

# Circular Economy in Automotive Manufacturing: Recycling and Sustainability

**Jerry A. Madrid**

Faculty, College of Technology,  
Surigao del Norte State University, Surigao City, Philippines

**Abstract:** *This paper investigates the integration of Circular Economy principles within the automotive manufacturing sector, with a particular focus on recycling and sustainability practices. Findings indicate a substantial shift towards Circular Economy adoption, with 68% of surveyed automotive companies initiating these practices. These efforts are exemplified by a commendable recycling rate of 45% and the widespread implementation of sustainability metrics (72%) for environmental performance assessment. Moreover, Circular Economy adopters report significant reductions in carbon emissions (average: 27%), improved resource efficiency (average: 34%), and decreased waste generation (average: 23%). These results underscore the industry's commitment to sustainability and emphasize the need for continued adoption, data-driven decision-making, innovation, policy support, and industry collaboration to further advance environmental responsibility and resource efficiency in automotive manufacturing, contributing to a more sustainable and responsible future.*

**Keywords:** Circular economy, Automotive, recycle, sustainable

## REFERENCES

- [1]. Hossain, M. U., Ng, S. T., Antwi-Afari, P., & Amor, B. (2020). Circular economy and the construction industry: Existing trends, challenges and prospective framework for sustainable construction. *Renewable and Sustainable Energy Reviews*, 130, 109948.
- [2]. Pla-Julián, I., & Guevara, S. (2019). Is circular economy the key to transitioning towards sustainable development? Challenges from the perspective of care ethics. *Futures*, 105, 67-77.
- [3]. Masi, D., Day, S., & Godsell, J. (2017). Supply chain configurations in the circular economy: A systematic literature review. *Sustainability*, 9(9), 1602.
- [4]. Bocken, N. M., & Short, S. W. (2021). Unsustainable business models—Recognising and resolving institutionalised social and environmental harm. *Journal of Cleaner Production*, 312, 127828.
- [5]. Norouzi, N. (2022). A Practical and Analytic View on Legal Framework of Circular Economics as One of the Recent Economic Law Insights: A Comparative Legal Study. *Circular Economy and Sustainability*, 2(3), 961-986.
- [6]. Bocken, N. M., & Short, S. W. (2021). Unsustainable business models—Recognising and resolving institutionalised social and environmental harm. *Journal of Cleaner Production*, 312, 127828.
- [7]. Molla, A. H., Shams, H., Harun, Z., Ab Rahman, M. N., & Hishamuddin, H. (2022). An assessment of drivers and barriers to implementation of circular economy in the end-of-life vehicle recycling sector in India. *Sustainability*, 14(20), 13084.
- [8]. Saidani, M., Yannou, B., Leroy, Y., & Cluzel, F. (2018). Heavy vehicles on the road towards the circular economy: Analysis and comparison with the automotive industry. *Resources, Conservation and Recycling*, 135, 108-122.
- [9]. Kyriakopoulos, G. L. (2021). Environmental legislation in European and international contexts: legal practices and social planning toward the circular economy. *Laws*, 10(1), 3.
- [10]. A. Marconi, M., Gregori, F., Germani, M., Papetti, A., & Favi, C. (2018). An approach to favor industrial symbiosis: The case of waste electrical and electronic equipment. *Procedia Manufacturing*, 21, 502-509.

- [11]. Roleders, V., Oriekhova, T., & Sysoieva, I. (2022). Trends in a global circular economy. *Management Theory and Studies for Rural Business and Infrastructure Development*, 44(2), 176-184.
- [12]. Koszewska, M. (2018). Circular economy—Challenges for the textile and clothing industry. *AutexResearch Journal*, 18(4), 337-347.
- [13]. Desing, H., Brunner, D., Takacs, F., Nahrath, S., Frankenberger, K., & Hischier, R. (2020). A circular economy within the planetary boundaries: Towards a resource-based, systemic approach. *Resources, Conservation and Recycling*, 155, 104673.
- [14]. Jaeger-Erben, M., Jensen, C., Hofmann, F., & Zwiers, J. (2021). There is no sustainable circular economy without a circular society. *Resources, Conservation and Recycling*, 168(5), 105476.
- [15]. Maiurova, A., Kurniawan, T. A., Kustikova, M., Bykovskaia, E., Othman, M. H. D., Singh, D., & Goh, H. H. (2022). Promoting digital transformation in waste collection service and waste recycling in Moscow (Russia): Applying a circular economy paradigm to mitigate climate change impacts on the environment. *Journal of Cleaner Production*, 354, 131604.
- [16]. Pandit, P., Nadathur, G. T., & Jose, S. (2019). Upcycled and low-cost sustainable business for value-added textiles and fashion. In *Circular Economy in Textiles and Apparel* (pp. 95-122). Woodhead Publishing.
- [17]. Maxfield, M. G. (2008). *Abandoned Vehicles*. US Department of Justice, Office of Community Oriented Policing Services.
- [18]. Reyneke, P. (2016). *Dumpsite Bricolage: The responses of the urban waste precariat to the formalisation and privatisation of waste management in the City of Tshwane* (Doctoral dissertation, University of Pretoria).