

# THE IMPACT OF DIGITALISATION IN A CIRCULAR ECONOMY. HOW ARTIFICIAL INTELLIGENCE IS TRANSFORMING TRADITIONAL MARKETING INTO A GREEN ONE

*Denisa-Roxana Botea-Muntean,*

*Lucian Botea\**

## **Abstract**

*In a circular economy, the impact of digitalisation is increasingly felt within the transformational processes and promotion of sustainability by companies. With the help of artificial intelligence and components of improve, convert and transform, research supports the idea that digitalisation promotes ecological change by adapting traditional marketing into green marketing. In this context, the influence and importance of sustainable and AI-supported promotion methods, which are both environmentally friendly, efficient and innovative, are highlighted. Methodologically, the research is exploratory and uses specific research questions to analyse the efficiency of green marketing strategies, based on AI and to bring new research perspectives, especially considering the limitations of the research related to the novelty of the topic and key elements, such as: sustainable development, technological change, digitalisation and circular economy. The research conclusions, based on the results obtained and in accordance with the specialised literature, emphasize that digital transformation and the implications of AI have a significant impact in shaping consumer attitudes and behavior towards ecological marketing, the strategies of this type of marketing defining new sustainability perspectives.*

**Keywords:** sustainability, technological change, marketing, environmental economics, digitalisation, circular economy, artificial intelligence

**JEL Classification:** Q01, O33, F23, M31, Q55

## **1. Introduction**

The background of the theme is founded on the premise that environmental protection has become one of the main targets on the agenda of companies that aim to become sustainable, green and environmentally friendly. The subject started from the United Nations mention on the agenda of the Sustainable Development Goals, which aim to reduce global carbon dioxide emissions by 45% by 2030 compared to 2010 levels and to reach net zero emissions by 2050.

---

\*Denisa-Roxana Botea-Muntean is PhD student at Bucharest University of Economic Studies, Bucharest.

E-mail address: munteandenisa21@stud.ase.ro

Lucian Botea is PhD Lecturer at Romanian-American University, Bucharest.

E-mail address: lucian.botea@rau.ro

Starting from these directives, a growing number of global companies and corporations have developed a sustainability strategy based on their own principles, which value the components: environment, economy and society, in accordance with the principles of the circular economy: recycling, reduction, reuse [Mocho, (2020)].

Relevance of the theme is noticed thus through the main research question: *How is AI technology reshaping traditional marketing into a green one to create more sustainable strategies?* Since digitalisation is a phenomenon of the modern world that supports ecological change, its results make it possible to improve, convert and transform processes and business models, with an effect on consumer behavior [Ramesohl, S., Berg, H., & Wirtz, J., (2022)]. Thus, the supply and demand relationship can be viewed holistically from the perspective of both companies and end consumers.

The structure of the paper is divided into three major chapters, such as literature review, methodology and results and discussion, these relying on the key elements of the paper: digitalisation, circular economy and green marketing. The secondary research questions: "What are the implications of AI in marketing?", "What impact do sustainable promotion methods have?" and "What are the effects of digitalisation in a circular economy?" outline the scientific approach of the topic, in accordance with the review of the specialised literature.

## **2. Literature review**

### **2.1. The impact of digitalisation in circular economy**

Digitalisation is developing a transformational potential that is profoundly changing people, our societies and the planet [Kottmeyer, B., (2021)]. From the facilities it offers to the challenges it faces, digitalisation plays an increasingly important role in any activity undertaken. When we talk about promotion in terms of marketing, the impact of technology is substantial, especially since we are considering, on the one hand, protecting the environment through the use of digital means of promotion, and on the other hand, developing society in accordance with sustainable development. Specialised authors have emphasised that digitalisation is not only about the use of emerging technologies, but also about the development of new, human-centered services and products, disruptive changes in service delivery, personalised services, and new partnerships [Redlein, A. and Höhenberger, C. (2020)].

The circular economy also has an impact on this transition to a digital transformation, encompassing and adapting traditional marketing to a new form of marketing, the green one. In other words, being digital in a circular economy means, above all, being systematic [Ramesohl, S., Berg, H., & Wirtz, J., (2022)] because digitalisation is considered an enabler of a circular economy [Ronkainen, L., (2022)]. Because digitalisation is currently seen as an enabler

of circular economy, linking the two concepts results in a technological future perspective, with a positive impact on the environment [Chauhan, C., Parida, V. and Dhir, A. (2022)]. Whether we are talking about promoting sustainability, or about implementing efficient, innovative and environmentally friendly practices, digital technologies support the approach towards a digital transformation within the circular economy.

In this case, traditional marketing strategies become sustainable marketing strategies, highlighting the transition from a traditional type of marketing to a green one, based on the principles of circularity and sustainability objectives. The impact of digitalisation in the circular economy in relation to the transition of marketing towards the sustainable sphere, thus marks a technological boost supported by artificial intelligence towards future promotion methods. This approach is highlighted especially by the increasing notoriety of the circular economy concept and awareness of the impact that human or technological processes have on the environment.

## ***2.2. Traditional marketing vs green marketing***

As a field in itself, marketing in the author Philip Kotler's understanding is not only about selling, but also about creating value for customers. Starting from this assumption, the adaptation of classic marketing to ecological marketing is defined rather by the environmental component of the sustainability's pillars (environmental, social and economic responsibility). Basically, the marketing mix with the 4Ps (price, product, promotion, placement) was transposed into a sustainable approach, which gives rise to a type of green marketing by exposing marketing elements in an environmentally friendly form [Mishra, P. and Sharma, P. (2014)].

As a result of globalisation and sustainable development in accordance with the development of society, green marketing represents a redefinition of the concept of sustainability in favor of the demand-supply relationship, and with the implications of buying behavior from the consumer's perspective, and understanding the market and adapting to the market from the perspective of companies. At the same time, in terms of companies and business models, adopting and implementing a type of green marketing certainly marks a competitive advantage [Sripathi, M., Leelavati, T.S., Krishna, K.V.P., Sindhuja, A., Lakshmi, T.D., Vamsi, E. and Singh, N.S. (2022)], considering the notions of education for sustainability, digitalisation and responsible consumption.

Unlike the usual practices of traditional marketing, green marketing emphasises a deep understanding of consumers' needs and desires, identifying their expectations for sustainable products and services. In this context, it is becoming increasingly evident that companies are forced to adapt their design, pricing, promotion and distribution to a new, innovative and green type of marketing [McDonald, S., and Oates, C. J., (2006)]. From a historical point of

view, the authors argue that green marketing was born in the 80s-90s, promoting environmental awareness with consumer behavior and sustainable development.

### **2.3. Artificial intelligence supporting circular economy through marketing strategies: challenges and opportunities**

Artificial intelligence and digitalisation show great support for the concept of a circular economy through green marketing practices, by promoting sustainability, digital marketing, and future technological changes.

The integration of artificial intelligence in the transformation process of traditional marketing into a green one, suggests opportunities for recognizing the impact of technology, for education in digitalisation and for sustainable, innovative and efficient promotion. At the same time, this integration process also implies the building of a sustainable relationship between companies and consumers, focusing on the responsibility component by promoting a circular business model and protecting natural resources through recycling, reduction and reuse.

The challenges noted as barriers, especially regarding the limits exposed by the impact of digitalisation within the circular economy, from a perspective of the implications of AI in the process of transforming traditional marketing into a type of green marketing, are categorised by the specialised literature [Ritzén S, Sandström GÖ. Barriers to the circular economy. (2017)] into 4 pillars, as follows:

1) Financial challenges: in this case we are dealing with barriers of costs, profitability, investment nature, such as higher costs for implementing the new technologies;

2) Structural challenges: in this case we are dealing with barriers of lack of information, such as misinformation;

3) Operational challenges: in this case we are dealing with barriers of infrastructural nature, supply chain management, such as power outages and the internet;

4) Attitudinal challenges: in this case we are dealing with barriers of perceptual nature, especially the perception of the concept of sustainability and risk aversion, such as: education for digitalisation and artificial intelligence (older generations of people may not handle new technologies).

In terms of opportunities, we take into account the development of society in relation to sustainable development, the streamlining of processes involved in the circular economy, as well as the innovative promotion marked by green marketing. Thus, the opportunities generated by digitalisation and the implications of artificial intelligence are directly connected to the strategic means of sustainable promotion, such as improve, convert and transform,

leading to an interconnection of marketing processes with the principles of sustainability [Kumar, V., Rahman, Z., Kazmi, A.A. and Goyal, P. (2012)].

Being a driver for sustainability [Gensch, C.O., Prakash, S. and Hilbert, I. (2017)], digitalisation thus represents an environmentally friendly evolution alternative, with future prospects and circularity implications, expected to gain more and more momentum in marketing processes in the near future. Traditional marketing promotion methods become, with the help of digital transformation and the implications generated by artificial intelligence, sustainable promotion methods that minimize the negative effects of resource consumption on the environment, supporting the principles of the circular economy in the long term.

### **3. Research methodology**

The research "The Impact of Digitalisation In A Circular Economy. How Artificial Intelligence is Transforming Traditional Marketing into a Green One" is an exploratory research and relies on a review of the specialised literature.

Starting from the authors' premises that define the circular economy, digitalisation and green marketing, as well as the implications of artificial intelligence, the present study pursue a perspective analysis on sustainable development in accordance with the development of society.

The exploratory and analytical analysis on key concepts, such as: circular economy, digitalisation, artificial intelligence, green marketing, represents both an interconnection of modern terms and a scientific overview, the review including academic journals, industry reports and specialised premises.

The research gap of this paper is given by the limitations exposed that come from the fact that the key terms defined in the paper are discussed more separately at this point and less in the same context, so the research leaves the chapter of discussions open from this scientific point of view.

## **4. Results and discussion**

### **4.1. General perspectives**

The main question of the research, "How does AI technology transform traditional marketing into an ecological one to create more sustainable strategies?" highlights, with the help of findings from the specialised literature, the fact that the involvement of artificial intelligence in a type of classic marketing within the circular economy leads to the transformation of this type of marketing into a green, ecological one, which is defined by the adoption of strategies based on reducing the consumption of natural resources, recycling materials involved in the production, promotion, distribution and price processes, and the reuse of tools used in strategies. For example, if in traditional marketing an outdoor campaign is done with the help of Out of Home (OOH) campaigns, in green marketing the promotion is done either on a digital panel,

and we are dealing with the technological component, being Digital Out of Home (DOOH), or on a panel created from sustainable materials that filter the air, that is, an innovative, sustainable component.

It is clear that as companies increasingly adopt AI and other digital technologies, marketing practices are evolving to become more efficient and greener, adapting to the natural cycle of transformation for environmental, social and economic responsibility. In essence, by using digital platforms and integrating AI tools to optimize transparent communication in marketing campaigns, brands can not only improve their market position, but also contribute to broader long-term sustainability goals. In this case, we are talking about the concepts of market understanding and market adaptation, in line with with global technological advancements.

The findings indicate that AI-based marketing strategies significantly improve consumer engagement and trust by delivering personalised and transparent messages, highlighting the implications for sustainability education, both for companies and for consumers, consumers who are becoming increasingly climate-conscious, attentive to market developments, and inclined to make sustainable, ethical, and quality choices [Halder, P., Hansen, E.N., Kangas, J. and Laukkanen, T. (2020)], because nowadays consumers are becoming more aware and sustainably oriented with a concern that the natural environment is fast deteriorating.

The other three research questions are based on a review of the specialised literature, depending on the impact of digitalisation in the circular economy, traditional marketing vs. green marketing, and AI supporting the circular economy through marketing strategies. The answers to these were highlighted through the conduct of this exploratory research and mark points of interest for the topic addressed, leaving the discussion open for new perspectives and scientific implications.

What are the implications of artificial intelligence in marketing? The perspectives and results of the research show us that, with the help of AI and by involving it in the strategy and scope of traditional marketing, the latter becomes a type of ecological marketing, in fact, a component of modern marketing. In this case, we say that digital tools and technologies such as AI support the circular economy approach through efficient, innovative and sustainable promotion methods.

What impact do sustainable promotion methods have? These methods, as found in the literature, aim to bring to the forefront the components that are desired to be promoted, either directly or indirectly, but this time in a sustainable way. Practically, within the circular economy and with the help of digitalisation, promotion methods are environmentally friendly, efficient and innovative, especially when artificial intelligence also makes its appearance.

What are the effects of digitalisation in a circular economy? In this case, we are talking, based on the results derived from the research on specialised sources, about the components improve, convert and transform, all of which are involved in a new transformational process based on artificial intelligence, which creates new directions for development, promotion and visualisation. Basically, we are talking about a circularity of classic marketing recycled into a form of ecological marketing.

The general perspectives of this paper are based on the exploratory research methodology, which encompasses, on the one hand, the vision of a future based on digitalisation and marked by artificial intelligence, but on the other hand, the strategic marketing vision of a transformation process in accordance with the principles of the circular economy.

#### ***4.2. Challenges related to the circular economy and digitalisation***

In terms of challenges, we can acknowledge that digitalisation, in addition to efficiency in consumption, time and resources, comes with a series of less favorable aspects, but which, once taken into account, can be foreseen, managed or avoided. Both among consumers and companies, digitalisation is seen as a central component in the circular economy, which can boost business models and consumer attitudes towards sustainability, innovation and development [Antikainen, M., Uusitalo, T. and Kivikytö-Reponen, P. (2018)].

Among the main challenges of digitalisation, we find financial, structural, operational and attitudinal challenges. These include a series of barriers that can interfere with the digitalisation process, either before implementation or in the use of digital tools. In this case, the use of artificial intelligence also aligns with this category, which, although it aims to be a promoter of positive change in the world, can bring with it a series of challenges [Neligan, A., Baumgartner, R.J., Geissdoerfer, M. and Schögl, J.P. (2023)].

In relation to green marketing, digitalisation can involve high implementation costs, investment risks, information limitations or limited education regarding artificial intelligence, reluctance to use digital platforms and tools, as well as unforeseen risks or risks related to the interconnection of processes.

At the same time, among companies, the challenges related to the CE and digitalisation are seen through the lens of business models that assume a reconfiguration of the strategy, focused on a mentality of reorienting services and products [Antikainen, M., Uusitalo, T. and Kivikytö-Reponen, P. (2018)]. In this case, adapting the business and marketing strategy to the principles of sustainability, by integrating digitalisation and adapting to a circular economy in a gradual way, with future perspectives, can assume an organic path of companies oriented towards economic, social and environmental results.

Over time, and especially in the current period, amid globalisation, digitalisation has become a key process among companies that want to improve their sustainability component [Majid, S. (2024)]. However, in order to strengthen their sustainability and digitalisation strategy, companies must put the role of consumers at the center of the transition, an important role in adapting to new products and services on the market. Since understanding the market and adapting to the market is an essential step, it is obvious that consumer behavior also represents a basic component in the digitalisation of production, promotion and communication processes, creating the premises of a circular, innovative and future-oriented business model.

#### **4.3. Solutions to the challenges of digital integration**

Despite the challenges encountered in the transition from traditional marketing to green marketing, by integrating digitalisation and artificial intelligence into business models oriented towards the circular economy, there is, in addition to a series of solutions, some ambiguity regarding the integration of circular business models and the digitalisation component, so as to result in an efficient, innovative and sustainable future strategy [Neligan, A., Baumgartner, R.J., Geissdoerfer, M. and Schöggel, J.P. (2023)]. In this framework, the role of facilitator for a circular economy falls to digitalisation both from the point of view of the current period and from the point of view of future evolution prospects on a global scale [Majid, S. (2024)].

However, for the challenges exposed in order to integrate digitalisation, the related solutions incorporate a holistic approach, of co-creation, networking, increasing transparency and providing information, aspects that can contribute greatly to establishing a green marketing strategy in relation to the adoption and insertion of the artificial intelligence component [Antikainen, M., Uusitalo, T. and Kivikytö-Reponen, P. (2018)]. The use of AI-based tools can facilitate the entire transformational process and create added value or generate a competitive advantage for companies that use such modern techniques. Moreover, in this case, we are talking about an adaptation to the globalization process, a process seen as an impact factor in the evolution of traditional marketing towards green marketing [Alyoshina, I.V. (2022)].

### **5. Conclusions**

This research provided a perspective on the impact of digitalisation in a circular economy, more specifically, how artificial intelligence can transform traditional marketing into green marketing. In this context, the importance and role of marketing in the adoption of digital solutions is noticed, highlighting at the same time the fact that this role is a growing one, especially against the backdrop of an increasingly evident digital evolution through its interconnected presence in various activities.

The digital ecosystem currently present at a global level represents a launch pad for AI-based strategies of companies that propose a reconfiguration of current business models into circular business models. Also from this perspective, traditional marketing is migrating towards a modern, ecological type of marketing, more precisely, green marketing, improved by its perspective on sustainability, with an impact on the environmental, social and economic components.

Based on the key elements analysed in the research: sustainability, technological change, marketing, environmental economics, digitalisation, circular economy, artificial intelligence, the results of the work were presented in a scientific form, in accordance with the exploratory methodology adopted, and they are grouped under the headings of general perspectives, challenges related to the circular economy and digitalisation and solutions to the challenges of digital integration.

In the research, by conducting an extensive review of the specialised literature on the subject, a series of perspectives, challenges and solutions were identified that mark the impact that the digitalisation component has in transforming the current traditional marketing model into a sustainable marketing model. Against the backdrop of a circular economy and with the implications of artificial intelligence, the current promotion methods of companies are forced to be adapted to the principles of social, environmental and economic responsibility. Thus, we can report that digitalisation is a promoter of the circular economy, helping efficiently, innovatively and sustainably the processes' transition towards modernisation.

Furthermore, the identified challenges presented in adopting digitalisation for a sustainable strategy are mainly related to obvious investment risks and costs, related both to the development of companies and to the understanding of consumers. An important role in this case is played by understanding the market and adapting to the market, components highlighted in the demand-supply relationship. Also, the solutions presented mark the premises of an organic development of society, in relation to the sustainable, digital and innovative development of society.

Due to the research gap regarding the limitation of results in the context of a digital era with multiple innovations, this paper indicates a point of open discussion towards new research perspectives related to the impact of digitalisation in a circular economy and how artificial intelligence transforms traditional marketing into a green one. Also, the interconnection of the key terms of the paper may represent a limitation present in the specialised literature at this time.

From the perspective of the literature review, the study reported that consumers are currently increasingly aware and willing to choose environmentally friendly, socially ethical and economically beneficial products

and services, which is encouraging more and more companies to direct their promotional strategies towards sustainable directions. Thus, the elements of the marketing mix are also being translated into a circular and sustainable model, contributing to a more sustainable and technological economy.

In conclusion, this exploratory research represents an important step in analysing the impact of digitalisation within the circular economy, providing a basis for discussions on the opportunities and challenges that this process has on society. In this direction, the transformation of traditional marketing and the migration of promotion processes and methods towards a green marketing approach, with ecological promotion processes and methods, constitutes a point of interest for understanding the global evolution from a digital point of view.

By incorporating all these concepts into a research that emphasizes the sustainable and digital evolution of society, we can note through the above that globalization represents an essential and decisive factor both in the transition of traditional marketing to a green one, and in the integration of tools based on artificial intelligence. In this context, both consumers and companies are witnessing a large-scale transformation of the current world towards a modern, digital and sustainable world.

### **Abbreviations**

CE: Circular Economy

AI: Artificial Intelligence

### **References**

1. Alyoshina, I.V. 2022. "Globalisation as a factor of marketing concepts' evolution". In *UPRAVLENIE/MANAGEMENT (Russia)*, 10(1), pp.85-100.
2. Antikainen, M., Uusitalo, T. and Kivikytö-Reponen, P. 2018. "Digitalisation as an enabler of circular economy" In *Procedia Cirp*, 73, pp. 45-49.
3. Chauhan, C., Parida, V. and Dhir, A. 2022. "Linking circular economy and digitalisation technologies: A systematic literature review of past achievements and future promises". In *Technological Forecasting and Social Change*, 177, p.121508.
4. Gavkalova, N., Martin, J., Shumska, H. and Babenko, K. 2024. "Landscape and circular economy as a mechanism of sustainable development in globalisation and digitalisation of the world economy".In *Economics of Development*, 23(2).
5. Gensch, C.O., Prakash, S. and Hilbert, I. 2017. "Is digitalisation a driver for sustainability?". In *Sustainability in a digital world: New opportunities through new technologies*, pp.117-129.
6. Halder, P., Hansen, E.N., Kangas, J. and Laukkanen, T. 2020. "How national culture and ethics matter in consumers' green consumption values". In *Journal of cleaner production*, 265, p.121754.
7. Kottmeyer, B. 2021. "Digitisation and sustainable development: the opportunities and risks of using digital technologies for the implementation of a circular

- economy”. In *Journal of Entrepreneurship and Innovation in Emerging Economies*, 7(1), pp. 17-23.
8. Kumar, V., Rahman, Z., Kazmi, A.A. and Goyal, P. 2012. “Evolution of sustainability as marketing strategy: Beginning of new era”. In *Procedia-Social and Behavioral Sciences*, 37, pp.482-489.
  9. Majid, S. 2024. “Digitalisation as a Tool to Enhance Eco-efficiency Measures: A Systematic Literature Review”. In *Scientific Papers of the University of Pardubice. Series D, Faculty of Economics & Administration*, 32(2).
  10. McDonald, S., Oates, C.J., Young, C.W. and Hwang, K. 2006. “Toward sustainable consumption: Researching voluntary simplifiers”. In *Psychology & Marketing*, 23(6), pp.515-534.
  11. Mishra, P. and Sharma, P. 2014. “Green marketing: Challenges and opportunities for business”. In *BVIMR Management Edge*, 7(1).
  12. Okorie, O., Salonitis, K., Charnley, F., Moreno, M., Turner, C. and Tiwari, A. 2018. “Digitisation and the circular economy: A review of current research and future trends”. In *Energies*, 11(11), pp. 3009.
  13. Neligan, A., Baumgartner, R.J., Geissdoerfer, M. and Schöggel, J.P. 2023. “Circular disruption: Digitalisation as a driver of circular economy business models”. In *Business Strategy and the Environment*, 32(3), pp.1175-1188.
  14. Ramesohl, S., Berg, H. and Wirtz, J. 2022. “The Circular Economy and Digitalisation: Strategies for a digital-ecological industry transformation”.
  15. Ritzén S, Sandström GÖ. Barriers to the Circular Economy. 2017. “Integration of Perspectives and Domains”. In *Procedia CIRP* 2017; 64:7–12. doi:10.1016/J.PROCIR.2017.03.005.
  16. Redlein, A. and Höhenberger, C. 2020. “Digitalisation”. In *Modern Facility and Workplace Management: Processes, Implementation and Digitalisation*, pp.139-175.
  17. Ronkainen, L. 2022. “Increasing circular economy awareness with digital marketing”.
  18. Sripathi, M., Leelavati, T.S., Krishna, K.V.P., Sindhuja, A., Lakshmi, T.D., Vamsi, E. and Singh, N.S. 2022. A “Green Marketing Exploration: A Shift from Traditional Marketing for a Sustainable Environment”. In *NeuroQuantology*, 20(8), p.2785.