


# Digital Transformation and Circular Economy for Sustainability



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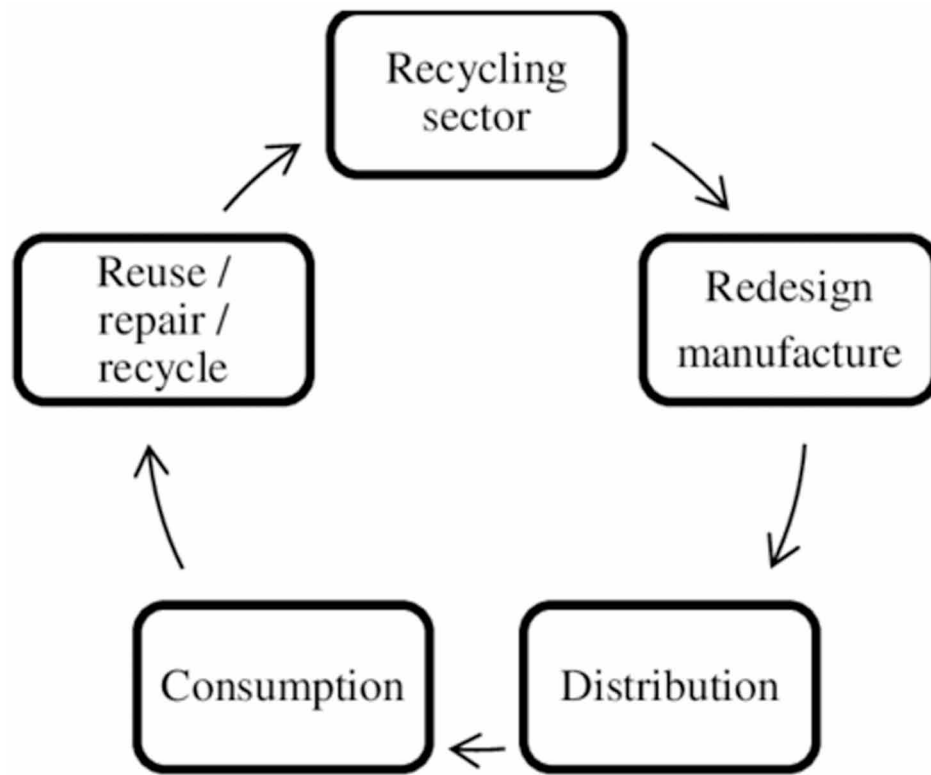
## INTRODUCTION

The traditional industrialization has been producing many byproducts and generating pollution and environmental degradation (Di Vaio, Hasan, Palladino & Hassan, 2022; Hu et al., 2011). This adverse scene made several researches think over the idea of “circularity”, aiming to reflect upon the way resources are currently used not only inside production and economical systems but also as a way to deal with their lack and its relation to population growth. (Alhawari, Awan, Bhutta & Ülkü, 2021; Cezarino, Liboni, Stefanelli, Oliveira & Stocco, 2019).

The idea of “circularity” (figure 1) was shaped around the conception of “Circular Economy”, which is understood by some authors as a differential perspective about organizational and operational production and consumption systems focused on recovering value from used resources. (Genovese, Acquaye, Figueroa & Koh, 2017; Lieder & Rashid, 2016; Sarc et al., 2019). The organizations which replace the traditional perspective of linear economy for this circular approach on energy and materials may experience economic, environmental and social benefits (Geissdoerfer, Savaget, Bocken & Hultink, 2017).

*Figure 1. A circular economy model*

*Source: Author's elaboration*



In general, the interest of researchers in studies about the relationship between sustainability and digital transformation has increased. Effectively, the issue of sustainability refers to economic, environmental and social development. Sustainability is a broad concept that is not limited to the environment only, as it also involves economic preservation and the valorization of social resources (Ghobakhloo, 2020).

At the same time, the economic development conducted through the empowerment of the industrial sector and consequently exploration of natural resources has made governments and society itself look for new ways to achieve a sustainable development. So, the digitalization may urge this transformation towards a more sustainable circular economy (Antikainen, Uusitalo & Kivikytö-Reponen, 2018; Cezarino et al., 2019; Hedberg, & Šipka, 2021; Jabbour et al., 2018). Besides, the industry 4.0 and the sustainability may be useful if taken as tendencies in organizational production systems (Rejikumar et al. 2019; Trappey et al., 2017).

With its smart solutions, the industry 4.0 brings in its core the digital transformation, offering an information technology infrastructure capable of providing a more efficient use of resources, enabling reduction of energy consumption, and logistics routes, while also optimizing capacity (Jæger & Halse, 2019; Sreedharan & Unnikrishnan, 2017). The digitalization enables transparent access to products' data, resource consumption, and the promotion of a life cycle of technological products (Antikainen et al., 2018). The business model may be developed based on the integration between technologies of industry 4.0 and the circular economy, promoting a digital transformation (figure 2).

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