

# A NEW ECONOMIC AND SOCIAL PARADIGM

CIRCULAR ECONOMY REQUIRES RADICAL ECONOMIC CHANGES, STARTING FROM PRODUCT DESIGN. NEW BUSINESS MODELS ARE NEEDED, NAMELY INTEGRATING THE CIRCULAR REUSE OF RESOURCES WITH NEW SKILLS AND WITH THE FUNDAMENTAL ROLE OF THE MARKET AND OF SUITABLE POLITICAL MEASURES.

After decades of corporate sustainability focused on intangible assets as reputation, financing, community relations, today the concept of circular economy opens up a new era in which the management of material resources becomes pivotal to reach the next corporate goals on economic, social and environmental sustainability.

The current linear economic model and its production processes are based on the on-going use of massive quantities of energy and raw materials and the subsequent generation of emissions and waste. This model, that never considered the environmental aspects, has showed over time its many limits, which are mainly three: most used resources are not renewable, therefore are doomed to be depleted sooner or later; renewable resources are used at such a pace that prevents their natural regeneration; finally waste and pollutants exceed their environmental absorption<sup>1</sup>.

Within the academic world, two English environmental economists, Turner and Pearce, were among the first<sup>2</sup>, at the end of the '80s<sup>3</sup>, to talk about the need to shift from a closed and linear economic model, without any relation to the environment and with a manufacture-use-dispose process, to an open and circular system in which negative "externalities"<sup>4</sup> (finite resource consumption, pollution, waste production) are part of the economic system itself according to the material balance model<sup>5</sup>. The concepts of "open" and "closed" systems are to be considered physically, in other words the extended economy refers to them to imagine a model based on the one hand on thermodynamics laws<sup>6</sup>, and on the other, likely to apply the typical economic tools to the environment.

Only over the last few years the concept of circular economy finally left mere academic debates to enter the common language. Circular economy means an economy capable of reducing to zero<sup>7</sup>



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its waste and pollutants production and at the same time minimizing its use of energy and raw materials through cyclical material flows similar to natural ones. This approach is also named "from cradle to cradle", using the typical life cycle assessment terms, because it underlies the need to transform post-production and post-consumption waste and residues into new resources for a new production cycle. The Ellen MacArthur Foundation, internationally well-known British non-profit organisation, defines circular economy as *"one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles"*. It is not simply about waste re-use optimization, but instead changing every step of the supply chain in order to preserve and regenerate the natural capital, maximize resources re-using them in biological or technical cycles and minimizing the unavoidable negative externalities. This requires

a radical change of paradigm of the whole production system, from product design and development, things need to be conceived in order to last as long as possible and to be then exchanged, recovered, repaired, reproduced and only at the very end recycled.

The vast majority of the currently marketed products is made of such a material mix that their re-use is complex and expensive and, when possible, it leads to *downcycling*<sup>8</sup>, in other words to a qualitative material downgrading even if the recycling is quite energy consuming. In the circular economy product design must already include end-of-life scenarios in order to facilitate the collection, recovery and re-use of materials. The shift towards a circular economy entails new business models replacing the current ones or integrating them to seize new opportunities. Large corporations may play a crucial role in terms of innovation and circular economy promotion thanks to their size, resource availability and process management

and integration. New skills and roles are needed in supply chains to guarantee circular material flows and their re-use in production or natural cycles, as well as more efficient and cost-effective systems for the collection, separation and treatment of materials.

Market mechanisms play a fundamental role in boosting and fostering such changes; nevertheless they can be supported by political measures aimed at guiding the market as well as by educational entities and opinion leaders likely to influence consumers' choices. Some crucial factors are also the European or international common rules and standards as well as incentives and other credit access tools.

In the circular economy, products and materials have a more sustainable value; waste and resource consumption are minimized and even when a product reaches its end-of-life its materials can be re-used several times to create further value. This model has a meaningful social added value: the European Commission calculates that waste prevention, eco-design, re-use and similar measures can generate for European companies net savings accounting to 600 bn euros, that is 8% of the yearly turnover, leading to the creation of 580,000 new jobs<sup>9</sup>.

The industry will play a strategic role in promoting and accelerating such a radical change through research and innovation of product design and production processes, industrial synergies, testing of new supply chain models and reorganization of the existing ones. In order to favour the shift towards the circular economy also public entities, decision-makers and authorization and control bodies will have

to get a better knowledge of industrial processes, supply chains and reverse logistics in order to understand how to promote the creation of new cycles and to monitor their social and environmental impact.

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#### NOTE

<sup>1</sup> From the paper: "Dal Green Procurement al Circular Green Procurement. Promuovere l'economia circolare attraverso l'evoluzione degli acquisti verdi. Position Paper", Coordinamento delle Agende 21, 2016.

<sup>2</sup> This concept is not new in the academic world. See for instance, Kenneth Boulding (1966) in *The economics of the coming spaceship Earth*: "The closed economy of the future might similarly be called the 'spaceship' economy, in which the earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy". See also Barry Commoner (1972), *The closing circle*, here we find the first elements of this theory.

<sup>3</sup> Pearce D.W., Turner R.K. (1989), *Economics of natural resources and the environment*, The Johns Hopkins University Press.  
Turner R.K., Pearce D.W., Bateman I. (1993), *Environmental economics: an elementary introduction*, The Johns Hopkins University Press.

<sup>4</sup> See the *external cost theory* introduced by Marshall (Marshall A., 1920, *Principles of economics*, London, Macmillan) then further developed by Pigou (Pigou A.C., 1920, *The economics of welfare*, Macmillan, London) and

other major authors (including, to name but a few, K. Arrow, R.H. Coase, P.M. Romer, M.E. Porter).

<sup>5</sup> This model introduces in the economic system the contribution made by the environment in terms of natural resources and the collateral phenomenon of energy and material dispersion, generally designated as waste production. This extension lays the foundations to the integration in the analysis of the effects of some physical laws, like the mass and energy conservation laws.

<sup>6</sup> The application of thermodynamic principles to economic analysis favours the comprehension of some key sustainable development concepts, which are strictly intertwined with the original meaning of the term "circular economy", the sense of this word being sometimes lost in the vulgarisation process. One of them is the impossibility to eliminate the environmental impact of man-made material and energy flows: according to the above-mentioned physical laws the waste mass equals the mass of inputs used in production and consumption cycles. Another key concept is the impossibility of a full material recovery caused by the irreversibility of the transformation processes of matter into energy and by energy degradation (also see the notions of exergy and anergy).

<sup>7</sup> As explained in the previous note, a complete neutralisation of the man-made impact on the environment is impossible from a physical point of view. Here the idea is to reduce it as much as possible within the given technological, operational and physical limits.

<sup>8</sup> The term *upcycling* was used for the first time in 1994 in an article by Reiner Pilz, from the German company Pilz GmbH & Co. KG, to define a form of re-use generating an added value compared to the original good or material and it is the opposite of *downcycling*, which reduces the original quality level.

<sup>9</sup> European Commission, fact sheet *Circular Economy Package: Questions & Answers*, 2015, [http://europa.eu/rapid/press-release\\_MEMO-15-6204\\_en.htm](http://europa.eu/rapid/press-release_MEMO-15-6204_en.htm)

