

# Chapter 11

## The Circularity in Transportation Completed

**Eminegül Tekerci**

 <https://orcid.org/0009-0002-9538-167X>

*Izmir Institute of Technology, Turkey*

**Yavuz Duvarcı**

 <https://orcid.org/0000-0002-5496-2358>

*Izmir Institute of Technology, Turkey*

**Volkan Emre Uz**

 <https://orcid.org/0000-0002-9328-4756>

*Izmir Institute of Technology, Turkey*

**Nicel Saygı**

 <https://orcid.org/0000-0001-7773-1563>

*Izmir Institute of Technology, Turkey*

### ABSTRACT

*This study explores the need for radical change in the transport sector, focusing on circularity and its implementation through innovative technologies. The unsustainable nature of current transport systems is discussed, highlighting the urgent need for change due to environmental impacts such as the climate crisis exacerbated by fossil fuels. The research presents a framework for 'Transport Circularity' that integrates solar energy, autonomous vehicles and other intelligent transport systems to create more sustainable, efficient and socially inclusive mobility solutions. Beforehand, drawing on philosophical perspectives, particularly Spinoza's views and Marxist critiques on conventional transportation, the study argues that a systemic overhaul*

DOI: 10.4018/979-8-3693-6695-0.ch011

*is inevitable. This transition's social and economic implications are also discussed, including its potential to dismantle existing power structures that benefit from the status quo. The study concludes with a vision of a resilient, sustainable and equitable future for urban and regional transport systems, giving a concrete example of Izmir.*

## INTRODUCTION

As is known, nowadays, production/consumption processes carried out in unnatural ways are being questioned. There is sufficient evidence suggesting that awareness has been developed within the public sector concerning this issue. In contrast, circular economy models have begun to be formulated as a new approach, and their projection onto the transportation sector will be discussed through possible models.

It is evident that the existing systems are neither natural; therefore, they cannot fit into any known philosophical and logical paradigm. It is imperative for transportation to undergo a transformation through “natural” way (which will be called Spinozan), ensuring that its effects are at an acceptable level. Thus, this study focuses rather what ought to be with a new strategy and with new technologies from this point on.

Although energy efficiency from unnatural ways has seemed the most convenient one compared to others, fossil fuel cannot be viewed positively at all due to their harmful and cumulative external effects on the nature because humanity is aware after all that irreversible points have already been exceeded as a result of the climate crises it faces (White Paper 2011). All those adverse effects mentioned above have been questioned for a long time, since the irreversible effects have continued to increase. In the perspective of future “green” transportation (or mobility), no “green light” should be given to fossil fuels anymore; on the contrary, now it will be given to, for example, electric vehicles and autonomous vehicles in various forms (White Paper, 2011). Nevertheless, the societal acceptance of systemic issues, the loss of life resulting from accidents, and the recurrence of such incidents impede the resolution of these problems and exacerbate the situation. This cultural perspective fosters the perpetuation of problems and hinders the development of effective solutions. Therefore, there is a need for a radical (revolutionary) change in the existing systems, and if possible, it should not be postponed (Buchanan, 2005). Due to the insufficiency of time, the transformation will need inevitably be radical and revolutionary one.

The concept of change has been a fundamental aspect of human thought since antiquity. The idea that “the only thing unchanged is the change” reflects the understanding that all established structures, including those in transportation, will inevitably evolve. As horse-drawn carriages, which were the dominant mode of transportation a century ago, gave way to railways and then to motorised vehicles, it seems reasonable to posit that the current transportation infrastructure will undergo

36 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/the-circularity-in-transportation-completed/360775](http://www.igi-global.com/chapter/the-circularity-in-transportation-completed/360775)

## Related Content

---

### Artificial Intelligence and Machine Learning-Based Agriculture

Sakshi Rajput, Lititia Khanna and Priti Kumari (2023). *Smart Village Infrastructure and Sustainable Rural Communities* (pp. 16-34).

[www.irma-international.org/chapter/artificial-intelligence-and-machine-learning-based-agriculture/324959](http://www.irma-international.org/chapter/artificial-intelligence-and-machine-learning-based-agriculture/324959)

### Road Aesthetics and Its Effect on Road Users

Anuj Jaiswal, Arshi Parashar and Vicky Lalramsangi (2025). *Interdisciplinary Approaches to Transportation and Urban Planning* (pp. 233-266).

[www.irma-international.org/chapter/road-aesthetics-and-its-effect-on-road-users/360773](http://www.irma-international.org/chapter/road-aesthetics-and-its-effect-on-road-users/360773)

### Distracted Driving Detection With Object Detections as the Basis Using Deep Learning Algorithm

D. Ramya Cauvery and C. Sakunthala (2025). *Urban Mobility and Challenges of Intelligent Transportation Systems* (pp. 525-548).

[www.irma-international.org/chapter/distracted-driving-detection-with-object-detections-as-the-basis-using-deep-learning-algorithm/375313](http://www.irma-international.org/chapter/distracted-driving-detection-with-object-detections-as-the-basis-using-deep-learning-algorithm/375313)

### A Systematic Text-Analytics-Based Meta-Synthesis Approach for Smart Urban Development

Mani Dhingra and Subrata Chattopadhyay (2022). *International Journal of Urban Planning and Smart Cities* (pp. 1-23).

[www.irma-international.org/article/a-systematic-text-analytics-based-meta-synthesis-approach-for-smart-urban-development/302131](http://www.irma-international.org/article/a-systematic-text-analytics-based-meta-synthesis-approach-for-smart-urban-development/302131)

### High Speed Rail and Regional Competitiveness

Lara Brunello, Jonathan Bunker, Sandro Fabbro, Franco Migliorini and Renzo Ferrara (2012). *City Competitiveness and Improving Urban Subsystems: Technologies and Applications* (pp. 159-196).

[www.irma-international.org/chapter/high-speed-rail-regional-competitiveness/60108](http://www.irma-international.org/chapter/high-speed-rail-regional-competitiveness/60108)