

Circular Economy in Algeria Vs Selected Moderately Developed Countries: Comparative Study

الاقتصاد الدائري في الجزائر مقابل بعض الدول متوسطة النمو: دراسة مقارنة

Hachim Meryem Nabila¹, Mejahed Kenza²

¹ University Centre Of Maghnia - Tlemcen (Algeria), m.hachim@cu-maghnia.dz

² University Centre Of Maghnia - Tlemcen (Algeria), k.medjahed@cu-maghnia.dz

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Abstract:

The study highlights key challenges and provides recommendations for Algeria to accelerate Circular Economy (CE) adoption by strengthening policies, increasing investments, and fostering public-private partnerships. This study compares Algeria's CE performance with that of moderately developed countries such as Turkey, Morocco, and Thailand. Key indicators analyzed include recycling rates, policy implementation, investment levels, and waste management efficiency. Findings show that Algeria lags behind due to weak regulations, low investment, and poor waste management infrastructure.

Keywords: Circular Economy, Moderately Developed Countries, Waste transition, Sustainability, Economic Transition.

JEL Classification Codes: Q01, Q53, Q56, O13, O44.

ملخص:

تُبرز هذه الدراسة التحديات الرئيسية وتقدم مجموعة من التوصيات لمساعدة الجزائر على تسريع اعتماد الاقتصاد الدائري من خلال تعزيز السياسات العمومية، وزيادة الاستثمارات، وتشجيع الشراكات بين القطاعين العام والخاص. كما تُقارن الدراسة أداء الاقتصاد الدائري في الجزائر بأداء دول متوسطة التطور مثل تركيا والمغرب وتايلاند. وتشمل المؤشرات الأساسية التي تم تحليلها معدلات إعادة التدوير، وتطبيق السياسات، ومستويات الاستثمار، وكفاءة إدارة النفايات. تُظهر النتائج أن الجزائر لا تزال متأخرة في هذا المجال نتيجة ضعف الإطار التنظيمي، وانخفاض حجم الاستثمارات، وقصور البنية التحتية الخاصة بإدارة النفايات.

كلمات مفتاحية: الاقتصاد الدائري، الدول متوسطة التطور، التحول في إدارة النفايات، الاستدامة، التحول الاقتصادي.

تصنيفات JEL : Q01, Q53, Q56, O13, O44

INTRODUCTION:

Transition to a circular economy (CE) has emerged as an imperative strategy for countries which desire to decouple economic growth from environmental degradation. In contrast with the traditional linear “take-make-dispose” approach, the circular economy is characterized by resource efficiency, waste minimization and systemic value-retention (Geissdoerfer et al., 2017).

In Algeria, there is increasing awareness about sustainability issues; however, circular economy practices are still fragmented and face institutional and infrastructural barriers (Bouzidi & Guemide, 2022). Nevertheless, by means of inventive policy instruments, industrial symbiosis and stakeholder engagement some rather less developed countries such as Morocco, Tunisia and Turkey are adopting more planned approaches to CE integration (Korhonen et al., 2018).

To detect policy lacunae, cooperation opportunities and accelerator factors for the Algerian transition to sustainability we use this comparative study to analyze the relative degree of CE implementation in Algeria with respect to a selection of peer countries. The work is part of the broader debate on sustainable development in emerging economies and the operationalization of CE principles in heterogeneous governance and economic contexts

Problematic (Research Question):

How does Algeria’s circular economy performance compare to that of moderately developed countries, and what strategies can be implemented to enhance its adoption of circular economy principles?

Hypothesis

1. Algeria’s circular economy development is significantly behind that of moderately developed countries due to weak policies, low investment, and inefficient waste management systems.
2. Implementing stronger regulations, increasing investment, and fostering public-private partnerships will help Algeria close the gap with other countries.
3. Public awareness and education on sustainable consumption and waste reduction are key to improving CE adoption in Algeria.

1 -Literature Review

In contrast to the traditional linear development model characterized by “taking, making and disposing,” the circular economy (CE) concept has attracted growing global interest as a strategic model for sustainable development. According to Kirchherr et al. (2017), the circular economy aims to minimize waste generation by redesigning products and services to extend their life cycles. This model seeks to maximize material value through reuse, repair, remanufacturing, and recycling, thereby closing production loops and integrating social, environmental, and economic dimensions. In this regard, Geissdoerfer et al. (2017) emphasize that CE represents a new sustainability paradigm based on systems thinking and business innovation to enhance resource efficiency and reduce environmental degradation. Similar conceptual foundations have also been discussed in the Algerian academic context, where Medjdoub (2020) highlights the theoretical and practical relevance of the circular economy as an integrated framework for sustainable resource management in emerging economies.

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Several international experiences demonstrate varying degrees of success in implementing CE principles in moderately developed countries. For instance, Morocco and Turkey have adopted industrial symbiosis initiatives and national regulatory frameworks to promote circular practices (OECD, 2021). Turkey has notably emphasized waste valorization, eco-design, and sustainable production, particularly in the construction and textile sectors (Yildiz Çankaya & Sezen, 2019). Likewise, the circular economy is embedded in Morocco's national sustainable development strategy, especially through programs related to sustainable agriculture and wastewater recycling (El Bilali & Allahyari, 2018).

In contrast, Algeria has made relatively limited progress toward CE adoption. Although some waste management reforms and sustainability objectives have been introduced, institutional constraints, regulatory shortcomings, and insufficient stakeholder engagement continue to hinder effective implementation (Bouzidi & Guemide, 2022). These challenges are further exacerbated by the absence of a comprehensive national CE strategy and low investment levels in green technologies. Moreover, societal awareness and knowledge regarding sustainability remain comparatively weak (Benabdallah & Boughanmi, 2020; Medjdoub, 2020). Consequently, despite sharing environmental challenges common to other middle-income countries, Algeria requires stronger institutional frameworks, policy harmonization, and stakeholder collaboration to adapt international best practices and advance its transition toward a circular economy.

2- Methodology:

This study employs a comparative research methodology to analyze Algeria's circular economy (CE) performance relative to moderately developed countries such as Turkey, Morocco, and Thailand. The research approach includes data collection, analysis of key indicators, and case study comparisons.

2-1 Research Approach

A qualitative and quantitative approach is used to evaluate Algeria's CE progress based on: Quantitative analysis: Statistical data on recycling rates, waste management efficiency, investment levels, and policy implementation.

Qualitative analysis: Policy reviews, case studies of CE strategies in other countries, and expert opinions on Algeria's challenges.

2-2 Data Collection Methods Data is gathered from

- Official reports (e.g., Algerian government, UN, World Bank, OECD).
- Scientific research from academic journals and previous CE studies.
- International organizations such as the European Environment Agency (EEA) and the Ellen MacArthur Foundation.
- Case studies of Turkey, Morocco, and Thailand to examine best practices in CE adoption.

2-3 Main Indicators:

To compare circular economy, policy and regulations, investment and funding, public awareness private sector role in Algeria with moderately developed countries, the following indicators are analyzed:

Table (1): comparative Indicators of Circular Economy Policies, Investments, and Stakeholder Engagement in Algeria and Moderately Developed Countries

Category	Indicators	source
Circular economy performance	Recycling rate(%), waste management efficiency	Word Bank, OECD
Policy and Regulations	Number of circular economy policies, enforcement level.	Government reports, UN.
Investment and funding	Circular economy investment (billion USD)	National statistics, World Economic Forum
Public Awareness and Private Sector Role	Participation of businesses consumer awareness campaigns.	Case studies, NGO reports

Source: Made by the authors

2-4Comparative Analysis

A benchmarking approach is adopted to assess Algeria's progress in implementing the circular economy (CE) by comparing it with selected moderately developed countries, namely Turkey, Morocco, and Thailand. Through this cross-country comparison, best practices derived from successful CE policies in these countries are identified and analyzed in order to formulate relevant and context-specific recommendations for Algeria. At the same time, the analysis highlights key gaps and structural challenges within Algeria's current CE framework, thereby providing a clearer understanding of the institutional, regulatory, and operational constraints that hinder the effective transition toward a circular economy.

2-5Limitations of the Study

This study is subject to several limitations. First, data availability remains a constraint, as some circular economy (CE) indicators for Algeria are limited or incomplete, which may affect the depth of the analysis. Second, country-specific factors such as economic structures, cultural contexts, and regulatory frameworks differ across countries and may influence the transferability and applicability of certain CE strategies to the Algerian context. Finally, time constraints represent a limitation, since CE policies and initiatives are rapidly evolving, and recent developments may alter adoption trends beyond the period covered by this study.

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3- Expected Outcome

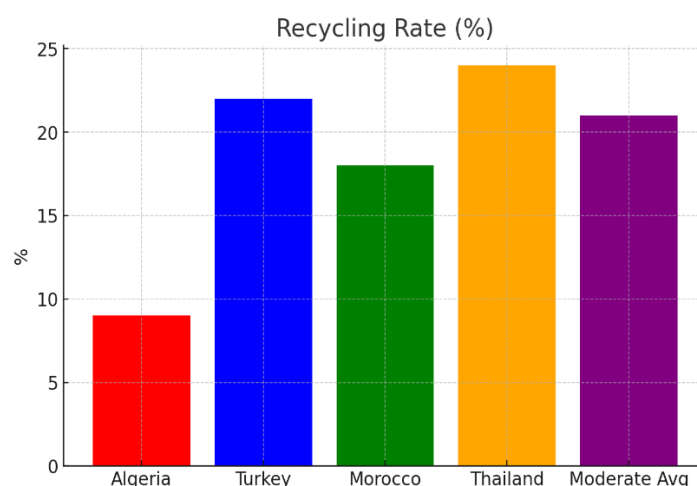
This study aims to: Identify gaps in Algeria's CE strategy. Highlight best practices from moderately developed countries. Propose actionable recommendations for Algeria's circular economy transition.

key comparisons between **Algeria and moderately developed countries** in the circular economy, including:

1. **Recycling rates (%)**
2. **Investment in circular economy (billion USD)**
3. **Number of circular economy policies implemented**
4. **Waste recycled (%)**

3-1 Recycling rate (%)

Fig (1): Recycling rate (%)



Source: Made by the authors based on: Algerian government, UN, World Bank, OECD databases.

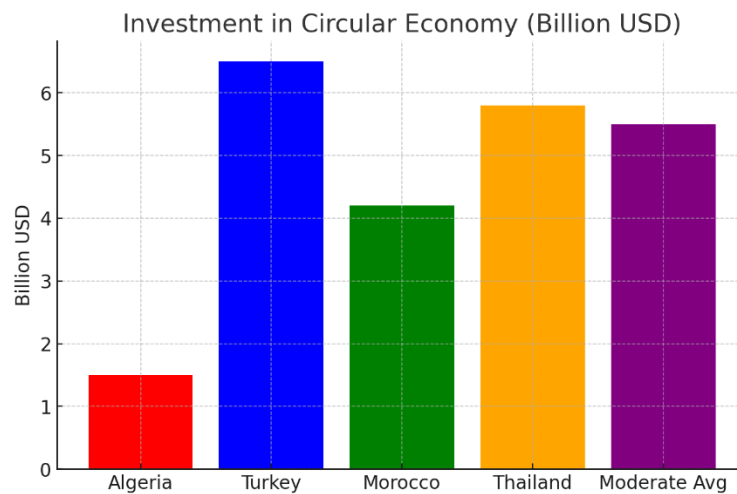
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- **Algeria: 9%** → Algeria has the lowest recycling rate among the countries compared.
- **Turkey (22%), Morocco (18%), Thailand (24%)** → These countries have significantly higher recycling rates due to better waste collection systems and stronger policies.
- **Moderate Avg (21%)** → The average for moderately developed countries shows that Algeria is far behind.

Key Insight: Algeria needs to **improve waste sorting, collection systems, and recycling infrastructure** to increase its recycling rate.

3-2 Investment in Circular Economy (Billion USD):

Fig (2): Investment in Circular Economy (Billion USD)



Source: Made by the authors based on: Algerian government, UN, World Bank, OECD databases.

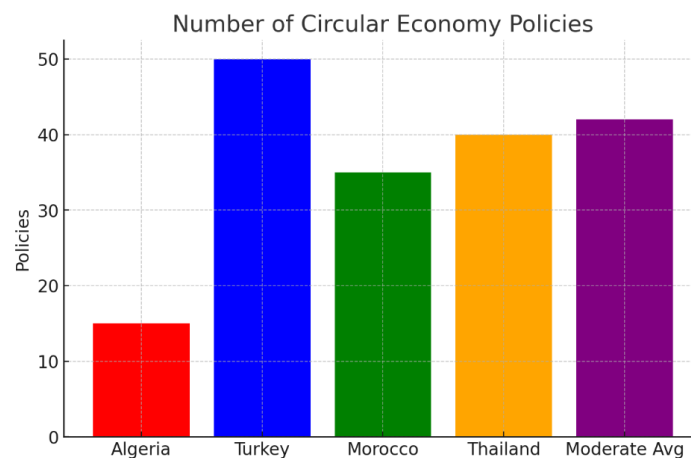
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- **Algeria: \$1.5 billion** → Algeria has the lowest investment in circular economy initiatives.
- **Turkey (\$6.5B), Morocco (\$4.2B), Thailand (\$5.8B)** → These countries have attracted more investments in waste management, sustainable production, and green industries.
- **Moderate Avg (\$5.5B)** → Algeria's investment is far below the average.

Key Insight: Algeria must **increase government and private sector investment** in circular economy projects to keep up with global trends.

3-3 Number of Circular Economy Policies Implemented:

Fig (3): Number of Circular Economy Policies Implemented



Source: Made by the authors based on: Algerian government, UN, World Bank, OECD databases

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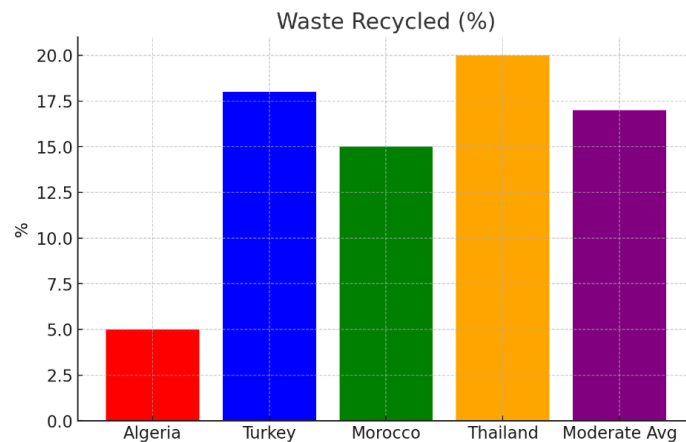
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- **Algeria: 15 policies** → The country has implemented fewer circular economy policies compared to others.
- **Turkey (50), Morocco (35), Thailand (40)** → These countries have introduced stronger laws and incentives for recycling, sustainable production, and waste management.
- **Moderate Avg (42)** → Algeria lags behind in policy enforcement.

Key Insight: Stronger **government regulations, incentives for businesses, and enforcement of environmental laws** are needed to advance Algeria's circular economy.

3-4 Waste Recycled (%):

Fig (4): Waste Recycled (%)



Source: Made by the authors based on: Algerian government, UN, World Bank, OECD databases

View Graph

- **Algeria: 5%** → Only a small portion of waste is recycled in Algeria.
- **Turkey (18%), Morocco (15%), Thailand (20%)** → These countries have better waste management and recycling systems in place.
- **Moderate Avg (17%)** → Algeria is well below the average.

Key Insight: Algeria needs to **develop efficient waste management infrastructure, promote waste separation at the source, and encourage businesses to use recycled materials.**

4-Results and founding:

4-1 Overall Analysis and recommendations:

Overall, the findings indicate that Algeria lags behind moderately developed countries across all four assessed indicators circular economy performance, policy and regulatory frameworks, investment levels, and public awareness largely due to low investment, weak and insufficiently enforced policies, and inadequate waste management infrastructure.

To address these challenges, Algeria needs to significantly enhance recycling efforts through the development of waste sorting and processing facilities, increase investment in green industries and circular economy projects, strengthen legal and regulatory frameworks to ensure effective enforcement of sustainability measures, and intensify public awareness

initiatives to encourage recycling practices and waste reduction among households and businesses.

4-2 Additional Analysis and recommendation:

Learning from other moderately developed countries can significantly enhance Algeria's circular economy performance by adapting proven policy instruments and governance mechanisms. Turkey's experience demonstrates the effectiveness of strong government recycling directives and Extended Producer Responsibility (EPR) legislation, which obliges producers to manage and finance the treatment of waste generated by their products, thereby increasing recycling rates and corporate accountability.

Similarly, Morocco has successfully implemented public-private partnerships in waste management, leading to notable improvements in collection efficiency and recycling outcomes, while Thailand has focused on banning imported plastic waste and promoting local waste-to-energy solutions to reduce landfill dependence. Drawing on these experiences, Algeria should prioritize the adoption of EPR laws, actively encourage private sector investment in recycling and circular industries, and develop robust public-private partnerships for waste collection, treatment, and recycling in order to accelerate its transition toward a more sustainable and circular economic model.

4-3 Addressing Algeria's Challenges:

Algeria's transition toward a circular economy is constrained by several interrelated challenges, notably low recycling rates, insufficient investment, weak policy enforcement, and limited public awareness. A significant share of recyclable materials continues to be disposed of in landfills due to the absence of waste separation at source and inefficient collection systems, while the informal recycling sector, despite its important role, remains largely unrecognized and unsupported. At the same time, investment in circular economy activities remains substantially lower than in other moderately developed countries, with limited financial mechanisms to support green startups and recycling enterprises.

These issues are further compounded by weak and poorly enforced circular economy regulations, which allow industries to persist in linear production models, as well as low societal awareness of waste reduction and recycling practices. Addressing these challenges requires an integrated policy response, including the introduction of waste separation programs at households and businesses, investment in modern recycling infrastructure, formalization of the informal recycling sector through incentives and training, and the creation of fiscal incentives and funding schemes to stimulate private and foreign investment.

In parallel, Algeria should strengthen and enforce waste management laws, promote sustainable materials and circular production models, require mandatory sustainability reporting, and implement nationwide awareness campaigns alongside waste-to-energy initiatives and educational programs to embed circular economy principles across society.

4-4 Critical Contextual Analysis: Beyond Indicators:

Although benchmarking in terms of recycling rates, levels of investment and numbers of policies can provide useful comparative insights, these measures fail to capture the structural political, institutional and socio-economic influences on circular economy (CE) performance. In countries like Turkey, Morocco and Thailand higher recycling rates and stronger policy are immediately associated with:

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4-4-1 Governance Quality and Institutional Capacity:

Effective enforcement mechanisms, clear regulatory frameworks, and active government oversight have enabled these countries to translate CE policies into measurable results. By contrast, Algeria's fragmented governance and overlapping institutional mandates often delay implementation.

- **Public Policy Environment:** Peer countries have integrated CE within broader sustainable development and industrial strategies, ensuring consistency and continuity. In Algeria, however, circular economy initiatives remain piecemeal and lack alignment with national economic diversification priorities.
- **Socio-economic Structures:** Cultural acceptance of waste sorting, informal sector integration, and consumer awareness campaigns have supported progress abroad. Algeria still faces low levels of citizen engagement and limited formal recognition of informal recyclers, which undermines systemic CE adoption.
- **Feasibility of Model Transfer:** Although practices such as Morocco's public-private partnerships or Turkey's extended producer responsibility laws are promising, replicating them in Algeria requires adapting to the local governance structure, financial constraints, and societal attitudes. Direct transplantation of foreign models without contextualization risks failure.

4-4-2 Implication:

Algeria's CE transition cannot rely solely on importing best practices. A realistic strategy must consider governance reforms, institutional strengthening, and cultural change to ensure feasibility and long-term sustainability.

Conclusion:

This comparative approach shows that the adoption and implementation of the circular economy clearly vary between Algeria and some medium-developed countries. Despite its potential role, to date the circular economy in Algeria has yet to be pursued out of a lack of established policy framework, weak institutional capacity and insufficient coordination. Instead, other peer countries have achieved greater progress by focusing on strategic planning, public-private partnerships and innovation-led efforts. In order to narrow this gap, the focus should be on developing a holistic circular economy roadmap in Algeria, and this can be achieved through enhanced legislations; combined with increasing awareness, investments in sustainable infrastructure and education. Algeria can draw upon the experiences of others to speed up its move towards a more sustainable, resilient and inclusive economic future. Ultimately, in order to align itself with other countries that are only moderately developed, Algeria needs more democracy and focus on these four key areas:

First, strong policy and regulatory frameworks are needed to provide clarity around circular economy laws and regulations in order for them to be enforced effectively, leading to predictable incentives and compliance conditions for businesses and consumers. Second, intensified investment in innovation is needed to back recycling industries, green start-ups and research activities promoting resource efficiency and circular business models. Third, investment in infrastructure and technology is crucial to accommodate material recovery and closed-loop systems, especially with respect to waste treatment and recycling facilities.

Lastly, raising the degree of public awareness and education is central to sensitizing citizens and businesses to sustainability challenges, preparing them for a behavior change and ensuring wide societal involvement in circular economy initiatives.

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