

Transforming production and consumption systems

the lens of three main participants in the system: (1) businesses selling products; (2) consumers buying and using products; and (3) policymakers regulating the production, use and end of life of products. This overview presents a generalised view of a fully linear

or fully circular system, neither of which exists today. Nevertheless, it provides insight into the fundamental mechanisms defining products and the societal role of such products required for successfully transitioning towards a circular economy.

Table 2.1 Key mechanisms shaping the role of products in a linear and a circular economy *
















Linear system mechanisms	Circular system mechanisms
Business perspective	
 <i>Product as value creation source</i> Profit margins are based on the difference between the market price of a product and the production cost. The strategy for increasing profits is to sell more products and keep production costs as low as possible. Technological innovation makes old products obsolete and urges consumers to buy new products. Protection of intellectual property rights, a main source of value, leads to protective design measures, such as creating barriers to repairing a product, rather than sharing product technical information and repair manuals.	 <i>Functionality/performance as a source of value creation</i> Products are part of an integrated business model focusing on the delivery of a performance or functional service. Competition is mainly based on the creation of added service value of a product, not solely on its sales value. Social/business model innovation allows the creation of extra value by applying technological innovation to solving societal needs. As products are part of a company's assets, cost minimisation drives product longevity, reuse, reparability and remanufacturing.
 <i>Economies of scale in global production chains</i> Cost efficiency drives the optimisation of global production chains, minimising the costs of resources, labour and transport.	 <i>Location of production and use tend to be more linked</i> As the provision of a service is physically linked to the location of the customer, there is an incentive to produce/manage physical products used in a service close to the user.
 <i>Steer consumer needs towards product offer</i> Products with short lifespans are preferred as they are cheaper to make and support a market for new products that replace old ones. Maintenance and repair are avoided, as it is more profitable to sell new products than to repair old ones.	 <i>User needs/wants drive the role of a product</i> Offering the best service means matching the (intangible) needs of the user with a combination of services and products.
 <i>Tendency to disregard end-of-life phase</i> There is no economic incentive for product life extension, reuse or remanufacturing as they counteract most linear business models.	 <i>Internal incentive to incorporate end-of-life phase in business model</i> As products are assets, minimising life-cycle costs is an implicit incentive for a company, inducing a search for the best economic equilibrium between reusing, repairing, remanufacturing and recycling products.
Consumer perspective	
 <i>Consumerism follows marketing</i> Consumers want new products that keep pace with fashion and technological advances. Consumers must match their needs with the product offerings available.	 <i>Customer satisfaction is an important driver</i> In a service relationship with a company, the customer experience feeds back more strongly to the service provider, raising consumers' awareness of their actual needs. In other cases consumers become prosumers who co-create or co-produce the products and services they need.
 <i>International opportunities for cost reduction</i> Consumers seek the cheapest version of a product on international markets, enabled by e-commerce.	 <i>Local-first attitude</i> Accessibility to the service provider is part of the service experience, which leads to proximity as a customer choice criterion.
 <i>Ownership is the norm</i> Owning a product is regarded as the normal way to fulfil needs. Over time, previously luxury products become commodity goods due to decreasing production costs. Beyond legal warranty, product repair is considered too expensive compared with buying a new product. Do-it-yourself repair is considered too difficult due to complex and protective product design.	 <i>Accessibility is the norm</i> Fulfilling needs is driven first and foremost by accessibility of a product and the satisfaction provided by its use. Different consumer segments can access products of their choice through customised services or by sharing products, for instance in peer-to-peer networks. Service agreements provide an incentive for product care for the producer and the user, depending on the agreement.

Table 2.1 Key mechanisms shaping the role of products in a linear and a circular economy * (cont.)

Linear system mechanisms	Circular system mechanisms
 <p><i>Low/no residual value of products</i> End-of-life products (broken or obsolete) are considered a burden, to be disposed of as cheaply as possible — by selling on the second-hand market, storing at home, or through regulated waste disposal systems or illegal incineration or dumping.</p>	 <p><i>End-of-use incentives incorporated</i> If products are part of a service, there are incentives to return them to the provider after use, avoiding stocks of obsolete products in households, or illegal dumping.</p>
Policy perspective	
 <p><i>Dependence on existing production system</i> There is a strong link between mass production of goods, and the focus on cutting costs in general, and making the production as efficient as possible, often resulting in lower labour costs and less job creation.</p>	 <p><i>More focus on facilitating skilled workforce</i> More localised and service-based activities require a skilled but affordable workforce. Policymakers can facilitate this by shifting taxes from labour to resources.</p>
 <p><i>Global playing field</i> Competition for economic factors on the international market steers national social and environmental policies.</p>	 <p><i>Less risk for outsourcing jobs</i> As management of products as local assets is less likely to be outsourced, there is less incentive for a race-to-the-bottom in social and environmental policies.</p>
 <p><i>Balance consumer protection with economic stakes</i> Protection of consumer safety and health is mostly reactive and geared towards protecting existing economic stakes, such as value-added tax (VAT) income.</p>	 <p><i>Facilitate safe and healthy services with regulation</i> As safety and consumer health are business incentives for high-quality performance, policies focus on facilitation of these types of services.</p>
 <p><i>Action prompted by health or environmental concerns</i> There is no inherent incentive for regulation of the waste phase of products. Only when waste-related health or environmental concerns arise is regulatory action taken to minimise negative impacts.</p>	 <p><i>Facilitation of end-of-life management</i> Extended producer responsibility rules create incentives for companies to internalise end-of-life management. Governments provide basic infrastructure and fiscal measures supporting reverse logistics.</p>

Note: * This table highlights the most relevant process parameters compatible with circular thinking. Environmental effectiveness cannot be evaluated without further investigation.