INNOVATIVE BUSINESS MODELS FOR CIRCULAR AND GREEN ECONOMIC TRANSITIONS: A SCIENTOMETRIC AND CONCEPTUAL ANALYSIS

Mihut Nicoleta-Maria, Associate Professor, PhD, *"Constantin Brâncuşi" University of Târgu Jiu, ROMANIA*

ABSTRACT: Web of Science (WoS), developed by Clarivate Analytics, is one of the most important bibliographic platforms for discovering, evaluating and monitoring scientific production globally. This article analyzes the database architecture, the operating principles of advanced search, query optimization strategies and scientometric indicators used to evaluate results. Good practices in formulating search strategies, specific limitations and recommendations for maximizing the relevance and reproducibility of searches are discussed.

KEY WORDS: Circular Economy, closed loop economy, sustainability, sustainable development

1. INTRODUCTION

In the context of the exponential growth of the volume of scientific information, indexing and search tools play an essential role in the research process. Web of Science (WoS) is one of the longest-running and most rigorous multidisciplinary databases, covering peer-reviewed journals, conferences and scientific volumes from multiple fields. Unlike general search engines, WoS uses strict selection criteria and offers advanced scientometric tools, such as Journal Impact Factor and h-index.

Over the past two decades, pressures on global economic systems have steadily increased, requiring major structural transformations. Rising demand for resources, environmental degradation, intensifying climate change and volatile supply chains have stressed the limits of traditional linear economic models based on the "extract-produce-consume-dispose" scheme. In response to these challenges, the circular economy and the green economy have become essential strategic frameworks for ensuring long-term sustainability. The circular economy promotes a regenerative model that aims to keep resources in the economic circuit for as long as possible, reduce waste generation and increase resource efficiency. The green economy, in turn, focuses on decoupling economic growth from environmental impact through technological innovation, effective public policies and low-emission economic models.

At the heart of these transformations is the innovation of business models, which is necessary to facilitate the transition to sustainable economic systems. Circular business models, eco-innovation, digitalization and the adoption of green strategies are fundamental levers that allow companies to reduce their dependence on finite resources, increase their resilience and competitiveness and generate economic value through sustainable practices.

The literature on the circular economy and the green economy has grown exponentially since 2010, but there are still insufficiently explored areas, especially regarding the practical application of circular models in industry, the assessment of economic impact and the integration of digital technologies into circular processes.

This article provides a systematic review of studies indexed in the Web of Science on business models and innovation in the context of the circular and green economy, with the aim of identifying current trends, dominant themes, research gaps and future directions.

2. METHODOLOGY

2.1. Database and motivation for selection

The method used in this study is a systematic literature review, based on

querying the Web of Science Core Collection (WoSCC) database, a platform internationally recognized for its rigorous selection and multidisciplinary coverage.

Three main collections were selected for this analysis: SCIE (Science Citation Index Expanded), SSCI (Social Sciences Citation Index), ESCI (Emerging Sources Citation Index).

2.2. Analysis interval

The search included articles published between 2010–2024, to capture the recent dynamics of the concepts of circular economy, green economy and eco-innovation.

2.3. Query Builder strategy used

The full query entered in Advanced Search was:

TS=(("circular economy" OR "green economy"
OR "circularity" OR "eco-innovation"
OR "sustainable business" OR "resource efficiency")
AND
("business model*" OR "innovation" OR "eco-innovation"
OR "sustainable business model*"
OR "innovation strategy" OR "green innovation"))
AND PY=2010-2024

This strategy allowed for the capture of relevant literature on the intersection of business models, innovation, circularity and green transition.

2.4. Inclusion criteria

The inclusion criteria are based on: original articles published in peer-reviewed journals, English language, relevance to the topic of eco-innovation and circular models, accessible in full text and indexed in selected collections.

2.5. Exclusion criteria are: proceeding papers, reviews, editorials; strictly technical studies without an economic component; duplicates or extensions of the same studies.

2.6. Analysis procedure

After obtaining the raw results, a three-stage analysis was applied:

- Title + abstract review – for preliminary filtering.
- Full reading of relevant articles – for detailed understanding.
- Thematic coding – identification of dominant conceptual clusters.

3. DOMINANT CONCEPTUAL TRENDS

3.1. Circular business models

The literature review shows that circular business models focus on maintaining the value of products and materials in the economy for as long as possible. The most common approaches identified are:

3.1.1. Product-Service Systems (PSS)

- Models in which value moves from selling the product to providing a service associated with the product.
- Examples: leasing of industrial equipment, maintenance services for electronics or automobiles.

3.1.2. Refurbishing and remanufacturing

- Process of reconditioning products to extend their lifespan.
- Example: reconditioning of IT or automotive equipment.

3.1.3. Sharing platforms and the collaborative economy

- Companies create digital markets for sharing resources or products.
- Example: e-bike or car rental platforms.

3.1.4. Reverse logistics and circular value chains

- Organizing reverse flows of materials for recycling or reuse.
- Examples: packaging collection for reuse, industrial waste recycling.

The temporal analysis shows a significant increase in studies on PSS and digital platforms since 2015, suggesting a trend towards the digitalization of circular models.

3.2. Eco-innovation

Eco-innovation appears as the main driver of the implementation of circular and green models. Studies identify three main dimensions:

- *Eco-innovative design* which includes the design of products with a longer lifespan, biodegradable materials, reducing resource consumption.
- *Process innovation* mean optimization of industrial processes to reduce waste and energy consumption.
- *Digitalization and monitoring* what it means integration of IoT, AI and blockchain technologies for material traceability and optimization of life cycles.

So eco-innovation is more frequently studied in sectors with high resource intensity (automotive, electronics, construction).

Figure 1 shows a keyword map / term network, generated with VOSviewer, for the conducted study.

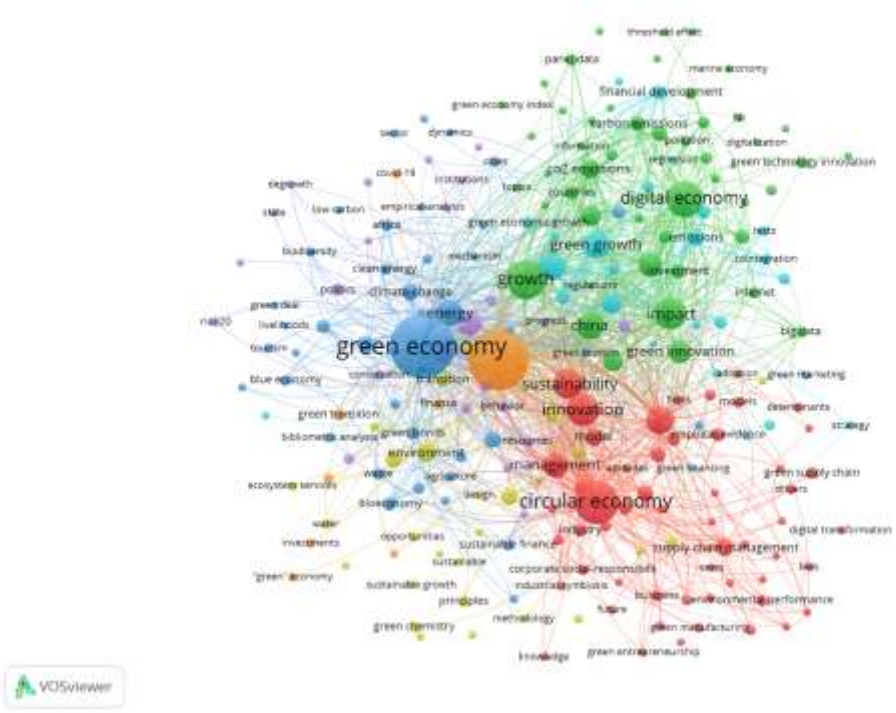

Fig. 1 Keyword map / term network, VOSviewer generated

3.3. Geographical distribution of studies

The analysis of the publication network shows that the literature is concentrated in table 1:

Table 1. The analysis of the publication network

Region	Percentage of total items (%)
European Union	45%
China	25%
United States	15%
Rest of the world (including Romania, Japan, Nordic countries)	15%

In conclusion, the European Union dominates due to Green Deal strategies and circularity financing while China focuses on industrial transition and the adoption of digital technologies in heavy industry.

3.4. Predominant conceptual models

The thematic analysis highlighted the following frequently used conceptual frameworks:

- Triple Bottom Line (TBL) – the balance between profit, environment and social responsibility.
- Sustainable Business Model Framework – integrating economic, social and ecological value into the business model.
- Circular Business Model Canvas – adapting the classic business model to regenerative economic circuits.
- Value Hill Model – identifying the stages of value creation and recapture in the circular economy.

These frameworks provide researchers and practitioners with conceptual tools for planning and implementing circular models.

3.5. Research gaps and opportunities

The critical review of the literature identifies four major gaps:

- Lack of empirical studies applied to SMEs, although they constitute the majority of firms globally.
- Insufficient econometric evaluations, with most studies being conceptual or case study-based.
- Limited integration of digital technologies into circular business models.
- Insufficient analysis of real economic impacts, such as cost reduction, ROI or resource efficiency.

These gaps provide clear opportunities for future research, focused on empirical validation, digitalization and economic performance evaluation.

4. CONCLUSIONS

- Most studied topics: PSS models, eco-innovation, digitalization.
- Dominant industrial domains: automotive, electronics, construction.
- Geography of studies: predominantly EU, China, USA.
- Conceptual frameworks: TBL, SBM Framework, Circular Business Model Canvas.
- Major gaps: SME application, econometric evaluations, real impact, technological integration.

In conclusion, the literature indicates significant progress in the conceptualization of circular and green models, but there are still major opportunities for applied and empirical research. The packaging of this test allows for safe transport without the risk of contamination.

REFERENCES

[1] Geissdoerfer M., Savaget Paulo., Bocken N., Hultink E. J., *The Circular Economy – A new sustainability paradigm?*, Journal of Cleaner Production 143: 757–768. doi:10.1016/j.jclepro.2016.12.048

[2] Nancy M. P. Bocken, Ingrid de Pauwc, Conny Bakker and Bram van der Grinten, *Product design and business model strategies for a circular economy*, Journal of Industrial and Production Engineering, 2016Vol. 33, No. 5,308–320.

[3] Pasăre M. M., *Approach regarding composite electrodepositions*, Confereng 2020, Annals of the „Constantin Brancusi" University of Targu Jiu, ISSN-L 1842-4856, ISSN 2537-530X (online), Engineering Series, No. 2/2020, Pg.100-104, Nov. 2020.

[4] Pasăre M. M., *Elastic buckling of straight bars*, Fiability & Durability / Fiabilitate si Durabilitate, 2021, Vol 28, Issue 2, p42, ISSN 1844-640X.

[5] Alan Murray, Keith Skene, Kathryn Haynes, *The Circular Economy: An Interdisciplinary Exploration of the Concept*

and Application in a Global Context, May 2017, Journal of Business Ethics, DOI:10.1007/s10551-015-2693-2

[6] Adina Tătar, *Noise barriers and noise as a hazard*, Analele Universităţii „Constantin Brancuşi" din Târgu - Jiu, Seria Inginerie, Nr.4/2017, România, ISSN 1842-4856

[7] Adina Tătar, Theory several fields, Revista Fiabilitate şi Durabilitate, Editura "Academica Brâncuşi", Târgu Jiu, ISSN 1844 – 640X, No 1/ 2020

[8] Ianăşi C., *Outplacement - a form of counseling in firms restructuring*, Annals of the „Constantin Brancusi" University of Târgu Jiu, Engineering Series 2014, ISSN-L 1842-4856 Issue 4, p215.

[9] Ianăşi C., *Techniques for working with students in the field of engineering*, Annals of the „Constantin Brancusi" University of Târgu Jiu, Engineering Series, No. 4/2023, ISSN-L 1842-4856, pag.124-127

[10] Ionici Cristina, *Comparison of mechanicalproperties of steels of theusual metal powdersbased on Cu and Ni tested at low temperatures from pump selements*, 14TH GEOCONFERENCE SGEM CONFERENCE ON NANO, B IO TECHNOLOGIES, ISBN 978-619-7105-20-9/ISSN 1314-2704

[11] Ionici Cristina, *COMPUTATIONAL MODEL OF A SMALL LAC.*, Annals of 'Constantin Brancusi' University of Targu-Jiu. Engineering Series / Analele Universităţii Constantin Brâncuşi din Târgu-Jiu. Seria Inginerie, 2016, Issue 2, p52

[12] Niculescu T, Pasculescu D, Pasculescu VM, Stoica IO, *Evaluation of electrical parameters of intrinsic safety barriers of the electrical equipment intended to be used in atmospheres with explosion hazard*, Int. Multidiscip. Sci. GeoConf. Surv. Geol. Min. Ecol. Manag. 2014.