

Economic Aspects of Protecting Trade Secrets in the Circular Economy

Magda Lužar¹  

¹Faculty of Organisation Studies Novo mesto, Ulica talcev 3, 8000 Novo mesto, Slovenia

Abstract

Research Question (RQ): This article discusses aspects of trade secret protection from a circular economy perspective. It focuses on three research questions: (1) how firms manage the tensions between information sharing and the protection of key knowledge, (2) what are the key economic factors and methods by which firms assess the benefits and risks of knowledge disclosure, and (3) what strategies firms use to economically manage the risks associated with trade secret protection.

Purpose: The aim is to explore the economic dimensions of trade secret protection in a circular economy. The focus is on the tensions between collaboration and knowledge protection, the economic factors that guide disclosure decisions, and risk management strategies.

Method: A systematic literature review was conducted using the PRISMA guidelines in the Web of Science and Scopus databases. The analysis included peer-reviewed articles published in the years 2016-2025, in English, in the fields of environmental science, sustainability, business sciences and economics. After a multi-stage selection process, 35 articles were included in the final analysis.

Results: The analysis shows that tensions between knowledge protection and sharing are widespread and are reflected in dilemmas between short-term competitiveness and long-term sustainability. Economic factors and valuation methods are diverse. Companies use traditional financial indicators to assess decisions: return on investment and economic value added. In practice, they are complemented by sustainability valuation approaches, e.g. life cycle analysis, environmental accounting and measuring consumers' willingness to pay. Risk management strategies are based on a combination of formal mechanisms, dominated by contracts and licenses, informal approaches involving trust and ethical commitments, and technological solutions, such as digital traceability and blockchain. The effectiveness of these strategies is closely linked to institutional incentives that reduce risks and encourage cooperation.

Organization: The findings offer guidance to business leaders for a balanced management of knowledge protection in circular business models. The research highlights the importance of systematically evaluating the economic benefits and risks of information disclosure and establishing appropriate mechanisms to reduce the uncertainty of collaboration.

Society: It is important to emphasize institutional mechanisms to support secure knowledge exchange, which has broader implications for sustainable development, as it enables more efficient use of resources, reduced environmental impacts, and greater corporate responsibility towards society and the environment.

Originality: Businesses often direct economic decisions towards maximizing private benefits, which limits the potential for the transformative effects of circularity. Sustainable transformation requires institutional mechanisms that reduce the costs of cooperation and increase the security of knowledge exchange.

Limitations / further research: The research is limited to peer-reviewed articles in English published between 2016 and 2025 and indexed in two databases, and the analysis is based on secondary sources. Further research could include in-depth case studies, cross-country comparative analyses, and empirical testing of the impact of institutional mechanisms on firms' willingness to share and protect knowledge in circular business models.

Keywords: circular economy, trade secrets, economic aspects, knowledge sharing, confidential information, risk management, institutional mechanisms.

1 Introduction

Circular economy is becoming one of the central paths of sustainable transformation, as it is based on reducing resource use, limiting waste and developing new business models. Through the aforementioned process, knowledge and innovation emerge as the main elements of change. It is precisely transparent information management that enables the connection of stakeholders in complex value chains. It is openness that raises issues related to the protection of trade secrets and the protection of key information. Companies encourage cooperation and knowledge flows, but at the same time, it is a challenge for them to maintain a competitive advantage and reduce the risks associated with the disclosure of key knowledge.

In the context of investments in research and innovation, companies often face the challenge of how to effectively protect the results of their innovation activities. In particular, when market openness does not allow for the appropriate commercial exploitation of the knowledge created. One approach is to use formal intellectual property rights: patents, copyrights and design rights. Companies often also protect access to confidential information that has a commercial value but is not generally known. Such information, which is valuable, undisclosed and whose confidentiality is actively protected, is defined in law and practice as trade secrets (Directive (EU) 2016/943, 2016). A “trade secret” means information that meets all of the following requirements: (a) it is not generally known or readily accessible in the circles where such knowledge is usually discussed; (b) it has a commercial value precisely because of its secrecy; and (c) its holder has taken reasonable steps under the circumstances to protect it as a secret (Directive (EU) 2016/943, 2016). In this paper, the term trade secrets is used broadly to include strategically valuable confidential knowledge and sensitive business information relevant to circular business models.

Companies face a tension between sharing information needed for collaboration and innovation and protecting knowledge whose disclosure could lead to a loss of competitive advantage or abuse by employees or partners (Klein, 2020). Stronger legal protection of trade secrets encourages greater integration of information within companies and improves the quality of decision-making by reducing the costs of disclosure risk (Andreicovici et al., 2024). However, it

can also have uneven effects on employees, increasing labor costs due to the necessary incentives employees receive for loyalty (Klein, 2023). Key economic factors in deciding whether to protect trade secrets include the cost of establishing protective measures, potential losses from disclosure, the legal environment, and initial investments, with smaller companies often being more exposed to influences and having limited resources for protection (Gonçalves et al. 2022).

A holistic approach to the circular economy requires connections between sectors and consideration of broader systemic impacts. For a more effective and sustainable implementation of circularity principles, it is important to involve actors from different perspectives: cooperation in supply chains, the use of digital technologies, consumer education, and the development of new business models and production approaches. (Hossain et al., 2024)

The existing literature has extensively addressed the legal aspects of knowledge protection, especially in relation to intellectual property (Andreicovici et al., 2024; Klein, 2020) and trade secrets (Directive EU 2016/943, 2016). The discussion has focused on regulation, legal tools and institutional frameworks that determine the conditions for protection. Less discussed is the question of how companies economically weigh the benefits and risks of sharing knowledge within the framework of a circular economy. Namely, collaboration, open innovation and data sharing are often key conditions for success (Capponi et al., 2025; Ramani & Savaskan, 2025).

The research gap raises the need for a deeper understanding of how firms balance the economic benefits associated with information sharing (e.g. access to new markets, joint innovation) and the risks associated with losing control over trade secrets or reduced competitive advantage (Moon & Lee, 2021; Van Loon et al., 2021). In this article, we discuss aspects of trade secret protection from a circular economy perspective. We focus on three research questions: (1) how firms manage the tensions between information sharing and protecting key knowledge, (2) what are the key economic factors and methods by which firms evaluate the benefits and risks of knowledge disclosure, and (3) what strategies firms use to economically manage the risks associated with protecting trade secrets. The paper aims to provide a systematic review of the current knowledge and, on this basis, discuss assumptions for further research and practice.

2 Theoretical Framework

2.1 Circular economy and trade secrets

To understand the importance of trade secrets, it is necessary to highlight the specifics of the circular economy. Kirchherr et al. (2017) showed that there are more than one hundred different definitions, which reflects the complexity and diversity of approaches, and their findings show that the circular economy is most often depicted as a combination of reduction, reuse and

recycling activities. After a few years, Kirchherr et al. (2023, p. 7) analysed 221 definitions of the circular economy and in their findings provided a meta-definition: “The circular economy is a regenerative system that requires a paradigm shift to replace the concept of “end of life” with reduction, alternative reuse, recycling and recovery of materials throughout the supply chain, with the aim of promoting value preservation and sustainable development, creating environmental quality, economic development and social equity for the benefit of current and future generations. This is enabled by an alliance of stakeholders (industry, consumers, policymakers, academia) and their technological innovations and capabilities.” OECD (2025) views the circular economy as a systemic transformation that combines environmental, economic and social goals.

In companies, the protection of knowledge is a key issue. Trade secrets have the same value as patents and other types of intellectual property rights. They can protect a wide range of expertise and experience and business information as a complement to intellectual property rights or as an alternative to them. They enable creators and innovators to generate profit from their creations or innovations and are particularly important for business competitiveness and research and development and innovation performance (EU Directive, 2016/943, 2016). In addition to the costs incurred in circular economy partnerships, research also draws attention to internal economic challenges. Klein (2020, 2023) emphasizes that legal protection within companies includes employee-related costs and confirms that the protection of trade secrets is a multidimensional process. Companies use a variety of legal and organizational mechanisms to protect knowledge, and the costs of establishing them can be high (Andreicovici et al., 2024). Trade secrets contribute to global competitiveness and innovation but remain less well-researched than patents. Especially in small and medium-sized enterprises, trade secrets are often incorporated into business models. Pricing strategies, customer and supplier lists, financial planning, production techniques and research and development data are knowledge that can have the same strategic value as patents or other forms of intellectual property rights, as they are essential for maintaining competitiveness and managing innovation. The disclosure or misuse of this information can cause a company significant economic damage and threaten its market position. (European Commission, 2021)

2.2 Tensions between sharing and protecting knowledge

In a circular economy, collaboration is essential because it requires the exchange of materials, data, and information. However, openness creates tensions. Capponi et al. (2025) highlight the dilemma between intellectual property protection and access to innovation, which often limits the transformative changes of circular practices. Similarly, Ramani and De Giovanni (2025) show that companies weigh the private benefits of protecting knowledge against the broader effects of disclosing it. Their analysis reveals that companies share knowledge only when there are institutional incentives that reduce the risk of losing competitive advantage.

Partnerships create new opportunities and at the same time increase exposure to risks. Veleva and Bodkin (2018) show that collaborations often result in mismatches in maturity, capacity and market expectations of partners, leading to cost and coordination tensions. Industrial symbiosis is based on the exchange of data on material flows and processes. Without clear contractual arrangements and trust, the risk of disclosure of sensitive information increases (Hamam et al., 2023). In social and solidarity-based circular economy environments, formal protection instruments are often replaced by trust, shared values and participatory governance (Monciardini et al., 2024).

Moon and Lee (2021) and Hosseini Dehsiri and Amiri (2024) highlight the tension between the agile dynamic capabilities of companies and the demands for regulation and standardization. Digital traceability increases transparency and trust, but at the same time exposes sensitive data to risks of disclosure (Hunka et al., 2025; Lin & Chang, 2024).

Studies confirm that companies inevitably face a tension between collaboration and knowledge protection in a circular economy (Capponi et al., 2025; Moon & Lee, 2021; Veleva & Bodkin, 2018). This finding supports the research question of how companies manage the tension between information sharing and the protection of key knowledge.

2.3 Economic aspects of protection

The costs of implementing protective measures influence companies' decisions to protect knowledge, warn Goncalves et al. (2022). Classic indicators such as return on investment (ROI) and economic value added (EVA), net present value (NPV) and total cost of ownership (TCO) are used to assess the profitability and cost-effectiveness of circular business models (Rodrigues et al., 2023, Supanut et al., 2024, Van Loon et al., 2021).

Consumers are willing to pay a premium for access to product information through digital traceability, add Hunka et al. (2025) from the consumer perspective. They use cascading wood use as an example of a method that combines economic and environmental aspects of valuation (Imbrenda et al., 2023). Hamam et al. (2023) highlight the importance of logistics costs and proximity of partners for the feasibility of industrial symbiosis. The use of methods such as life cycle analysis (LCA) and environmental accounting (EMA) allows for the integration of economic and environmental impacts (Hosseini Dehsiri and Amiri, 2024). There is often a tension between short-term profitability and long-term sustainability (Van Loon et al., 2021).

Economic factors go beyond just classical accounting logic and include broader aspects of resilience and sustainable competitiveness. The key question is what are the key economic factors and methods by which companies evaluate the benefits and risks of knowledge disclosure in a circular economy.

2.4 Risk management strategies in the circular economy

The challenge for companies is to integrate the circular economy into their business model and process strategy in today's volatile competitive environments. Society expects numerous benefits and advantages associated with the circular economy. Digital technologies, knowledge and training of employees are key factors in the transition from a linear to a circular economy (Hossain et al., 2024). De Giovanni (2022) wrote that the necessary use of a business strategy that includes blockchain technology is a priority because it enables transparency, traceability and security throughout the circular economy process and brings operational advantages in closed supply chains. The inclusion of the aforementioned technology enables the monitoring and protection of information and helps in managing motivational structures for the effective participation of all stakeholders in the circular economy. (De Giovanni, 2022) Companies often get stuck between short-term and long-term goals, which reinforces the importance of strategic decision-making (Van Loon et al., 2021). Lin and Chang (2024) show that digital traceability tools enable greater transparency but also raise data protection issues.

Companies manage risks in circular practices at multiple levels. They use a combination of formal, informal and technological approaches, and the effectiveness of each strategy is shown in relation to institutional incentives. Among formal approaches, contractual mechanisms prevail, e.g.: licensing agreements, non-disclosure agreements (NDAs) and long-term service contracts. These instruments provide a legal basis for information sharing and at the same time allow control over which information remains confidential (Capponi et al., 2025; Lu et al., 2023). Informal mechanisms are based on trust, ethical commitments and long-term partnerships. In environments where formal protections are weaker, trust between partners often becomes a key means of reducing the risks associated with knowledge disclosure (Hamam et al., 2023; Monciardini et al., 2024). Technological approaches are being implemented primarily through digitalization and data traceability, companies are using secure data infrastructures, e.g. blockchain, digital twins and traceability systems, which enable greater transparency and reduce the possibility of misuse of sensitive information (Giuffrida et al., 2025). The gradual introduction of circular solutions through pilot projects and phased investment allows companies to manage risks with the aforementioned resources and adjust them on an ongoing basis according to results and stakeholder responses (Supanut et al., 2024; Van Loon et al., 2021).

Successful risk management is based on a combination of different strategies, raising the question of which strategies companies use to economically manage the risks associated with protecting trade secrets in the circular economy.

3 Method

The research discusses the economic aspect of protecting trade secrets in the circular economy. A systematic literature review was conducted to prepare the paper, in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, which

ensure the transparency of the research process. The article focuses on trade secrets in the circular economy, discussing concepts such as confidential information, sensitive knowledge and intellectual property, if or when they are considered in the research as part of the same economic dilemmas. The purpose of the review was to understand how this knowledge affects the economic decision-making of companies within the framework of the circular economy and in the context of circular business models.

The literature search was conducted from May to June 2025 in two scientific bibliographic databases, Web of Science (WoS) and Scopus, as they are considered comprehensive and high-quality sources of peer-reviewed academic literature. These databases were selected due to their broad coverage of high-impact journals in the fields of sustainability, economics, and management. This approach ensured methodological consistency and relevance of the selected studies, although it may limit the overall scope of the review. Search strings were used that combined the terms of the field of trade secrets and related concepts (“trade secret”, “confidential knowledge”, “sensitive information”, “intellectual property rights”) as well as the circular economy (“circular economy”, “circular business model”) and economic aspects (“economic impact”, “competitive advantage”, “business strategy”).

Only peer-reviewed articles published between 2016 and 2025 in English were included in the review. Contributions from the scientific fields of environmental sciences, sustainability studies, business studies, economics, management and social sciences were considered. Records that did not address the connection between the circular economy and economic aspects of decision-making, were not published in scientific journals and were not issued within the appropriate time and language frame were excluded. A total of 912 hits were found (WoS: 298, Scopus: 614). After removing 210 duplicate records, 702 articles were included in the review. Based on initial screening of titles, keywords and abstracts, 652 articles that did not meet the research questions were excluded. 50 articles were included in a full-text review, and 15 were eliminated after re-evaluation. Thus, 35 articles were included in the final analysis (Figure 1).

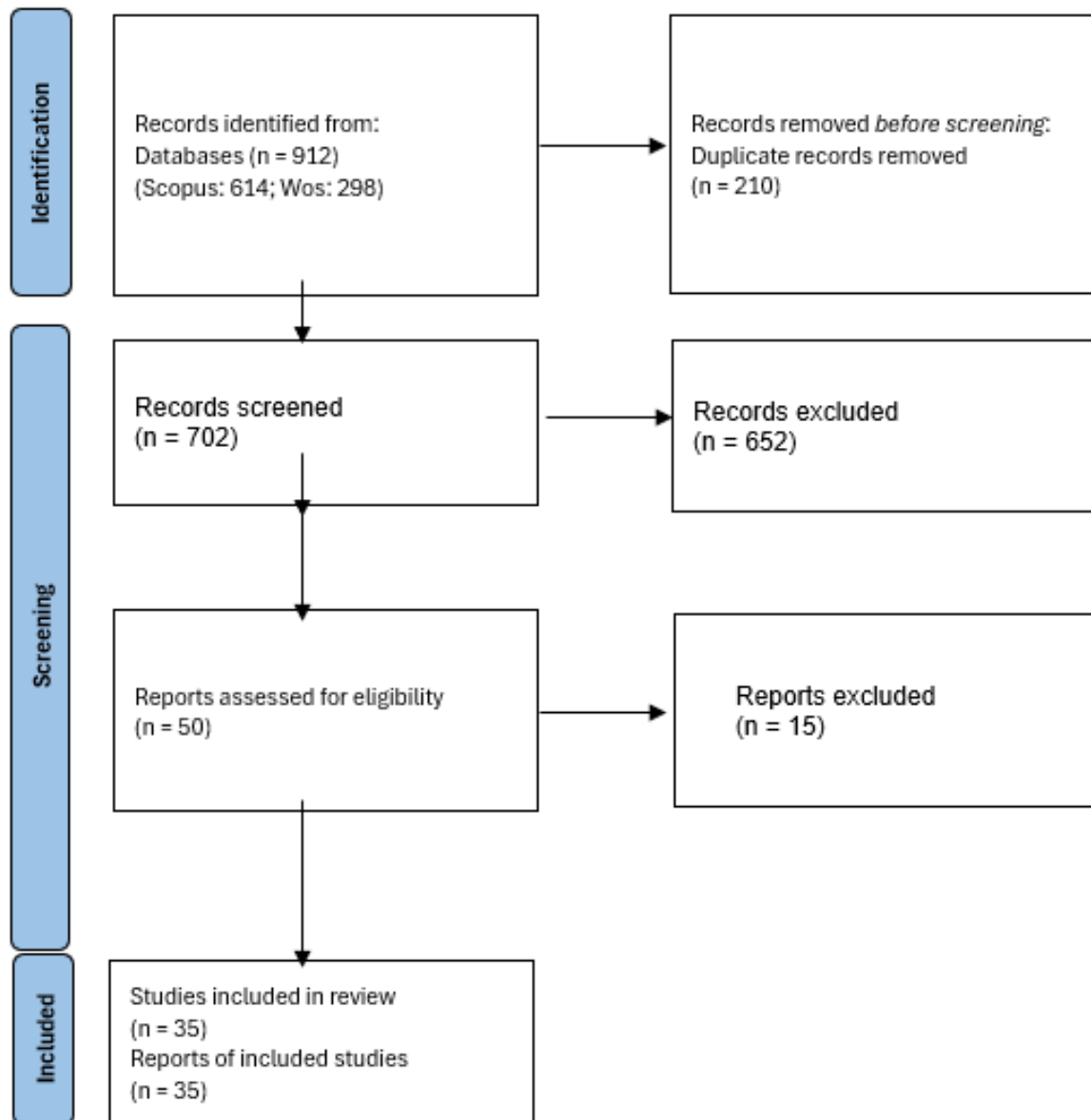
The selected articles were analysed using qualitative thematic content analysis. The analysis focused on identifying recurring themes related to: (1) tensions between knowledge sharing and protection, (2) economic evaluation factors and methods, and (3) risk management strategies in the circular economy. The articles were systematically categorised according to their dominant concepts, analytical focus, and strategic approaches discussed in the literature. The results of the analysis were synthesised into thematic categories and presented in Tables 1–3.

The thematic categories were developed using a combined inductive and deductive approach. Initial categories were guided by the research questions and theoretical framework, while additional themes emerged during the iterative reading of the selected articles. The coding process involved grouping similar concepts and patterns across studies, after which the

categories were refined and consolidated into broader thematic clusters. Individual articles could be assigned to multiple thematic categories where relevant, reflecting the multidimensional nature of the analysed phenomena.

Figure 1

PRISMA 2020 flow diagram of the study selection process



4 Results

The tensions listed (Table 1) in the circular economy are multidimensional or complex. Companies are constantly weighing up the trade-offs between protecting and sharing knowledge, between competitiveness and collaboration, and between short-term economic benefits and

long-term sustainability. Transparency and digitalization create new opportunities, but at the same time increase the risk of trade secret disclosure. Companies do not eliminate the tensions, but manage them through various compromises and adjustments.

Table 1

Managing the tension between information sharing and knowledge protection

Main tension	Description	Authors
Tension between protection and dissemination of knowledge, trade secrets	Companies are weighing the options of protecting innovation, trade secrets, technological know-how, and the rapid spread of circular economy practices.	Capponi et al. (2025); Lu et al. (2023); Monciardini et al. (2024); Ramani and De Giovanni (2025);
Tension between competing interests and the need for cooperation	Partnerships require knowledge sharing, which carries the risk of losing control over key information. Reuse decisions require strategic knowledge that companies find difficult to share.	Azcarate-Aguerre et al. (2022); Capponi et al. (2025); Hamam et al. (2023); Jain et al. (2018); Lieder et al. (2017); Miller et al. (2025); Rizos et al. (2016); Sonar et al. (2024); Veleva & Bodkin (2018);
Tension between short-term profits and long-term sustainability goals	Profitability often hinders the long-term goals of the circular economy. Rebound effects can negate the expected sustainable benefits and increase the uncertainty of participation.	Metic et al. (2024); Munir et al. (2024); Sawe et al. (2021); Sund et al. (2025); Supanut et al. (2024); Van Loon et al. (2021);
Tension between dynamic capabilities and standardization and regulatory compliance	Innovative approaches are often limited by normative frameworks and process inflexibility and organizational rigidity.	Hickey and Kozlovski (2020); Hosseini Dehshiri and Amiri (2024); Karagiannis et al. (2019); Moon & Lee (2021)
The tension between transparency and traceability and the protection of trade secrets	Traceability increases trust, but it also reveals key content.	Gong et al. (2024); Hunka et al. (2025); Karagiannis et al. (2019); Lin and Chang (2024);
The tension between the different paces of innovation in startups and established corporations	Differences in the speed of innovation between startups and established corporations create tension in collaboration.	Giuffrida et al. (2025); Jain et al. (2018); Miller et al. (2025); Rizos et al. (2016); Veleva & Bodkin (2018);
Tension between market acceptance and the need to change the business model	Consumers do not always accept new circular models.	Hunka et al. (2025); Lu et al. (2023); Obara Kai et al. (2022), Russell and Nasr (2023); Singhal et al. (2021)
Tension between risks in value chains and benefits of cooperation	Feedback chains require intensive information sharing between partners, which increases the risk of uncontrolled knowledge leakage.	Gong et al. (2024); Hosseini Dehshiri and Amiri (2024); Hickey and Kozlovski (2020); Krikke et al. (2022), Rodrigues et al. (2023); Sonar et al. (2024);
Tension between data digitization and privacy and ownership issues	The use of digital technologies (IoT, digital twins, FAIR principles) promotes learning and traceability, but at the same time raises sensitive issues regarding ownership and control of data.	Giuffrida et al. (2025); Karagiannis et al. (2019); Rossi et al. (2020); Roca et al. (2020);

Note. IoT – Internet of Things; FAIR – Findable, Accessible, Interoperable, Reusable
Source(s): Authors' own elaboration

Companies combine classic financial indicators (ROI, NPV, EVA, TCO) with methods that include environmental and social impacts (LCA, EMA). Key factors in decisions about knowledge

disclosure include customers' willingness to pay, compliance costs, resource volatility and the effects of public incentives. Valuation thus goes beyond profitability and encompasses broader aspects of resilience and sustainable competitiveness. (Table 2)

Table 2

Key economic factors and methods for evaluating benefits or risks

Economic factors, methods	Description	Authors
Willingness to pay and price premiums for transparency	Consumers' willingness to pay for access to information on the composition and sustainability properties of products.	Hunka et al. (2025); Lu et al. (2023); Obara Kai et al. (2022); Russell & Nasr (2023)
Classic financial indicators (ROI, NPV, EVA, TCO)	Using financial indicators to assess the profitability of circular models and long-term value created.	Azcarate-Aguerre et al. (2022); Hickey and Kozlovski (2020); Jain et al. (2018); Krikke et al. (2022); Rodrigues et al. (2023); Singhal et al. (2021); Supanut et al. (2024); Van Loon et al. (2021)
LCA and value retention	Assessing the combined economic and environmental impacts throughout the product life cycle.	Roca et al. (2020); Rossi et al. (2020); Russell & Nasr (2023), Saidani et al. (2021); Sund et al. (2025);
Uncertainty and the use of robust models	Quantitative models to assess the returns and risks of sharing or protecting knowledge. Simulation to estimate design costs, savings and impacts of business models.	Hamam et al. (2023); Hosseini Dehsiri and Amiri (2024); Lieder et al. (2017); Metic et al. (2024); Ramani and De Giovanni (2025); Sonar et al. (2024);
Compliance costs and EMA	It includes adapting to legislative requirements, monitoring environmental impacts through EMA, and financial consequences related to reputation in the eyes of stakeholders.	Gong et al. (2024); Karagiannis et al. (2019); Rodrigues et al. (2023); Van Loon et al. (2021)
Digitalization and data traceability	Digital solutions (IoT, blockchain, QR) enable data transparency in the value chain. Companies are weighing the costs of implementation against the benefits of increased trust and efficiency.	Giuffrida et al. (2025); Gong et al. (2024); Lin & Chang (2024); Rossi et al. (2020); Roca et al. (2020);
Access to resources and price volatility or variability	The availability and stability of raw material prices determine the resilience of companies. Uncertainty in markets encourages the development of strategies to reduce dependence and optimize costs.	Hamam et al. (2023); Sund et al. (2025); Veleva & Bodkin (2018); Munir et al. (2024)
Market mechanisms and incentives	Subsidies, prices and licensing schemes shape the economic attractiveness of circular models and influence companies' decision-making regarding the protection and sharing of knowledge.	Moon and Lee (2021); Ramani and De Giovanni (2025); Singhal et al. (2021);
Organizational factors (competences, productivity, human capital)	Internal competence, productivity and human capital influence the ability of companies to effectively protect and exploit strategic knowledge in a circular economy. Deciding between the benefits and risks of knowledge loss.	Imbrenda et al. (2023); Lu et al. (2023); Miller et al. (2025); Rizos et al. (2016); Sawe et al. (2021);

Note. ROI – return on investment; NPV – net present value; EVA – economic value added; TCO – total cost of ownership; LCA – life cycle assessment; EMA – environmental management accounting

Source(s): Authors' own elaboration

Risk management strategies in the circular economy are diverse and range from selective disclosure to the establishment of new forms of contractual partnerships and local focus and decentralized operations.

Table 3

Strategies for economic risk management

Strategy	Descriptions	Authors
Selective disclosure and licensing	Sharing knowledge under controlled conditions (NDA, license agreements, partial disclosures).	Capponi et al. (2025); Lin and Chang (2024); Ramani & De Giovanni (2025)
Partial openness (open standards with a protected core)	Using open standards for collaboration while keeping key processes protected.	Lin and Chang (2024); Rossi et al. (2020); Roca et al. (2020); Saidani et al. (2021)
Data management	Digital traceability and FAIR, IoT and metadata principles enable access control and monitoring of data usage.	Azcarate-Aguerre et al. (2022); Giuffrida et al. (2025); Hunka et al. (2025); Karagiannis et al. (2019) Lin & Chang (2024); Rossi et al. (2020);
Contracts and platforms	Forming partnerships based on formal contracts and platform sharing rules. Trust, coordination, and institutional incentives reduce the risks of participating in sustainable models.	Hamam et al. (2023); Jain et al. (2018); Lu et al. (2023); Sonar et al. (2024); Miller et al. (2025); Rizos et al. (2016), Veleva & Bodkin (2018)
Gradual transition	Pilot projects, phased implementation and internal investment mechanisms for risk management.	Hickey and Kozlovski (2020); Imbrenda et al. (2023); Sawe et al. (2021); Supanut et al. (2024); Van Loon et al. (2021)
Forming feedback chains (CLSC)	Alternative flows in closed chains reduce the risks of disclosure and loss of value.	Hickey and Kozlovski (2020); Hosseini Dehsiri and Amiri (2024); Krikke et al. (2022); Russell & Nasr (2023); Singhal et al. (2021);
Financial risk transfers	Economic risk management through insurance, emission contracts and compliance mechanisms.	Gong et al. (2024); Karagiannis et al. (2019)
Local focus and distributed operation	Establishing local partnerships and regional networks enables strengthening organizational resilience and protecting strategic knowledge.	Hamam et al. (2023); Imbrenda et al. (2023); Rizos et al. (2016); Veleva & Bodkin (2018);
PSS and contractual mechanisms	Leases, warranties, and contractual arrangements allow companies to protect knowledge in circular service models.	Azcarate-Aguerre et al. (2022); Obara Kai et al. (2022); Russell & Nasr (2023); Singhal et al. (2021); Van Loon et al. (2021);
Co-decision-making in politics	Joint development of standards and regulations enables the secure exchange and dissemination of knowledge.	Monciardini et al. (2024); Munir et al. (2024); Ramani & De Giovanni (2025); Sund et al. (2025)
Risk measurement systems	Environmental accounting, KPIs and indicators of significant impacts as tools for monitoring and managing risks. EMA, AIMRE for early detection of rebound risks.	Jain et al. (2018); Karagiannis et al. (2019); Krikke et al. (2022); Metic et al. (2024); Rodrigues et al. (2023);

Note. NDA – Non-Disclosure Agreement; FAIR – Findable, Accessible, Interoperable, Reusable; IoT – Internet of Things; CLSC – Closed-Loop Supply Chain; KPI – Key Performance Indicators; PSS – Product-Service System

Source(s): Authors' own elaboration

Companies rely on digital solutions to control access to data, as well as financial instruments to transfer risks and pilot projects to reduce uncertainty. In practice, formal mechanisms (e.g. contracts, licenses) and informal approaches (trust, network coordination) are often combined. Economic risk management in the circular economy requires a flexible multi-layered approach. (Table 3)

The review shows that companies in the circular economy manage the multifaceted tensions between protecting and sharing knowledge. They often opt for compromise solutions that combine formal and informal approaches. Companies use classic financial indicators and holistic approaches that combine environmental, market and organizational aspects. Depending on the situation, the company decides on a management strategy. A combination of selective disclosure, digital solutions, partnership agreements and the gradual introduction of innovations prevail. The protection of trade secrets in the circular economy is a process of adaptation that depends on economic opportunities, risks and the institutional environment.

Based on the above, we focus on the discussion and analyse in detail the findings from the literature review. In particular, we analyse the connection between theoretical starting points and what arguments the analysis shows for practice and future research.

5 Discussion

Based on the literature review, we find that the term “trade secret” is less frequently used in the context of the circular economy in a narrow legal sense. Authors more often use the terms: strategic knowledge, key information or confidential practices. Research focuses mainly on the practical level of knowledge protection and sharing, rather than on the formal-legal framework. Capponi et al. (2025) show that companies in the circular economy address knowledge protection issues mainly through the dilemma between open innovation and maintaining competitive advantage, with the formal framework of trade secrets often in the foreground. Veleva and Bodkin (2018) state that companies in partner networks face the tension between cooperation and the risk of losing control over knowledge, which they describe as practical decisions about sharing sensitive information rather than legal discussions about trade secrets. Monciardini et al. (2024) find that socially oriented circular models are based on trust and informal mechanisms, treating confidential practices as a common good, rather than being protected by institutionalized legal instruments.

The reviewed literature also reflects differing perspectives. One stream emphasises openness, collaboration, and knowledge diffusion as prerequisites for circular transformation (Monciardini et al., 2024; Ramani & De Giovanni, 2025). On the other hand, emphasis is placed on the importance of protecting strategic knowledge and maintaining competitive advantage through selective disclosure and legal safeguards (Capponi et al., 2025; Klein, 2023). The findings

indicate that firms rarely adopt fully open or fully closed approaches, but rather develop context-specific approaches that combine elements of openness and protection.

In the first research question, we asked: How do companies in the circular economy manage the tension between information sharing and the protection of key knowledge? The analysis shows that the tensions between information sharing and the protection of knowledge in the circular economy are multifaceted. The highlighted dilemma is the relationship between intellectual property protection and the diffusion of innovation (Capponi et al., 2025; Ramani & De Giovanni, 2025). Companies weigh the competitive advantage that comes with a closed approach and the broader market impact of disclosure. Similarly, Capponi et al. (2025), Hamam et al. (2023), Veleva and Bodkin (2018) find that partnerships create opportunities for innovation, but at the same time increase the risks of losing control and key knowledge. Van Loon et al. (2021) and Sawe et al. (2021) point to the conflict between short-term profits and long-term sustainable benefits. Moon and Lee (2021) and Hosseini Dehsiri and Amiri (2024) highlight the tension between the dynamic capabilities of companies and the demands for standardization. A particular challenge is digital transparency, which strengthens trust, while increasing the risks of revealing trade secrets (Hunka et al., 2025; Lin & Chang, 2024). It is clear that tensions are universal and occur at different levels, within organizations, between organizational and institutional. The management of tensions is often selective and situational, which leads to “weaker” forms of circularity, especially where cooperation remains limited.

The second question we analyzed: What are the key economic factors and methods by which companies evaluate the benefits and risks of knowledge disclosure in a circular economy? Several authors define the economic factors and methods by which companies evaluate the benefits and risks of knowledge sharing. Krikke et al. (2022) show that traditional financial indicators, mainly ROI and EVA, are used, as well as cost savings and discounts for customers. Hunka et al. (2025) show that consumers are willing to pay more for access to product information through digital traceability. Transportation costs and logistical proximity have a decisive impact on the feasibility of industrial symbiosis (Hamam et al., 2023). Veleva and Bodkin (2018) point out that differences in the pace of innovation between large companies and startups create risks of additional costs, because partners often invest at different rates and their investments are difficult to coordinate. Companies often use LCA and EMA to assess the effects of circular models, as these methods allow for the simultaneous evaluation of economic costs and environmental benefits (Hosseini Dehsiri and Amiri, 2024). The methodology for the economic evaluation of benefits and risks in the circular economy is not standardized. Companies use very different methods: classic financial indicators such as ROI, NPV, EVA and life cycle analysis (LCA) and environmental accounting tools (EMA). There is no uniform methodology and the results are often tied to the specific situation in an individual industry or company. All this makes comparisons between cases difficult and reduces transparency for investors, which can consequently hinder the wider implementation of circular models.

The third research question asks: What strategies do companies use to economically manage the risks associated with protecting trade secrets in circular business models? Companies use different strategies to manage the risks associated with protecting trade secrets. Capponi et al. (2025) and Ramani and De Giovanni (2025) emphasize that companies often use a closed innovation approach and selectively disclose information, with licensing being one of the key protection mechanisms. Some organizations build on trust, participatory governance and shared values, and this reduces the need for formal protection tools (Monciardini et al., 2024; Veleva and Bodkin, 2018). The use of digital tools, such as QR codes and blockchain solutions, allows companies to increase product traceability and process transparency, while ensuring the protection of sensitive data. In this way, companies balance the need for consumer trust with the requirements for protecting trade secrets (Hunka et al., 2025; Lin & Chang, 2024). Management support is crucial for the implementation of circular strategies if there are doubts about their economic feasibility and judgment and also represents a broader organizational challenge (Van Loon et al., 2021). Companies are looking for a balance between formal approaches (licenses, contracts, NDAs), informal approaches (trust, ethical promises) and technological approaches (digital traceability). Risks need to be managed through guaranteed legal protection, through participation in networks and through data control and traceability. Successful risk management is likely to be based on combinations and interweaving of the above dimensions, while public incentives also significantly reduce economic risks and encourage companies to be more open.

When managing the tension between protection and cooperation, a situation arises where companies often prioritize short-term competitiveness over long-term benefits, thereby limiting the broader impact of circular practices. The economic factors and methods by which companies evaluate benefits and risks are diverse, and the company seeks a balance between classic financial indicators (return on investment, economic value added) and sustainability methods (life cycle assessment, environmental accounting, consumer willingness to pay analysis for transparency), and precisely dispersion is a challenge because the results are often disjointed and difficult to measure, which limits their usefulness in strategic decision-making. Strategies for economic risk management are diverse. These include legal mechanisms, trust agreements and digital solutions for traceability. These are effective in the case of institutional incentives that support cooperation. Companies often maximize private benefits, thereby limiting the circular potential. Systemic changes require institutional mechanisms that reduce the costs of knowledge sharing while increasing security and trust for cooperation.

Thus, the analysis shows that institutional mechanisms also play an important role in managing the tension between protection and knowledge sharing. These include standardization, such as the establishment of uniform reporting and traceability protocols, public policies in the form of incentives and regulations, and industry initiatives, such as partnerships and certification schemes. Such frameworks reduce the costs of cooperation, strengthen trust between

companies, and enable more secure sharing of sensitive information. A predictable environment is created in which responsibility is distributed among stakeholders.

6 Conclusion

This article provides an overview of the economic aspects of trade secrets in the circular economy. We answer three research questions, discuss the tensions between sharing and protecting knowledge, key economic factors in evaluating benefits and risks, and strategies for economically managing risks. Our findings are valid for trade secrets in a broader sense, i.e. all forms of strategic knowledge that companies either protect or share.

First, we found that companies across industries experience similar tensions between intellectual property protection and the diffusion of innovation, between competitiveness and collaboration, and between short-term profits and long-term sustainability. Companies are developing innovative forms of collaboration, but the results also show that a logic of closed innovation often prevails, limiting the dissemination of circular practices more broadly.

Companies use a wide variety of economic factors and methods to evaluate the benefits and risks of knowledge disclosure. They use traditional financial indicators, such as ROI and EVA, as well as methods such as life cycle analysis, ecological accounting and measuring consumers' willingness to pay. The use of these diverse methods makes comparisons difficult and reduces the attractiveness of circular business models for investors.

A review of risk management strategies shows that companies use a combination of formal mechanisms (e.g. contracts, licenses, NDAs), informal forms (trust, ethical commitments, shared values) and technological solutions (digital traceability, blockchain). The choice of strategies often depends on the industry, company size and institutional environment. Public policies and incentives that enable companies to share innovations more safely play an important role in reducing risks.

The findings show that companies often target private benefits and thereby contribute to the development of so-called "weak circularity", especially where they integrate the circular economy into existing business models without fundamental transformation or sustainable transformation. To achieve full impact in the circular economy, it is necessary to strengthen institutional mechanisms that reduce the costs of participation, promote open innovation and ensure the protection of trade secrets in a way compatible with sustainability goals.

This review confirms that economic aspects are key to understanding and managing trade secrets in the circular economy. Currently, companies rely on different indicators and approaches (e.g. ROI, EVA, LCA, consumer willingness to pay), which creates a diverse view. Fragmentation makes comparisons between companies and industries difficult and reduces

transparency for investors and policymakers. Standardized valuation methods would enable more comparable results and facilitate investment decisions, the design of supporting policies and the wider implementation of circular business models. Furthermore, the research shows that companies often use strategies (e.g. NDAs, licenses, digital tracking technologies) without a clear understanding of how the combinations complement each other. A deeper understanding of the combinations of strategies would enable a more balanced risk management. Companies could at the same time protect their core knowledge and reap the benefits of the spread of innovation in the ecosystem. This is important for the transition from “weak circularity” to “strong circularity”, where social and environmental impacts are taken into account in addition to economic ones.

A key finding of the review is that institutional mechanisms are essential to overcome these limitations. Standards, public policies and industry initiatives can reduce the costs of collaboration while ensuring the security of knowledge sharing. They enable companies to make the economic risk of information sharing manageable while maintaining a competitive advantage. This confirms that the future development of the circular economy requires systemic solutions that go beyond individual companies and strengthen trust between stakeholders.

Currently, companies use very different economic approaches (e.g. ROI, EVA, LCA, WTP) to economically evaluate the benefits and risks associated with sharing and protecting trade secrets in a circular economy. This diversity makes comparison difficult and reduces the usefulness of the results for investors and policymakers. Further research could develop a framework that combines classical financial indicators with sustainability metrics. Comparable tools for the economic evaluation of benefits and risks would need to be developed. Most of the existing literature is based on models or conceptual discussions. Further in-depth empirical research could be conducted in companies that already use circular models to search for strategies that work best in reducing risks in practice. Such research can help identify which strategies (e.g. formal mechanisms, trust, digital tools) are most effective in practice. Comparative studies across industries are needed to identify where tensions and evaluation methods are most pronounced. Previous research has not developed a uniform methodology, and companies operate differently depending on the sector and the supporting environment. Research shows the decisive influence of public incentives and the institutional framework on the willingness of companies to cooperate. The impact of different incentives (subsidies, tax breaks, regulations) on knowledge protection should be further analysed.

The main contribution of this study lies in the systematic integration of economic, legal, and managerial perspectives on trade secret protection within the context of the circular economy. It provides a structured overview of key tensions, evaluation approaches, and risk management strategies, thereby contributing to a more comprehensive understanding of decision-making processes in this field. Finally, this study is based on a systematic literature review and therefore

aims to synthesise and systematise existing approaches rather than develop a fully operational analytical model.

References

1. Andreicovici, I., Bormann, S., & Hombach, K. (2024). Trade secret protection and the integration of information within firms, *Management Science*, 71(2), 1213–1237. <https://doi.org/10.1287/mnsc.2021.03484>
2. Azcarate-Aguerre, J. F., Klein, T., Konstantinou, T., & Veerman, M. (2022). Facades-as-a-Service: the role of technology in the circular servitisation of the building envelope. *Applied Sciences*, 12(3), 1267. <https://doi.org/10.3390/app12031267>
3. Capponi, G., Castaldi, C., & Piscicelli, L. (2025). Beyond business as usual? How organisations navigate tensions between circular economy and intellectual property right strategies. *Industry and Innovation*, 1–32. <https://doi.org/10.1080/13662716.2024.2449262>
4. De Giovanni, P. (2022). Leveraging the circular economy with a closed-loop supply chain and a reverse omnichannel using blockchain technology and incentives. *International Journal of Operations & Production Management*, 42(7), 959–994. <https://doi.org/10.1108/IJOPM-07-2021-0445>
5. European Parliament, & Council of the European Union. (2016). *Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure*. Retrieved from <http://data.europa.eu/eli/dir/2016/943/oj>
6. European Commission: Executive Agency for Small and Medium-sized Enterprises. (2021). *Trade secrets: managing confidential business information*. Publications Office. <https://data.europa.eu/doi/10.2826/449107>
7. Giuffrida, R., de Majo, C., Giuffrida, M., & Broadbent, I. D. (2025). FAIR data management practices to introduce circular economy in aquaculture: benefits, barriers and a preliminary roadmap. *International Journal of Data Science and Analytics*, 1–21. <https://doi.org/10.1007/s41060-025-00765-4>
8. Gonçalves, B. D. S. M., Carvalho, F. L. D., & Fiorini, P. D. C. (2022). Circular economy and financial aspects: A systematic review of the literature. *Sustainability*, 14(5), 3023. <https://doi.org/10.3390/su14053023>
9. Gong, Y., Stanley, J., Wang, B., & Alharithi, M. (2024). Examining strategies developed by insurance companies for addressing carbon emissions in the automotive supply chain in the UK. *Sustainability*, 16 (22), 9895. <https://doi.org/10.3390/su16229895>
10. Hamam, M., Spina, D., Raimondo, M., Di Vita, G., Zanchini, R., Chinnici, G., Toth, J., & D'Amico, M. (2023). Industrial symbiosis and agri-food system: Themes, links, and relationships. *Frontiers in Sustainable Food Systems*, 6, 1012436. <https://doi.org/10.3389/fsufs.2022.1012436>
11. Hickey, P., & Kozlovski, E. (2020). E-strategies for aftermarket facilitation in the global semiconductor manufacturing industry. *Journal of Enterprise Information Management*, 33(3), 457–481. <https://doi.org/10.1108/JEIM-05-2019-0124>

12. Hossain, M., Park, S., Suchek, N., & Pansera, M. (2024). Circular economy: A review of review articles. *Business Strategy and the Environment*, 33(7), 7077–7099. <https://doi.org/10.1002/bse.3867>
13. Hosseini Dehshiri, S. J., & Amiri, M. (2024). Considering the circular economy for designing closed-loop supply chain under hybrid uncertainty: a robust scenario-based possibilistic-stochastic programming. *Expert Systems with Applications*, 238, 121745. <https://doi.org/10.1016/j.eswa.2023.121745>
14. Hunka, A. D., Daniel, A. M., Bour, A., & Boyer, R. H. (2025). Is transparency a good business strategy? Consumer preferences and willingness to pay for information about the chemical content of reused and recycled clothing. *Sustainable Production and Consumption*, 56, 128–141. <https://doi.org/10.1016/j.spc.2025.03.020>
15. Imbrenda, V., Coluzzi, R., Mariani, F., Nosova, B., Cudlinova, E., Salvia, R., ... & Lanfredi, M. (2023). Working in (slow) progress: socio-environmental and economic dynamics in the forestry sector and the contribution to sustainable development in Europe. *Sustainability*, 15(13), 10271. <https://doi.org/10.3390/su151310271>
16. Jain, S., Jain, N. K., & Metri, B. (2018). Strategic framework towards measuring a circular supply chain management. *Benchmarking: An Journal*, 25(8), 3238–3252. <https://doi.org/10.1108/BIJ-11-2017-0304>
17. Karagiannis, I., Vouros, P., Skouloudis, A., & Evangelinos, K. (2019). Sustainability reporting, materiality, and accountability assessment in the airport industry. *Business Strategy and the Environment*, 28(7), 1370–1405. <https://doi.org/10.1002/bse.2321>
18. Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
19. Kirchherr, J., Yang, N. H. N., Schulze-Spüntrup, F., Heerink, M. J., & Hartley, K. (2023). Conceptualizing the circular economy (revisited): an analysis of 221 definitions. *Resources, conservation and recycling*, 194, 107001. <https://doi.org/10.1016/j.resconrec.2023.107001>
20. Klein, M. A. (2020). *Trade Secret Protection in a Developing Economy*. (MPRA Paper No. 103360). Rensselaer Polytechnic Institute, Munich Personal RePEc Archive. Retrieved June 21, 2025, from <https://mpra.ub.uni-muenchen.de/103360/>
21. Klein, M. A. (2023). Trade secret protection, multinational firms and international trade. *International Economics*, 173, 325–342. <https://doi.org/10.1016/j.inteco.2023.01.007>
22. Krikke, H., Palma, N. C., Shell, J., & Andrews, J. (2022). Circular economic surplus asset management: A game changer in life sciences. *IEEE Engineering Management Review*, 50(2), 117–126. <http://doi.org/10.1109/EMR.2022.3174634>
23. Lieder, M., Asif, F. M., Rashid, A., Mihelič, A., & Kotnik, S. (2017). Towards circular economy implementation in manufacturing systems using a multi-method simulation approach to link design and business strategy. *The International Journal of Advanced Manufacturing Technology*, 93(5), 1953–1970. <https://doi.org/10.1007/s00170-017-0610-9>
24. Lin, C. C., & Chang, Y. C. (2024). Impact of circular economy network building: resilience strategy to climate action. *International Journal of Climate Change Strategies and Management*, 16(3), 337–361. <https://doi.org/10.1108/IJCCSM-12-2022-0150>

25. Lu, C. F., Cheng, C. Y., & Hung, Y. L. (2023). Assessing consumer perceptions of chemical leasing business models and possibilities for adoption by Taiwanese manufacturers. *Sustainable Production and Consumption*, 35, 325–337. <https://doi.org/10.1016/j.spc.2022.11.010>
26. Metic, J., Guzzo, D., Kopainsky, B., McAloone, T. C., & Pigosso, D. C. (2024). A simulation-based approach for investigating the dynamics of rebound effects in the circular economy: A case of use-oriented product/service system. *Journal of Environmental Management*, 365, 121627. <https://doi.org/10.1016/j.jenvman.2024.121627>
27. Miller, E. M., Patala, S., & Ovaska, J. P. (2025). Forging the future: Reconfiguring value chains through circular economy meta-organizing. *Organization & Environment*, 38(2), 227–256. <https://doi.org/10.1177/10860266241297340>
28. Monciardini, D., Rocca, L., & Veneziani, M. (2024). Virtuous circles: Transformative impact and challenges of the social and solidarity circular economy. *Business Strategy and the Environment*, 33(2), 642–660. <https://doi.org/10.1002/bse.3505>
29. Moon, S., & Lee, H. (2021). Shaping a circular economy in the digital TV industry: Focusing on ecopreneurship through the lens of dynamic capability. *Sustainability*, 13(9), 4865. <https://doi.org/10.3390/su13094865>
30. Munir, M. T., Naqvi, M., & Li, B. (2024). A converging path: a decade's reflection on net zero emissions and the circular economy. *Frontiers in Energy Research*, 12, 1332174. <https://doi.org/10.3389/fenrg.2024.1332174>
31. Obara Kai, F. O., Fabricio, A. C. B., Miranda, H. B. D., & Martins, S. C. D. S. (2022). Upcycling Process: Consumer and Organization Perception. *Revista de Gestão – RGSA*, 16(1), article e02881. <https://doi.org/10.24857/rgsa.v16.2881>
32. OECD (2025). The Circular Economy in Cities and Regions of the European Union. *OECD Urban Studies*. OECD Publishing. <https://doi.org/10.1787/e09c21e2-en>
33. Ramani, V., & De Giovanni, P. (2025). Circular economy business strategies and public schemes: a game theory-based survey. *International Transactions in Operational Research*. <https://doi.org/10.1111/itor.70031>
34. Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyke, T., ... & Topi, C. (2016). Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and Enablers. *Sustainability*, 8(11), 1212. <https://doi.org/10.3390/su8111212>
35. Rocca, R., Rosa, P., Sassanelli, C., Fumagalli, L., & Terzi, S. (2020). Integrating virtual reality and digital twin in circular economy practices: A laboratory application case. *Sustainability*, 12(6), 2286. <https://doi.org/10.3390/su12062286>
36. Rodrigues, V. D. V., Wander, A. E., & Da Rosa, F. S. (2023). Diagnosis of the sustainability of a poultry value chain from the perspective of environmental management accounting. *Revista de Gestao Social e Ambiental*, 17(1), 1–20. <https://doi.org/10.24857/rgsa.v17n1-021>
37. Rossi, J., Bianchini, A., & Guarnieri, P. (2020). Circular economy model enhanced by intelligent assets from industry 4.0: The proposition of an innovative tool to analyze case studies. *Sustainability*, 12(17), 7147. <https://doi.org/10.3390/su12177147>
38. Russell, J. D., & Nasr, N. Z. (2023). Value-retained vs. impacts avoided: the differentiated contributions of remanufacturing, refurbishment, repair, and reuse within a circular economy. *Journal of Remanufacturing*, 13(1), 25–51. <https://doi.org/10.1007/s13243-022-00119-4>

39. Saidani, M., Yannou, B., Leroy, Y., Cluzel, F., & Kim, H. (2021). Multi-tool methodology to evaluate action levers to close the loop on critical materials–Application to precious metals used in catalytic converters. *Sustainable Production and Consumption*, 26, 999–1010. <https://doi.org/10.1016/j.spc.2021.01.010>
40. Sawe, F. B., Kumar, A., Garza-Reyes, J. A., & Agrawal, R. (2021). Assessing people-driven factors for circular economy practices in small and medium-sized enterprise supply chains: Business strategies and environmental perspectives. *Business Strategy and the Environment*, 30(7), 2951–2965. <https://doi.org/10.1002/bse.2781>
41. Singhal, D., Jena, S. K., Aich, S., Tripathy, S., & Kim, H. C. (2021). Remanufacturing for circular economy: Understanding the impact of manufacturer's incentive under price competition. *Sustainability*, 13(21), 11839. <https://doi.org/10.3390/su132111839>
42. Sonar, H., Sarkar, B. D., Joshi, P., Ghag, N., Choubey, V., & Jagtap, S. (2024). Navigating barriers to reverse logistics adoption in circular economy: An integrated approach for sustainable development. *Cleaner Logistics and Supply Chain*, 12, 100165. <https://doi.org/10.1016/j.clscn.2024.100165>
43. Sund, J. H., Albizzati, P. F., Scheutz, C. and Tonini, D. (2025). Comprehensive assessment of environmental and economic impacts of the entire EU waste management system. *Waste Management*, 204, 114910. <https://doi.org/10.1016/j.wasman.2025.114910>
44. Supanut, A., Maisak, R., & Ratchatakulpat, T. (2024). Circular economy strategies in practice: a qualitative examination of industry adaptation and innovation. *Revista De Gestão - RGSA*, 18(3), article e06723. <https://doi.org/10.24857/rgsa.v18n3-121>
45. Van Loon, P., Van Wassenhove, L. N., & Mihelic, A. (2021). Designing a circular business strategy: 7 years of evolution at a large washing machine manufacturer. *Business Strategy and the Environment*, 31(3), 1030–1041. <https://doi.org/10.1002/bse.2933>
46. Veleva, V., & Bodkin, G. (2018). Corporate-entrepreneur collaborations to advance a circular economy. *Journal of Cleaner Production*, 188, 20–37. <https://doi.org/10.1016/j.jclepro.2018.03.196>

Magda Lužar (1973) holds a PhD in organizational sciences from the Faculty of Organizational Studies in Novo Mesto. She holds a bachelor's degree in economics. She has gained experience and competences working in the financial field of business and non-business. Her research focuses on aspects of management, green strategies and circular economy, as well as knowledge exchange between employees in organizations. She transfers her work experience and theoretical knowledge through lectures to students of various faculties, future graduates of mechanical engineering, organization, social science informatics and computer science.

Povzetek**Ekonomski vidiki varovanja poslovnih skrivnosti v krožnem gospodarstvu**

Raziskovalno vprašanje (RV): Ta članek obravnava vidike varstva poslovnih skrivnosti z vidika krožnega gospodarstva. Osredotoča se na tri raziskovalna vprašanja: (1) kako podjetja obvladujejo napetosti med izmenjavo informacij in varstvom ključnega znanja, (2) kateri so ključni ekonomski dejavniki in metode, s katerimi podjetja ocenjujejo koristi in tveganja razkritja znanja, in (3) katere strategije podjetja uporabljajo za ekonomsko obvladovanje tveganj, povezanih z varstvom poslovnih skrivnosti.

Namen: Cilj je raziskati ekonomske razsežnosti varstva poslovnih skrivnosti v krožnem gospodarstvu. Poudarek je na napetostih med sodelovanjem in varstvom znanja, ekonomskih dejavnikov, ki usmerjajo odločitve o razkritju, in strategijah obvladovanja tveganj.

Metoda: Izveden je bil sistematični pregled literature z uporabo smernic PRISMA v podatkovnih bazah Web of Science in Scopus. Analiza je vključevala strokovno pregledane članke, objavljene v letih 2016–2025 v angleščini, s področja okoljske znanosti, trajnosti, poslovnih znanosti in ekonomije. Po večstopenjskem postopku izbora je bilo v končno analizo vključenih 35 člankov.

Rezultati: Analiza kaže, da so napetosti med varovanjem in deljenjem znanja zelo razširjene in se odražajo v dilemah med kratkoročno konkurenčnostjo in dolgoročno trajnostjo. Ekonomski dejavniki in metode vrednotenja so raznoliki. Podjetja uporabljajo tradicionalne finančne kazalnike za ocenjevanje odločitev: donosnost naložbe in ekonomska dodana vrednost. V praksi jih dopolnjujejo pristopi vrednotenja trajnosti, npr. analiza življenjskega cikla, okoljsko računovodstvo in merjenje pripravljenosti potrošnikov za plačilo. Strategije upravljanja tveganj temeljijo na kombinaciji formalnih mehanizmov, v katerih prevladujejo pogodbe in licence, neformalnih pristopov, ki vključujejo zaupanje in etične zaveze, ter tehnoloških rešitev, kot sta digitalna sledljivost in tehnologija veriženja blokov. Učinkovitost teh strategij je tesno povezana z institucionalnimi spodbudami, ki zmanjšujejo tveganja in spodbujajo sodelovanje.

Organizacija: Ugotovitve ponujajo smernice poslovnim vodjem za uravnoteženo upravljanje varstva znanja v krožnih poslovnih modelih. Raziskava poudarja pomen sistematičnega ocenjevanja ekonomskih koristi in tveganj razkritja informacij ter vzpostavitve ustreznih mehanizmov za zmanjšanje negotovosti sodelovanja.

Družba: Pomembno je poudariti institucionalne mehanizme za podporo varni izmenjavi znanja, ki ima širše posledice za trajnostni razvoj, saj omogoča učinkovitejšo uporabo virov, zmanjšane vplive na okolje in večjo odgovornost podjetij do družbe in okolja.

Originalnost: Podjetja pogosto usmerjajo ekonomske odločitve k maksimiranju zasebnih koristi, kar omejuje potencial za transformativne učinke krožnosti. Trajnostna transformacija zahteva institucionalne mehanizme, ki zmanjšujejo stroške sodelovanja in povečujejo varnost izmenjave znanja.

Omejitve/nadaljnje raziskovanje: Raziskava je omejena na strokovno pregledane članke v angleščini, objavljene med letoma 2016 in 2025 ter indeksirane v dveh podatkovnih bazah, analiza pa temelji na sekundarnih virih. Nadaljnje raziskave bi lahko vključevale poglobljene študije primerov, primerjalne analize med državami in empirično testiranje vpliva institucionalnih mehanizmov na pripravljenost podjetij za deljenje in zaščito znanja v krožnih poslovnih modelih.

Ključne besede: krožno gospodarstvo, poslovne skrivnosti, ekonomski vidiki, deljenje znanja, zaupne informacije, obvladovanje tveganj, institucionalni mehanizmi.



Articles in this journal are licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).



This journal is published by [Faculty of Organisation Studies in Novo mesto](https://www.fos.unm.si/).