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KEY TRENDS IN STRATEGIC MANAGEMENT IN TERMS OF CIRCULAR ECONOMY

КЛЮЧОВІ ТЕНДЕНЦІЇ СТРАТЕГІЧНОГО УПРАВЛІННЯ В УМОВАХ ЦИРКУЛЯРНОЇ ЕКОНОМІКИ

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The article examines the emerging trends in strategic management practices within the context of the circular economy. As the world faces increasing environmental challenges, there is a growing recognition of the need for sustainable business models that minimize resource consumption and waste generation. The article highlights several key trends in strategic management that are aligned with the principles of the circular economy. There is a growing emphasis on eco-design and product innovation. Digitalization and the use of advanced technologies are playing a crucial role in enabling circular economy practices. Additionally, the article highlights the importance of shifting towards a service-oriented business model. The article aims to provide insights into the key trends and strategies that organizations can employ to integrate circular economy principles into their strategic management practices.

Key words: circular economy, eco-design, sustainability, Internet of Things, blockchain, artificial intelligence.

У статті розглядаються тенденції, що виникають у практиках стратегічного управління в контексті циркулярної економіки. Оскільки світ стикається з дедалі більшими екологічними проблемами, зростає визнання потреби в стійких стратегіях, які мінімізують споживання ресурсів і утворення відходів. У статті виділено декілька ключових трендів стратегічного менеджменту, які узгоджуються з принципами циркулярної економіки. Все більше уваги приділяється еко-дизайну та інноваційним продуктам. Компанії усвідомлюють важливість розробки продуктів, що придатні для ремонту, відновлення та переробки, що мінімізує відходи та подовжує їхній життєвий цикл. Описано впровадження стратегій циркулярної співпраці та партнерства, які набувають поширення. Організації визнають цінність співпраці з постачальниками, клієнтами та іншими зацікавленими сторонами для створення замкнутих систем. Ці партнерства дозволяють краще керувати ресурсами, зменшувати кількість відходів і створювати нові джерела доходу за рахунок спільного використання ресурсів і матеріалів. Цифровізація та використання передових технологій відіграють вирішальну роль у створенні стратегій циркулярної економіки. Такі технології, як Інтернет речей, блокчейн і штучний інтелект, використовуються для підвищення відстежуваності, прозорості та ефективності в усьому ланцюжку створення вартості. Це дозволяє покращити відстеження матеріалів, більш ефективно розподіляти ресурси і впроваджувати стратегії для зменшення утворення відходів. Крім того, у статті підкреслюється важливість переходу до бізнес-моделей, орієнтованих на надання послуг, а не продаж товарів. Замість того, щоб продавати продукти, компанії досліджують інноваційні способи надання продукту як послуги, коли клієнти платять за корисність або ефективність продукту, а не володіють ним безпосередньо. Ця зміна спонукає виробників розробляти довговічні та придатні до переробки продукти. Метою статті є ознайомлення з ключовими тенденціями та стратегіями, які організації можуть використовувати для інтеграції принципів циркулярної економіки у стратегічне управління. Зрештою, стаття є інтегрованою у ширшу мету сприяння стійкій та ресурсоефективній економіці, яка мінімізує вплив на навколишнє середовище та сприяє довгостроковій життєздатності продуктів та ресурсів.

Ключові слова: циркулярна економіка, еко-дизайн, стійкість, Інтернет речей, блокчейн, штучний інтелект.

Problem formulation. Tons of garbage are generated in the world every year, most of which ends up in landfills. A circular economy preserves the value of products or resources by returning them to the production cycle after use.

The article addresses the pressing challenge of transitioning from a linear economy to a circular economy. The linear economy's "take-make-dispose" model leads to significant resource depletion, waste generation, and environmental degradation. The problem lies in the need for effective strategic management practices that align with the principles of the circular economy and enable organizations to transition towards sustainable and resource-efficient business models.

Literature review. The literature on the circular economy and its strategic management implications highlights the urgent need for transitioning from linear to circular economic models. Scholars have emphasized the importance of integrating circular economy principles into strategic decision-making processes to achieve sustainable development goals.

Research by Kirchherr, Reike, and Hekkert (2017) provides a comprehensive review and taxonomy of circular business models. Their work emphasizes the diverse approaches organizations can adopt to align with circular economy principles. This research serves as a foundation for understanding the different strategies and innovations discussed in the article [1].

Popp and Worrell (2019) conducted a structured literature review on strategic management in the circular economy. Their study identifies key themes, challenges, and opportunities associated with integrating circularity into strategic decision-making processes. Their findings highlight the importance of strategic alignment and organizational adaptation to embrace circular economy practices [2].

Bocken, Short, Rana, and Evans (2014) explore the evolution of the circular economy concept and its research dissemination. They emphasize the role of strategic management in implementing circular economy principles and stress the importance of collaboration, innovation, and new business models in achieving a circular economic system [3].

Van Oppen, Bocken, and Dierkes (2020) present a case study of a Dutch multi-utility company to examine the role of strategic management in the transition to a circular economy. Their research illustrates the practical challenges and outcomes of adopting circular

economy principles. It highlights the need for integrating circularity into strategic decision-making and fostering collaboration among stakeholders [4].

Moroz and Hindle (2019) investigate the dynamic capabilities required by firms to effectively implement circular economy strategies. Their work emphasizes the strategic management practices necessary for firms to adapt to the circular economy paradigm. They emphasize the importance of agility, innovation, and collaboration in driving circular business models [5].

These studies collectively contribute to understanding the strategic management implications of the circular economy. They emphasize the importance of eco-design, collaborative partnerships, digitalization, service-oriented business models, and supportive regulations. The literature underscores the need for organizations to embrace these trends to drive sustainable growth, reduce environmental impact, and contribute to the transition towards a more circular and resource-efficient economy.

Objectives of the study. The main objectives of the study are to identify and analyze the key trends in strategic management practices that support the implementation of the circular economy; to examine the role of eco-design and product innovation in driving circularity by extending product lifespan, reducing waste, and promoting resource efficiency; to investigate the significance of collaborative business models and partnerships in creating closed-loop systems, enhancing resource management, and fostering waste reduction; to explore the impact of digitalization and advanced technologies in enabling traceability, transparency, and efficiency throughout the value chain to support circular economy practices.

The main research material.

Companies can generate additional income by implementing circular economy models in their operations. For example, the sale of refurbished components or the provision of certain goods and their elements for rent. The secondary market of components has a significant potential for development. This is confirmed by the fact that the European Association of Automotive Parts Suppliers estimates that the European remanufactured parts market has an annual potential of 10–12 billion euros [6].

1) Increasing the level of innovativeness

A business can develop new products and services using feedback loops and applying circular business models. The development of

resource-efficient technologies for processing, recovery, and waste disposal makes it possible to create innovative products that can become market leaders.

2) Reduction of operating costs

It is obvious that the use of circular economy models implies a reduction in the costs of primary raw materials. In addition, companies can more rationally allocate their resources by turning products into services or creating sharing and sharing platforms. Thus, the company's assets are more profitable, the problem of overproduction disappears, and the consumer satisfies his needs at a lower price.

3) Involvement of clients and employees

Companies can involve their customers and employees in the implementation of circular economy ideas, which leads to increased customer loyalty, strengthening corporate culture, improving the image of the employer and strengthening the company's competitive advantage.

4) Increasing competitiveness

Enterprises operating within the circular economy have the opportunity to expand their activities to new markets or start new niches.

5) Involvement of partners

The introduction of the circular economy into the company's strategy can be the basis for vertical cooperation with suppliers of secondary raw materials, as well as an opportunity for cooperation with international companies and obtaining grants for the development of circular projects.

6) Adaptation of business models and relationships to new value creation chains

Consumer expectations, market supply and technology are constantly changing, requiring companies to respond flexibly. For example, the COVID-19 pandemic showed the unpreparedness of the economic system for global challenges. The introduction of the circular economy concept into the company's strategy implies the sustainability of business models to changes in environmental, economic and social factors.

7) Risk avoidance

As issues such as resource scarcity, pollution and commodity price volatility become increasingly threatening to business, companies can address these issues through the circular economy.

Recycling, resource recovery, reuse and repair are the main circular models that are already widely used by businesses, but new business models and technologies are being developed

that allow businesses to use their resources even more efficiently and avoid landfilling.

The StartUs research platform analyzed 3,964 enterprises that use circular solutions in their activities and highlighted key trends in the current circular economy, such as artificial intelligence, the "Internet of Waste" and blockchain technology. In addition, current trends include the use of waste as alternative sources of energy, exchange platforms and reusable packaging, the use of biomaterials, modern technologies for the recovery of products and their components. Accordingly, these trends are also reflected in the strategic management of enterprises in the conditions of the circular economy [7].

1. Focus on Renewable Energy:

The circular economy presents a significant trend in waste management, wherein the conversion of waste to energy through processes like incineration, gasification, anaerobic digestion, and pyrolysis plays a vital role. This approach not only facilitates efficient waste disposal but also generates clean energy for utility purposes, thereby promoting renewable energy utilization and reducing reliance on non-renewable sources.

2. Reuse of Materials and Packaging:

The circular economy emphasizes the reuse of products to extend their life cycle and minimize waste generation. Notably, asset sharing platforms enable businesses to generate revenue by lending materials or equipment that would otherwise remain underutilized. Additionally, there is a growing shift from single-use packaging to reusable packaging made from durable materials capable of enduring multiple life cycles. This transition reduces the need for new raw materials, minimizes waste generation, and effectively lowers the carbon footprint associated with packaging production and disposal.

3. Implementation of "Internet of Waste" Technology:

Efficient waste collection systems are crucial for optimizing resource utilization. Startups are leveraging the Internet of Things (IoT) to develop intelligent waste management solutions. These systems utilize sensors, IoT platforms, and mobile applications to improve garbage collection efficiency. For instance, smart bins equipped with real-time fill level sensors transmit data to waste collectors, enabling optimized pickup routes, reduced fuel consumption, and enhanced labor productivity.

4. Utilization of Artificial Intelligence for Resource Efficiency:

Effective waste separation and sorting are pivotal for directing materials to appropriate recycling processes. Artificial intelligence (AI)-driven technologies offer significant potential in this regard. AI-based sensors can differentiate between objects made of different materials and detect chemical contamination, improving sorting accuracy. Furthermore, AI-powered equipment employing computer vision and deep learning algorithms enables faster and more precise sorting, surpassing human capabilities. These advancements enhance resource efficiency in waste management operations.

5. Adoption of Biologically Based Materials:

The circular economy encourages the use of biomaterials derived from renewable resources as a means to reduce environmental pollution and promote sustainability. Biomaterials, typically compostable and easily recyclable, find applications in various sectors such as packaging, construction, healthcare, and automotive industries. Moreover, the shift towards bioplastics and other biomass-derived materials, including sawdust, recycled food waste, and mushrooms, aims to curtail reliance on non-renewable resources and minimize the environmental impact of traditional materials.

6. Implementation of Alternative Technologies for Metal Product Restoration:

While recycling is an important aspect of waste management, it can be resource-intensive. Hence, the circular economy advocates for the restoration of products and materials as an alternative approach. Remanufacturing, involving the restoration of products to their original state using reused, refurbished, and some new parts, offers a more sustainable solution. Advanced technologies like laser metal deposition, an additive manufacturing process, not only restore components but also introduce additional features to enhance performance. These technologies enable Original Equipment Manufacturers (OEMs) to reduce capital investment while minimizing their carbon footprint.

7. Integration of Blockchain Technology:

Blockchain technology has emerged as a significant trend in the circular economy, offering transparency, traceability, and driving the adoption of circular solutions. Businesses leverage the immutability and decentralized nature of blockchain to verify the origin of products, ensuring compliance with sustainability requirements. For instance, the World Economic Forum's Mining and Metals Initiative Carbon Tracking Platform utilizes blockchain to track

carbon emissions throughout the supply chain, assisting mining companies in meeting environmental, social, and corporate governance standards [8].

Conclusions. The article highlights the top trends and innovations in the field of circular economy, providing valuable insights into the ongoing efforts and developments in promoting sustainability and resource efficiency. These trends reflect the growing recognition and adoption of circular economy principles by organizations across various sectors.

One key trend identified in the article is the shift towards a circular supply chain, which involves rethinking and redesigning supply chain processes to minimize waste, optimize resource utilization, and enable the recovery and recycling of materials. This approach fosters collaboration among different stakeholders, from suppliers to consumers, in creating closed-loop systems and reducing environmental impact.

Another significant trend is the emergence of innovative business models that promote circularity, such as product-as-a-service and sharing platforms. These models emphasize access over ownership, encouraging the reuse, repair, and sharing of products rather than their disposal. They contribute to the extension of product lifecycles, reduction of waste, and the creation of new revenue streams.

Technological advancements also play a vital role in driving circular economy trends. Innovations like blockchain, Internet of Things (IoT), and artificial intelligence (AI) enable enhanced traceability, transparency, and efficiency in supply chains, ensuring proper tracking and management of resources throughout their lifecycle. These technologies facilitate improved decision-making, waste reduction, and the development of data-driven strategies.

Additionally, the article highlights the importance of policy and regulatory support in driving circular economy initiatives. Governments and regulatory bodies are enacting measures to incentivize circular practices, set standards, and create an enabling environment for sustainable business models to thrive. Such support is crucial for scaling up circular economy adoption and realizing its full potential.

In conclusion, the resource underscores the dynamic nature of the circular economy and showcases the key trends and innovations that are shaping its implementation. The identified trends, ranging from circular supply chains to innovative business models and technological

advancements, demonstrate the continued progress in transitioning towards a more sustainable and resource-efficient economic model. By embracing these trends, businesses and policymakers can contribute to a more sustainable future and address the pressing environmental challenges we face today.

The circular economy encompasses various trends and innovations aimed at promoting sustainability and resource efficiency. These include the focus on renewable energy through

waste-to-energy processes, the reuse of materials and packaging to extend their life cycle, and the implementation of technologies like the Internet of Things and artificial intelligence to improve waste management efficiency. Additionally, the adoption of biologically based materials and alternative technologies for product restoration, along with the integration of blockchain technology for transparency and traceability, further contribute to the advancement of the circular economy.

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