

“Circularity is not a trend; it’s a culture shift”; Ken Webster (Webster and Ellen Macarthur Foundation, 2017)

According to the European Commission (2015), a CE “... is an economy where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised”. the Circular Economy (CE) introduced by environmental economists (Pearce and Turner, 1990) is based on the principles of industrial ecology, how material and energy flows from extraction from the natural resources and is transformed by the industrial processes using energy into products and services. In industrial ecology, it is implied that a circular economy will be beneficial to society and to the economy as a whole (Andersen, 2007).

Gains will accrue not solely through the reduction of environmental residuals but, arguably more significantly, through the mitigation of the consumption of virgin materials for economic endeavours. While the potential advantages may appear self-evident intuitively, it is crucial to emphasize that the conceptual framework inherent in the circular economy approach is rooted in physical, rather than economic, observations. (Andersen, 2007).

Three economic functions of the environment can be identified: provision of resources, life support system, sink for waste and emissions (Ghisellini et al., 2016). The three fundamental functions should be assigned a monetary value. Nevertheless, in many instances, environmental goods, such as by air and water quality or public goods, lack an associated price or a market, despite possessing discernible value or utility for individuals and societies.

Various models exist to support the transition to CE such as Industrial Symbiosis (IS), (Jacobsen, 2006), characterised by Chertow, 2000,, “The part of industrial ecology known as industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical ex-change of materials, energy, water and by-products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity” (Chertow, 2000), although an apparently recent newcomer to the CE ecosystem, IS has been engaged in throughout the ages with peoples trading in commodities and exchanging goods (Rachel and Laybourn, 2012).

CE endeavors are directed towards one of three distinct levels, as delineated by (Yong, 2007, Yuan, Bi and Moriguchi, 2008)): the macro level, which concentrates on geographically delimited regions such as cities, provinces, and countries; the meso level, which focuses on eco-industrial networks wherein waste (material or energy) from one company is repurposed by another company; and the micro level, which directs attention to refining or enhancing the environmental performance within an organization. This involves endeavours such as reducing resource consumption, minimizing waste disposal, or manufacturing products with reduced environmental impact. The strategies collectively denoted by the four Rs (reduction, repairing, remanufacturing, and recycling) represent deliberate or inadvertent approaches employed by organizations to enhance efficiency.

Surveys conducted at the micro level, focusing on organizations and their adoption of CE strategies, reveal that a considerable proportion of respondent organizations lack a comprehensive understanding of the four Rs. Notably, there is an emphasis on reduction and recycling, with comparatively less attention to repair and refurbishing practices. Furthermore, a noteworthy gap exists in the awareness of CE principles, even among those utilizing the four Rs to enhance their business practices. The empirical evidence suggests that, despite claims of explicit adoption of CE practices, the actual implementation remains suboptimal (Barreiro-Gen and Lozano, 2020). To close the loop in CE and enhance operational efficiencies, it is imperative to foster a closer integration

between theory and practice, involving collaborative engagement with stakeholders who are impacted by or have a stake in organizational activities.