

# 4.

## The circular economy: historical grounds

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## INTRODUCTION

The circular economy has come to stay. There can be no doubt about this: all one has to do is visit the webpages that the European Commission devotes to this theme, and that show the action plan of the circular economy package for the current year, 2018, as well as the initiatives in place for promoting the circular economy among a wide range of stakeholders.<sup>1</sup> And this is how it will be in the years to come. Through its ambitious plan for monitoring innovation policies and processes in various economic sectors and in all of the Member States, the European Commission reveals its regulatory talent and its ability to incorporate ideas that, because of the public impact that gave rise to them, need to be duly framed and protected. The environment and the climate may be subject to the risk of catastrophes, but the circular economy has already earned the status of a powerful antidote for preventing them, or at least for lessening their effects.

In the standardized language of the European Commission, “a circular economy is explained as 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”. This concept fits in well with both the European Union and the United Nations’ agendas for sustainable development, having been established as a strategic objective that allows for the preservation and regeneration of natural resources at a global level. In this way, the concept has definitively entered into the jargon of economists, engineers, architects, industrial designers, scientists, entrepreneurs, and public decision-makers, challenging the conceptual operationality of the more generic term of sustainability, whose broad scope and not always easy definition (Portney 2015) do not allow us to isolate the specificity of the scientific and political agenda associated with the circular economy.

By turning this issue into a priority programme, involving the various European decision-making bodies and binding the Member States to the screening of established guidelines and directives, there is no doubt that the European Commission is making a decisive contribution to strengthening a cause that it has borrowed from civil society organizations, the enlightened public sphere, and autonomous social, political, and business movements.

1 The European recommendations and directives are especially important in regard to mitigating and eliminating plastic waste in the oceans. Cf. [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm); and <http://circulareconomy.europa.eu/platform/>.

However, the definition presented above does not seem to do sufficient justice to the meaning that is transmitted to us by those ideologues who are most committed to defending the cause of the circular economy.

Walter Stahel, a Swiss architect, who co-founded the Product-Life Institute in Geneva, was one of the leading promoters of the idea of the circular economy in the early 1980s.<sup>2</sup> In a more recent text, in which he revisits and synthesizes his contributions in this field, he defines the circular economy as follows:

A circular economy would turn goods that are at the end of their service life into resources for others, closing loops in industrial ecosystems and minimizing waste. It would change economic logic because it replaces production with sufficiency: reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired (Stahel 2016, 435).

Or, in other words, the concept of a circular economy suggests a criticism of the functioning of a linear economy viewed in terms of the final consumption of finished products that are non-recyclable and generate rubbish and waste. By searching for a credible alternative to the growth models based on an intensive use of the traditional factors of production (land, labour, and capital), the supporters of the circular economy bring to the political agenda of reflection on the future of human societies an ambitious programme of innovation and renewal in the creation of new manufacturing processes and new products. In this way, the circular economy:

(...) refers to an industrial economy that is restorative by intention; aims to rely on renewable energy; minimizes, tracks, and hopefully eliminates the use of toxic chemicals; and eradicates waste through careful design. The term goes beyond the mechanics of production and consumption of goods and services, in the areas that it seeks to redefine. The concept of the circular economy is grounded in the study of non-linear, particularly living systems (Webster 2017, 46).

It was also Walter Stahel who pioneered the term “cradle to cradle” (made popular through the work with the same title by Braungart and McDonough,

<sup>2</sup> The concept was sketched in 1976 by Walter Stahel in his research report to the European Commission “The Potential for Substituting Manpower for Energy”, co-authored with Geneviève Reday-Mulvey (Stahel and Reday-Mulvey 1981).

2009), which expresses one of the key ideas of the circular economy, namely that everything that is born and lives can be born again and gain new life. In this way, agents and businesses engaged in the work of industrial design, recycling, information technologies, and genetic engineering cooperate in an increasingly convergent fashion to increase the life cycle of products and to enrich their value chain. This process also generates an extension of the labour market, with job opportunities open in new sequences of the course of production, thus helping to reduce unemployment.

The implementation of the circular economy cannot be limited to simple procedures of reduction, reuse, and recycling. The aim is not just to obtain gains in eco-efficiency, but instead to promote eco-effectiveness through the development of new products with a long life-cycle (Braungart and McDonough 2009). The aim is to produce goods that, when they reach the end of their useful life, are not turned into useless waste, but can instead be decomposed and turned into nutrients for plants and animals, or used as raw material for the manufacture of new products in a new industrial cycle. The intention is that in the cities of the future the buildings that are constructed will produce more energy than they consume. It is no longer considered important to discuss the problem of the shortage of fossil fuel reserves, since such reserves are rendered obsolete through the increasing recourse to alternative energies. It is even admitted that the effluents produced by factories may enter into the distribution circuits of our drinking water (Kiser 2016).

These examples suggest that our technological imagination may sometimes become confused with futurist illusions. The aims of the circular economy are frequently the fruit of some proactive excesses, the work of well-meaning visionaries who are generously committed to building a brave new world. However, the growing number of organizations, businesses, civic groups, university departments, research & development centres, and think tanks that are dedicated to promoting and implementing the strategic goals of the circular economy clearly demonstrates that the concept has indeed come to stay.<sup>3</sup>

3 Among those institutions that are most active in promoting the circular economy are the Ellen MacArthur Foundation (<https://www.ellenmacarthurfoundation.org/>), the Product-Life Institute, in Geneva (<http://www.product-life.org/>), and the John T. Lyle Center for Regenerative Studies (<http://env.c.pp.edu/rs/rs>). Updated information about good practices in the circular economy can be found on the *European circular economy stakeholder platform* (<https://circulareconomy.europa.eu/platform>) and in the e-book *Why circular economy? 20 reasons to switch to the circular economy*, Spark News, 2017 (<http://issuu.com/sparknews/docs/>). See also <https://www.eea.europa.eu/publications/circular-econo> »

But does this mean that everything is new in this enticing programme of sustainable economic and social development that obliges us to think of the world in a different way? This is the question that I shall now try to answer, already anticipating the direction that this response will take: the ingredients that were used to form the concept of the circular economy already had antecedents that were deeply rooted in the history of economic ideas. For this reason, it is worth looking at these historical grounds that confer an unexpected perennality upon the circular economy.

The notions of circularity in the economy, the shortage and perishable nature of resources, the stationarity of growth rates, the rejection of consumerist abuses, the criticism of the society of abundance, the appeal for sharing and reciprocity, the preservation of the environment, are all questions that have accompanied the formation of economic science over the last 250 years. The brief outline that is presented here examines some of these historical grounds of the circular economy. In taking this disciplinary incursion into the history of economic science as our frame of reference, it should be stressed that the interdisciplinary nature of the concept of the circular economy does not overlook other perspectives for the study of the question, namely taking into account the sciences of engineering and environmental studies, biology, and the ecosystems. Accordingly, this chapter amounts to only a partial examination of some of the grounds underlying the configuration of the circular economy within the contemporary scientific debate.

## HISTORICAL ORIGINS OF THE CONCEPT OF THE CIRCULAR ECONOMY

The idea of circularity in the way that the economy functions dates back to the very beginning of the emergence of political economy as a scientific device for explaining the relationship between economic agents who produce and consume. The concept of circular flow was clearly present in the economic literature written in the mid-eighteenth century, most notably in the works by

► my-in-europe for a global approach highlighting the expected progress resulting from the implementation of the circular economy. These publications and websites provide multiple examples and experiences promoted and encouraged by both public and private agencies in different countries. As regards the case of Portugal, it is worth referring to the official initiative endorsed by the Ministry of Environment (<http://eco.nomia.pt/>), which includes funding opportunities and fiscal incentives. The number and diversity of initiatives is increasing quickly, as illustrated in <https://www.circulareconomy.pt/>.

John Law, Richard Cantillon, and the French physiocrats (Schumpeter 1954, 223-243; and Murphy 1993). The description made by François Quesnay in *Tableau économique* (1759), which focused on the flows of expenditure between the classes sharing the space of economic relations in an agricultural kingdom, demonstrates how the product created in a certain year is consumed and, simultaneously, how it guarantees the reproduction of the same circuit in the following year, and so on in each subsequent year.

It is a scheme of economic reproduction that does not generate growth or an accumulation of the initially invested capital, since the aim is to create an analytical tool to explain the way in which wealth circulates, and not the way in which capital is accumulated. Through the development of a simple explanatory scheme, a basic idea began to take shape for understanding the circular flow of income, which is used to illustrate any introductory economics textbook: the households that provide factors of production (land, labour, and capital) to the firms that produce goods and services, and that create the income (rents, wages, profits, and interest) that makes expenditure possible (consumption and investment). It was also this interpretive model, whose conception was pioneered by John Law (*Money and Trade Considered*, 1720) and Richard Cantillon (*Essai sur la nature du commerce en général*, 1755), that served as the inspiration for the development of analytical tools and concepts that were of great importance in the formation of modern economic theory, namely input-output tables, national accounts tables, and general equilibrium approaches.

The concept of a circular economy recovers this simple notion of the circular flow of income, but also adds some other fundamental ingredients. One of these ingredients is the one that refers to the context of the shortage associated with the use of natural resources and production factors. In this particular area, the main historical source of inspiration was the work of Thomas R. Malthus, who, in his famous *Essay on the Principle of Population* (1798), outlined the risks inherent in demographic growth, whose geometrically progressive rate of increase threatened to exhaust available resources that grew only arithmetically. Regardless of the validity or not of the catastrophic projections made by Malthus (which overestimated the demographic trends that were to be noted in the more developed countries and underestimated the effects of technological progress on the exploration of natural resources), there is no doubt that his message functioned as a kind of warning about the imminent depletion of resources, the imbalances in the natural world caused

by humankind, and the destabilizing effects of demographic growth, especially in urban areas.

This pessimistic view was to be shared by many other nineteenth-century authors, disillusioned with the nefarious consequences of the industrial revolution and the economic progress that had given rise to social inequalities, and which, above all, had resulted in such negative disturbances to the environment. The emergence of an ecological and environmental awareness occurred within the context of the scientific imagination and the discoveries that centred on the observation and knowledge of the natural world, as Alexander von Humboldt demonstrated so clearly in his masterpiece *Cosmos* (1845). But it also happened at the level of the philosophical imagination and the ethical and civic resistance of Ralph Waldo Emerson, the author of *Nature* (1836) and Henry David Thoreau, the author of *Walden* (1854). The examples of these authors, writing toward the end of the first half of the nineteenth century, were undoubtedly important for the gradual development and strengthening of an attitude of vigilance in relation to the loss of the circular balance and harmony of the natural world. This, in turn, led to a growing concern for the preservation of the environment that today finds fervent backing among the militant supporters of ecological causes (Wulf 2015).

Another source of influences that are implicit in the approach to the circular economy is the one relating to the criticism of the aim of achieving constant and continuous growth. In fact, by questioning the virtues of growth for growth's sake, the circular economy recovers a tradition in the history of economic thought that had one of its best examples in the work of John Stuart Mill. In one of his most famous books, *Principles of Political Economy: With Some of Their Applications to Social Philosophy* (1848), Mill differs from the classical economists of his generation by stating that the possibility of capitalist economies attaining the stationary state – in other words, a moment in their progressive evolution when the accumulation of capital and the further growth of the product would cease to be possible – should not be regarded as a negative inevitability or as a threatening spectre. According to Mill, it would even be desirable if such a situation were to occur, insofar as it would make it possible for priority to be given to the problems of the distribution of wealth and property, instead of to the constant growth of annual production. This would be an opportunity for people to devote themselves to their own moral and cultural development and to improving their quality of life, including

their relationship with their surroundings. And this beneficial stationary state was regarded by John Stuart Mill as an ideal model of society that could be drawn closer to, or even made possible, through political reforms that would gradually transform capitalism into a fairer and more humane economic system. It is worth taking a close look at his words:

I cannot, therefore, regard the stationary state of capital and wealth with the unaffected aversion so generally manifested towards it by political economists of the old school. I am inclined to believe that it would be, on the whole, a very considerable improvement on our present condition. I confess I am not charmed with the ideal of life held out by those who think that the normal state of human beings is that of struggling to get on; that the trampling, crushing, elbowing, and treading on each other's heels, which form the existing type of social life, are the most desirable lot of human kind, or anything but the disagreeable symptoms of one of the phases of industrial progress (Mill 1848, Book IV, vi, §2, 753-754).

The criticism of economic growth without any human limits was a constant feature in the writings of economic thinkers and worldly philosophers that ran counter to the predominant vision of an economic science based upon the principles of the supposed rationality of producers and consumers who are satisfying unlimited needs. This condemnation of the acquisitive spirit and the wasteful squandering of wealth was the main concern in the approach that Thorstein Veblen adopted to the phenomenon of conspicuous consumption in his famous *Theory of the Leisure Class* (1899). Among the various authors representative of the institutionalist school in economics, it was John Kenneth Galbraith who best interpreted and developed Veblen's legacy in dismantling the factors that interfere in the motivations and propensities of individuals for consumption, whether it be in the form of exhibitionism or mimicry, in their search for a desired social status, or due to exogenous determinations and impositions that induce behaviour that does not correspond to free individual choices.

As a society becomes increasingly affluent, wants are increasingly created by the process by which they are satisfied. This may operate passively. Increases in consumption, the counterpart of increases in production, act by suggestion or emulation, to create wants. Or producers may proceed actively to create wants through advertising and salesmanship (Galbraith 1958, 158).



This does away with the myth of the sovereign consumer, the holder of freedom of choice in the market. Such a consumer is nothing more than a passive economic agent, a victim of artificially created needs, who is subject to the interests of an economy of ill-shared abundance.

Why grow, why produce and consume when such actions bring with them waste and the depletion of natural resources? Expressed in this way, this is also the question that the defenders of the circular economy challenge us to answer. They have inherited a long tradition of critical thought about the possibility of the collapse of the systems of natural equilibrium caused by human action, about the shortage and unsuitability of available resources, about the submission of the natural world to the business power, and about the incapacity of consumers to assert their own will.

#### THE METAPHOR OF “SPACESHIP EARTH”

The remote origins of the notion of the circular economy were made real and tangible in an essay that, although it is not expressly claimed or recognized as being a foundational text, cannot avoid being remembered as a pioneering contribution to the development that the circular economy has enjoyed over the last two decades. I am referring to the text of Kenneth Boulding with the suggestive title of “The economics of the coming Spaceship Earth” (Boulding 1966; Spash 2013).

In keeping with his unorthodox and militant criticism of mainstream neoclassical economics, in this short essay Boulding presents us with a warning about the deterioration of the environment as a result of human activity and the social structures that serve as its support. The terms of his presentation are essentially very close to the characteristic language of the circular economy, even though at no point in his text does Boulding actually use such terminology.

The period in which Boulding published “Spaceship Earth” corresponded to the moment when the first signs were beginning to be shown of a reflection that was concerned with the risks of environmental deterioration caused by the rhythm of economic growth in the postwar period. The worsening of pollution, the wastage of natural resources in capitalist and socialist economies sustained by growing levels of consumption of fossil fuels, were themes that appeared with ever greater impact on a political agenda in which the

consequences of economic growth and the need for imposing limits on this same growth were discussed in a scientifically grounded fashion. The earlier optimistic view about the possibility of achieving social well-being through a growth in individual and mass consumption was now superseded by an ever greater awareness of the risk arising from the deterioration and depletion of the resources that needed to be mobilized in order to achieve such an aim (Ropke 2004).

Kenneth Boulding uses the concept of entropy, applied to the understanding of the open systems of the material world, of energy, and communication, to explain that the world economy functions through the combination, interaction, and exchange of inputs and outputs that shape the processes of production and consumption. Using a language that is not always exempt from imprecision, Boulding defends a vision of the economic system that counters the model that he classifies as the “cowboy economy”, an exploitative, maverick economy constantly consuming resources that are considered to be unlimited. He opposes this model with the spaceship earth economy, or, in other words, an economy that is self-contained, demanding an efficient use of limited resources, capable of guaranteeing the reproduction of a given capital stock that one wishes to keep stable. In his own words:

The closed economy of the future might similarly be called the “spaceman” 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 (Boulding 1966, 7-8).

In the spaceship economy, there is no place for either consumption or growth as the prime motivations of human action:

The less consumption we can maintain a given state with, the better off we are. If we had clothes that did not wear out, houses that did not depreciate, and even if we could maintain our bodily condition without eating, we could clearly be much better off (Boulding 1966, 9).

The metaphor of the “Spaceship Earth” proved very useful for his purposes of critically denouncing the technological optimism and the hedonistic cult of consumerism that are the hallmark of the advanced market economies of the

western world. It inspired contemporary reflections on sustainability and the global environmental challenges (Kula 1998, 129-33). It gave the world a timely warning about the way in which humankind thinks about its relationship with the natural world (even if the concepts lack a certain rigorousness and precision in terms of terminology), and it continues to be used as a tool for arguing in defence of environmentally friendly technologies and public policies based on the principles of social responsibility and a commitment to goals of sustainable development that are subject to screening (Barbier and Burgess 2017). And it not only afforded continuity to, but also consistently incorporated the themes of circularity, the shortage of resources and the limits of growth, which have persistently remained on the research agenda revisited by the history of economic ideas.

Spaceship Earth was also an additional pretext for Boulding to continue to pursue his crusade against conventional mainstream neoclassical economics, challenging the definition of key concepts such as production, consumption, and income, and calling for a renewed consideration of the value of capital as a variable flow and as a fixed stock.

The essential measure of the success of the economy is not production and consumption at all, but the nature, extent, quality, and complexity of the total capital stock, including in this the state of the human bodies and minds included in the system. In the spaceman economy, what we are primarily concerned with is stock maintenance, and any technological change which results in the maintenance of a given total stock with a lessened throughput (that is, less production and consumption) is clearly a gain (Boulding 1966, 8).

Finally, it was a demonstration of Boulding's appeal for a fruitful dialogue between economics and other disciplines from the area of the social sciences that are indispensable for understanding human behaviour and its relationship with the surrounding social and natural environment (Fontaine 2010). In this sense, his work made a decisive contribution toward enriching an open vision of the social problems that the concept of the circular economy obliges us to consider and that his metaphor challenges us to face up to:

The spaceship metaphor stresses the earth's smallness, crowdedness, and limited resources; the need for avoiding destructive conflict; and the necessity for a sense of world community with a very heterogeneous crew (Boulding 1993, 311).

## CONCLUSIONS

The problems of the contemporary world are obviously different from those that caught the discerning attention of Kenneth Boulding in the mid-1960s and which he revisited once more in the early 1990s. Today, the risks and threats to the environment have an incomparably more urgent status on the political agenda. The impact of economic activity on the natural balances has caused us to pay much greater attention to the conditions that must be safeguarded in order to guarantee the survival of future generations.

It is not enough to trust in the regulatory role that governments, international agencies, and enlightened public opinion can and must play in preventing more serious threats. Greater vigilance has to come from the actors themselves, those who most contribute to the worsening of the symptoms of environmental degradation and the emission of carbon dioxide and greenhouse gases that provoke global warming and medium and long-term climate change; in other words, the economic agents and the private and public business sector. The annual costs of the effects of pollution, the destruction of the ecosystem, and the impacts on our food and health systems, all call for the direct involvement of companies from the agricultural, industrial, and services sectors, which have a share in the responsibility for the occurrence of these phenomena.

For this reason, it is not surprising that the appeals for the assimilation and affirmation of the vitality of the concept of the circular economy increasingly involve the business sector, which seeks to benefit from the effects that the materialization of this new paradigm may give rise to, from what is a doubly profitable perspective: on the one hand, because it lessens exposure to the risks of environmental deterioration; on the other hand, because it obliges the business sector to adopt processes of innovation and creative destruction associated with new processes of industrial engineering and new products of consumption that are harmoniously included in new chains of ecologically sustainable production. And it is on this capacity for adjustment and the incorporation of change that, in the end, our own future depends.

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