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Research Article

Barriers and driving forces in the transition to a circular economy: Developing countries and Türkiye

Döngüsel ekonomiye geçişte bariyerler ve itici güçler: Gelişmekte olan ülkeler ve Türkiye

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Abstract

The transition to a circular economy (CE), whose primary goal is to ensure sustainable development, has become a major global agenda item, particularly in developed countries, due to the economic, social, and environmental benefits it will deliver. However, despite all these benefits, the desired progress in the transition to this new economic order has not yet been achieved. The barriers encountered during the transition process are cited as the primary reason for this situation. Therefore, identifying the barriers encountered during the transition to CE and the driving forces that motivate the process is crucial to the successful progress of the transition. Drawing on traditional literature, this research examines the barriers to the adoption of CE in developing countries, including Türkiye, and the driving forces that encourage the transition. By analysing detailed examples from various countries, this article aims to guide businesses, practitioners, and policymakers in developing countries, particularly Türkiye, facing similar barriers in implementing the system. In this way, the findings of a limited number of studies on Türkiye and other developing countries are presented and interpreted together, and the study aims to contribute to the field's gap regarding CE applications in developing countries. The research demonstrates that the success of the process depends solely on the participation, cooperation, and coordination of all stakeholders; therefore, the transition to CE requires a holistic perspective across all economic levels (micro, meso, and macro). The findings demonstrate that implementing the necessary policies, regulations, and practices for the transition to CE, providing financial support and incentives to businesses, adapting technological infrastructure to support CE, and conducting training and awareness-raising activities will significantly impact the success of the process.

Keywords: Circular Economy, Barriers and Driving Forces, Developing Countries, Sustainable Development

Jel Codes: M00, Q56, Q58

Öz

Temel hedefi sürdürülebilir kalkınmayı sağlamak olan döngüsel ekonomiye (DE) geçiş; sağlayacağı ekonomik, sosyal ve çevresel faydalardan dolayı başta gelişmiş ülkeler olmak üzere tüm dünyada ana gündem maddesi haline gelmiştir. Ancak tüm faydalarına rağmen bu yeni ekonomik düzene geçişte hala arzu edilen ilerleme sağlanamamıştır. Bu durumun ana nedeni olarak geçiş sürecinde karşılaşılan engeller öne sürülmektedir. Bu nedenle DE'ye geçişte karşılaşılan engellerin ve geçiş sürecini motive eden itici güçlerin neler olduğunu tespit etmek geçiş sürecinin başarılı bir şekilde ilerlemesi açısından önem kazanmaktadır. Geleneksel literatür incelemesine dayanan bu araştırmada Türkiye'nin de içinde bulunduğu gelişmekte olan ülkelerde DE'nin benimsenmesinin önündeki engeller ve DE'ye geçişi teşvik eden itici güçler ele alınmaktadır. Bu makale, farklı ülke örneklerini detaylı bir şekilde ele alarak, başta Türkiye olmak üzere gelişmekte olan ülkelerde benzer engellerle karşılaşan işletmelere, uygulayıcılara ve politika yapıcılara uygulamada izlenecek yolları göstermeyi amaçlamaktadır. Bu yolla Türkiye ve diğer gelişmekte olan ülkelerle ilgili sınırlı sayıdaki çalışmanın bulguları bir arada sunulup, yorumlanarak gelişmekte olan ülkelerdeki CE uygulamaları konusunda alandaki boşluğa katkı sağlamak hedeflenmiştir. Araştırma, sürecin başarıya ulaşmasının ancak tüm paydaşların katılımı, işbirliği ve koordinasyonu ile gerçekleşeceğini, bu nedenle de DE'ye geçişin tüm ekonomik düzeylerde (mikro, mezo, makro) bütüncül bir bakış açısını gerektiren bir süreç olduğunu göstermektedir. Elde edilen bulgular, DE'ye geçiş için gerekli politika, düzenleme ve uygulamaların yürürlüğe konulması, işletmelere bu konuda finansal destek ve teşviklerin sağlanması, teknolojik alt yapının DE'ye uygun hale getirilmesi ve toplumda DE konusunda farkındalığın artırılmasına yönelik eğitim ve bilinçlendirme faaliyetlerinin yürütülmesinin sürecin başarıya ulaşmasında büyük etkiye sahip olduğunu göstermektedir.

Anahtar Kelimeler: Döngüsel Ekonomi, Engeller ve İtici Güçler, Gelişmekte Olan Ülkeler, Sürdürülebilir Kalkınma

JEL Kodları: M00, Q56, Q58

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Introduction

In recent years, the problems caused by the current economic system, which is based on a linear economy driven by the "take, make, consume, waste" logic, have become so significant that they can no longer be ignored, thereby revealing the system's unsustainability. Environmental pollution, the depletion of natural resources, excessive consumption behaviour, and natural disasters caused by climate change are on the rise worldwide. These trends are resulting in irreversible environmental, social, and economic issues for governments, businesses, and individuals (Geissdoerfer, Savaget, Bocken & Hultink, 2017; Kirchherr, Reike & Hekkert, 2017; Malik et al., 2022). For this reason, people's relationships with nature and the environment are being questioned, and solutions are being sought. The CE was introduced in response to these pressing challenges and aims to secure ecological integrity, economic well-being and social fairness. It seeks to create a sustainable economic structure for both the present and future generations. The CE emphasises a new economic model that primarily aims to prevent the overexploitation of resources and waste generation, striving to keep materials circulating within the economy for as long as possible (Geissdoerfer et al., 2017; Kirchherr et al., 2017; Neves & Marques, 2022). Described as a transformative process, this emerging system requires profound structural change at all economic levels, from micro to macro. It must be approached through an integrated perspective and strong coordination (Calzolari, Genovese & Brint, 2021; Grafström & Aasma, 2021; Kazancoglu, Sagnak, Mangla & Kazancoglu, 2021; Prieto-Sandoval, Jaca & Ormazabal, 2018; Ting, Zailani, Sidek & Shaharudin, 2024).

Today, the global shift away from a linear economy towards a circular model is widely debated and assessed by a broad range of stakeholders, including business leaders, scientists, policymakers, politicians and civil society organisations. Developed nations in particular are prioritising environmental protection and sustainable development for present and future generations and are therefore paying closer attention to adopting CE practices. However, despite this growing attention and the potential advantages of the CE, progress in adopting its principles remains far below expectations (Abdulai et al., 2024; Grafström & Aasma, 2021; Sharma, Joshi, Prasad & Bartwal, 2023; Silvius, Ismayilova, Sales-Vivó & Costi, 2021). Compared to advanced economies, developing countries have made limited progress in adopting this model and continue to operate largely in the early phases of the process (Guarnieri et al., 2023a; Kahupi, Yakovleva, Okorie & Hull, 2024; Nath, Mustayin & Eweje, 2025). Scholars have noted that, despite its advantages, the slow progress is mainly due to various barriers encountered during implementation. Therefore, recognising these barriers is crucial for shaping the policies and regulations needed for a more effective transformation. To this end, scholars have recently conducted extensive research across various nations and sectors to identify such challenges (Huang, Azevedo, Lin, Cheng, & Lin, 2021; Kazancoglu et al., 2021; Kumar et al., 2021; Mhatre, Gedam, Unnikrishnan & Raut, 2023; Mishra, Singh & Govindan, 2022; Nath et al., 2025; Neves & Marques, 2022; Rizos & Bryhn, 2022; Stumpf, Schöggl & Baumgartner2021). Additionally, studies have investigated the factors that facilitate and accelerate the transition to circular practices within firms and at the national level. These studies also provide practitioners and decision-makers with guidance on the conditions necessary for a successful transformation (Abdulai et al., 2024; Cramer, 2022; Erdiaw-Kwasie Abunyewah & Baah, 2024; Feng & Lam, 2021; Gallego-Schmid, Vásquez-Ibarra, Guerrero, Henninger & Rebolledo-Leiva, 2024a; Lehmann, Cruz-Jesus, Oliveira & Damásio, 2022; Patwa et al., 2021; Sánchez-García, Martínez-Falcó, Marco-Lajara & Manresa-Marhuenda, 2024).

The main objective of this study is to identify the barriers encountered in the transition to CE in developing countries, including Türkiye, and the driving forces that facilitate and encourage this transition, and to offer recommendations and a roadmap for practitioners, policymakers, and businesses. The main research question of this study is to determine the barriers developing countries face in the transition to CE and the driving forces that facilitate and motivate this transition. Because the transition to CE is a dynamic and constantly evolving process, we have focused on recent studies in the field. For this purpose, articles on "circular economy practices in developing countries," "barriers," and "drivers" published between 2020 (January) and 2025 (August 2025 in the Web of Science (WoS) will be examined. Due to the scarcity of studies specific to Türkiye, articles published between 2020 (January) and 2025 (August 2025 in Dergi Park will also be included in the study under the headings "circular economy practices in Türkiye," "barriers," and "drivers. The study also aims to provide a detailed assessment of the barriers, drivers, and recommendations encountered in various developing countries (e.g., Bangladesh, Brazil, China, Ghana, India, the Caribbean, Latin America, Malaysia, Namibia, Pakistan, Chile, and Taiwan). This effort is intended to ensure diversity and reduce the risk of duplication by evaluating situations across different country contexts. The first section of the study will provide a general definition of CE. The second section will address the barriers faced by businesses and countries during the transition, and the third section will explain the drivers that facilitate and

encourage the transition to CE. The following section will focus on studies specific to Türkiye and address CE implementation in Türkiye. The concluding section will provide an overview of all these barriers and drivers and offer recommendations for practitioners and policymakers.

Literature review

Circular economy

The unconscious and excessive use of natural resources resulting in irreversible depletion; the daily decline of biodiversity; global warming and the climate crisis; and the ever-increasing pollution of water, air, and soil are among the most important problems of our time. These issues have significant environmental, social, and economic impacts on individuals, businesses, and governments, forcing them to reconsider their relationship with nature and the environment (Geissdoerfer et al., 2017; Malik et al., 2022). Recently, the concept of CE has been proposed as a solution to these problems, and discussions are underway on how to transition from the current economic system to the CE. CE represents a new economic model based on business practices that aim to minimise waste by using fewer resources and materials in production, distribution, and consumption and by reusing, recycling, and recovering them multiple times within the system. The main goal of this new economic system is to achieve sustainable development and make a livable environment, economic growth, and social equality possible for current and future generations (Kirchherr et al., 2017).

Geissdoerfer et al. (2017) describe the CE as a regenerative system that seeks to minimise resource consumption, waste, emissions, and energy losses by slowing, closing, and narrowing material and energy flows. This approach relies on strategies such as designing products to be durable, carrying out regular maintenance and repairs, and reusing, remanufacturing, refurbishing, and recycling materials. The core aim is to retain resources and materials within the economic cycle for as long as possible, thereby extending their utility and reducing waste generation (Neves & Marques, 2022). Similarly, Kirchherr et al. (2017) emphasise that the CE, which promotes sustainable development by balancing environmental protection, economic growth, and social well-being, must be examined across three scales: micro, meso, and macro. The micro level focuses on products, firms, and consumers; the meso level focuses on eco-industrial clusters; and the macro level focuses on cities, regions, nations, and global systems. The central objective across all these levels is to foster sustainable growth while curbing the depletion of natural resources, energy, and materials.

On the other hand, Prieto-Sandoval et al. (2018) characterise the CE as an economic model representing a paradigm shift in human society's interaction with nature. It is further argued that the concept should incorporate four essential elements. Firstly, there should be continuous circulation of resources and energy through reuse and waste recovery, alongside a reduction in resource dependency. Secondly, there should be application of a comprehensive perspective that spans micro, meso, and macro levels. Thirdly, its role as a fundamental driver of sustainable development should be considered. Finally, there should be strong connections to processes of societal innovation. Grafström and Aasma (2021) also argued that for CE practices to be successful, a holistic perspective must be taken at all levels of the economy. That progress can only be achieved this way. Consequently, the concept of CE, which is gaining traction in policymaking and business practices, is driving a fundamental transformation of the current economic system and presenting challenges to the current production and consumption systems of modern industrial countries (Calzolari et al., 2021). Consequently, the transition from linear to circular models entails significant transformations in economic and political systems, as well as changes in company perspectives, practices, operations, and business models (Kazancoglu et al., 2021).

In summary, the transition to CE is a process that involves fundamental changes and the redesign of entire industrial systems through coordination. However, given the complexity and interconnectedness of economic systems, this transition is anticipated to be neither quick nor easy, progressing gradually (Momete, 2020). In this process, it is also clearly stated that governments should play an important role in managing and directing change through effective policies, legislation and regulations (Kazancoglu et al., 2021; Patwa et al., 2021).

Barriers to the transition to a circular economy

In recent years, CE has become a key priority for business leaders, researchers, policymakers, and civil society organisations, particularly in the United States, European Union countries, China, and Japan, as a means to ensure environmental protection and sustainable development (Guarnieri et al., 2023a). However, despite the many benefits of the transition to CE, the failure to achieve the targeted progress has emerged as a significant issue of debate (Abdulai et al., 2024; Grafström & Aasma, 2021; Sharma et al., 2023; Silvius et al., 2021). Even within the European Union, one of the organisations that prioritises

the transition to CE and the achievement of sustainable development goals, significant differences in the implementation of the CE transition have been noted among member states, depending on their levels of development. Furthermore, it has been estimated that only about half of the member states are ready for this transition (Momete, 2020). Conversely, in developing countries other than China, there is a noticeable lack of interest and effort in the transition to CE and the adoption of relevant practices when compared to developed countries, and the process is still in its infancy (Guarnieri et al., 2023a; Kahupi et al., 2024; Nath et al., 2025). Research indicates that progress in this area has been hindered by the challenges experienced during the transition to CE (Abdulai et al., 2024; Grafström & Aasma, 2021; Sharma et al., 2023; Silvius et al., 2021). Therefore, it is crucial to identify these barriers so that regulations and policies can be developed that effectively advance the transition and ensure a smoother, more successful transition (Gallego-Schmid et al., 2024b). For this purpose, the barriers encountered during the transition process are examined in detail by researchers in different country contexts and from micro, meso, and macro perspectives (Huang et al., 2021; Kazancoglu et al., 2021; Kumar et al., 2021; Mhatre et al., 2023; Mishra et al., 2022; Mubarik, Kontoleon & Shahbaz, 2024; Nath et al., 2025; Neves & Marques, 2022; Rizos & Bryhn, 2022; Stumpf et al., 2021; Trevisan, Lobo, Guzzo, Gomes & Mascarenhas, 2023).

Even European Union member countries that attach importance to the CE and sustainable development face various barriers in implementing the transition to CE (Momete, 2020). For example, Silvius et al. (2021) examined the obstacles faced by 30 furniture companies from 5 European Union countries in their transition to CE. The study categorised the companies into four different groups based on the challenges they faced. These were defined as companies that recognise the importance of the transition but face resource constraints; companies that face policy and business model barriers to the transition; companies that face market-related challenges; and, finally, companies that face internal, technological, and awareness-related challenges.

In another study related to the European Union, the barriers faced by companies operating in the electrical and electronic equipment sector when adopting CE business models were analysed. The study identified the following barriers: political gaps in the field and the uncertainties faced by companies in implementation, particularly the lack of global circular economy standards; the costs or competitive difficulties faced by companies, especially small and medium-sized enterprises (SMEs), during the implementation phase; limited public procurement to promote circular practices; lack of transparency among supply chains; and lack of incentives to collect old devices (Rizos & Bryhn, 2022).

A study by García-Quevedo, Jové-Llopis, and Martínez-Ros (2020) examined the barriers that SMEs in Europe face when adopting the CE. The study identified three main barriers: the cost of complying with regulations, the existence of complex administrative and legal procedures, and the lack of trained and specialised human resources.

A more recent investigation examined the barriers to transition in the Dutch technical and interior textile industries. The investigation revealed that the primary obstacles are high production and sales costs for circular products, as well as a lack of consumer awareness and interest in this issue. In addition, cultural resistance to this issue, limited circular design options, insufficient circular input supply, limited ability to produce high-quality circular products, high initial investment costs in transitioning to CE, and restrictive laws and regulations were also cited as barriers (Hartley, Roosendaal & Kirchherr, 2022).

The study by Mishra et al. (2022) identifies seven key dimensions of the barriers SMEs face across industries in India when adopting CE practices. These barriers can be categorised as follows: knowledge and skill barriers, technological barriers, cultural barriers, financial barriers, strategic barriers, government and regulatory barriers, and market barriers. In a similar vein, Huang et al. (2021) examined the barriers affecting the transition to circularity in the Taiwanese textile sector, categorising them under six headings: government and regulatory barriers, economic and financial barriers, technological barriers, organisational and managerial barriers, infrastructure barriers, supply chain and market barriers, and social barriers. In the study by Tan, Tan and Ramakrishna (2022), the barriers to transitioning to CE were examined from the perspective of top management. These barriers included business leaders' risk aversion as decision makers, a lack of comprehensive policy actions to promote the transition, insufficient development and sharing of technology, knowledge, and infrastructure among ecosystem players, and businesses' lack of focus on consumer education about their products.

A study was conducted to identify barriers to transitioning to a smart CE using digital technologies. The study was based on a systematic literature review and a case study of nine companies in Brazil. A total of 45 barriers were identified under the following headings: information management barriers; financial barriers; process management and governance barriers; technological barriers; product and material barriers; reverse logistics infrastructure barriers; social behaviour barriers; and policy and

regulatory barriers. The study indicates that barriers emerge at various levels (micro, meso, and macro) and exert complex and multidimensional effects, making firm efforts alone insufficient for an effective transition. Therefore, all levels must act simultaneously (Trevisan et al., 2023). In this regard, Munaro and Tavares (2023) conducted a systematic literature review to analyse the barriers, drivers, and stakeholders affecting CE implementation in the construction sector. These barriers and drivers were examined under the headings of economic, informational, institutional, political, and technological. The authors stated that adopting CE practices in the construction sector can be achieved through effective communication and multifaceted, interdisciplinary collaboration among stakeholders and the government.

Another study examining the barriers to the adoption of CE practices in the Brazilian waste management system identified the main barriers as a lack of knowledge on how to transition from linear to circular; market barriers to the use of recycled waste; inconsistencies and gaps in regulatory implementation; and a lack of coordination between different levels of government. The study noted that companies encounter economic and financial barriers to implementing these solutions, even with technical solutions in place (Souza Piao et al., 2024). A study of urban mining practices for the recovery of precious metals from e-waste in developing countries identified several barriers. According to the study, the main barriers are inadequate regulatory frameworks, insufficient financing, insufficient technology and expertise, and inadequate monitoring and evaluation of e-waste policies (Erdiaw-Kwasie et al., 2024).

The study on barriers to the adoption of CE in the Indian construction sector identified a range of factors, including economic, environmental, technical, social, governmental, and behavioural factors. The study revealed that the main barriers to CE adoption were the lack of safe material recovery processes, identified as an environmental barrier, and the high operating costs of operating a circular supply chain, identified as an economic barrier (Mhatre et al., 2023). Another study in the Indian context investigated the barriers to Industry 4.0 and CE adoption in the agricultural supply chain. The study identified a lack of government support and incentives, of policies and protocols, and of awareness as the main barriers (Kumar et al., 2021). Another study in India identified a lack of awareness, training, knowledge, and understanding of circular practices in the oil and gas industry as the most significant obstacle to their implementation. The study underscored the importance of educating and training all stakeholders on circular practices and the need to establish dedicated training programs on this subject (Sharma et al., 2023). Another study examining the barriers to SME entrepreneurs adopting circular business models in the Indian context found that the biggest barrier was financial, followed by regulatory and operational barriers (Saharan et al., 2024).

A study by Huang et al. (2021) identified the following as the main barriers to CE innovation in the Taiwanese textile industry: low customer demand for circular textile products, a lack of effective circular business models, difficulties in promoting collaborative innovation throughout the supply chain, limited availability of high-quality recycled materials, high short-term costs, and low economic returns. Another study identified the main barriers to CE adoption among textile and apparel suppliers in Bangladesh as high costs, resistance from business owners, insufficient employee knowledge and skills, inadequate regulations, and a lack of technology and R&D projects (Nath et al., 2025). In a related study on Bangladesh, Rashid, Aziz, Karmaker, Bari and Raihan (2025) pinpointed the following as the primary barriers hindering the adoption of CE practices in the apparel accessories sector: inadequate top management commitment and leadership, a lack of expertise and resources, insufficient implementation of environmental regulations, and the absence of supportive government policies. The study also examines the complex relationships among these barriers, revealing how they interact and reinforce one another, hindering the adoption of circular practices.

In another study on developing countries, Ting et al. (2024) investigated the barriers to the adoption of the CE business model by manufacturing firms in Malaysia. Key barriers identified included difficulty accessing finance, high initial investment costs, high perceived business risk, a lack of skills and qualifications, a lack of a regulatory framework for the CE, and the dominant position of key players in the sector. Another study identified market and technology-related barriers to the adoption of the CE in the Ghanaian construction sector. These barriers include insufficient incentives for circular projects, a lack of technological expertise, insufficient high-tech awards for CE applications, and financial constraints. The study identified legal and institutional barriers, including complex institutional structures, difficulties in local government coordination, a lack of comprehensive vision, a lack of comprehensive national regulations supporting the CE, and the absence of effective government legislation (Abdulai et al., 2024).

Gallego-Schmid et al. (2024b) conducted a comprehensive literature review to analyse the political, economic, social, technological, legal, and environmental barriers to CE adoption in Latin America and the Caribbean. The study found that the informal waste management sector lacks sufficient support, and inconsistent government policies and limited incentives hinder the successful implementation of CE initiatives from a political perspective. Financial constraints and high upfront costs, particularly for SMEs, pose economic barriers. Insufficient public awareness and cultural resistance to new practices hinder social progress. The region's lack of infrastructure for effective material recycling and reliance on outdated technologies unsuitable for circular practices hinder the process from a technological perspective. Inadequate enforcement of existing regulations and the lack of coherent legislation supporting the CE pose legal barriers. Environmental barriers include the lack of monitoring of industrial environmental performance and the ongoing ecological degradation that undermines the stability of circular initiatives.

In a separate study, Gallego-Schmid et al. (2024a) pinpointed cultural resistance, limited public awareness and vocational training, increased consumption behaviour, inadequate regulatory enforcement, inadequate data and technological infrastructure outside metropolitan areas, the country's economic structure dependent on extractive industries, and insufficient financial support as the primary barriers to the adoption of CE in Chile.

Another study, which sought to identify the barriers to CE adoption in developing countries and consulted with CE experts from India, Pakistan, and Bangladesh, identified the most significant barriers as the lack of a clearly defined, consistent, and facilitating regulatory framework; insufficient economic incentives to make CE practices attractive; and limited awareness and knowledge of CE principles (Mubarik et al., 2024).

As illustrated in the studies, the challenges experienced during the transition to CE can be broadly classified under comparable categories. However, the scope, significance, and impact of these challenges can vary significantly across different countries and sectors. In this regard, given the unique circumstances of each country and sector, it is essential to identify the barriers to the transition to determine the policies, regulations, and practices necessary for a successful transition.

However, as Souza Piao et al. (2024) note, it is important to remember that as solutions are found to address barriers to the transition to CE, new ones may emerge, making the transition a dynamic, ongoing process.

Driving forces in the transition to a circular economy

In addition to studies investigating the barriers encountered in the transition to CE, there are also studies examining the driving forces that encourage countries and businesses to make this transition (Erdiaw-Kwasie et al., 2024; Gallego-Schmid et al., 2024a; Kumar, Kumar, Sassanelli & Kumar, 2025; Lehmann et al., 2022; Nath et al., 2025; Sánchez-García et al., 2024).

For instance, Cramer (2022) identified the following factors as drivers for the transition to CE at the national level: market pressure stemming from supranational policies, such as the European Union's CE framework; efforts by international companies to promote CE globally; support from civil society in implementing CE initiatives; and financial support for developing CE-related skills and knowledge.

Van Langen et al. (2021) identified the primary drivers as the support of innovative and long-term policies, investments in the research sector, and the creation of appropriate infrastructure for the CE. The study also emphasises that stronger political action, such as implementing regulatory measures, offering financial incentives to businesses, and raising public awareness of the CE, can significantly accelerate and facilitate the transition process.

Neves and Marques's (2022) study examined the primary drivers of material reuse and economic reintegration within the European Union. Their findings indicate that higher levels of education increase the likelihood of purchasing products made from recycled materials and of participating in recycling activities. This supports the adoption of the CE. The study also indicates that younger demographics are more inclined to purchase products with recycled content and separate waste for recycling, and that the younger population within a country is more effective in promoting CE.

Erdiaw-Kwasie et al. (2024) identified the key drivers promoting sustainable e-waste urban mining practices in developing countries. These drivers include increased demand for environmental protection, new regulations, greater awareness and knowledge of e-waste urban mining, and the attractiveness of income from e-waste recycling.

A recent study on the drivers of CE adoption in China highlighted the government's role in raising public awareness of CE, enhancing SMEs' access to finance to boost their sustainability, and investing in advanced technology for cleaner production, recycling, and modern infrastructure (Feng & Lam, 2021). Addressing governments as a driving force, Sánchez-García et al. (2024) also suggested that governments should support the adoption of new technologies that accelerate the transition to CE by offering incentives such as tax breaks and R&D funding. In a similar vein, Lehmann et al. (2022) have argued that policymakers should allocate funding and support circular investments and R&D to promote the CE. In this regard, the Ellen MacArthur Foundation emphasises that government policies that encourage and reward the adoption of CE practices are a key driver for firms' adoption of CE principles (Ellen MacArthur Foundation, 2014). For instance, Kahupi et al. (2024) examined the adoption of CE in the Namibian mining sector. They suggested that governments implement regulations, such as tax incentives, legislation, public-private partnerships, and supportive policies, to encourage the adoption of CE practices in developing countries. The study indicates that government regulations are a driving force in firms' adoption of CE practices. In another study examining the importance of governments' roles in the transition to CE, Cramer (2022) stated that countries at more advanced stages of the transition have stronger, more committed government structures than those at earlier stages.

Another study indicates that governments play a significant role in encouraging the adoption of CE in developing countries. It emphasises the importance of educating businesses about the long-term benefits of CE, given the perceived cost of transitioning from the current system to CE. Furthermore, the study suggests that showcasing successful examples of businesses that have increased efficiency, reduced costs, and discovered new markets through CE adoption can be persuasive. These examples may encourage other companies in developing countries to follow suit (Patwa et al., 2021). For instance, China, widely recognised as the world's manufacturing hub, is embracing green practices to meet the standards of its exporting partners, thereby enhancing its competitive edge in global trade (Feng & Lam, 2021). This situation creates a driving force that prompts Chinese companies to increase their export rates to countries that adopt CE standards, gain market share in those countries, and gain a competitive advantage over companies that do not adopt such practices. European Union regulations and policies on the CE also affect governments and businesses with commercial ties to the European Union, creating market pressures for them (Cramer, 2022; Guarnieri et al., 2023b; Vieira & Guarnieri, 2025). Increasing pressure and expectations regarding sustainability from civil society organisations (NGOs) and consumers are pushing companies to adapt, leading more companies to integrate sustainability into their core values, long-term goals, and visions (Alblowi et al., 2022).

Gallego-Schmid et al. (2024a) identified increased awareness of sustainability issues among young people, supportive public policies, compliance with international agreements to achieve global sustainability goals, cost reductions, and economic advantages such as improved competitiveness as drivers of Chile's transition to CE. Nath et al. (2025) identified several key factors contributing to the adoption of CE among Bangladeshi textile and apparel suppliers. These factors include long-term benefits, market pressure from buyers, increased awareness, greater collaboration, and increased research funding. A study on CE adoption in the Ghanaian construction sector identified several key drivers. These drivers include the potential for job creation, international collaboration and exchange of expertise, and customised solutions for end users that can facilitate CE implementation (Abdulai et al., 2024).

Jabbour et al. (2020) stated that in Brazil, where government policies do not support the adoption of CE, business owners and shareholders resort to CE practices to improve the sustainable performance of their firms. This, in turn, leads to the long-term performance gains of companies implementing CE practices being considered a driving force for these companies. On the other hand, when a company with a leading market position adopts CE practices, this can create a driving force that puts pressure on other companies in the same supply chain or industry. This can lead them to emulate, adopt, and imitate the practices of leading companies (Calzolari, Bimpizas-Pinis, Genovese & Brint, 2023; Gallego-Schmid et al., 2024a; Huang & Chen, 2022; Tiwari, Kumar, Raj & Foropon, 2024).

As the studies have indicated, the shift to CE necessitates the engagement and ownership of all stakeholders, particularly governments. In their research, Patwa et al. (2021) concluded that successful transition is possible only by embedding and spreading CE culture throughout society, and that this can only be achieved through changes in social attitudes and behaviours. This change necessitates a long-term process that requires the participation and support of all stakeholders, including governments, consumers, businesses, and NGOs (Grafström & Aasma, 2021; Munaro & Tavares, 2023; Patwa et al., 2021; Ting et al., 2024). The success of the transition to a circular economy depends not on a single factor but on coordinated action across all actors and levels (state, business, society).

Circular economy practices in Türkiye

Türkiye has taken initial steps in its transition to CE through recent regulations. For example, the Paris Agreement was adopted in 2015, and the Law on Approval of the Ratification of the Paris Agreement was published on October 7, 2021. In addition, Türkiye announced its Net Zero Emissions target for 2053 on September 27, 2021, and established the Climate Change Presidency on October 29, 2021 (Çevre Şehircilik ve İklim Değişikliği Bakanlığı, 2024). Furthermore, Türkiye's first "Climate Law" was adopted by the Turkish Grand National Assembly on July 2, 2025. By becoming a party to the Paris Agreement, announcing its 2053 Net Zero Emissions target, and adopting the "Climate Law," Türkiye has demonstrated its commitment to combating climate change. However, current policies and strategies are still insufficient to achieve the 2053 Net Zero target. In particular, excessive reliance on fossil fuels, insufficient financial resources, limited access to advanced technology, and a lack of social awareness hinder Türkiye's efforts to combat climate change and, consequently, the transition to CE (Demir, 2025).

On the other hand, in Türkiye, where the Zero Waste Project was launched in September 2017, the Zero Waste Regulation was published in July 2019 in line with sustainability principles (Mısır & Arıkan, 2022). CE, which began to be implemented in Türkiye in 2019 with this regulation, has become a hot topic for Turkish companies, politicians, and organisations due to the EU, Türkiye's largest export market, requiring the European Green Deal to be implemented from 2021 (Balbay, Sarıhan & Avşar, 2021). Regarding this topic, Güngör's (2023) study indicated that 27 of the 30 companies listed on Borsa Istanbul that published sustainability reports in 2021 included CE-related data. This suggests that CE is on the agenda of large enterprises in Türkiye. However, Asfuroğlu (2024) stated that Türkiye lacks data for most indicators used to measure the transition to CE, and that, where data exist, they are sometimes compatible with the EU's 2030 targets and sometimes not. Therefore, Türkiye has a long way to go in transitioning to CE. Consequently, it is clear that Türkiye needs comprehensive political regulations, investments in new technologies, and public awareness and behavioural changes regarding CE in the transition to CE (Sapmaz-Veral, 2021).

To achieve the goals outlined in the European Green Deal, Türkiye must implement regulations to reduce greenhouse gas emissions from economic activities, make green investment decisions, promote green technologies, increase and support renewable energy sources, establish rules for industrial waste management, and prioritise CE activities (Yılmaz, 2022). Ultimately, the regulations and projects to be developed in line with the European Green Deal are crucial for Türkiye's exports to the EU, its main market. Therefore, the government and businesses must adapt their policies and practices to CE as soon as possible (Ecer, Güner, & Çetin, 2021). Sectoral roadmaps developed in this direction will also be important in increasing Türkiye's export competitiveness (Yılmaz, 2022).

Although there has been an increase in the number of articles on CE applications in Türkiye recently, studies investigating the barriers and driving forces that Turkish companies face in the transition to CE on a sectoral basis (Bakkal & Kabadayı, 2025; Biber & Denktaş-Şakar, 2024; Can-Sağlam, 2023; Kazancoglu et al., 2021; Kayikci, Kazancoglu, Lafci, & Gozacan, 2021; Üçok & Yeşilay, 2022; Yeşilkaya Daş, & Yaşin, 2023) are limited. For example, Kazancoglu et al. (2021) examined policy-related barriers hindering the transition to CE in the supply chain of the Turkish ready-made clothing sector. The study identified the lack of legislation for an effective transition, the lack of mandatory CE requirements, and insufficient government support for environmentally friendly policies as the most important barriers. In the study by Kayikci et al. (2021), CE barriers for eco-cluster SMEs in the Turkish automotive industry were investigated by focusing on technology, producers, consumers, and policy. The study identified several challenges, including issues of ownership within an eco-cluster, a lack of government support and administrative accountability, and ineffective enforcement of environmental regulations. Furthermore, the lack of integration and collaboration among supply chain partners, the insufficient adoption of CE frameworks, and product complexity related to CE principles were identified as significant barriers for the entire eco-cluster.

In another research article, Biber and Denktaş-Şakar (2024) examined the barriers to the transition to CE in the Turkish logistics sector, based on the opinions of logistics experts. The study found that the main obstacles were the lack of legislation supporting the transition to CE and a lack of education, culture, and awareness about CE in society. Another study examined barriers to implementing CE in the Turkish manufacturing sector, based on the opinions of academics and experts. The study identified the lack of qualified personnel and knowledge of CE, uncertainty about the benefits of CE, insufficient government support, and inadequate interest and support from senior management for circular practices as the most significant barriers (Can-Sağlam, 2023). Bakkal and Kabadayı (2025) examined a company that produces batteries for automotive and industrial applications to identify the obstacles that companies operating in Türkiye may face in implementing circular supply chain initiatives. The study found that the most

significant barrier was insufficient senior management support. Additionally, a lack of collaboration and coordination among supply chain partners was listed as a substantial barrier. Another study investigating product lifecycle management and CE in Turkish companies analysed survey responses from 55 employees across different companies. The study indicated that the number of companies using CE and employees' awareness of CE were low, and therefore, the biggest barrier to CE was a lack of understanding (Üçok & Yeşilay, 2022).

Bayram (2023) analysed the evolution of environmental protection expenditures and investment amounts in Türkiye between 2012 and 2021. The study stated that the government should incentivise and provide financial support to businesses that invest in and spend on environmental protection, and that the government and businesses should collaborate to develop recycling infrastructure and create and implement innovative waste management solutions. Another study on this topic stated that expanding industrial symbiosis practices would increase the implementation of CE models that transform waste into raw materials. The study also emphasised the need to implement financial support mechanisms to encourage businesses to adopt waste reduction and recovery measures, and to support sectoral collaborations (Şensoy-Gün & Balbay, 2025). Yeşilkaya et al. (2023) examined industrial symbiosis practices that facilitate and support CE in the Turkish forest products sector. The study found that there are very few industrial symbiosis practices in Türkiye compared to European countries. The authors stated that businesses should be made aware of CE and its benefits; that the state should encourage firms to participate in industrial symbiosis networks with financial support and regulations; and that the necessary legal rules should be put in place.

Fındık's (2023) study offered various recommendations at the micro and macro levels to accelerate the transition to a CE model. At the micro level, it was emphasised that senior management in companies should support training on CE and take steps to establish a CE culture. At the macro level, it emphasised establishing university-industry collaboration on CE; developing a CE strategy that includes all stakeholders; monitoring successful and unsuccessful CE implementations at the international level and providing feedback; selecting successful companies as role models for CE implementation; and establishing shared resources or industrial symbiosis clusters across sectors. It also highlighted the importance of encouraging the production and consumption of circular products through legal regulations; incorporating training programs on circular product production and consumption into course curricula; and using the press and media to raise awareness about CE.

Similarly, Bolayır and Eroğlu (2025) stated that the foundations for the transition to CE in Türkiye can be laid only through nationwide adoption. The study emphasised that the transition to CE can be achieved through financial support and incentives for businesses implementing CE practices and operating in the recycling sector; the establishment and implementation of legal regulations regarding recycling; and public education, information, and incentive programs related to recycling. Delibalta (2022) stated that participation, cooperation, and coordination among all stakeholders are necessary to activate innovative models encompassing the circular economy and digitalisation practices in the Turkish mining sector. It also emphasised that the government should create an ecosystem that facilitates technological developments in the industry through incentives. Therefore, mining companies should implement these innovative models and make the necessary investments. Similarly, Karakadılar (2023) emphasised the importance of government policies, stating that the government can reduce the barriers companies face in investing in digital technologies and adopting CE principles through policies and incentive mechanisms.

Bilgili (2025) proposed a system specific to Türkiye to encourage recycling, accelerate the transition to CE, and achieve zero waste targets. This system, referred to as "Turkish waste banking," aims to reintegrate waste into the economy through economic incentives. It emphasised the need for an effective division of labour and coordination among institutions responsible for urban waste management in establishing this system. However, it was also noted that the system may face barriers, such as inadequate technical infrastructure and societal behavioural resistance. Sayan (2024) examined how sustainable waste management strategies can be developed and implemented in the healthcare sector through CE. The study offered several recommendations, including developing and implementing sustainable waste management policies, training personnel, and adopting innovative technologies for waste management processes. It also emphasised that the success of this implementation can be achieved only through collaboration across disciplines and the participation of all stakeholders in the sector.

Kara and Babaoğlu (2025), who addressed the issue from the perspective of local governments, stated that municipalities have significant responsibilities in expanding CE in Türkiye, including waste management, sustainable urban planning, and raising public awareness. The study also emphasised the

need for local-level inclusive policies, the use of new technologies, the promotion of sustainable production models, and the effective use of resources such as international funds, green bonds, and sustainable financing instruments in the implementation of infrastructure investments.

Similarly, in a study by Ayturan, Dinçbaş & Hasar (2025), while progress has been made in some sectors regarding CE implementation in Türkiye, the importance of implementing CE and sustainability principles across all industries and integrating them into decision-making processes to expand the process, developing innovative solutions for different sectors, and increasing stakeholder participation was emphasised. Furthermore, recommendations were made for the widespread adoption of CE practices, including raising public awareness, offering financial incentives, reducing taxes, utilising green financing instruments, and prioritising public procurement. It was stated that, in addition to the government's support and cooperation in this process, collaboration and coordination among central and local governments, the private sector, academia, and non-governmental organisations would also increase the success of the CE transition. From a government fiscal regulations perspective, Koç (2024) examined whether tax and fiscal incentive policies in Türkiye contribute to CE. The study stated that the state, as the rule-maker, plays a critical role through tax policies, incentives, and legal regulations. It has also been suggested that incentive mechanisms should be considered a state policy to foster sustainable consumption habits among individuals and to promote awareness and societal transformation.

Discussion

The purpose of this study is to identify the barriers encountered in the transition to the circular economy (CE) in developing countries, including Türkiye, and the driving forces that facilitate and encourage this transition. This study demonstrates that the transition to a circular economy (CE) in developing countries is still in its infancy, as the barriers cluster across five interdependent domains including regulatory obstacles, government barriers, financial barriers, technological barriers, social barriers, and organisational barriers (Gallego-Schmid et al., 2024b; Huang et al., 2021; Mhatre et al., 2023; Nath et al., 2025).

Problems such as inadequate and incomplete rules, regulations, and policies on the transition to CE, not being effectively implemented and supervised, or complex and inconsistent procedures on this subject are defined as regulatory barriers (Abdulai et al., 2024; García-Quevedo et al., 2020; Huang et al., 2021; Rizos & Bryhn, 2022; Stumpf et al., 2021; van Langen et al., 2021). Research indicates that governments play a significant role in the transition to CE, serving as regulators, rule makers and supporters (Feng & Lam, 2021; Kahupi et al., 2024; Kirchherr et al., 2017; Lehmann et al., 2022; Sánchez-García et al., 2024). However, governments' failure to prioritise CE in their agendas, their lack of provision of incentives and support in this regard, and their reluctance to cooperate with other actors are defined as government barriers in the transition to CE (Gallego-Schmid et al., 2024b; Kumar et al., 2021; Mhatre et al., 2023; Mishra et al., 2022; Rizos & Bryhn, 2022; Tan et al., 2022). Especially in developing countries, the support, implementation, regulations and policies of governments regarding the transition to CE are insufficient, and these governments cannot provide the necessary leadership in managing the transition process (Abdulai et al., 2024; Gallego-Schmid et al., 2024b; Kayikci et al., 2021; Kazancoglu et al., 2021).

The financial barriers that businesses encounter during the transition to CE, including lack of financing, high start-up costs, low return on investment, and difficulties in accessing funding, have been thoroughly documented (Huang et al., 2021; Mhatre et al., 2023; Mishra et al., 2022; Saharan et al., 2024; Silvius et al., 2021).

Inadequate technological infrastructure, industry reliance on outdated technologies, a paucity of R&D projects, a dearth of technology and knowledge sharing within the ecosystem, and a lack of technological expertise are expressed as technological barriers that businesses face (Abdulai et al., 2024; Gallego-Schmid et al., 2024a; Mishra et al., 2022; Nath et al., 2025).

The presence of cultural resistance to societal changes and the limited social awareness and public consciousness regarding the CE are examined under the title of social barriers (Huang et al., 2021; Mhatre et al., 2023; Sharma et al., 2023; van Langen et al., 2021). Researchers have identified several organisational barriers to organisational change, including a lack of knowledge in businesses, insufficiently trained and specialised human resources, resistance of business owners to change, a lack of senior management vision on this issue, and weak leadership characteristics (García-Quevedo et al., 2020; Rashid et al., 2025; Sharma et al., 2023; Tan et al., 2022; Ting et al., 2024).

Research has identified key factors driving businesses and nations towards adopting CE. Government financial support and incentives for the CE (Cramer, 2022; Feng & Lam, 2021; Kumar et al., 2025;

Sánchez-García et al., 2024) and the existence of supportive public policies (Gallego-Schmid et al., 2024a; Patwa et al., 2021; van Langen et al., 2021) have been identified as the most important of these factors. In addition, investments in the research sector and the creation of appropriate infrastructure for the CE (Feng and Lam, 2021; Lehmann et al., 2022; Nath et al., 2025; Sánchez-García et al., 2024), the long-term economic advantages that CE practices will provide (Abdulai et al., 2024; Gallego-Schmid et al., 2024a; Nath et al., 2025), and the supportive role of civil society (Alblowi et al., 2022; Cramer, 2022) are also identified as driving forces in the implementation of the companies' transition to the CE. Research indicates that the adoption of CE practices and sustainability activities by leading companies within the same supply chain or industry catalyses market transformation, prompting other companies to emulate these practices (Calzolari et al., 2023; Gallego-Schmid et al., 2024a; Huang & Chen, 2022; Nath et al., 2025; Tiwari et al., 2024). Likewise, it has been stated that countries and companies that have, or want to develop, trade ties with countries that have CE and sustainability policies and regulations, such as the European Union, will adopt CE practices to meet these countries' standards and gain market share and competitive advantage. This dynamic has prompted a shift toward CE (Cramer, 2022; Feng & Lam, 2021; Guarnieri et al., 2023b; Vieira & Guarnieri, 2025). Therefore, the trade ties of developing country companies with countries that have adopted CE practices, their increasing exports to these countries, or their efforts to participate in supply chains where such practices are adopted, serve as a driving force for them to adopt such practices.

The high level of education and environmental awareness in society, as well as the investment in CE education (Feng & Lam, 2021; Nath et al., 2025; Neves & Marques, 2022; Patwa et al., 2021), the existence of cooperation between businesses, institutions, and policymakers (Kumar et al., 2025), and the existence of international collaboration and the exchange of expertise (Abdulai et al., 2024; Nath et al., 2025) have also been identified as driving forces that motivate and facilitate the transition to CE.

When examining CE implementations in Türkiye, various steps have been taken towards the transition to CE through recent regulations such as the adoption of the Paris Agreement, the publication of the Zero Waste Regulation, the establishment of the Climate Change Presidency, the announcement of the Net Zero Emission target by 2053, and the enactment of the Climate Law (Ministry of Environment, Urbanization and Climate Change, 2024; Demir, 2025; Mısır & Arıkan, 2022). At the same time, the transition to CE has become a major agenda item for Turkish companies, politicians, and organisations due to the European Green Deal mandated by the EU, Türkiye's main export market (Balbay et al., 2021; Ecer et al., 2021; Sapmaz-Veral, 2021; Yılmaz, 2022). However, it is also stated that Türkiye is still in the early stages of transitioning to CE and has a long way to go (Asfuroğlu, 2024).

While studies on CE in Türkiye have increased in recent years, they are still insufficient. Identifying the barriers and drivers encountered in the transition to CE is particularly important for determining the regulations and practices necessary to accelerate the process and increase its success. Existing studies generally suggest similar barriers to CE in Türkiye, drivers, and recommendations to accelerate the transition to CE. In general, the most important obstacles to the transition to CE in Türkiye are listed as follows: lack of necessary regulations, policies and sanctions on CE, inadequate government support, financial inadequacies, inappropriate technological infrastructure, lack of knowledge, skills, expertise and senior management support in enterprises, lack of sectoral cooperation and coordination, and lack of awareness in society on this issue (Bakkal & Kabadayı, 2025; Biber & Denktaş-Şakar, 2024; Can-Sağlam, 2023; Ecer et al., 2021; Karakadılar, 2023; Kazancoglu, et al. 2021; Kayikci, et al., 2021; Sapmaz-Veral, 2021; Üçok & Yeşilay, 2022).

Studies conducted in the Turkish context have indicated that the state should play an active role and provide the necessary regulations, sanctions, and incentives to accelerate the transition to CE. Furthermore, the transition to this new economic system requires a paradigm shift across society, emphasising the importance of raising awareness and understanding of CE at all micro, meso, and macro levels. Regulations and practices such as sectoral collaboration between firms, the expansion of industrial symbiosis practices, the provision of financial support and tax advantages, the use of green financing instruments, the organisation of training programs to raise awareness of CE in society and businesses, the promotion of the use of new technologies, and the selection of successful companies in CE as role models have been identified as driving forces in accelerating the transition to CE (Ayturan et al., 2025; Bayram, 2023; Delibalta, 2022; Fındık, 2023; Koç, 2024; Sayan, 2024; Yeşilkaya et al. 2023). On the other hand, the EU's mandate for the European Green Deal is becoming a driving force for Turkish companies exporting to the EU market or those seeking to do so. Turkish companies will prioritise and feel pressure to transition to CE to avoid losing their market share in the EU, maintain their positions in the international supply chain, and increase their export competitiveness. Güngör's (2023) study, which

examined the CE data of companies listed on the stock exchange and publishing sustainability reports, confirms this.

Practical implications

The study offers important implications for macro-level policymakers and micro-level business managers. First, the state plays a crucial role in the transition to CE in developing countries. As the rule-maker, the government should implement the necessary policies, regulations, and sanctions for the transition to CE. This should eliminate deficiencies, confusion, and uncertainties in implementation and ensure the legal infrastructure needed for the transition to CE is in place. Because the transition from the current economic system to this new one will initially impose high costs on businesses, the state should support them with various financial support and tax incentives. Investing in new technologies, renewing existing technological infrastructure, and transforming it in line with CE is crucial for the transition to CE. The state should take the lead in making the necessary investments, and companies should be provided with financial support and tax incentives to support technological transformation and investment. Business managers, especially SMEs, should be informed about the long-term benefits of transitioning to CE. Successful countries, sectors, and company practices in transitioning to CE should be examined, and sectoral roadmaps should be developed. Collaborations should be established with universities and NGOs on this issue, and training support should be provided to companies. Education, information, and promotional activities should be undertaken to raise awareness of CE in society and businesses. The government should encourage the production and consumption of circular products through subsidies and tax reductions. Companies seeking to participate in international supply chains, expand into global markets, and increase exports should be provided with financial and educational support to facilitate the transition to CE. Company managers should prioritise the transition to CE by educating their employees, collaborating with other companies in the supply chain, and informing their customers and consumers, thereby accelerating the transition's success.

Limitations and recommendations

The study's primary limitation is that it is a traditional literature review. Therefore, future studies focusing on various developing countries and analysing these barriers and drivers in depth, using both quantitative and qualitative methods, will significantly contribute to the field. Furthermore, given the paucity of studies conducted in the Turkish context, an in-depth analysis of the barriers and drivers faced by Turkish firms, particularly those operating within international supply chains or with an export focus, in their implementation of CE transitions would significantly contribute to the field of CE in developing countries. An in-depth analysis of the CE transition practices of firms operating across sectors in Türkiye would also provide policymakers with significant benefits for developing sectoral roadmaps. Furthermore, comparing the CE transition processes of developing countries with similar economic and sectoral development levels, and comparing the barriers and drivers these countries faced during their transitions, constitutes a significant gap in the field for future research.

Conclusion

The world is on the verge of transitioning to a new economic system called CE. This new monetary system will offer not only benefits but also new opportunities. The faster developing countries, including Türkiye, transition to this new financial system, the greater their share of the global economy and the greater their competitive advantage. In this process, countries that lag in the transition to CE may be excluded from this new economic system. It's safe to say that in the coming years, the classification of developed and developing countries will be determined by those who adopt CE early and those who lag in adopting CE. Therefore, governments and companies must be prepared for this transformation, implement the necessary regulations as soon as possible, and design their economies accordingly.

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