the most relevant industry for the implementation of such technologies, and given the need to attract a significant amount of resources to transform existing business models, the implementation of circular economy projects is most realistic for large enterprises – agricultural holdings. Farms that implement circular economy principles can significantly reduce production costs, increase resource efficiency and improve market competitiveness. In addition, the transformation of farm business models based on circular economy principles contributes to the creation of new jobs and supports innovation in the agricultural sector. It can also lead to improved product quality and reduced environmental impact, which is important to meet the demands of consumers and regulators. In general, the transition to a circular economy allows farms to become more sustainable, economically viable and environmentally responsible.

The purpose of the study is to conceptualise the theoretical and applied provisions of the transformation of business models of agricultural holdings on the basis of the circular economy. Achieving this goal is based on solving a number of theoretical and practical tasks, namely:

– To formulate the concept of a business model based on the circular economy;

– to identify tools for forming a business model based on the circular economy;

– to study successful cases of transformation of business models of agricultural holdings based on the circular economy.

The methodological basis for the achievement of this objective and the fulfilment of the tasks set will be the analysis of literature and documents: a detailed study of scientific publications, analytical reports and regulatory documents to provide the theoretical basis for the study; case studies: analysis of real examples of successful transformation of business models of agricultural holdings based on the circular economy, which will allow the identification of effective strategies and tools; comparative analysis: comparison of different approaches and models in order to identify the most effective practices. These methods allow for a comprehensive study of the process of transforming agriholdings' business models, taking into account both theoretical aspects and practical experience, which is necessary for the formation of a holistic and effective concept.

2 The Concept of a Business Model Based on the Circular Economy

The concept of a business model in the circular economy appeared much later than the bulk of the literature on the circular economy in general. The term first appeared in an article by Schwager and Moser (2006), which explored certain types of business models for value creation in the context of closed production cycles. However, it was not widely used at that time.

Although the concept of a circular economy business model as an independent field of research has only developed in recent years, some of its individual ideas have been considered in related scientific fields for a longer period of time. For example, the cradle-to-cradle methodology for analysing and evaluating the life cycle of products refers to the concept of a circular business model even before the modern business model concept emerged. The concept of business model sustainability, which emerged in the late 2000s, includes circular business models as a type of sustainable business model with a focus on environmental and economic outcomes. Another related area of research is the concept of product-service systems (PSS), which began to develop actively around the 1990s as part of various approaches to greening production, and after 2010 shifted its focus to economic efficiency under the influence of the rapidly developing servitisation theory (Oriekhova, 2019). Modern product-service business models can be seen as a subset of innovative circular business models.

Finally, modern parallel theories, such as digitalisation, also often touch on business model innovation, as the introduction of digital technologies can be a tool for transforming business models towards greater circularity through better traceability of material and finished product flows.

There are many definitions of a circular business model in the current literature (Dementiev, 2023; Horbal & Plish, 2021; Oriekhova, 2019; Podra & Horoshko, 2022; Ruda & Myrka, 2020; Seisebaieva, 2019). As a rule, all of them are to some extent a combination of the basic definition of a business model presented in the famous paper by Osterwalder and Pigneur (2010) and the closed-

loop strategies first formulated by Bocken, Short, Geissdoerfer, Vladimirova, Evans (Bocken, & Short, 2016; Geissdoerfer, Vladimirova & Evans, 2018). These strategies include developing product recycling (closing the loop), improving resource efficiency (narrowing the use of resources), extending the use phase of products (extension), using products more intensively (intensification) and replacing products with services and software solutions (dematerialisation). Thus, a circular business model can be defined as a business model that enables the reuse of products, the extension of material and energy use, and the dematerialisation of the value provided to the customer, with the aim of reducing resource consumption, waste and emissions outside the organisational system.

Thus, circular business models can be classified into several main types:

1) Business model for closing energy and material flows (reuse, repair, recycling);

2) business model for extending the life cycle (use of durable materials, product maintainability);

3) business model for intensifying the use of products (through sharing economy tools);

4) dematerialisation business model (replacement of goods with services, use of digital goods and services).

The ability to implement innovation, including innovative business models, can quickly and successfully create an important competitive advantage for companies in the face of declining profitability of innovative technologies, increasing complexity of the external environment and falling cost of capital. This is evidenced by the experience of innovative digital business models used by modern technology conglomerates. Business model innovation not only has the potential to generate higher returns than product and technology innovation, but can also become a kind of "renewable" competitive advantage. Innovative business models contribute to sustainable competitive advantage as well as to social and environmental progress.

Analysing the global experience of implementing innovation in business models, four main ways of designing business models in general and circular business models in particular can be distinguished (Dementiev, 2023):

1) Start-up. Start-ups in the circular economy create new business models that enable the implementation of basic strategies (closing resource and energy flows, lengthening, intensifying and/or dematerialising resource cycles) outside the existing company. As a rule, these are new companies with their own brand, employees and resources. They can be supported by various innovation infrastructure organisations such as incubators or accelerators.

2) Business model diversification. Diversification of the circular business model involves the development of new business models that allow the implementation of circular economy strategies on the basis of the existing enterprise, using its resources and partner network. The current business model of the parent organisation continues to operate, while the new business models are either integrated into the organisation as new businesses or spun off as subsidiaries. Diversification may also involve the implementation of joint innovation projects with other companies and thus the creation of a joint business model between two or more companies.

3) Business model transformation. Transformation of a circular business model involves modifying an existing business model (which can be either traditional or circular) and incorporating circular business strategies into it. Acquisition (takeover) of a circular business model involves the merger and acquisition of an enterprise with a circular business model. In this case, the business models of the two companies are integrated. As a result, the degree of integration of the business models of the acquired companies may vary.

4) Acquisition of a business model (acquisition). Organisations can also combine different strategies to drive business model innovation. For example, a company may support start-ups through a corporate business incubation programme and then acquire successful start-ups to expand its business model portfolio. Alternatively, the company may diversify its portfolio by creating new divisions. Alternatively, a company may sell its core business entirely to create a new portfolio or use an acquisition strategy to transform its core business model.

3 Tools for Creating a Business Model Based on the Circular Economy

In the theory and practice of business modelling, quite a few tools have been developed for building circular business models. All of them are based on tools that have already become classical for the development of conventional business models (such as the business model canvas and value-based logic), but include new elements that are relevant to the implementation of circular strategies. The main tools for developing circular business models are as follows (Trembitska & Bohdan, 2023):

1) Business cycle structure. This tool allows to visualise and analyse the different stages of business cycles, including production, consumption and

disposal, taking into account the principles of the circular economy. It helps identify opportunities to reduce waste and optimise resource use at each stage.

2) A framework for a sustainable innovation circular business model. This framework covers various aspects of innovation aimed at sustainable development and the implementation of circularity principles. It helps companies develop innovative solutions that support the circularity of materials and resources.

3) Circular business model framework. This is an adapted version of the standard business model framework that incorporates specific elements of the circular economy, such as resource cycles, renewable energy and waste management. It allows business models to be structured and assessed in terms of their circularity.

4) An adapted sustainable business model framework. A tool that combines elements of sustainability and circular economy, enabling companies to create business models that are not only economically viable but also environmentally and socially responsible.

5) Circular business model mapping. This is a methodology that involves visualising the various components of a business model in terms of their circular aspects. This helps companies better understand how they can adapt their operations to maximise resource reuse and minimise waste.

Most modern tools for developing a circular business model are based on a currently popular strategic management tool – the business model structure. The main elements of the classical structure are key partners, key activities (value creation processes), key resources, value propositions, customer relationships, channels, customer segment, cost structure and revenue sources. The classical structure is adapted to the required cyclical business models by adding new elements or modifying existing ones.

Value-based logic is the second most commonly used basic methodological element for developing a business model. It organises the structure of the business model around the concept of value. The three main components of the concept are the value proposition (what the company offers the customer and why the customer will want to pay for it), value creation and delivery (how the company will create and deliver value to the customer), and value monetisation (how and by what means the company will generate revenue).

Circular economy business model development tools provide companies with a structured approach to developing and implementing circular economy business models, contributing to sustainable development and increasing resource efficiency.

4 Successful Cases of Transformation of Agricultural Holdings' Business Models on the Basis of Circular Economy

As major players in the agricultural sector, farms have a significant impact on the environment. The implementation of circular economy principles enables this impact to be minimised by reducing waste and using resources more efficiently. This is in line with global sustainable development goals to preserve natural resources for future generations. In addition, the transformation of agribusiness models based on circular economy principles can contribute to economic growth, job creation and competitiveness. Successful transformation cases provide real-life examples that can serve as models for other companies, showing how innovative approaches can be put into practice. This in turn stimulates innovation and technological progress in the sector. In addition, social pressure and growing consumer demand for corporate environmental responsibility are pushing agribusinesses to implement circular economy principles. Publishing and analysing successful cases creates a positive image for companies and can help strengthen their reputation in the market. All this makes the study of successful cases of business model transformation of agriholdings based on circular economy principles extremely important and relevant in the current context. The following are among the most sustainable practices of transforming the business models of agricultural holdings on the basis of the circular economy:

1) Olam International, an international agri-business, has implemented circular economy principles to improve its sustainability. The following circular practices have been implemented:

– Agricultural waste. Agricultural waste is processed into bioenergy and organic fertilisers.

– Water conservation. Using advanced irrigation technologies to optimise water resources.

– Composting. Food production waste is turned into compost, which is used on the fields.

2) Grupo Modelo (part of AB InBev), a Mexican beer producer, has integrated circular economy practices:

– Waste recycling. Waste from beer production, such as grain, is used to produce animal feed.

– Water recovery. Implementation of reverse osmosis systems for water purification and reuse in production processes.

– Energy saving. Use of biogas produced from production waste as an energy source.

3) Bonduelle, a French agricultural holding specialising in the production of vegetable products, is actively implementing the principles

of the circular economy. The following circular practices have been implemented:

– Organic waste. The use of plant waste to produce biogas, which is used to power production processes.

– Recycling of packaging. Transition to the use of recyclable and biodegradable materials for product packaging.

– Closed-loop system. Implementation of a closed-loop water system that reduces water consumption and costs.

4) Arla Foods, a cooperative dairy holding company, has integrated circular economy into its processes. The following circular practices have been implemented:

– Renewable energy. Using biogas from cow manure to generate electricity on farms.

– Waste recycling. Organic waste from dairy production is used to create fertiliser.

– Sustainable packaging. Switching to recyclable packaging to reduce plastic waste.

5) Tate & Lyle, an international agricultural holding company that produces sweeteners and ingredients for the food industry, is implementing the following circular economy practices:

– Efficient use of raw materials. Residues from corn processing are used to produce animal feed and bioenergy.

– Conservation of water. Implementation of a closed water supply system that significantly reduces water consumption.

– Waste reduction. Waste from the production of ingredients is recycled to create biomaterials that are used in other industries.

These examples demonstrate how agriholdings can successfully transform their business models based on the circular economy, achieving sustainable development, economic benefits and reduced environmental impact.

5 Conclusions

Thus, most definitions of the business model concept are directly or indirectly based on the value chain concept. Since the unit of analysis of the value chain is the business unit, it can be considered as the object of analysis of circular business model development. Although some authors in their studies refer to companies or firms as the focus of business model development, this can only be considered reasonable for companies that produce a specific product or firms with a homogeneous product portfolio. Developing a circular business model is not possible without broadening the focus of the analysis to include partners both upstream (suppliers) and downstream (customers). It may also be useful to include stakeholders and the company's ecosystem in the analysis. When developing a circular business model, modified strategic management methods can be used, such as the business cycle framework method, which is one of the most effective.

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