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Green Transition in Industry: The Circular Economy

The pandemic unlocked a new phase of economic transformation and, together with international regulations that were rapidly implemented thereafter, accelerated the reconstruction of sustainable development. The European Union has identified the Circular Economy—one of the key pillars of the European Green Deal—as a new economic model for building a sustainable future. However, potential solutions have not yet been implemented on a large scale. Companies willing to adopt circular solutions, as well as hard-to-abate sectors, face various barriers. Transitioning to this model—whose objectives include changing existing consumption and production patterns, ensuring the most efficient use of limited resources and keeping them in the economy for longer, reducing resource dependency and waste, lowering waste volumes, and increasing employment and growth—is challenging.

As the industrial revolution has progressed through successive phases to Industry 4.0, the current industrial system—built on a linear business model that has been in place for over a century—has rapidly depleted resources. Transforming this system through circular models and innovative investments to optimise and protect resources makes it clear that, under current actions, achieving the 2050 targets is not feasible. Moreover, the actions required to prevent the world from consuming resources faster than their natural regeneration rates are not solely within the control of companies. If circularity is achieved through a global transformation—including individuals responsible

for changing consumption habits—the engine of sustainable development will continue to operate.

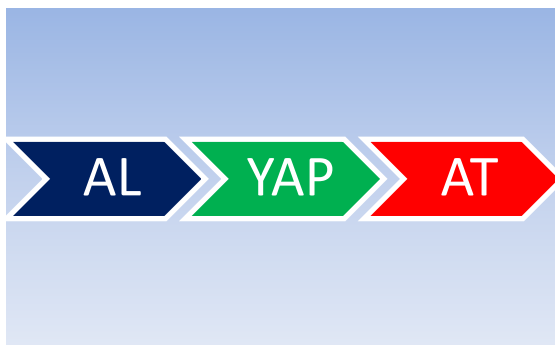
What Is the Circular Economy?

There are numerous definitions of the circular economy in the literature, as its scope is broad and it is applied by researchers across many disciplines. To better understand it, it is useful to briefly address the linear economy. Historically, in the early stages of industrialisation, product costs were high and purchasing power was low because 100% of resources or raw materials could not be utilised in production. As industries evolved while remaining dependent on primary and fossil resources, the ability to use 100% of inputs reduced costs and increased purchasing power. This fostered a “take–make–dispose” culture on the consumer side.

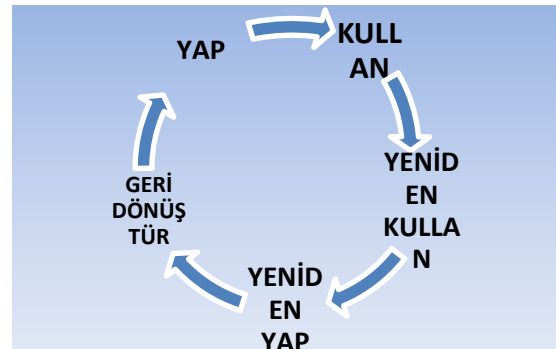
On the production side, rapid manufacturing resulted in waste, and under the assumption of unlimited resources, consumer demand was met by focusing on cost and labour optimisation rather than resource optimisation. Industry was thus structured around this approach, which came to be known as the linear economy model. Accordingly, the linear economy is a model based on the assumption of unlimited resources and a “use and discard” approach, in which labour and production are maximised while waste is insufficiently recovered.

In contrast, circularity focuses on resource efficiency and outputs. It is guided by the 3R principle—Reduce, Reuse, Recycle—which prioritises reducing resource consumption, reusing products or components, and generating minimal waste. The circular economy is therefore defined as a model in which energy and primary resources are used as efficiently as possible, outputs are fed back into production, secondary resources are actively utilised, waste is minimised, product lifespans are extended, and service-based solutions are enabled. It is regarded as a key instrument for sustainable development. In essence, it is an economic model that supports business models and strategies aimed at producing longer-lasting outputs with fewer resources while minimising the environmental and social impacts of residual outputs.

LİNEER EKONOMİ



DÖNGÜSEL EKONOMİ



The EU Has Adopted the Circular Economy as the Only Option for Its 2050 Targets

The circular economy—one of the most important tools for achieving the EU's net-zero vision—is not yet well understood by businesses, resulting in slow progress in implementation. While it is evident that achieving high levels of circularity requires disruptive changes and entails costs, the current linear model has lost not only its social and environmental sustainability but also its economic viability. If the system continues unchanged, risks such as volatility in raw material prices, limited access to critical materials, mutual import dependency, and the loss of markets and customers will increase.

Conversely, solutions to these risks are embedded within the circular economy, making the transition no longer optional but necessary. As the global leader in circular economy policymaking, the EU has positioned this model—one of the strongest drivers of the green transition—as the new economic model and the sole pathway to achieving its 2050 targets. This resource-efficiency-focused model protects natural capital while also delivering positive economic outcomes.

According to a study conducted in 2015, if the EU were to adopt technology-enabled circular principles, it could increase resource productivity by 3% and, when additional non-resource benefits are included, generate a net economic benefit of up to EUR 1.8 trillion by 2030 across three sectors. This scenario is also expected to contribute to a 7% increase in GDP and to employment growth (McKinsey, 2015). The benefits for businesses are similarly significant and include cost reductions, improved waste management and value creation from waste, sustainable growth, talent attraction, exports of sustainable products and services, the creation of new business opportunities and employment, enhanced resilience and competitiveness, and improved product and service networks. In this context, particularly for the priority sectors identified in action plans, seizing the opportunity for circular transition represents a major and critical step toward green transformation. When managed effectively and supported by technological developments, the transition may also lead to industrial renewal through R&D and infrastructure investments in areas such as resource efficiency, waste reduction, and carbon capture.



Barriers to Circularity

The transition to a circular economy is a challenging journey for industrial enterprises, and potential barriers vary across countries, sectors, and companies. The literature categorises these barriers in different ways: as soft (organisational and social) and hard (economic and technical) barriers (Jesus and Mendonça, 2018); as cultural, regulatory, market, and technological barriers (Kirchherr et al., 2018); or as cultural, legal, financial, and sectoral barriers (Hart et al., 2019). Other classifications include barriers related to finance, skills, business models, and consumer behaviour (Buruzs and Torma, 2016). In some cases, opposing views may attribute current challenges in the transition incorrectly to circularity itself. A lack of alignment in international trade policies also constitutes a significant barrier. Overall, the main challenges faced by industries in transitioning to a circular economy can be categorised as knowledge and skills gaps, financial constraints, regulatory issues, technological limitations, market and business model challenges, and consumer behaviour.

Capturing Circular Opportunities for a Sustainable Future

The EU's strong commitment to the circular transition has mobilised all economies with which it cooperates. Given that the EU is our largest export market, this rapidly growing global trend makes it imperative for industries in our country to actively pursue and support circular transformation. Moreover, the EU itself is not yet far advanced in implementation, and practical applications remain limited. This creates substantial circular opportunities that should be proactively pursued to close the gap.

To this end, long-term strategies should be developed through collaboration among companies, NGOs, academics, and other experts under a public-sector umbrella. Without strong partnerships, progress toward shared objectives will not be achievable. While there are good practices among companies in our country that have adopted the circular model—and some

have even become global leaders within their sectors—these represent only a very small proportion. Therefore, it is essential for industrial sectors to develop a thorough understanding of regulations, closely monitor developments, prioritise industrial and urban symbiosis projects, harmonise and integrate industrial processes, invest in training qualified personnel at all levels, raise awareness, expand knowledge sharing, prioritise infrastructure and technological investments that support circularity, take timely and well-prepared actions, and develop incentives and sustainable financing mechanisms for infrastructure and R&D investments.

The transition to a circular economy represents a critical opportunity that must not be missed in the pursuit of sustainable development.



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