Does the transition to the Circular Economy on a global scale enhance mechanisms of intragenerational inequality?

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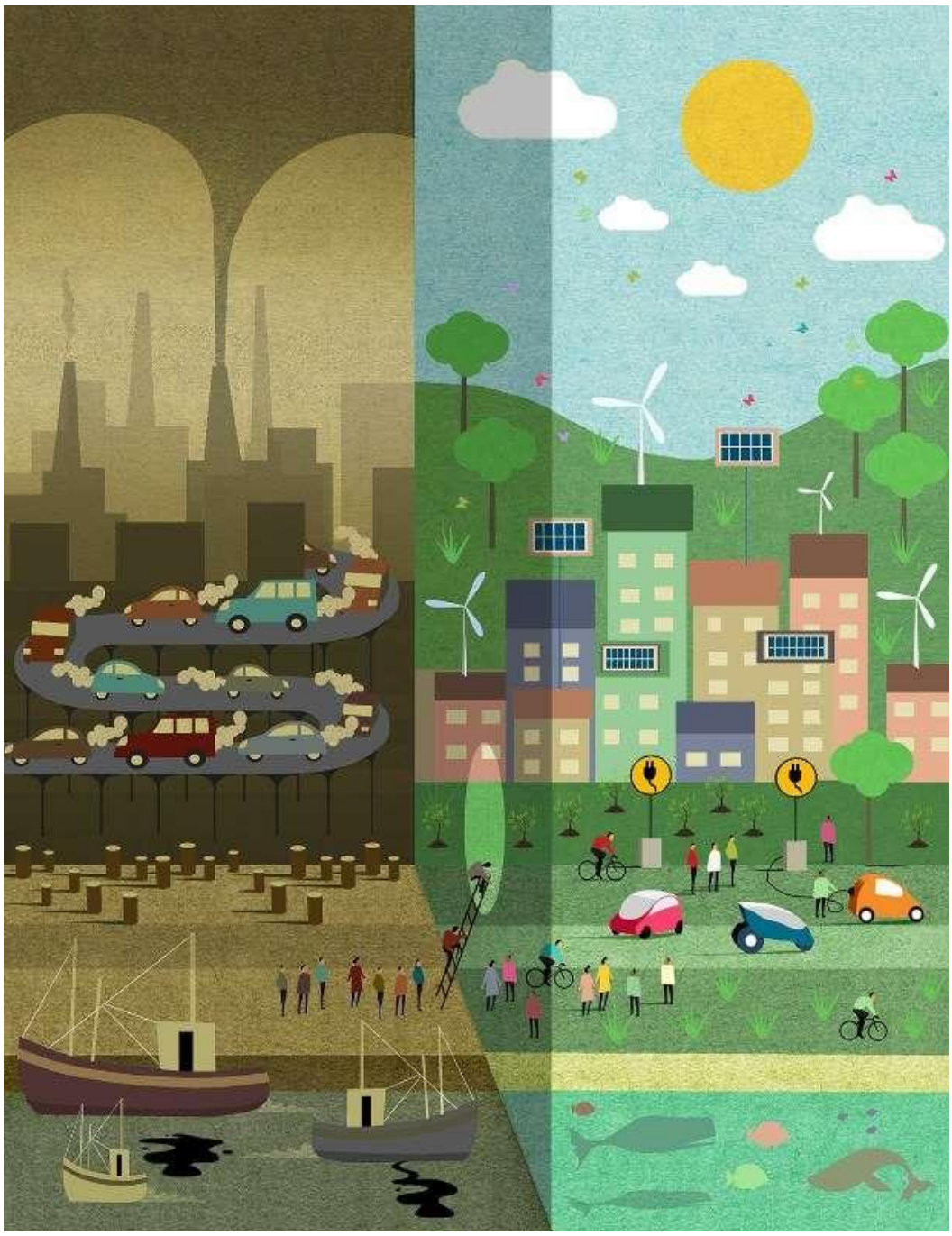

Adam Simpson. Would you want to live in the sustainable world?

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ABSTRACT

The study argues that the Circular Economy (CE) model often privileges the Global North economies' standpoint, revealing a significant inadequacy. Therefore, the present research investigates the extent of the disparities in closed-loop strategies between developed and developing countries. The objective of the analysis is to understand whether these contingencies are relevant and whether they are the display of global economy dynamics that reinforce mechanisms of inequality, conflicting with the Sustainable Development rationale.
It is found that the analysis corroborates the existence of imbalanced drivers, opportunities, barriers and drawbacks between the Global North and the Global South, although potential benefits for the South are entailed. However, it also emerges the existence of critical transnational dynamics which may prevent the achievement of CE objectives globally. The existence of these overlooked and unaddressed global forces is identified as the actual problem of the CE model. Indeed, the narrow focus of the CE on production processes and local, national and regional dynamics diverts the attention from the Global Value Chains. Thus, it is recommended to analyse the global CE structure by applying the Global Value Chain framework, in order to investigate if it is possible to overcome the exposed CE's limits.

KEYWORDS: Circular Economy; Sustainable Development; Global South; global inequality.

Lo studio adduce che il modello di Economia Circolare (CE) privilegia spesso il punto di vista dei paesi del Nord Globale, rivelando una importante inadeguatezza. Pertanto, la presente ricerca indaga l'entità delle disparità nelle strategie a "circuito chiuso" tra Paesi sviluppati e paesi in via di sviluppo. L'obiettivo dell'analisi è comprendere se queste evenienze siano rilevanti e se siano la manifestazione di dinamiche di economia globale che rafforzano i meccanismi di disuguaglianza, in conflitto con la logica dello Sviluppo Sostenibile.
Si è constatato che l'analisi conferma l'esistenza di incentivi, opportunità, barriere e svantaggi squilibrati tra il Nord del mondo e il Sud del mondo, sebbene siano implicati potenziali benefici per il Sud. Tuttavia, emerge anche l'esistenza di dinamiche transnazionali critiche che possono impedire il raggiungimento degli obiettivi della CE a livello globale. L'esistenza di queste forze globali ignorate e non affrontate è identificata come il vero problema del modello CE. In effetti, la prospettiva limitata della CE sui processi di produzione e le dinamiche locali, nazionali e regionali distoglie l'attenzione dalle catene del valore globali. Si raccomanda, quindi, di analizzare la struttura globale della CE applicando lo schema di analisi della catena del valore globale, al fine di indagare se è possibile superare i limiti evidenziati della CE.

INTRODUCTION

The findings of previous research of the author are the basis upon which lay the foundations of the current study. The previous research indicated that the literature available on the Circular Economy (CE) fails to provide a balanced understanding of the issues it globally encompasses, and that it may reflect a shortcoming of the whole Circular Economy strategy. Indeed, the literature on the model tends to focus more on developed countries' concerns and needs, and the perspective chiefly adopted to address the CE model is that of the Global North. The paper aimed to inquire whether differences of barriers or drivers to the CE implementation existed between developed and developing countries, or if a global approach would rightfully apply.
As the investigation illustrated, these disparities between Global North and Global South subsist, as indeed exist different potential positive and negative outcomes for the two categories of countries. Overall, the discussion of the results provided a basis for further reflections and research on the theme.

The present study draws on several considerations that emergehd from more recent and comprehensive literature, which includes the latest academic studies, policy papers and reports, among other things. On the one hand, the research seeks to investigate the full extent of disparities in closed-loop ventures in developed and developing countries. On the other hand, the paper transcends the analysis, and it seeks to understand if these contingencies are the display of an economic model that reinforces mechanisms of intragenerational inequality, which is the inequality between people of the same generation, contrary to the rationale behind the Sustainable Development goals targeted by the CE.

In order to conduct this analysis, the study is divided into two parts, the first (ideally comprising only chapter 1) being centred on designing a complete framework for the subsequent analysis and reflections, while the second (chapters 2, 3, 4 and 5) focuses on the analysis of the Circular Economy model.

The research starts with a discussion of the Sustainable Development paradigm (SD, henceforth), the framework of the entire study, as it represents both a departing point for reflections on CE and a primary target of its policies, according to part of the literature. This section illustrates the SD paradigm's emergence, core discourses, but also spotlights the criticisms to its vagueness and weak foundations. The discourse here scrutinises the relationships of the model with actual targets of social, environmental and economic nature. A section of the chapter focuses on the contemporary debate in which take sides scholars who consider necessary the shift to a model of development

founded on economic de-growth, in order to assure equality between current generations and across generations, and scholars who deem economic growth essential to that end.
The context is highly relevant for the current analysis because the study is problem-oriented and tackles a concrete problem with significant global implications. Thus, it is not a unique theory that influences the whole understanding of this issue.

Subsequently, the second part deals entirely with the CE. First, the second chapter explains the meaning and significance of Circular Economy, its models of implementation and rules, as well as its genesis and evolution. The amount of literature available on the topic is substantial, and it encourages a conceptual discussion of the model, whose conceptualisation is critically confronted, and an analysis of its essential physical limits.

The third chapter isolates the weaknesses and gaps identified in the literature and proposes the direction of the research to address them. It is here demonstrated that the most significant studies, deemed to have a wide-ranging global approach to CE strategies, policies and hindrances, are short-sighted and fail to identify the priorities of the Global South. Thus, the study pursues to evaluate if this restrictive stance corresponded to the lack of CE models and strategies tailor-made upon developing countries' needs.

The analysis will attempt to address some fundamental questions such as: are there actual differences between GS and GN countries that could influence different CE perspectives? Are the drivers to the circular shift diverse? Is the implementation of such CE policies more burdensome in some of these countries, and how? Are Circular Economy precepts and policies consistent with economic and environmental sustainability aims? And finally: does the implementation of Circular Economy worldwide enhance mechanisms of inequality between developing and developed countries?

Thus, the fourth chapter analyses and contrasts the existing differences between Global South and Global North. Differences between South and North's opportunities, expected benefits, barriers to CE implementation and drawbacks are analysed, and it is found that actual discrepancies between the policies' outcomes exist and have significant implications for the GS.
The analysis also identifies global dynamics that partly invalidate the CE strategies and that result to be crucial to discuss the results and understand the Circular Economy's limitations. An innovative interpretation of the CE strategy's inadequacy is introduced and, conclusively, it is suggested how its framework may be employed to overcome the CE's faults.

1. THE SUSTAINABLE DEVELOPMENT

1.1. Sustainable Development, the aim of the Circular Economy

> *"There have long been calls from industry for guidance in implementing strategies for sustainable development. The Circular Economy represents the most recent attempt to conceptualize the integration of economic activity and environmental wellbeing in a sustainable way"* (Murray et al., 2017:369).

In order to critically evaluate the Circular Economy model, it is necessary to outline the theoretical framework in which it was conceived. For this purpose, the analysis will move in two different dimensions, delineating and criticising the Mainstream Sustainable Development, in its approach to international development and in its interpretation and manipulation of social and environmental concerns. Then, it will be examined the green critique of the Mainstream discourse, in order to delineate a clear context for the evaluation.

To clarify, the author understands Sustainable Development as the ideal result of development policies, which should set environmental and social sustainability as the primary objective. Circular Economy is considered here the current preferred path to attain SD according to numerous scholarships and development actors.

Sustainable Development emerged in the 1980s in response to a wide array of concerns, which comprised the interest for the development of unindustrialised economies, the pressure for nature preservation within and outside developed countries, the burden of economic growth, the emergence of ecology and the crisis perceived in the untenable growth of global population (Adams, 2001).

Even though SD has been extensively investigated throughout the decades (e.g. Kates et al., 2017; Atkinson et al., 2014; Keiner, 2006), it is important to note that the making of the theory has been infrequently studied with a truly balanced perspective of Global North and Global South, which is here deemed compulsory to understand the approach to CE within this research.

1.2. Mainstream Sustainable Development

1.2.1. The emergence of Sustainable Development

The origins of SD are generally associated with the publication of the Brundtland Report in 1987 (e.g. Hansen & Wethal, 2015; Grober, 2007). Indeed, it is precisely in the 1980s that has been developed the SD interpretation that today leads the discourse, and which has been named "mainstream" by several authors (e.g. Lélé, 1991; Adams, 2001; Redclift, 1987, 2005; Hopwood et al., 2005).

Yet, the Brundtland Report is the outcome of shifts of focus of the global environmental agenda. Sustainable Development, more precisely, initially emerged in the context of the UN Conference on the Human Environment convened in Stockholm in 1972. The need to hold a conference was driven by Global North countries' environmental concerns over pollution, and it was unexpected that unindustrialised economies not only joined the debate, but also shaped it. Developing countries, scared that the global resource management discourse was an attempt to prevent them from following the industrialisation path, called for attention for their development priorities. And, apparently, they received it (Adams, 2001). In this respect, the Stockholm Conference achieved the recognition of GS countries' need for development. The conviction that development and environmental protection could be coupled was starting to gather momentum, and it was made clear by the Stockholm principles. However, it was uncertain how to accomplish this synthesis.

While the international debate after Stockholm was still lively, the term Sustainable Development appeared in 1980 in the World Conservation Strategy (WCS) presented by the International Union for Conservation of Nature. The aim of the debate was the achievement of SD, and it was meant to be pursued through the conservation of living resources, implying that environmental conservation was not impaired by development (Lélé, 1991). Indeed, defining a global agenda for Sustainable Development, the WCS claimed that global responsibility was necessitated both for development and conservation (Adams, 2001:66*ff*). However, as Khosla (1987) and Lélé (1991) observed, what the WCS was addressing was ecological sustainability rather than SD. Moreover, it lacks any insight into the divide and disparities between GS and GN, missing the opportunity to point at the politics of international development (Adams, 2001:69). In other words, the WCS's attempt to place environmentalist concerns in a development discourse can be considered unsuccessful.

On the contrary, the seminal report Our Common Future, or Brundtland Report (BR), explicitly inserts the SD discourse in the framework of economic and political international development

(Brundtland, 1987:xi). The report is well-known for providing the first and most widely accepted definition of Sustainable Development, which is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (ibid., 1987:54).

Adams pinpoints two key concepts behind this definition: the recognition of basic needs with the pre-eminence of the development of the poor, and the acknowledgement of environmental limits as set by technologies and social structures (Adams, 2001:71). The SD here depicted puts people first in a balance of environmental and developmental objectives, and it seeks a new kind of growth, that should be based on traditional and innovative principles, such as the equal access to resources, citizen participation in decision-making, the retention of a sustainable population level, the reorientation of technologies towards risk management, environmental conservation, and sustained economic growth (Brundtland, 1987). Thus, in order to convey SD, the BR deems necessary a shift in the political and economical approach to development, as well as a change of technology and production process that can ensure ecological and social sustainability.

The BR also takes into consideration the divergence of Global South and North: promoting the idea of fairness between rich and poor countries, the report encourages global responsibility towards common goals, and welcomes international trade and capital flows in the measure they are meant to conservation and improvement of living standards in the GS (Baylis et al., 2017). Indeed, the constraints to the adoption of ecologically sound development policies in the GS are ascribed to poverty (worsen by protectionism, rising debts, stagnating flows of aid) and population growth (Brundtland, 1987:76).

The report even recognises a relationship of dependency between developed and developing economies, that prevents the latter from implementing environmentally sound policies because "the export of natural resources remains a large factor in their economies, especially those of the least developed nations" (ibid.:77). Thus, due to the environmental and economic interdependence of GN and GS, the BR suggested as a solution the increase of aid investments in developing countries, directed to promote projects of Sustainable Development.

Finally, a key contribution is that of the Rio Conference on Environment and Development held in Brazil in 1992. This UN conference has been pivotal for two reasons: it attributed to non-governmental organisations a fundamental role in SD debate (Redclift, 2005:213), in particular "powerful, wealthy and influential NGOs of industrialised countries" (Adams, 2001:82), and it made clear that among GS and GN there were irreconcilable differences which later emerged in the Rio documents (ibid.:83). Notably, it became evident that international action and responsibility, two key elements of the Brundtland's strategy, were falling short of industrialising countries'

expectations. The outcome documents of Rio themselves failed to achieve any agreement of commitments on the operationalisation of the principles there deliberated, and no significant shift occurred in international policies in the aftermath.

Despite the upsetting inadequacies of the Rio output, it arguably determined the triumph of Mainstream Sustainable Development discourse (MSD) (Adams, 2001; Redclift, 2005), consolidating the approach established with the Brundtland Report (Lélé, 1991:611).
Before addressing the SD approach embraced in this research, it is useful to outline the main characteristics of MSD's stance towards developing countries. Suffice it to note, while the first aims to transform international development methods, the MSD merely intends for adjusting the existing development practices.

1.2.2. The reformist discourses

Mainstream Sustainable Development includes different currents of thought which are associated because they express different shades of the same reformist strategy. For this reason, it is possible to tackle these ideas jointly. As a whole, MSD thinking has been shaped by modernist development theory, and it is the output of the industrialised setting in which it has been conceived (Adams, 2001).
According to Lélé (1991), MSD, thanks to the simple and clear objectives of its best-known conceptualisation, has been able to gain wide acceptance in development discourses of a wide array of key actors, from international environmental agencies, to developmental agencies, NGOs and activist groups. This success, anyway, is also ascribable to its ambiguity, that according to many studies made it a catchphrase and attracted policymakers, scholars and organisations, who borrowed it as a slogan and employed it in deeply diverse development discourses (e.g. Murray et al., 2015; Giddings et al., 2002; Asefa, 2005).

As beforehand mentioned, the MSD discourse has been influenced by and accommodated the modernisation theory, which is a conception of development that regards industrialised countries as successful examples of progress, while considers industrialising economies "pre-modern" nations expected to develop following the path that the first already traced. Aseniero (1985) explicitly linked this standpoint with developmentalism, an economic theory that couples the concept of the "common path of development" with targets of economic growth through protectionism, a strategy that best suits high-income economies.

Adams (2001) claims that within the MSD can be identified three orientations. In the beginning, the prevailing interpretation was the Free-Market Environmentalism: a libertarian theory which

considers capitalist growth within a free-market context the best solution to deliver SD. This orientation perfectly fitted in the modernisation theory, because it assumes that in a free-market, GS countries would find the best conditions to chase GN's growth, allowing for equitable development poor and rich countries. This orientation rejects any assumption of "limits to growth", that will be discussed below more thoroughly.

A second orientation is the Ecological Modernisation, which refuses the idea of an environmental catastrophe, believing that technological development and shifts in national policies can impede the environmental issues that have been linked with human activities.

Finally, the last orientation within MSD is called Environmental Populism. This model gained traction in the 1990s and implies the involvement of civil society in the draft of environmental policies, entailing a participative model of development based on local initiatives. This approach was endorsed principally by Global South's organisations, willing to drive development programmes "from below" without recusing capitalism and technocentrism.

1.2.3. The three pillars of Sustainable Development

The main limit of the MSD approach lies in the trade-offs it allows between its core objectives. Indeed, SD widespread broad maintains that sustainability encompasses three dimensions or areas of intervention, interconnected but independent: the economic, social and environmental sustainability.

In the MSD discourse, the economic sustainability is identified with the creation and preservation, within a capitalist free-market, of growth conditions for the present and future generations. Economic issues tackled by SD policies generally originates from the clash of expectations of growth with the problems of deregulated markets, which goes along with financial instability, tensions caused by widening economic inequalities, and supply risk, which feeds prices volatility (Sachs, 2015; Jackson, 2009; Geissdoerfer et al., 2016).

The social sustainability, conversely, is the capacity to ensure intragenerational and intergenerational welfare, and it addresses issues such as social exclusion, elevated unemployment, inadequate working conditions, injustice, widening inequalities, health-related risks (Hopwood et al., 2005; Geissdoerfer et al.,2016; Kurane, 2010).

Finally, the environmental sustainability aims to resources conservation, which should be protected to make sure that future generations will also be able to benefit from them. Environmental problems that ought to be addressed by MSD are biodiversity loss, soil, water and air pollution, depletion of natural resources, excessive use of land, resort to unsustainable energy sources, management of excessive waste generated in production chain and at the end of life of

products, erosion of the ecosystem, climate change (Jackson, 2009; Geissdoerfer et al.2016; Bermejo, 2014).

This interpretation of SD along three different lines of action traces back to the 1990s, when international organisations, as the World Bank, the OECD and the EU, began to imply that sustainability can be pursued independently in any of the three dimensions (Bermejo, 2014:74). Hence, they paved the way for the implementation of three separate types of sustainability, admitting different strategies to weigh and balance its pillars. Predictably, this stance soon allowed for the acceptance that "trade-offs" were possible between the dimensions (Giddings et al., 2002:189). Lastly, Ekardt (2015:67) adds that a threefold concept of sustainability is problematic as far as it diverts from the authentic purpose of SD, which is the preservation of fair conditions of life for the future generations and the elimination of inequality between present generations.

1.3. Beyond the Mainstream discourse

1.3.1. The contradictions of the three pillars method

The "three-sustainabilities" approach within MSD discourse emerges as frail, because, as stated, economic targets are too often considered paramount by the Global North's stakeholders (Adams, 2001). Developed countries assume that pursuing growth, and therefore increasing economic capital is vital for actualising social and environmental goals. This is deemed true because, first of all, through the redistribution capital surplus it is possible to attempt to deliver equality and, secondly because growth is perceived as essential for financing new social policies and environmental programmes.

It should be underlined that relativising the significance of the pillars according to the belief that they all have the same weight can be an obvious pitfall. Indeed, this approach has been largely employed by MSD practitioners to allow trade-offs among the economic, social and environmental sustainability, with arguably unsustainable results.

1.3.2. The criticisms about the conceptualisation's vagueness

The second thread of criticisms blames the ambiguity of words and concepts employed by the Mainstream Sustainable Development discourse. This ambiguity entails two key aspects, because, on one side, it regularly caused a marked departure from the overarching purpose of SD, but, on the other, the larger acceptance by development actors that it gained partially determined the

very success of the paradigm. Nevertheless, the widespread acceptance of a malleable SD concept goes to the detriment of an appropriate application (Hansen & Wethal, 2015; Giddings et al., 2002; Hopwood et al., 2005).

Giddings et al. expressed a highly critical remark: "it [SD] can be interpreted to mean almost anything that anyone wants, so that beneath its covers lies a multitude of sins" (2002:188). Similarly, McNeill (2000) defined the SD concept "ill-defined", adducing that its meaning totally depends on the standpoint of the actor who employs it. To give an example, more than 200 of the biggest international companies involved in environmentally hostile activities such as mining, logging, extraction of oils and gas, chemicals, and big GN financial institutions adhere to the much-criticised World Business Council for Sustainable Development. The literature is rich in examples of contradictory attitudes and initiatives partook within the MSD spectrum (e.g. Wackernagel & Rees, 1996; Giddings et al., 2002; Hopwood et al., 2005), and all of them successfully illustrate how capitalism profits from this frailty to promote the economic pillar and pursue the goal of economic growth first (Rees, 1998).

1.3.3. Overcoming the growth dilemma

> *"While empirical evidence is accumulating to support the prediction of the Limits to Growth model, especially in regard to the disappearance of species, increased pollution and mounting pressures on natural resources […] the discourse of limits to growth seems overshadowed by the optimism of 'sustainable development'".* (Kopnina & Shoreman-Ouimet, 2015:10).

There is a third key issue surfacing both within and outside the MSD discourse, and it revolves around an impossible quandary, which has tormented social, economic and environmental scientists for decades: the growth dilemma. The ecological economist Tim Jackson (2009) happily simplifies it: while on one side economic growth threatens the environment inducing climate change and ecosystem destruction, on the other, it is deemed essential to sustain prosperity, employment and the welfare state, due to the way our economic system works today.
This debate reveals itself pivotal for an encouraged in-depth understanding of the status-quo of SD and the interests at stake, which exert a great influence on the success of the Circular Economy.

Early discussions about the relationship between natural resources and economic growth trace back to the 1970s, when was published the renowned report "The limits to growth" (Meadows et al., 1972). This essay contests that sustained growth is feasible, stating that being natural resources finite, the economic growth based on them cannot be infinite. It is worth mentioning that the report is important also for being a milestone that inspired the Sustainable Development discourse.

a. *Steady-state economy, closed-loop models and degrowth*

Many authors have defended the report's findings and maintain that "sustainable growth" is a blatant contradiction in terms. Among these, some highly emblematic studies belong to Herman Daly (1973; 1996; 2006; Daly & Cobb, 1994) and Bartlett (2004; 2006). Bartlett is well-known for defining "sustainable growth" as an oxymoron. His studies focused on population growth for decades, and he deemed "human overpopulation" the greatest challenge for the attainment of sustainability, in line with Malthusian theory (Bartlett, 2004). He argued that the smallest but compound percentage of population increase entails a threat for the planet because of the enormous increases of expenditure, inequality, resource shortages, surge of production levels and rise of environmental degradation (Bartlett, 2004). Of the same opinion of Bartlett is Herman Daly, who has significantly contributed to the debate on the relationship between politics, economics and the environment advocating that (un)economic growth and sustainability are an obvious contradiction. As author of "Sustainable Growth: An Impossibility Theorem" (1994), he claims that SD is meaningful only when understood as development without growth, which is "qualitative improvement of a physical economic base that is maintained in a steady state by a throughput of matter-energy that is within the regenerative and assimilative capacities of the ecosystem" (ibid.:268). This is the very core of his Steady-state economy, an approach to Sustainable Development that deems necessary the maintenance of constant wealth and population and restrained use of resources. What is interesting is that Daly's approach to resource decoupling is built upon a closed-loop regenerative system (Daly, 2006), implying that the resort to a Circular Economy model can be a viable way to prevent resource exhaustion. A similar solution that embraces CE principles is Munier's idea of "balance", meant to be achieved through "lower production costs without sacrificing wages if resources are used in a more efficient way, such as by employing fewer raw materials, less energy, less water, by recycling, etc" (Munier, 2005:17). Daly (2006), moreover, believes that if Global North economies only would limit their unsustainable growth, there would be an opportunity for the Global South to remove inequality. Likewise, Assadourian (2012) considers the GN "overdeveloped" and judges its levels of production and consumption completely unsustainable. Thus, he also suggested that developed countries should take drastic measures to control their population size and to move back to less-consumerist habits.

However, Daly's Steady-state economy model received as many praises as criticisms, among which the sharpest may be that of Georgescu-Roegen (1975) and Boulding (1981) who denied that a steady model of development could prevent resource exhaustion but may be only slowed down with a constant stock of wealth and people. Georgescu-Roegen claims that since the global economy is based on the employment of material and energy resources, even relying on much lower rates of resource depletion and resorting to recycling, global resources are meant to run out. Therefore, neither economic growth or zero-growth can ensure lasting SD. Thus, according to the intellectual, the only path towards sustainability should be the one pursuing "decline", or

degrowth. This economic strategy has been supported by many other social scientists, among who stands out Serge Latouche. From the 1980s, the post-development academic has been an advocate of a critique of development and modernity as Westernisation of the world, has investigated the socio-economic dynamics of the Third World, and he has deeply explored the relationship between environment, economy and intragenerational equity within this context. For Latouche (1997), any economic system predicated on growth is problematic, as he believes that growth is a mere excuse for pursuing profit in the name of SD but finally widening inequality instead of eradicating it. For this reason, Latouche endorses an economic model of progress that puts at the core environmental issues and social needs, and advocates for "décroissance" not only in the Global North but also in Global South countries (Latouche, 2004).

However, as appropriately observed by Blewitt, degrowth cannot attain actualisation, and it is destined to remain a theoretical paradigm. It can inspire vivacious grassroots movements, but since it does not entail any gain for world's leaders, its realisation remains unrealistic. However, as it is about to be discussed, "continual economic growth is not realistic either" (Blewitt, 2018:220).

b. *The Mainstream approach to sustainable growth*

Antipodean positions are advocated by other scholars, major international institutions and corporations, which assert that economic growth is essential in the path towards development. This conviction is the very core of Mainstream Sustainable Development discourse, in which two louder voices arise among the others: one of the free-market environmentalists, advocates of growth in a deregulated capitalist market, and that of who endorses Ecological Modernisation and believe in the ability of technological innovations for decoupling growth from environmental exploitation. Both these views endorse an eco-efficient "sustainable growth" that is built upon an increase in resources productivity and energy efficiency. However, the key instrument suggested for reconciling Sustainable Development and economic growth in a free market is the introduction of "green taxes" on environmental externalities (e.g. Hawken, 1993; Hawken et al., 1997; Brown, 2001). Among the attempts to correct market failures, deserves to be mentioned Lester Brown's model. Brown, who has been one of the forerunners of SD, also pioneered the Environmentally Honest market system. He argued that sustainable growth is desirable and that it can be attained only in a market in which ecological and environmental externalities are reflected in full cost pricing through taxes, leading to a cut of environmental damages according to market laws (e.g. Miller, 2006; Brown, 2013).

A different attempt to reconcile SD and growth has been made by the United Nations with the recent conception of Green Economy (GE). According to the "Green Economy Report" by UNEP (2011), GE is the answer to the "brown economy" based on fossil fuels and aims to overcome the global ecological crisis. It is intended to achieve SD, on the one hand, reducing environmental risks and resource depletion and, on the other, improving welfare and social equity. The same Report,

reaffirming social objectives within SD, expressly aims to reduce inequality between GS and GN through this recommended model of the economy. Similarly to the UN, the OECD has publicised its own recipe for sustainable growth, which is called Green Growth (OECD, 2011). The model was pioneered in 2002 by Paul Ekins, who was seeking for policies to decouple growth from environmental exploitation. The OECD's GG Strategy aims to accommodate the three pillars of SD and technological progress into a comprehensive framework that should guide the pursuit of sustainable growth. In particular, investments, innovation and the creation of new markets are considered crucial for the success of the Strategy. It is therefore clear why many other international institutions decide to endorse GG. For example, the World Bank has set up a Global Green Growth Institute in 2010 and published its own Green Growth plan in 2012. For GE and GG there is no universally agreed definition, but clearly the two approaches have many common features. Both of them are strongly linked to market-oriented solutions, and the recourse to price-regulating interventions for externalising environmental costs in pricing reflects it (e.g. Runnals, 2011; OECD, 2013). On the other hand, while GE is an economic regime, well-rounded and attentive to many aspects of environmental sustainability and social equity, GG is a policy strategy for backing the growth pursuit in the Sustainable Development era.

Notably, other supporters of Green Growth are eminent international organisations, consultancies and think tanks, such as the World Economic Forum, the McKinsey Global Institute, the Ellen MacArthur Foundation, which avowedly endorse GG policies through the adoption and promotion of Circular Economy practices (Blewitt, 2018:226). The European Union, which with its development policy aims to move towards a Green Economy, has also lately embraced the CE model to generate growth, reduce poverty and sustainably manage the natural capital, as it will be discussed later on (EU, 2015).

However, the model of development embraced by these influential institutions has received many critiques. Castro, for instance, deems controversial these key development actors' conservative ideologies, which find in technologies and other economic ploys the remedy for all the environmental problems and consequently for equality issues (Castro, 2004:200-201). For the scholar, the Green Growth much praised by the UN and the OECD is barely more than capitalist development.

The former chief economist of the World Bank and recipient of the Nobel Prize in Economics, Joseph Stiglitz (2002) observes that growth and development do not affect the Global South. He censures the International Monetary Fund (IMF) and the World Bank for the imbalanced influence they purposefully exert on the globalisation process. Critical of the neo-liberalist doctrine and free-market policies that these institutions encourage both in GN and GS countries, the economist opines that these policies have damaged the emerging economies, while they factually uphold the economic growth of the Global North. Stiglitz, who considers that social injustices increase together with environmental depletion, attributes the uneven economic growth to global politics, with its unjust policies and misguided priorities (Stiglitz, 2012).

1.3.4. The answer of the radical discourses

Mainstream Sustainable Development, despite its good intentions, seems to have failed to meet expectations of far-reaching sustainable outcomes. Notably, the intragenerational equity target, core of the Brundtland Report, is far from being achieved, since it is evident that the equality divide is growing, both between and within macro world regions. After all, the goals set by the previously discussed international debates missed the opportunity to determine the conditions for concrete changes, seeking to refocus the development discourse instead of transforming it.

This approach has been highly criticised by a number of academies, which argue that current poverty and inequality structures have been produced by the predecessors of the same development actors that today endorse MSD (Kopnina & Shoreman-Ouimet, 2015).

2. THE CIRCULAR ECONOMY MODEL: THE METHOD

The second part of the theoretical analysis delivers a full picture of the Circular Economy model. First, it builds a robust and finely nuanced theoretical framework, that is a key instrument for discussing the investigation's results. Afterwards, it challenges the CE concept itself, which is analysed and critically discussed drawing upon literature of both uncontested principles and innovative schemes of analysis.

2.1. Foundations of the CE industrial system

2.1.1. The limits of the linear model

> *"The linear 'take-make-dispose' model relies on large quantities of easily accessible resources and energy, and as such is increasingly unfit for the reality in which it operates. Working towards efficiency alone -a reduction of resources and fossil energy consumed per unit of manufacturing output- will not alter the finite nature of their stocks but can only* delay *the inevitable. A change of the entire operating system seems necessary."* (MacArthur Foundation, 2012:22).

The Circular Economy is a new typology of industrial system that was designed to replace the unsustainable, yet today leading, linear production model. The latter, also called "take-make-dispose" model has never been a suitable system to ensure that present and future generations could meet their needs. The crisis of Sustainable Development has its roots in this unsuitable industrial model (e.g. Ness, 2008; EMF, 2012; Ghisellini et al., 2016).

The "linear model" has been prevalent since the Industrial Revolution, and prospered throughout the XX century, especially in the Western countries. There, the employment of abundant cheap resources and labour from less developed countries, encouraged by the globalization of the markets, created a system that is built upon the continuous exploitation of raw materials, which are extracted, processed and manufactured, sold, used and discarded (Andrews, 2015; Benton et al., 2011). This system clearly benefitted raw materials producers, manufacturing industries, energy suppliers and retailers, and fed the post-WWII economic boom in numerous Global North countries (Andrews, 2015:307).

This model began to be questioned in recent years, as it became evident that several critical problems tackled by SD practitioners could have been solved dismissing that industrial system (Korhonen et al., 2018). However, while SD has been called too ambiguous to be implemented, the

Circular Economy is gaining momentum because it is regarded as an organisational model to guide businesses in the actualisation of SD principles (e.g. Murray et al., 2017; Kirchherr et al., 2017a; Ghisellini et al., 2016).

The problems commonly linked to the mostly-linear configuration are in particular related to supply risk and to negative externalities that affect natural ecosystems. In economic terms, businesses are encouraged to shift to a different system to prevent risks related to the shortage of raw materials, price volatility, unpredictable market fluctuations, dependence on critical materials. From the environmental point of view, the major issues are the increasing pollution, the exploitation of lands, water supplies mismanagement, the problematic handling of waste, the loss of value throughout the production (e.g. Preston, 2012; Su et al., 2013; Whaugray, 2013; EC, 2014a).

Moreover, the growing demand for resources poses the problem of the spreading geopolitical tensions and conflicts (Le Billon, 2001; Mason et al., 2008; Cuvelier et al., 2014; Andrews, 2015), while climate change dramatically impacts migration patterns and forces displacements (Goodwin-Gill & McAdam, 2017; Stapleton et al., 2017; Rigaud et al., 2018).

What is more, these trends, as claimed by consistent studies, are destined to worsen. Much anticipated systemic changes concern the growth of global population, that affects mostly developing countries, the increasing urbanisation of such areas, accompanied by a rise of living standards of the expanding middle classes and the resulting increase of consumption and waste generation. According to the World Bank's projections, urban residents will account altogether for 70% of the global population by 2050, and they will generate twice the waste produced by the people living in rural areas (Hoornweg & Bhada-Tata, 2012). The environmental and social implications possibly will further undermine the possibility of future generations to meet their own needs (Lehman, 2018; Kharas, 2017; EMF, 2017; Satterthwaite, 2009).

The circular model, on the other hand, according to many scholars and think tanks, embodies the remedy to most of these problems. CE can promote economic and employment growth, incentives innovation, entails fewer emissions, enhances soil health and land productivity, and implies greater supply security and resilience, among the others (e.g. Zhijun & Nailing, 2007; Mathews & Tan, 2011; EMF, 2015, Kalmykova et al., 2018).

2.1.2. The theoretical roots

For outlining the theoretical basis upon which the CE model is built, the present research relies on the elaboration of the studies made in a previous research of the author (Huier, 2018).

The conceptualisation of the Circular Economy is recent, although it is the product of the combination of the works elaborated by different academies. To shed light on its complex origins, this research relies mainly on the studies made by the Ellen MacArthur Foundation (2013), and the recent analyses of Ghisellini et al. (2017), Murray et al. (2017) and Beaulieu et al. (2015). Even if the CE concept is a recent one, and it has been gaining eminence only in the last years, its theoretic genealogy is rooted in a reflection that started many decades ago and that often went along with the advancement of the SD's discourse.

It is commonly attributed a first rough delineation of the CE idea to the ecological economist Kenneth Boulding (1966), who imagined the economy as an open system, with limitless input resources and outputs, in contrast to a closed economy, in which resources and waste are curbed and are an economic concern (Allwood, 2014).

Another important influence on the foundation of the CE concept are the contributions to Boulding's study given by Pearce and Turner (1989): the General Systems theory and Industrial Ecology. (Ghisellini, 2017). In the 1980s, IE introduced an innovative approach to the analysis of the industrial system by adding the environmental perspective and characterising a whole ecosystem marked by "flows of material, energy and information as well as by provision of resources and services from the Biosphere" (Ghisellini, 2017:14). In that sense, IE catalysed the shift from open to closed cycles of materials and energy, inspired by studies of living systems.

Overall, the debate was enriched by each theoretical approach bringing different solutions inspired by the regenerative cycle of ecosystems. Regenerative Design dates to the 1970s, when Lyle proposed a global model of production in which both the environment and the natural resources were respected. His goal was that all systems and resources would be used aiming at their own regeneration.

In 1986 Walter Stahel (2006) introduced the Performance Economy theory. It consists in the idea of an economy structured in closed loops, that would respect the limits of existing resources and prevent waste. The new additions brought by this model are the possibility of refurbishing and reconditioning goods and of extending their durability. Another innovative contribution by Stahel was the idea of selling services instead of goods so that by combining social, environmental and economic gains, households' and industry's requests would be met. (Beaulieu et al., 2015:7). In a Performance Economy, governments are required to settle a taxation system that rewards

companies that incorporate the new principles, and that discourages the employment of non-renewable resources by implementing higher taxation rates (ibid.:8).

Stahel also conceived a theory called Cradle to Cradle (C2C), which was further developed by Braungart and McDonough. Waste is a central concern for the C2C, a theory opposite to the "Cradle to Grave" linear model. The authors argue that only 5% of raw materials are used in the final product, whereas all the rest becomes waste by the end of the production (Braungart & McDonough, 2002). The two scholars also developed the concept of "eco-effectiveness" which entails that waste should not exist: indeed, it could be cut out thanks to the rethinking of products, processes and services (ibid.). According to Beaulieu (2015), the five steps of the C2C are: the expulsion of toxic materials, the innovation of existing products, the evaluation of materials based on their toxicity, the improvement of the production quality through the addition of biological and technical nutrients to ensure eco-effectiveness, and finally the retained ownership's reintegration.

The most recent direct contribution to CE was developed by biologist Janine Benyus and it's called Biomimicry. Said model transports nature's mechanisms and designs into the economic realm. Nature is then understood as a measure to assess the sustainability of models and of the human existence (Benyus, 2002:1).

A great deal of importance is given to Gunter Pauli's Blue Economy (BE) (2010). It gives prominence to the zero-waste goal and aims for an auto-regenerative economy. Waste generated with the production of one good would become the raw materials and resources for other goods. The model hopes to tackle both environmental and social concerns about SD. BE is even considered to be an alternative for sustainable development in the Global South.

Lastly, The Shared Value approach by Porter and Kramer (2011) suggests "creating measurable business value by identifying and addressing social problems that intersect with their business" (Shared Value Initiative, 2015). This framework is centred on value chains and local communities, postulating that benefits for society would match the benefits for businesses (Porter & Kramer, 2011). In that sense, businesses are expected to operationalise their models to meet social needs, and they would do so by reshaping goods and markets, redefining the value chain and fostering the development of local community clusters (Porter & Kramer, 2019:5).

Conclusively, as by contrasting all of the above cited theorizations on CE, it is possible to define it as "an economy-wide system planned to be able to regenerate itself, cutting off waste and toxic substances, that considers every product and sub-product, since the design, a nutrient of biological

or technical nature, destined to remain in the ecosystem for the creation of new capital, with minimum losses of value and damages to the biosphere, in an indefinite loop" (Huier, 2018:14).

Circular Economy hence represents an innovative paradigm for development, proposing cutting-edge patterns for production, distribution, consumption and recovery.

2.1.3. Circular Economy essential principles

Once described the theories that influenced the development of a CE paradigm, it is possible to concise the cross-cutting principles that define and guide CE measures, compiling what scholars and think tanks consider to be its essential dictates (e.g. EMF, 2013; IMSA, 2013; Beaulieu et al., 2015).

- Waste is eliminated from production. Since CE is restorative by intention, each phase of life of the products is waste-free. Biological nutrients should be composted and carefully re-introduced into the biosphere. Technical nutrients should be embedded in the production cycle after dismantled at the end-of-life of the product.
- CE conveys economic growth with the capacity of resilience of individuals, communities, organisations, industries, and systems.
- The CE model relies on renewable energy alternatives, fostering the replacement of the energy model based on fossil fuels.
- The circular model encourages a complete synergy of parts and systems, drawing attention to economic infrastructure, social structure and environment. Taking into account the cause-effect relationships between different components it is possible to design and implement effective solutions and models.

2.2. From an idealistic to a thoughtful conceptualisation. A critical review.

Hitherto, we considered the most conventional CE discourse, commonly accepted up to recent years by academics and think tanks. Nevertheless, the topic gained increasing attention in the last decade, as it arguably became the prevailing model to pursue Sustainable Development in many countries, especially in the EU and East Asia.

The operationalisation of CE theories, the worldwide experimentations, the contributions of organisations and the involvement of policymakers, enriched this model of practices and principles. Consequently, the literature has developed rapidly, and new threads of investigations and critiques have emerged.

Thus, the present investigation aims to offer the full picture of the CE industrial system, with its strengths and weaknesses. In order to achieve this objective, not only the analysis will contribute to shed light on the global challenges of this recent model, but the theoretical background itself will be built upon the critical studies and challenging scientific approaches. The final goal is to get to the heart of CE discourse by questioning the "mainstream" viewpoint.

For this purpose, this chapter will, first, highlight the weaknesses within the conformist CE interpretations, then, it will review the faults found in its scientific model.

2.2.1. Shortcomings of Circular Economy common definitions

According to some scholars, various acceptable definitions of CE coexist, and none of these can be recognised as prominent in terms of validity (e.g. Yuan et al., 2008; Lieder & Rashid, 2016; Kirchherr et al., 2017a). Blurriness and abundance of conceptualisations are identified as a major threat to Circular Economy research, as they prevent both academics and practitioners from fruitfully engaging in the topic and accumulating knowledge (e.g. Ghisellini et al., 2016; Blomsma & Brennan, 2017; Murray et al., 2017; Geissdoerfer et al., 2017). Yet, numerous literature reviews identified the most employed definition (e.g. Kirchherr et al., 2017a:225; Beaulieu et al., 2015:29; Geissdoerfer et al., 2017:759), which is the one provided by the Ellen MacArthur Foundation, a think tank whose mission is to spread the Circular Economy worldwide:

> *"[the Circular Economy is] an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."* (EMF, 2012:7).

Kirchherr, Reike and Hekkert (2017a), who conducted the first extended analysis on 114 different CE's definitions and demonstrated that the EMF's one is the most employed, assume that this conceptualisation has strongly impacted the CE global discourse, since the EMF 2012 report is considered a seminal work (Geissdoerfer et al., 2017; Lieder & Rashid, 2016). Nevertheless, in his scrutiny of conceptualisations of CE, Kirchherr et al. demonstrate to be cognizant of the inherent shortcomings of the large majority of definitions.

First, the authors identify a major weakness in the lack of explicit references to Sustainable Development. This negligence is problematic because CE is principally understood as an operationalisation of SD principles for businesses (Kirchherr et al., 2017a:227).

Secondly, Kirchherr et al. draw attention on the carelessness for the long-term gains: while the safeguard of future generations is a key aspect of SD, the analysis revealed that it is totally overlooked by CE researchers (Kirchherr et al., 2017a:228; Geissdoerfer et al., 2017:766).

Thirdly, both Kirchherr et al. (2017a) and Ghisellini (2016) notice that consumer responsibility is rarely taken into account, albeit crucial as an enabler of CE. Yet, it is observed that the disregard can be ascribed to a significant gap in the research (Borrello et al., 2017:1). Sustainable consumption is for instance considered valuable by more recent EMF research (e.g. EMF, 2013) and even present in the guidelines of institutions such as the European Commission (EC, 2015:6). The consumer responsibility can ensue from two different approaches: it can stem from a different and more self-conscious attitude towards consume which reject consumerism or can manifest itself through new consumption systems and business products, such as leasing, renting-the-service options and sharing economy. The idea upon which these latter initiatives are built is that an eco-efficient economy should convey into efficient use all the available material capacity and employ it refuting to resort to new commodities as much as possible. It should be rejected the general assumption that production processes are at the centre of CE strategies. It may be difficult to endorse anti-consumerism policies within a capitalist global economy, but it is of the utmost importance, just like it is encouraged the shift of businesses to circular blueprints. For this reason, the neglect of consumers' economic function within CE definitions is properly considered a major shortcoming. It is remarked by Merli et al. (2018) that studies on the strategies for social and cultural changes are needed to fix these issues and help to transform the approaches towards consumption within CE. Decision-makers, for their part, should extend CE concerns to the societal level, involving consumers and encouraging radical shifts in their behaviour.

2.2.2. The essential limits of the circular model

An acritical context for the research would not fit the objectives of the investigation. Therefore, this chapter aims at defining the Circular Economy model by spotlighting its main limits. Indeed, interrogating the scientific bases of the industrial system proposed, in the last few years scholars have identified a number of relevant challenges to its validity. These shortcomings are in some cases relatively renowned, yet, researches and reports often underemphasize closed loops' weaknesses and decide to embrace more idealistic models that ignore the trade-offs.

In this respect, the most extensive study has been conducted by Korhhonen, Honkasalo and Seppälä (2018), who aimed to analyse the practical ways in which CE ought to attain Sustainable Development's objectives. This is chiefly done from the environmental perspective, because the critical engagement with social and economic standpoints are explicitly outside the scope of the investigation, even if judged substantial by the authors.

Before starting to address the results of the study, it must be stated that the scholars propose a new and scientifically validated definition that the current research endorses and has decided to adopt. This definition is the closest to the author's own conceptualisation of a sustainable closed-loop economy:

> *"Circular economy is an economy constructed from societal production-consumption systems that maximizes the service produced from the linear nature-society-nature material and energy throughput flow. This is done by using cyclical materials flows, renewable energy sources and cascading-type energy flows. Successful circular economy contributes to all the three dimensions of sustainable development. Circular economy limits the throughput flow to a level that nature tolerates and utilises ecosystem cycles in economic cycles by respecting their natural reproduction rates"* (Korhonen et al., 2018:39).

This approach to CE has several merits, for instance, compared to the standard EMF conceptualisation. The most important are two. First of all, it mentions the three dimensions of sustainability that must be deemed essential. Secondly, it does not overlook sustainable consumption, which is here, indeed, at the core of the system with the more employed sustainable production process.

Hence, the extensive study of Korhonen et al. managed to identify six major challenges to the CE model, which will be discussed for their critical relevance. These CE shortcomings, largely overlooked by research, are surely destined to influence future research threads.

Another key contribution is the study by Brennan, Tennant and Blomsma, who identified further limits to closed-loop businesses. They argue that all the economic models present weaknesses, and

therefore they decided to demonstrate that also circular production methods are necessarily associated with trade-offs. The scholars focus on design challenges, but they looked also at some of the technical issues that have been confronted by Korhonen et al. (2018).

The first inconsistency identified rests on Georgescu-Roegen's research on thermodynamics and economics (1971), which investigated the limits to growth in the relationship between material and energy's physical flows and economics science. His "fourth law" of thermodynamics, which asserts that the complete recycling of energy is theoretically impossible because of the entropy law, even though later dismissed (because entropy law does not apply to matter of macroscopic scale) (e.g. Ayres, 1999), inspired a critical reflection. Indeed, it is true that because of entropy CE processes need energy, materials and labour (e.g. Bjørn and Hauschild, 2012; Allwood, 2014) and this will eventually result in unsustainable outcomes if the growth of the physical scale of the whole economic system is not controlled (Korhonen et al., 2018:42). Therefore, since sustainability is not the necessary consequence of the circular flow processes, every reduce, reuse, recycle and recover CE project should be individually assessed to assure it delivers a net sustainability contribution.
This first limit to CE application which resides in thermodynamics laws demonstrates that recycle should be the least preferred strategy if one wants to reduce resource and energy loss.

The second shortcoming lays in the system boundary limits. Acknowledged the global scope of CE and its SD objectives, it should be noticed that CE is currently far from being a truly global model in its scope, because the nature of the projects so far implemented show a GN reach. Nevertheless, CE projects' net sustainability contribution should have a global outlook and a long-term orientation, but the problem is that the assessment of these requisites is a real challenge. The scholars argue that the difficulties of this approach have been proved to be of two kinds. The first limit is identified by Korhonen in 2004 in spatial system boundaries, and it is called problem displacement or problem shifting, which simply means "reducing environmental impact in one part of the system by shifting the problem to another part of the system" (Korhonen et al.:42). It has been easy to find in the literature examples of these shifts, where local environmental gains result in environmental, social or economic losses somewhere else. This problem will also be discussed further in a later section, as Murray, Skene and Haynes (2015) address what they call the unintended consequences and the over-simplistic goals of the Circular Economy. The second system boundary limit has a temporary dimension and has been studied by Robért et al. (2013). It refers to the common discrepancies between short-term and long-term gains, caused by the unpredictable interactions between energy and matter flows, human economy and environmental consequences. The outcomes of these relations often result in plain inconsistencies, which are further analysed below by Brennan et al. (2015).

The main problem entailed by these system boundaries limits is that they necessary imply intragenerational and intergenerational trade-offs. The concern from the GS perspective is that since CE actions are promoted chiefly in the GN or by international institutions which embrace the capitalist system, arguably the gains and losses risk to be unequally exchanged between a "core" which takes the decisions and a "periphery" which pays for them.

A third main issue lies with the economic efficiency increases' limits. These economic growths are subjected to three widely studied effects. The most famous is the economy-wide "rebound effect" which occurs when cost-effective and low-impact Circular Economy activities determine an overall increase of the productivity and trigger economic growth, consequently reducing or removing the benefit. This effect has been thoroughly investigated by Zink and Geyer (2017), who builds up their model on previous studies about energy efficiency rebound (e.g. Sorrell & Dimitropoulos, 2008). They observe two main mechanisms that cause this "rebound effect": first, it can happen when substitute goods cannot replace primary goods, because less desirable; secondly, it can occur when prices drop because of the impact of substitute goods on markets. Remarkably, Zink and Geyer underline that substitution and income effects have a major impact on developing countries' economies, where customers increase their consumption comparably more than elsewhere (2017:598). The overall result is that these effects may amount to economy-wide changes with unpredictable implications. For example, when the EMF estimated that the CE shift in EU would increase GDP by up to 7% in the years 2015-2030 (EMF et al., 2015:33), it is implicit that the growth rebound effect would be significant, both in economic and environmental terms.

The second effect caused by physical economic growth is the "Jevon's paradox", which amounts to the increased consumption that ensues the positive effect of technological progress or a policy on the efficient use of a resource. This efficiency determines a price effect and an increased demand, which combined with economic growth remove the benefit (Alcott et al., 2012). This is the same effect that causes energy efficiency to increase energy use instead of cut it, for instance. The paradox implies that when an economy becomes more efficient, or more circular, or "greener", it only benefits the stakeholders who believe that increased consumption and economic growth lead to increased well-being and surplus redistribution.

The third effect here analysed is the "Boomerang effect", whose name refers to the way environmental protection in a region or country does not bring long-term sustainable results if adequate policies do not complement it. Environmental degradation would first affect another region where conservation policies are not implemented, but subsequently, the damage would also affect the first countries. Notably, this dynamic typically affects poorer economies first, even though developed nations are more likely to be capable of extracting resources in a more

sustainable way (Berlik et al., 2002). Mayer et al. (2005) present a case study that shows how Finnish and Chinese domestic forest protection laws, not complemented by policies to reduce the import of wood, actually cause the increase of imports from other countries as Russia, where conservation laws are not equally strict. The outcome is therefore environmentally and socially unsustainable.

According to Korhonen et al. (2018:43), the main consequence of these paradoxes is that all circular initiatives, although efficient, necessary generate environmental impacts and deplete resources, and these global impacts are destined to accumulate over the years even in the case of a global shift to circular businesses. In this case, consumers' behaviours should be addressed to grant a more sustainable development path.

The fourth limit to CE is posed by path-dependency and lock-in. These are the mechanisms triggered when an economic innovation enters a market and the returns to scale, and the learning effects allow it to conquer this market. Then, when a better idea or product reaches the market, it would meet these mechanisms' barriers. Typically, economists would expect that is the most efficient innovation available to win a market, but, quite the opposite, these limits would prevent more environmentally or socially sustainable policies to take root, in the CE case (Norton et al., 1998). Or, even worse, these mechanisms prevent efficient circular practices from breaking into markets that are saturated by fully interconnected linear economy processes. Korhonen, Honkasalo and Seppälä also warn that the path dependency mechanism affects even organisational culture, business strategy and management models, which also heavily hamper a change of direction.

Governance and management's constraints give a further limit to a CE effective implementation, according to Korhonen et al. Industrial Symbiosis (IS) arguably represents the most efficient production model for circular industries, envisaging the shared management of physical flows of matter, energy and by-products. In IS projects distinct industries are connected and they collaborate to grant that physical flows are shared and one's by-product feeds the processes of another (e.g. Chertow, 2000). IS surely need physical proximity among the industries, but it also requires a degree of intra-organisational and inter-organisational strategy, which appears to lack commonly. Indeed, Korhonen et al. observed that even when IS practical initiatives take place, practical challenges and mismanagement issues still take place, and that it is always possible to implement larger and more efficient regional business networks theoretically, but in practice governance and management's limits prevent them.

Finally, the last limit identified by Korhonen, Honkasalo and Seppälä lays within cultural definitions. Physical flows, is argued, are concepts which are differently defined by each culture or society, and that are differently assessed by governments, economic actors and CE practitioners. The fact that waste and by-products are not defined in a unique way by decision-makers imply that policies and laws can produce inconsistencies and inefficient results for CE implementation. These concepts are dynamic, and they also vary according to the history and industrialisation stage of the region that defines them. Suffice it to say that many flows that have been revealed to be harmful to human health, had been considered resources with economic value for decades. The same may happen today if the harmfulness of products or waste streams was ignored in reason of a lack of knowledge, technologies or experience, and it may be the case with new materials and e-waste.

On the contrary, it is observed that what is considered waste in a region because of its regulations or customs can be a resource elsewhere. Even within the same area, definitions can make possible for-by products, such as food by-products, to be transformed into organic fertilisers, biomaterials, and bioenergy (e.g. EMF, 2019). Therefore, it is clear that a different definition may entail important loss of values, loss of efficiency, and socially and environmentally unsustainable consequences in the long-term.

3. THE CIRCULAR ECONOMY:THE CLASH WITHIN

3.1. A key gap in the literature

This chapter partly builds upon a past review of CE research done by the author (Huier, 2018) and it resumes the different standpoints from which Circular Economy has been studied since in 2012 appeared the renown Ellen MacArthur Foundation (EMF) report, bringing to prominence the CE system in sustainability debates. The EMF's conceptualisation had the merit to powerfully impact the CE global discourse, which increasingly drew the attention of scholars, think-tanks, governments, policymakers and businesses (e.g. Geissdoerfer et al., 2017; Lieder & Rashid, 2016).

Nevertheless, in the academic environment, the debate moved along very specific lines of thought, and researchers showed to be interested in precise aspects of the model to the detriment of overlooked threads of analysis. From the perspective of Sustainable Development global targets, the lack of attention paid to the Global South is here considered central.

Examining the review studies carried out in the last 3 years (e.g. Lieder & Rashid, 2016; Ghisellini et al., 2016; Geissdoerfer et al., 2017; Merli et al., 2018) appears a focus on three distinct aspects of CE: studies preceding the publication of the EMF report aimed at defining CE, successive studies took on the identification and analysis of its practices, finally recent researches are interested in its possible benefits. A small number of studies also review or propose innovative tools to measure the results of CE policies.

First, mainly in the 1990s, scholars worked to define Circular Economy, as the new business option to deliver economic and environmental advances. On the one hand, many studies sought to outline its uncertain origins (e.g. Pearce and Turner, 1989; Erkman, 1997; Andersen, 2007), on the other, likewise investigations attempted to define its key principles, for the most part after the first publication of the EMF report (e.g. Preston, 2012; He et al., 2013; Stahel, 2014; Castellani et al., 2015).

Second, many researchers conveyed their efforts to analyse from different perspectives the policies and strategies produced by CE practitioners (e.g. Feng & Yan, 2007; EMF, 2012; Sakai et al., 2011; Geng et al., 2013; Winans et al., 2017). In this respect it should be noted that most of the studies focused on China, where the first extensive CE policies have been implemented, even if

there are many exploratory case-studies engaging, to varying degrees, with all the world macro-regions (e.g. Allen & Khrishnan, 2017; Storey et al., 2015; Lehmann, 2018).

Finally, in the last few years, while policymakers have been committed to programme new CE initiatives and governments to introduce new regulations to promote them, academics and think-tanks' studies have shifted their focus again. Nowadays, the most prominent topics are the possible benefits of CE strategies and the hindrances to their actualisation (e.g. WBCSD, 2018; Wijkman & Skånberg, 2017; Galvão et al., 2018).

The number of articles that attempt to introduce new perspectives on drivers and barriers to the adoption of CE practices has unquestionably risen in the last five years, and the introduction of CE policies in EU with a normative top-down approach had a pivotal role in this shift. Indeed, the geographic distribution of the literature reveals that the European Union is a key player, followed by a few European countries, China, Japan and more recently the United States. This is confirmed by both area studies (e.g. Wijkman & Skånberg, 2015; Reichel et al., 2016; Domenech & Bahn-Walkowiak, 2017) and reports focusing on businesses and specific industries (e.g. Lacy et al., 2014; Peck & Tempelman, 2015; Ghisellini et al., 2018). With regards to the benefits it has been observed a strong trend to concentrate on economic gains more than environmental and social ones (e.g. Bastein et al., 2013; ESA, 2013; Martin et al., 2015).

Looking at this picture it results evident that scarce attention has been paid to countries placed outside the above-cited regions, which not coincidentally are industrialised and high-income regions. In the light of the above-examined frame of theories, practices and perspectives on both Sustainable Development and CE, it can be safely argued that it is not possible to accommodate low-income and less-industrialised economies within the findings of available researches on Western countries. Hence, the Global South needs to be addressed by targeted enquiries on these subjects.

3.2. The methodology

The study is built upon the findings of previous research of the author (Huier, 2018), which inferred the existence of actual disparities between the approach of the literature towards developed and developing countries. From the results of the research, it emerged that the perspective chiefly adopted to address the CE discourse is that of the Global North. The most significant studies, deemed to have a wide-ranging global approach to CE strategies, policies and hindrances, are short-sighted and fail to identify the priorities of the Global South. Thus, it was suggested that

future research may go further by assessing if this restrictive stance corresponded to the lack of CE models and strategies tailor-made upon developing countries' needs.

Yet, the previous research was limited in its scope because of the methodological approach adopted. The data collection was entirely developed with an undue emphasis on the literature on the Circular Economy concept alone. While some additional literature centred on related concepts was accepted when it unmistakeable referred to the circular model (e.g. Lederer et al., 2018, whose definition of Green Economy totally coincides with that of CE), a large part of the literature addressing CE-related aspects was dismissed.

The present study, to address the shortcomings, is based on a three stages literature review and aims to deal with the gap in Circular Economy research that has been identified. The gap and its corollary uncertainties are founded on the fragmentary nature and scarcity of the literature available on the opportunities that the Circular Economy policies offer to the Global South countries, as well as to the peculiar challenges they may have to face for successfully adopting circular strategies. This lacuna is particularly meaningful because of the tendency to analyse only a GN's perspective may deliver to major hindrances to its operationalisation. A significant example is that of the Ellen MacArthur Foundation's Reports (e.g. 2012; 2013; 2015), which heavily influenced the European Commission's strategy.

The first stage of the three-stages literature review is a systematic review of the formal literature. A systematic review is deemed an important starting point because it provides an overview of the status quo of the topic studied and is it required for reliably assessing the results in a later stage of the research (e.g. Denyer & Tranfield, 2009). In this first stage, it was important to define specific keywords for consistent research about the differences existing between Global North and Global South in relation to their engagement with the CE. Thus, some key steps should be pointed out. First, at this stage, only formal literature was considered, and therefore reports, policy papers, books and other similar sources were excluded. Second, the research has been carried out on two authoritative bibliographic databases, which are largely employed in Social Sciences research: Scopus and Web of Science. Third, the literature review was limited to the years between 2012 to 2018, being considered the first EMF Report (2012) pivotal for research on CE. Finally, the selection of keyword encompassed the term "Circular Economy"; the terms analogous to "developing countries", "Global South", "Third World", "low-income countries", and similar, including their contrary; specific terms such as "strategy", "benefit", "opportunities", "barriers", "drawback", and similar nouns and variations.

The second stage attempted to enlarge the spectrum of results. The research has been replied including reports, policy papers and books. In order to widen the scope of the research, it resorted

to Google Scholars. Moreover, additional keywords were added, in particular, was deemed important to include key papers which do not include keywords such as “Circular Economy” or “Global South” but that analysed a specific GS country or CE process, for example.

The third stage is an open-ended research phase, driven by the necessity to balance the quantity of papers collected on the GN. This stage has been handled by researching additional relevant literature in the bibliography of the papers collected, or by specifically researching international institutions, think-tanks, NGOs, and other organisations’ publications.

All the findings of the three-stages research have been individually assessed to decide their relevance. In this step, the analysis concerned the title, the abstract, keywords and conclusions.

The analysis of the data available, finally, has been performed on the NVivo software, which allows to code all the resource collected and to identify the key topics’ clusters.

4. THE TWO-SPEED CIRCULAR MODEL

4.1. The questions to pose to Circular Economy

Blomsma and Brennan (2017), taking inspiration from Paul Hirsch and Daniel Levin's conceptualisation of the "umbrella concept" (1999), propose a subdivision in different phases of the CE narrative, which begins from the preamble stage in the 1960s-80s, crosses the "excitement period", and ends with the contemporary "validity challenge period" started in 2013. Their breakdown is convincing. They argue that the current phase is characterised by a new kind of engagement of scholars, who delve now into a more critical exploration of Circular Economy's arguments and attempt to identify and challenge its shortcomings. The current research moves forward in this context, looking for the contradictions between SD's objectives and ineffective CE policies' operationalisation. This is also the case of the studies reviewed for building up the critical perspective in the previous sections. In this chapter, where a significant portion of the literature available on the Circular Economy is addressed, it would be valuable to encounter other critical studies ready to challenge the model.

The questions at the centre of the present investigation, which wants to challenge the global validity of the current Circular Economy model and its implementation, build upon a narrative that contests the mainstream to ask: *The CE is really an economic model able to deliver Sustainable Development worldwide?* In order to pursue SD, CE should certainly beware of the unresolved issues that prevent countries outside the Global North to pursue the sustainable growth promised by the paradigm. But, as long as GS faces poverty, major inequalities, and lacks the tools to face environmental problems, it is evidently prevented from pursuing SD. ***Are CE policymakers addressing GS problems that hold it back from attaining the same wellbeing promised to GN?*** If Circular Economy strategies do not attempt to eradicate GS major issues, CE seems to be yet another model that privileges the GN position. Therefore: ***Does the implementation of Circular Economy worldwide enhance mechanisms of inequality between developing and developed countries?***

Acknowledged that environmental and economic benefits are generally explicit mainly for the GN, while social gains are often deemed implicit and overlooked, this chapter will observe the existing differences between Global South and Global North, because the dissimilarities between these countries are commonly neglected by research, yet they are essential to establish if any form of discrimination is practiced. Differences between Global South and Global North's benefits and setbacks from CE implementation, are related to the disregarded situations of economic inequality.

These disparities, if found, would raise questions about the adequacy of the CE model to be implemented worldwide with the declared objective to deliver intergenerational and intragenerational equality.

The literature gathered in this section intends to probe if CE implementation is currently fixing the intragenerational inequality gap to meet the goals of Sustainable Development, or if it just focuses on the Global North.

4.2. The opportunities embedded in CE strategies

Very few studies investigate both Global South and Global North's opportunities of a Circular Economy shift, but they immediately enlighten the differences. Felix Preston identifies them in an early briefing paper that introduces the CE as a new model able to redesign resource consumption's global dynamics. He maintains that for developed countries CE would deliver increased wellbeing through economic growth and strengthen supply security, allowing for great business opportunities, while on the side of developing countries what the CE offers is industrialisation (Preston, 2012:3). Overall, the concerns for developing countries seem marginal throughout the briefing paper, which mentions the importance of the CE shift in the GS only in reason of the highly resource-intensive production phase through which they are currently going to pursue development (ibid.:5, 10). This picture can be taken as an outline of the overall research on CE.

Of course, this is a reductive example, but from the research emerge different classes of benefits for Global South and Global North. Given the large number of studies with a focus on the latter, it is easy to start there the analysis. It should be noticed that the focus of numerous policy briefs, think-tanks' reports and institutional researches is often affirmed to be global, but it actually tends to privilege the North's preoccupations.

4.2.1. The CE potentialities for the Global North

The gains promised to high-income countries are quite specific and mostly related to economic growth, reduction of the dependency on natural resources, increased wellbeing. In order to describe these CE opportunities, the benefits have been discussed separately according to the categories emerged during the review.

Among the sets of benefits classified, the three that proved to have major traction are the economic gains, resource efficiency, and the potentialities of job creation. Other categories and sub-categories of benefits have been identified, such as further environmental improvements

beyond resource efficiency, improved health, drive to innovations. Nonetheless, they are not here discussed in-depth because of the less obvious priority they represent for the GN in the literature and because they are more appropriately assumed to be drivers to the implementation of the CE. Nevertheless, it is necessary to specify that the lack of attention paid in this context to environmental progress is surprising, and it will be further discussed in the next chapter.

a. *Economic benefits from material cost savings*

A study produced by the World Economic Forum claims "This is a trillion-dollar opportunity, with huge potential for innovation, job creation and economic growth" (WEF, 2014:13). This is what several reports explain and repeat and, among the many, those published by the UK-based think-tank Ellen MacArthur Foundation emerge as the most referenced and renown, to the point of influencing European Union's policy.

Substantial material savings have been initially promised to Europe by the first EMF's Report (2012), according to which the Circular Economy would enable savings in net material cost of USD 340 to 380 billion per year for a "transition scenario", which assumes only product design changes and shifts from recycling to refurbishing and remanufacturing. Savings amounting to USD 520 to 630 billion per year are envisioned for an "advanced scenario", in which the shift to CE is global and further technologies have been developed and adopted. In the "advanced scenario" the estimates predict that the production sectors that will gain the most out of the shift are the automotive, machinery and equipment, and electrical machinery and apparatus industries. Remarkably, these essential costs savings calculated by the EMF are the data upon which have been built many other EU-funded studies and highly influential reports in recent years (e.g. EEA, 2016a; EEA, 2016b; Dodick & Kauffman, 2017). Even EU official papers have reported these net material cost savings to support their latest policies (e.g. EC, 2018a).

The EMF Report on consumer goods released in 2014 estimated global savings of USD 700 billion per year in consumer goods alone. The projections for the sector indicated cuts and rewards in consumer categories such as packaging, food and beverage waste, textiles, personal care, and hygiene. According to one of the latest studies published by the EMF, "Cities and the Circular Economy for Food" (2019), the food sector alone, in case of a systemic shift to CE of all the cities worldwide, would reward the global economy with annual benefits worth USD 2.7 trillion by 2050, much more than any calculations made a few years ago could suggest. This report, global in its scope, has been based on data collected in dozens of focus cities, among which only a few are from the GS (Workshop Circular Cities Conference, 2018), more specifically sizeable industrialised metropolitan areas in Brazil, such as São Paulo and Rio de Janeiro.

Two other EMF's reports from 2015 and 2017 expand the previous researches and provide new figures: the updated studies maintain that thanks to technologic progress Europe may generate EUR 0.6 trillion per year in primary resource benefit and EUR 1.2 trillion in non-resource and externality benefits, that would amount to a 7% increase of the GDP by 2030. Current linear economy costs that amount to EUR 7.2 trillion per year for mobility, food and built environment (the three major sectors that alone represent 80% of resource use) could be reduced by EUR 0.6 trillion from 2015 to 2020, and by additional EUR 0.7 trillion of related benefit and EUR 0.5 trillion in externality costs. Talking about innovation, the EMF identify EUR 230 billion worth investments that might create an additional increase of 7% of GDP, that could cut raw material consumption by 10% more.

Besides the material cost savings, other savings opportunities lie in the reduction of manufacturing costs: thanks to new designs for reuse, recycle and refurbishment, it is possible to keep the products longer in the market or reintroduce them cutting many industrial processes. A recent study revealed for the automotive sector savings between the 30-50% if remanufacturing practices replaced the take-make-dispose system, and an additional 70% cut to the generation of waste (EIB, 2019). The same paper considers that if by-products and waste streams were correctly identified and their potential for reuse recognised, the benefit would be relevant both in terms of costs cut and in terms of increased efficiency that, if applied in a symbiotic production model, would guarantee new revenues and eliminate waste management costs (ibid.).

b. *Resource efficiency and development of resilience*

The mitigation of price volatility and supply risk is a significant reward that even if quantifiable in financial benefit, it is worth the competitive advantage it allows gaining. Reduction of resources and increase of price uncertainty and volatility are some of the most disruptive changes of market conditions, and therefore among the acknowledged main drivers to Circular Economy. Businesses can find in the CE shift a way to eschew resource dependency through new industrial approaches and technologies. It would permit to build a more resilient economy, reducing the dependence on imports of raw materials from the GS, the exposure to sudden price increases and to supply risk (EMF, 2014), which, as previously seen, are subjected to market fluctuations, geopolitical problems, and climate change effects.

According to the estimates published by the European Commission in 2011, at the time between the 6% and the 12 % of all material consumption was avoided thanks to recycling practices and eco-design policies, but it was held that was possible to reach the 17% of the total by 2030. A more

recent study (EMF, 2015) valued EUR 0.6 trillion the net material savings. Achieving these results would improve resource security and pave the way towards a resilient system.

An academic study tried to describe the benefit of resource security for Europe and argued that while supply risk cannot be eliminated for numerous raw materials, for others, such as iron and paper, it is possible to reach the 50% of recovery rate (Gregson et al., 2015). In the political economy arena, the EU is currently in a fragile position. EU's costs for materials and components is assessed to be between 40% and 60% of the total costs for manufacturing industries, determining a competitive disadvantage with other industrialised economies that can rely on their supplies for production (EMF, 2015). With 14 materials crucial for its high values manufactures that are categorised as on high supply risk, EU's dependence on imports from Africa and China endangers its economic stability. Especially China, which alone provides 95% of global rare earth resources, is in the position to disturb the market equilibrium. This is what happened when in 2010 China decided to cut 30% of its exports and price' swings hit EU, U.S. and Japan (Gregson et al., 2015).

The Circular Economy policies, decoupling growth from resources, address supply risk with recycling, remanufacture, refurbish strategies and, therefore, they help industrialised economies to reduce dependency on resource markets, exposure to price shifts and enhance their resilience.

c. *Job creation opportunities*

U.S environmental analyst Lester Brown, whose "Environmentally honest market" system of taxes has been earlier discussed, in 2008 presented statistics on the expected growth of United States economy through investments in the renewable energy industry and energy efficiency technology. He claimed that the renewable energy industry was growing by 30% every year and that jobs creation was one of the main outcomes. He estimated that for every USD billion invested in wind farms 3350 jobs would have been created, for every USD billion in solar cell installations 1480 new jobs, for USD 1 billion in solar thermal power plants 2270 jobs, and so on. In total, the analyst projected, a USD 0.5 trillion investment of federal funds in the sector would create 3 million jobs by 2020 (Brown, 2008).

Whether these supposed benefits are accurate or not, it is certain that studies agree on the positive employment effects of Green Growth policies and Circular Economy, as confirmed by Horbach, Rennings and Sommerfeld (2015), who carried out the most extensive investigation on green jobs creation, which they refer to as "circular economy jobs".

To be more specific, UNEP considers “green jobs” those that aim to safeguard ecosystems and biodiversity, help to reduce resource consumption resorting to efficiency, promote a low-carbon economy and minimise waste and pollution (2008).

According to the International Labour Organisation green jobs must also entail decent work conditions for the workforces (ILO, 2012). This fundamental aspect can be assumed as crucial for matching green jobs with sheer social benefit. Consistent with the policy guidelines of the EC’s Resource Efficient Platform (EREP, 2014), green jobs should aim to deliver better employment conditions: the policies should combine sustainability objectives, activate EU funding, promote skills development for young people, and make green skills part of life-long education. The EREP’s strategy for the EC also recommends the involvement of workers in matters such as environmental risk management, resource use, risks at the workplace and health-related aspects (ibid.). Altogether, it can be observed that decorous work conditions are considered by institutions a relevant feature of CE jobs within the EU (e.g. EC, 2014b).

Concerning actual growth estimates, the European Commission acknowledges a substantial creation of green jobs that traces back to the 2000s: in line with Eurostat data between 2002 and 2011 the green employment in the EU increased from 3 to 4.2 million (EC, 2014b). Growth forecasts assume the creation of almost 0.8 million jobs by 2020 according to EC’s statistics (EC, 2018a), and more than 1 million new jobs by 2030 for a WRAP analysis in the current development scenario, while almost 3 million new jobs in case of a complete green shift (WRAP, 2015). A study predicted for the UK alone an increase of 0.5 million jobs in the same scenario (Morgan & Mitchell, 2015), in Germany green employment could reach 0.6 million jobs by 2030 (Lehr et al. 2012), finally the U.S. under certain conditions may attain a growth of 0.5 million per year by 2030 (Wei et al., 2010).

However, I should be noticed that a criticality of the analysis of green jobs creation lays in the difference between net and gross gains: a significant part of the newly created Circular Economy jobs causes a corresponding reduction of jobs in the “linear economy”, and therefore the gross benefit may be deceptive (Oakdene Hollins & Wuppertal Institute, 2017).

A European Parliament’s study (EPRS, 2017), which reported data from previous researches made in the UK, suggests that there is a high request for high-skills professionals in the waste collection sector and landfill, with jobs such as civil and mechanical engineers, chemists and environmental scientists being the most common (APSRG, 2015). The same study also identified further opportunities for workers with technical knowledge, or background in procurement, sales and trading (ibid.). A second study reported in the EP’s report offers an insight into potential skills required for CE jobs, but again the research is based on data collected in the UK alone (Green Alliance, 2015). The study evidences a major request of low and medium-skills jobs with mid-wage

pay rates in remanufacturing, recycling and bio-refining, but also alleges that in the last field high-skills jobs are required for development, testing and marketing chores.

On the other hand, a large study carried out by EPSU (2017) on the nature of CE jobs in Europe, painted a different situation. It blamed those reports, like that of the mentioned Green Alliance, that employing data collected from high-income European countries as the UK present a "too positive" image of the actual situation. Indeed, there may be an issue with uneven working conditions across the continent. First of all, small studies regarding the UK itself portrayed a different situation: for instance, a research of Gregson et al. (2016) highlighted that most of the workers employed in recycling and solid waste facilities in UK and Belgium are typically Eastern Europeans, often women, required to work long hours in tiring conditions for minimum wage pays. Secondly, unregulated sectors such as informal recycling employ a significant number of workers in Eastern and Southern Europe, but also in countries like Denmark and Germany. It is found that informal recyclers living out the collection and disposal of municipal waste manage to contribute to the CE significantly (Scheinberg, 2016), but their working conditions are not regulated, and they are often exposed to health risks.

d. *An overview of environmental improvements*

> *"Recent modelling results differ in size, but all of them show that increasing resource efficiency can lead to higher economic growth and employment, often even when environmental benefits are not accounted for."* (EC, 2017: Report of the Stakeholder Session of the G7 Meeting on Resource Efficiency).

From the whole picture, it emerges that at the top of the Global North's concerns there are resource efficiency and economic growth. However, there is something more than economic profit and employment, an aim that is generally at the core of the scientific literature on the Circular Economy, but that in the inventories of the opportunities for industrialised countries often ends up being just mentioned in few lines: the improvement of the environment. Nevertheless, it is correct mentioning that among GN's targets is often cited the reduction of the greenhouse gas and carbon dioxide emissions, which jeopardise the health, social wellbeing, induce climate change and determine biodiversity loss (e.g. EMF, 2014; EEA, 2016a; EC, 2017). A sound research by Enkvist and Klevnas (2018) found that the adoption of Circular Economy strategies could optimistically cut 296 million tonnes of carbon dioxide emissions per year by 2050 in the EU, and 3.6 billion tonnes per year globally. Alongside these advantages, also emerged the hopes to impact the resilience of the ecosystem positively and to contribute to reducing the impact of mining activities in other regions. Furthermore, in a European Environment Agency's report are mentioned preoccupations for traffic congestion, accidents, noise pollution, opportunity costs related to obesity and other health issues, which are expected to be addressed by the CE (EEA, 2016a).

4.2.2. The opportunities for the Global South's shift

The studies that promote the vast number of benefits that the operationalisation of the Circular Economy can deliver to low-income and unindustrialised economies are numerous (e.g. Gower & Schröder, 2016; Allen and Krishnan, 2017; Retamal & Dominish, 2017). Most of these studies, however, are part of think-tanks and economic consultancies' reports. The few academic studies available that trace a positive outline of emerging economies' opportunities tend to be less unreservedly optimistic and habitually depict the advantages alongside with barriers and other related issues.

Surely, GS may have more serious reasons to endorse the end of unsustainable take-make-dispose practices. Suffice it to say that at the current population growth rate, problems such as mounting waste, pollution and diseases will increasingly challenge the low-income countries, where pollution is already the largest cause of death:7 million people die there every year because of water, air and soil pollution (WHO, 2019).

a. *China between the North and the South*

Because of its approach to the Circular Economy implementation that markedly differs from the Western way of green policy-making, China is usually left aside by studies that focus on industrialised economies. However, because of its robust achievements and its advanced top-down economic strategies are fairly advanced, it can hardly be comprised in the Global South perspective. China's position is not clearly defined in the literature. It seems scholars cannot decide whether to put its approach, policies, and triumphs in their reports about high-income areas such as Europe and North America or if it would better fit in the "rest of the world" category. Being the latter case frequent, China often ends up being referenced as an excellent example of policy engagement next to less industrialised low-income states that are nowhere closed to China's history of circular implementation, which is the world oldest with its 17 years of history.
For such reasons, and because of a methodology boundary that prevented the gathering of literature on the country's standpoint, the current research leaves the Chinese case outside the two simplistic but effective categories of Global South and North, with rare exceptions.

b. *Leapfrogging to Circular Economy*

The Global South does not only have a good reason to embrace Circular Economy now, but it has an unquestionable advantage over the industrialised countries that already walked their development paths taking rather unsustainable and hazardous choices. Most of the emerging economies, who are now at risk of adopting inefficient strategies to develop along the lines of the

take-make-dispose paradigm, still have time to change directions. According to many scholars (e.g. Ekins & Hughes, 2017; Preston & Lehne, 2017; Tukker, 2005) developing countries can simply "leapfrog" the "less-resource-efficient and more-polluting development stages, infrastructures or technologies initially utilized by industrial countries, by moving straight to new policies and technologies that sidestep that development pathway" (Ekins & Hughes, 2017:129). Despite the expectations of modernisation theorists who believe that all societies should follow the economic development of the successful Western countries, the "leapfrog" idea suggests that a better route is now possible for the developing world. Leapfrogging can occur both by assimilating proven strategies and technologies that are employed in other countries or by developing individual strategies to attain sustainability thanks to resource efficient approaches. Precisely, a study by SWITCH-Asia et al. (2015) identified three optimal categories of products to start testing sustainable solutions, and these are renewable energy, organic agriculture, and mobile technologies. CE100 Brasil (2017) has identified in built environment another key sector to leapfrog to CE for rapidly industrialising economies.

Unfortunately, it is not possible yet to validate the leapfrogging approach because of the scarcity of scientific literature on the topic. Nevertheless, some examples of circular practices that are already embedded in GS economies seem to support it. The analysis of Preston and Lehne (2017) reports notable models of circularity: in Nigeria, 70% of e-waste imports are functional and are directly reused, and also the remaining 30% of non-functional are, for the largest part, repaired and reused. Another example is from Haiti, where the disaster debris is turned into bricks and then buildings. Cases within the literature are numerous and they offer some evidence of this advantage of the Global South; thus, it is now essential to analyse the opportunities at stake.

c. *The pressure of primary concerns*

Among the reports that sponsor the benefits of the CE transition in the GS, that of UK-based development agency Tearfund, titled "Virtuous circle. How the circular economy can create jobs and save lives in low and middle-income countries " (Gower & Schröder, 2016) is thought-provoking because of its many references to European profit and as many indications of global benefits, which are likely to leave out Global South-centred unbiased information. Fortunately, there are several studies with a focus on a single country, region or that look at the ensemble of developing countries, which can better illustrate their hopes for change. What appears to differ from the Global North, is that in the South some of the strongest concerns voiced are related to environment, health and food, even though economic disparities and employment issues are still crucial. For instance, a large study on Asia carried out by Allen and Krishnan for the Asian

Development Bank (2017) has shed light on many CE opportunities and drivers of change relevant for low and middle-income Asian countries. In order to discuss the economic opportunities encountered, the authors differentiate between "external pressures" that push for them to shift and internal opportunities. The first ones are the preoccupation for the sustained increase of resources' prices, resource constraints and external regulatory pushes like the Extended Producer Responsibility, which is a taxation strategy introduced first in Europe in 1990 that charges the environmental costs for products' end-of-life management directly to the producer.

On the other hand, the internal opportunities envisaged for businesses are industrial innovations, new possibilities of value creation, and the orientation towards improved business solutions such as eco-efficiency. All these enablers of development and pushes to improve the production and consumption schemes are important, and likewise relevant are the economic growth benefits and employment opportunities they encompass. Nevertheless, the crucial sustainability urgency in the Global South is the waste issue.

- Overcoming the waste emergency

Waste management in low and middle-income countries is intended as the priority sector that should seek urgent improvements according to many scholars and development actors (e.g. Guerrero et al., 2013; Preston & Lehne, 2017). In developing countries, the difficulty in exploiting waste for the creation of new value is a relevant loss, but the health risks and the difficulties in disposing of new waste in controlled dumpsites are more troublesome. According to Wilson "in most of Europe, public health is largely 'taken for granted' and is no longer a major driver" (2007:200), but he identifies it as one of the drivers for developing economies: indeed, uncollected organic waste is a major threat because of the potential diseases that vectors such as rats and insects may spread (Hoornweg & Bhada-Tata, 2012). Wilson also identifies environmental protection to be a minor driver, together with value recovery from waste, the possible strengthening of the roles of institutions and, finally, the rise of public awareness (Wilson, 2007).

The study of Allen and Krishnan identifies four main issues relevant to the Asian continent with a pressing need to be addressed. The first concern is the vast amount of loss of value in crucial sectors like food, plastic packaging, and electronics; a second problem the lack of space for overflowing landfills, that often cause landslides and deadly methane gas explosions. It is estimated that worldwide every year 270,000 people die because of the burning of waste in open landfill sites (Kodros et al., 2016). A third source of preoccupations is the amount of waste that flows in rivers and oceans and pollutes the soil, which is particularly critical for several Asian rivers that are deemed biologically dead. The water of the Citarum river in Indonesia, which sustains 30

million people's livelihoods, is considered extremely toxic with more than 200 textile factories pouring chemicals into its water (McCarthy, 2016); likewise, toxic is the Ganges river, which every day absorbs more than a billion gallons of sewage and industrial waste (Black, 2016). A last all-encompassing concern is that of the overwhelming production of waste which can be today hardly disposed and is meant to grow. All these problems, in any case, are hoped to be overcome with the adoption of circular policies (EMF, 2017b).

To better understand these expectations of the South it is useful to delve into the waste crisis, and the food waste issue offers a good example for both loss of value and waste management. It is acknowledged that food waste generation is correlated with income levels and living standards, and it entails higher values of waste for the high-income countries (Thi et al., 2014). Even though the volume of food wasted is significantly lower in the South, there, the growing population and the economic hindrances determine a more problematic management issue, which is meant to degenerate in the long-term, also because of the increasing consumption trends. World Bank's projections for 2025 evidence a possible turnaround, with almost 4.2 billion kg of total waste produced in low and middle-income countries, against the less than 2 billion kg of the GN (Hoornweg & Bhada-Tata, 2012). Nevertheless, an investigation on food waste management recommends tailor-made strategies for the Global South to deliver more sustainable outcomes. Without going yet into further detail about the barriers to the implementation of CE that will be tackled later, it is possible to anticipate that the adoption of circular policies opens up many opportunities. For example, it can increase the formal collection of food and other organic waste, avoiding the spread of illnesses, or it could be employed in anaerobic digestion processes for producing fuel (Thi et al., 2015). Finally, it would be possible to establish a food bank, for conveying recovered food loss from farmers and unsold food into food banks, which may eventually feed millions of hungry people (Lipinski et al., 2013).
As resumed here, the concerns for food waste management alone are overwhelming, and so are the opportunities that developing economies can envision in the Circular Economy, compared to the Global North.

- Environmental priorities

Two Ellen MacArthur's reports on India (2017b) and China (2017c) and a report by the EMF-funded CE100 Brasil (2017), although dealing with deeply different countries, managed to capture many of the most cited environmental concerns of paramount importance for the Global South. The report on India pinpoints several crucial system challenges for the GS, such as freshwater availability, heavily affected by droughts, waterborne diseases and pollution, which endangers agriculture and 76 million people that in India cannot access it (EMF, 2017b). The water crisis is

considered one of the greatest global risks by the WEF: “A range of compounding factors risk pushing more megacities towards a “water day zero” that sees the taps run dry” (WEF, 2019:71). These factors are familiar for GS countries and include “population growth, migration, industrialisation, climate change, drought, groundwater depletion, weak infrastructure and poor urban planning” (ibid.). The WEF identifies water shortage as a major societal problem, which may cause new conflicts over the resource. Wastewater treatment and water reuse current practices are increasingly praised to be safe and effective Circular Economy solutions (e.g Voulvoulis, 2018; Wang et al., 2014). Another environmental emergency is related to soil degradation (EMF, 2017b), which threatens food production and the lives of more than 1.2 billion people that live in degrading agricultural lands in developing countries (Barbier & Hochard, 2016). A third menace to the ecosystems is the loss of biodiversity and the impoverishment of the fishery resources. The latter issue is relevant everywhere in the GS and beyond, but it encumbers India for several reasons: it is an overexploited source of employment, because of the economic profit of the fishery exports worldwide, and also because of the intensifying degradation that affects the aquatic ecosystem (EMF, 2017b).

The EMF’s report on China (2017c) has the value to illustrate environmental opportunities for large conurbations in rapidly developing countries worldwide. With a CE shift, cities can reduce the amount of pollutant emissions and improve social wellbeing. Dangerous emissions comprise greenhouse gas, fine particulate matter that significantly impacts health, nitrogen oxide pollutants that contribute to causing acid rains, water pollution that impacts human health and marine ecosystems, air and noise pollution that have been linked to cardiovascular disease (Münzel, et al., 2014).

Finally, the abovementioned report on Brazil (CE100 Brasil, 2017) have highlighted good opportunities in CE policies that already started to impact the agriculture positively. For example, large reclamations of swamp areas and degrading land are creating new agricultural areas, regenerative farming practices, such as composting, cover cropping and crop rotation, are already restoring the land. Moreover, Brazilian farmers are starting to adopt environmental certifications that drive to take on ecological practices, while businesses and communities are embarking in projects for stopping biodiversity loss. The condition of the Brazilian CE looks particularly promising.

d. *Economic growth and wellbeing in the South*

On the side of economic growth, studies specifically focused on developing countries hardly mention nor quantify any opportunity to make a profit from the circular transition. Usually, the economic benefit is encompassed as direct results of initiatives that aim to achieve environmental targets or recover waste or improve the management of natural resources. The few studies that propose an evaluation of economic growth that include the Global South, tend to refer to global statistics and analysis (e.g. Gower & Schröder, 2016; EMF, 2013) or to be country-specific and hardly employable to better understand the broad potentialities for the GS (e.g. Bauer et al., 2013; EMF, 2017b). However, in order to give an idea of some of the opportunities identified, it is possible to analyse the case of India, which is one of the key countries in the available analyses. According to the study of the Ellen MacArthur Foundation (2017b), comparing India's economic modelling with the European data, it is possible to foresee the profit of the Indian shift: by 2030 the country may save the 11% of its GDP annually. This cut of the expenses is ascribed to more efficient use of resources, increasing innovations, material cost savings for consumers. Another study (Bauer et al., 2013) evidences growth's potential for India thanks to the improvement of the renewable energy capacity. In a rapidly growing country, with increasing needs of products and services, the transition to green energy is a desirable strategy to deal with the challenges in a sustainable way (Lederer et al., 2018). Energy supply needs are projected to grow by almost 7% per year, increasing the dependence of India on petroleum and coal and its exposure to dangerous energy shortages. The increasing scarcity of fossil fuels and the dependence on imports are already driving the government towards the promotion of renewable energy, in order to better sustain the country's growth, independence and stability. Wind energy, especially, is the renewable energy source with the most potential. In 2011 the installed capacity of wind energy was growing by 19% yearly, reaching the 14 GW, which accounted for the 70% of the country capacity in renewable energy (EY, 2011). By the end of 2016, the total capacity was more than doubled, with a wind power capacity over the 28 GW (GWEC, 2017), while at the end of 2018 the capacity reached 35 GW (Indian Ministry of New and Renewable Energy, 2018). In 2011, well before the upsurge in renewable energy capacity, the jobs creation's estimates pointed at a grow from 28,000 to over 84,000 jobs by 2020, according to GWEC (2011). The economic benefits of this strategy are analysed by Bauer et al. (2013). First, the growth of renewable allows for a significant depreciation of the energy, which will benefit both the industry and the consumers. Second, there are both direct tax deductions for wind energy projects, amounting to up to 80%, and also indirect tax benefits specific for manufacturers. Eventually, the successful initiative of India boosting the renewable energy capacity is an additional solid example of profit from CE strategies.

- The sharing economy

The sharing economy seems to be one of the most promising initiatives for developing countries, able to deliver services and create profit with small investments, and with the result to partly decouple economic activities from resource exploitation and waste generation. Research is currently limited on the topic. However, some scholars have been able to identify the opportunities for the sector. A recent study (Retamal & Dominish, 2017) has pointed out different areas that may see improvements, consistent with studies made in GN countries: first of all, sharing economy businesses may enable a reduction of materials and energy consumption and a related reduction of greenhouse gas emissions thanks to services that may alleviate traffic and diminish waste. Secondly, the sharing economy can promote development, drawing investments and creating new business possibilities, which subsequently would stimulate entrepreneurial ambitions and create new jobs. Moreover, sharing services often sold at lower prices than traditional competitive businesses may also improve social wellbeing (Retamal, 2017). Another study evidenced that the potential implications for environmental, social and economic sustainability transition are much greater in the Global South than in the North for the sharing economy, even if not yet adequately addressed by policy-makers (Roxas, 2016). Most of the opportunities for emerging economies include sectors such as transport-sharing, freelance work and agriculture, but greater benefits could be created if the sharing economy was applied to target societal priorities (Retamal & Dominish, 2017).

e. *Green jobs potential*

The employment potential of the CE is identified as one of the key drivers for the transition. Furthermore, it arguably offers the most detailed data to evaluate the growth and social wellbeing that CE can enable in the South. In general, as Preston and Lehne (2017) observe, the Circular Economy implies activities that are undoubtedly more labour intensive, thus easily contributing to job creation. Remanufacturing and repairing activities, for example, imply more processes and require more work than manufacturing activities (Dervojeda et al., 2014). Likewise, dismantling, sorting, transporting and recovery processes for reusing the materials in the construction sector imply more labour than the demolition (Cooper et al., 2014). The reports and studies available help to outline the current employment issues in the GS and to understand how CE may actually improve the status quo.

A recent report by the International Labour Office (ILO, 2018) highlights that there is a strong connection between environmental degradation and jobs availability and conditions. In particular, developing countries and marginalised social groups, women included, are those that suffer the

most the direct consequences on the employment of climate change. It is estimated that the 40% of world employment, most of which is based in Africa and Asia and affects world's poor, is dependent on ecosystem services, making the environment a key element for jobs preservation. It is estimated that every year human-induced natural disasters result in the loss of around the 0.8% of global jobs. In a scenario of climate change mitigation, 72 million jobs, most of which located in Southeast Asia and Western Africa, are estimated to be wiped out by 2030 because of the rising temperatures. As another example, the exploitation and impoverishment of the fishery stocks alone may destroy more than 85 million jobs. On the contrary, the report maintains that the effort to change the current scenario will impact positively the employment sector, offering the opportunity to create 18 million jobs globally, of which 14 million in Asia and Pacific, by 2030.

Focusing more specifically on the GS, the report by ILO (ibid.) acknowledges the scarcity of data on green jobs outside the EU and U.S. Nevertheless, it recognises and analyses the green jobs potential of the legislative initiatives in some developing countries, which are lately encouraging the shifts to CE through renewable energy and waste management. Overall, the ILO observes that not only GN and Asian countries are promoting the transition to greener policies at the national level. A study on Sub-Saharan Africa, for instance, reveals that development strategies that target a green transition exist in Burkina Faso, Burundi, Chad, Mali, Niger and Senegal, sometimes also envisaging the creation of green jobs specifically. Senegal, for instance, targets to create more 10,000 green jobs by 2020. Other studies reveal similar green strategies in countries such as the Philippines, that with the Green Jobs Act from 2016 planned to create decent jobs in sectors related to sustainability, offering funds and incentives to attain this objective. Likewise, in Cambodia, a strategy for green growth plans to create new jobs and to invest in the development of green skills and knowledge of the workforce. In Mongolia, a transition to a sustainable economy focuses on decent green employment, seen as a benchmark to measure progress.

Another report of the International Labour Office (Strietska-Ilina et al., 2012) presents another perspective. It offers an outlook of the green employment situation worldwide and presents specific figures from selected GS countries. Unfortunately, being the report from 2012, some data may be obsolete given how quickly the green policies develop, anyway it surely helps to portrait the overall situation. First of all, what clearly emerges is that the waste management sector is that in which most of the jobs are created in the GS. Of these, however, the large majority is represented by informal jobs (in Uganda, Philippines and Thailand, the informal sector includes more than 70% of the total green jobs; in Indonesia, India and Mali the informal jobs are more than 50%, *see* Strietska-Ilina et al., 2012). Consequently, it is clear that a large part of the jobs in these

countries can be hardly affected by the protections eventually entailed by national circular policies, as those just discussed. However, the report offers some data that illustrates the rapport between investments in green policies in some countries and the number of jobs that are expected to create. The statistics available are from the period immediately following the economic recession, and as regards with the GN, they are consistent with the situation previously depicted. It emerges that several governments in the GS designed special green policies to overcome the crisis and that the investment in green jobs creation has been particularly momentous weighty in Asia. China, Republic of Korea and Japan appear to have invested the most to prompt sustainable growth. Chinese experts estimated that for every USD 100 billion of investment, the GDP would grow by USD 143 billion, prompting the creation of 600,000 new jobs. The USD 60 billion investments made by the Republic of Korea's government for implementing CE strategies were projected to create more than half a million jobs (ibid.:46*ff*). Overall, Asia has great potential for the development of green jobs. China and India present some key propitious conditions to enhance the employment, such as the demonstrated integration of circular practices in its industry, the large size of its green industry sectors, the number of candidates with a college degree, the will to keep on investing in circular strategies for the economic development.

Finally, a stand-alone study on the employment potential in the Middle East by van der Zwaan et al. (2013) deserves to be briefly discussed. The study analyses the potential of job creation in relation to renewable energy, and it is built upon a scenario in which a transition to CE could enable by 2050 the deployment of wind and solar energy for up to the 60% of the total energy supply. The model created by the scholars allow for assessments of the domestic workforce that may be employed in the renewable energy, and it suggests that around 155,000 to 180,000 direct jobs and 115,000 indirect jobs may be created. The scholars consider direct jobs those related to core processes, while the indirect jobs estimations refer to jobs that are connected to the first ones at a secondary level. These estimations are positive and entail a positive impact on employment, anyway, it should be noticed that the estimations made by the ILO (2018) contradict those of der Zwaan et al. The ILO's report suggests that in the next decades among the regions that will face job losses, the Middle East alone will count for 300,000 jobs lost, related to the decrease of employment in fossil fuel-related sectors, such as petroleum extraction and refinery, mining of coal and electricity production by fossil fuels.

4.2.3. Summary and implications for the research

From the results emerge that economic growth is a clear opportunity and target for developed and developing countries that engage with CE strategies.

From the literature on the Global North, which mostly comprehends academic articles that study the EU and the U.S., it appears that the decrease of resource dependency is the crucial driver, because it can empower an exponential economic growth, thanks to the reduced exposition to market fluctuations and to the net cost savings that it enables in a great number of sectors through the cut of resources' imports. The resource dependency issue, in the CE strategy, is recognised as problematic, because in the long-term it subjects the economic profit to increasing uncontrollable dynamics. Thus, the CE represents a viable strategy to overcome this issue.

This approach to CE seems confirmed by the inadequate attention paid to the environmental concerns. The environmental improvements are regularly implied, yet seldom analysed. The environmental benefit may look flagrant and inherent the Circular Economy, and therefore it is deemed necessary to focus on less evident key drivers.

As regards the GS, the most pressing issues are related to waste management and environmental degradation. The lack of capital and infrastructure added to the effects of climate change seriously affect low-income countries, which intend the CE strategy as a possible solution to limit their difficulties. Therefore, even though there are economic growth opportunities and chances to boost jobs creation, the position of the GS is inherently weaker. Several legislative initiatives, especially in Asia, are already positively promoting CE strategies for economic profit and enhanced wellbeing. However, the scant literature on African and Latin American concrete economic potential, the scarcity of formal literature and the prevalence of international organisations' reports constrain a robust analysis of the overall performance of CE in developing countries.

It is, however, possible to praise the Indian and Chinese approaches. These two countries are rethinking their products and services, promoting business models that are curbing environmental exploitation and creating new profit from CE initiatives. It is conceivable that many other economies, mostly in Asia, could successfully imitate some of the strategies, policies and investments undertaken in these two bigger economic markets.

Overall, the CE looks like a positive strategy able to address the resource dependency of industrialised countries, and most of all of the EU. For the GS the benefit from economic growth and jobs creation comes in second place since the urgencies that CE promises to address are the waste crisis and the environmental degradation. Hitherto, it seems that CE is likely to benefit the countries that decide to embrace its approach. However, it is necessary to tackle also the strategy's drawback in order to assess its suitability to deliver sustainable development globally.

4.3. The downside of the circular strategies

On the one hand, Circular Economy policies have already started impacting positively economic growth, raising green employment, reducing air, water, and soil degradation, improving wellbeing. Unfortunately, not many economies are today able to adopt CE strategies straightforwardly. Technological, financial, cultural and legal barriers may hinder their implementation.

On the other hand, the CE already altered markets balances, geopolitical relationships and development paths of both developing and developed countries. Some key examples are the Global North's reduction of raw materials imports from resource-driven economies, the curb of exports of electronic and plastic waste to developing countries, and the Chinese ban on import of scrap materials that have implications for the North American and European economies.

Even though it may be early to assess circular policies' effects in some regions, there is a growing interest in the difficulties that deter countries and local communities from embarking upon CE projects. Because of the purposes of this investigation, it is deemed essential to shed light on the different potential setbacks that GS and GN may undergo. The results would indicate if CE suits global expectations.

4.3.1. The barriers to the implementation of circular policies worldwide

As observed with the opportunities entailed by a Circular Economy transition, also the most thorough studies on the barriers carried out by scholars, think-tanks and institutions tend to target the Global North. However, some single-country studies allow also depicting the situation of the GS.

Two academic investigations are noteworthy for the extent of their analyses and their categorisation of the barriers. The first, based on bibliometric and content analysis methods, can offer a broad picture of barriers to CE implementation worldwide. The study, which covers publications on CE from 2005 to 2017, found that the main barriers to CE transitions are technological, policy and regulatory, financial, managerial, related to performance indicators, customers and social (Galvão et al., 2018). Although the authors do not explain what these categories exactly comprehend and which documents have been analysed, the up-side of the investigation is the quantitative approach that allowed for the content analysis of 195 academic papers. A second classification is proposed by Govindan and Hasanagic (2018), who looked at the barriers from a supply chain perspective and categorised them by their collocation, inside the enterprise or in the external environment. The main clusters identified are slightly different from the previous research and better described. The nature of the issues may be governmental,

economic, technological, social and cultural, or related to knowledge and skills, management, frameworks, and market issues.

Furthermore, there is a third systematic barriers' analysis, which employed semi-structured interviews and a survey, but limited in its scope because centred on EU. This study carried out by Kirchherr et al. (2018) has recognised four categories of challenges, which are cultural, regulatory, connected to the market and technological. This more straightforward yet comprehensive categorisation is found to be the more appropriate and well-defined to perform here an analysis able to contrast the challenges faced by the Global North.

4.3.2. The barriers to the transition in the Global North

Several studies address the barriers comprehensively to implement CE strategies with a focus on EU and other industrialised countries. One of the most interesting is that of Kirchherr et al. (ibid.), because it is the only large-N study, and it resorts to a survey and interviews to understand what are the barriers that slow down or impede the CE transition according to experts. The interviewees are entrepreneurs, policy-makers, government advisors and academics: thus, their study can offer a unique and reliable perspective on the barriers. Another study relevant because of its standpoint is that of de Jesus and Mendonça (2018), who analyse both academic and non-academic literature, similarly to the approach adopted by the current investigation. They aim to make an analysis based on a robust methodological approach, able to emphasise the industry's perspective through government institutions and think-tanks' reports and policy recommendations. A third key study has been carried out by Vanner et al. (2014) for the European Commission. They too conducted a literature review of academic studies and grey literature, and subsequently proceeded to analyse in-depth fourteen studies that have been identified to be the most relevant.

a. *The cultural barriers*

First of all, Kirchherr et al. (2018) delve into the cultural barriers, considered the main impediment to the EU shift (Kirchherr et al., 2017b), which comprise aspects of the transition that may be linked to consumer preferences, awareness, cultural component within the company, and also the already mentioned lock-in to a resource-intensive economy. Therefore, the cultural barriers are principally understood as a lack of engagement with Circular Economy principles. The stakeholders seem to agree upon the relevance of the lock-in mechanism, which considers both companies and consumers "locked" in the linear system mindset and the resource-intensive infrastructure (e.g. Korhonen et al., 2018; Mahpour, 2018; Preston, 2012). Moreover, Preston (2012) added as a critical barrier the lack of enthusiasm of the consumers, which is due to the scarce awareness and

the inadequate understanding of the issue and solution, also highlighted by many other studies and reports (e.g. Govindan & Hasanagic, 2018; Mahpour, 2018; Houston et al., 2018). Govindan and Hasanagic (2018) ascribe the lack of interest to the limited appeal of certain products, in particular, those refurbished, which have difficulties to overcome customers' scarce acceptance of second-hand goods (ibid.). Nevertheless, there are also studies that attribute the limited success of refurbished products in the GN to their limited availability (e.g. van Weelden et al., 2016). A further crucial barrier identified by many authors is the inadequate engagement of the business's stakeholders. This possibly occurs because of their agenda oriented towards short-term results (e.g. Beaulieu et al., 2015), or the interest to maintain the status quo (e.g. Masi et al., 2018), because of the unawareness of industrial symbiosis strategies (e.g. Vanner et al., 2014) or the lack of will to cooperate among companies (e.g. Preston, 2012). The study of Rizos et al. (2015) wholly centred on the challenges faced by small and medium-sized enterprises (SMEs), allows to gain another perspective, and it points out the environmental culture as a limit for small businesses. The study indicates that organisational shortcomings and inadequate management regimes, due to the fusion of the roles of SMEs owner and manager in the same figure, are the most common issues hampering the adoption of circular policies.

b. *The regulatory barriers*

On the side of the regulatory barriers in EU, one of the most relevant reports to be taken into account is that prepared for the EC by the Technopolis Group (2016), who analysed precisely the remaining regulatory barriers in Europe after the adoption of the Action Plan on Circular Economy. The study builds on the findings of Vanner et al., who in 2014 recommended to the EC to address serious shortcomings inherent the legislation, such as the inadequacy of the information, the ambiguity of the language, the unsuitability of the context for the implementation of the regulations, and it pointed out some unintentional impediments within the legislation. According to the Technopolis Group, the EU Action Plan already overcame several issues associated with these barriers; nonetheless, few regulatory obstacles still exist. Therefore, for the EU, the following regulatory barriers are identified: lack of clear definitions, gaps in the legislation, ambiguity of objectives and even contradictions between norms, problematic definition of value limits in the regulations, failure to fully enforce the existing legislation or incongruity between EU regulations and national laws (Technopolis Group, 2016). In contrast, Kirchherr et al. (2018) did not locate regulatory barriers among the priorities of the interviewed experts. It emerges that in the EU, thanks to the promulgation of the Action Plan for the CE in 2015, most of the regulatory inadequacies have been removed. However, the analysis also reveals that obstructing regulations are a critical challenge for entrepreneurs and policy-makers. Equally challenging is the lack of

supportive policy frameworks and effective legislation. Indeed, if on the one hand institutional and regulatory factors may be crucial to address many barriers hampering the transition, on the other hand, an unfavourable legal framework and an uneven system of incentives and subsidies may discourage the adoption of circular policies (e.g de Jesus & Mendonça, 2018; Rizos et al., 2015; EMF, 2017).

Finally, specific regulatory barriers have been identified in the U.S. by a study of Ranta et al. (2018). Through the analysis of several case studies from U.S., China and EU, Ranta et al. could point out the lack of national regulations and the absence of high-level direction for the waste management, producing inconsistent legislations between the states.

c. *The market barriers*

Commonly, the critical market barriers identified are the high up-front investment costs and the low prices of raw materials that deter the shift to the CE (e.g. Beaulieu et al., 2015; Rizos et al., 2015; Preston et al., 2012). The analysis of Kirchherr et al. (2018) connects these two major barriers in the EU to faults prompted by inadequate governmental intervention and, thus, they overlap the regulations barriers to a certain extent. The market barriers can be tackled by specific smart regulations intended to support businesses' transitions (e.g. Preston, 2012; Kirchherr et al., 2018). On the one hand, the high up-front costs could be lowered by government initiative through financial incentives and the provision of funding and, on the other hand, the low prices for resources could be levelled up by removing subsidies and even incorporating externalities into their prices (e.g. Rizos et al., 2015; Kirchherr et al., 2018; Beaulieu et al., 2015), as suggested by several academics who pursue the sustainable growth through the correction of market failures.

Rizos et al. (2015) evidence the challenges for small and medium-sized enterprises, which are more susceptible than larger enterprises to suffer the additional investments that the compliance to CE strategies entails. SMEs may also find more challenging to face the extra indirect costs, both in terms of investment of time for the transformation and in terms of human resources that should engage in further activities (Iraldo et al., 2010). Furthermore, the market instability and the uncertain profitability of the shift (given, among the other factors, to unstable consumers preferences), put at increasing risk the investments. Concerning financial incentives, Rizos et al. (2015) alert that SMEs may find more difficult to fully understand and evaluate the possibilities of support offered at national and EU level, which represents a rather considerable disadvantage.

d. *The technological barriers*

De Jesus and Mendonça (2018) maintain that the technological barriers are the greatest challenge to the transition to Circular Economy. Indeed, technological innovation and its solutions are perceived as a precondition for many advanced CE policies, both according to the academic and to non-academic literature (e.g. Vanner et al., 2014; Lin & Zheng, 2016; Preston, 2012). According to the study carried out by van Eijk (2015), most of the technological barriers are located within the scope of design and production. A study by Brennan, Tennant and Blomsma (2015) has identified some specific trade-offs associated with current design issues. For example, there is a trade-off between durability and light-weighting, because increased durability usually corresponds to an increase of materials employed to strengthen it, affecting its aspect and its weight. But the light-weighting is another primary CE strategy because it leads to a reduction of resources' consumption. Moreover, light-weighting can be employed in a number of areas: for instance, it is successfully applied to cars to decrease their fuel consumption. Another limit related to design is the current impossibility to design out hazardous substances because there are not safe substitutes yet (ibid.). Similarly, Kirchherr et al. (2018) observe a lack of technologies adequate to implement CE, which are evident in the loss of quality in remanufactured products and in the trade-offs between aesthetic design and circular targets.

A report for The Netherlands Organisation for Applied Scientific Research (Bastein et al., 2013), which focuses on the Dutch economy, recognises the existence of other barriers, such as the inconvenience and difficulty to recover complex products, the criticality to reuse biotic waste, the scarce products' standardisation that would allow to reuse product parts.

As regards the SMEs, it is found that a lack of technical skills of the human resources is the most significant concern (Rizos et al., 2015): indeed, the lack of competences impedes to recognise, evaluate and adopt efficient technical and technological solutions, able to pursue sustainability and cut the costs. Moreover, some scholars point out an undue reliance on actors external to the enterprise, such as equipment suppliers or trade associations, which may equally lack knowledge of the fittest environmental technologies (Hoevenagel et al., 2007).

4.3.3. Global South's disadvantage

a. *(Un)intended consequences of the Global North's circular strategies*

- The problem displacement

The "unintended consequences" that GN actions cause owing to its CE strategy may be relevant for different geopolitical relationships and economic, environmental or social implications for the GS. This expression is lent from Murray, Skene and Haynes' research (Murray et al., 2015), which tackles what they call "unintended consequences and over-simplistic goals". Thereby, the discussion starts with their investigation, which intends to challenge some critical aspects that are inherent CE and sustainability. The critique sheds light on diffused CE practices that, while entailing economic gains for the GN, produce environmental damages in the Global South. This issue, already referred to as problem displacement, is that introduced earlier when discussing the major technical limits of CE policies. According to Murray et al. the resort to green fuel, for instance, triggered the deforestation of large areas of Borneo for planting oil palm. On the other hand, the production of biofuel caused the loss of millions of acres of tropical forest that are substituted by soy fields, determining the displacement of farmlands. A further example is the green technologies drive, which employs rare earth metals, whose production requires in some cases more fossil fuel than it produces, and mining which is blamed for the toxic effects of human health, according to studies conducted in China (Zhang et al., 2000). These observations are not intended to be denials of CE advantages, but certainly, underline that the mismanagement of green policies in developed countries already caused damages which the GS suffered and will endure.

- The impact of CE on export-oriented developing economies

However, these are not the only unintended effects experienced by Global South countries in connection with the choices taken by international actors who promote a CE transition. A focal concern is that a Circular Economy transition in the Global North may further weaken the economies of low-income export-oriented countries. As noticed by de Jong et al. (2016), despite the risk that the exports of Raw Materials may decline and reduce the revenues for developing countries, very few scholars and policy-makers appear to pay attention to this issue. However, the study of de Jong et al. aims to fill this gap by assessing the impact of a CE transition of the Netherlands and the EU on developing countries reliant on the export of minerals and metals. The study finds that while the Dutch imports are too little to make any difference, at the EU level it is observed that 24 countries rely on exports to EU for between 1% and 8% of their GDP (specifically, Guinea, Liberia, Mozambique, Mauritania, Niger and Namibia rely on them for more than the 5% of their GDP). Considered that not even an utter transition to CE can determine a total reliance on

the sole recovery of materials, according to the study the share of exports to EU alone is not decisive for impacting the sub-Saharan African economies. Thus, the scope of the study broadens to assess the impact for developing countries in case of a CE worldwide transition. In this case, it is shown that several African countries would be severely impacted (with countries such as Sierra Leone dependent on exports for almost the 35% of its GDP, and Mauritania, Suriname, Mali and Guyana reliant for far more than the 20%). As de Jong et al. point out, a factor that prejudices these African countries more than others as Chile, reliant on exports for the 15% of its GDP, is the lack of diversification of their economies.

The study of de Jong et al. (ibid.), finally, calls attention to two pivotal issues. First of all, the study underlines how developing countries highly reliant on exports generally correspond to highly vulnerable states in reason of the challenges they confront (as an effect of the so-called "resource curse", e.g. Humphreys et al., 2007). They call these factors "risk multipliers" to identify the further fragilities that affect their stability, and they are relevant to better positioning the GS within a CE global transition. The most critical factors of the vulnerability identified are:

- the inclination to the emergence of low-intensity conflicts which undermine the security;
- the political setbacks ascribable to the pervasive corruption, denial of political rights and civil liberties, factionalism, governmental inefficiencies and ineffectiveness of the rule of law;
- the inadequacy of human development, according to the Human Development Index, which considers, among the others, women participation in the workforce, infant mortality, educational level and unemployment;
- the economic frailty evaluated from the GDP growth, inflation, resource rents and food dependence, as well as the degree of globalisation.

Secondly, what emerges from this study is that it is difficult to assess not only how but when the export-oriented countries may start to be impacted by the shift. Indeed, on the one hand, because of the growing complexity of products the recovery of the metal contained is becoming more difficult, partly slowing down the replacement of raw materials. On the other hand, the unclear targets and deadline for the transition to CE in Europe make it difficult to assess when the countries reliant on the export may begin to be severely impacted. In any case, de Jong et al. identify in the limited diversification of these economies the significant frailty which jeopardises them.

However, research carried out by the McKinsey Global Institute (Dobbs et al., 2013) examined the economies of export-oriented countries to assess both how they benefit from their natural resources to boost their economic growth, and how they can maximise their potential. What is remarkable for the current investigation is that the research of Dobbs et al. highlights the main reasons why export-oriented economies strive to pursue an economic growth rate and per capita income that settle below the global average (ibid.:25ff). This framework is necessary to allow a

more balanced evaluation of these economies' mechanisms and limitations. First, these countries' economies are frail because they are not supported by a business environment that protects them and the investors from political and financial instability. Second, the research upholds that these countries have proved not being able to invest the profit of the export in long-term projects that pursue social prosperity and sustainable growth. Third, Dobbs et al. point at the scarce diversification within these economies, which strive to sustain sectors not based on resources, as it has also been indicated by de Jong et al. (2016). Dobbs et al. (2013:38) refer to the effects of the so-called "Dutch disease", which designates the negative impact on an economy generated by the inflow of foreign currency that can animate conflicts and corruption. A briefing paper by Itriago et al. for Oxfam (2009) stresses the pivotal role played at the political level by bribery. Social, environmental and financial negative impacts can be traced back to exploitative contracts between the developing countries' governments and multi-national corporations, which leave only a fraction of the total profit to the countries. Moreover, also for Itriago et al. the situation is worsened by the lack of interest or capacity to transform these revenues in long-term investments.

The export-oriented developing countries can undoubtedly benefit from a different approach to their long-term strategy. If they should address their in-built problems here evidenced for pursuing prosperity and growth, arguably they should also plan to adjust and diversify their economies to overcome the challenges posed by GN's transition to the Circular Economy. Further studies are necessary to shed light on the desirable strategies that the GS countries should implement for taking advantage of the circular global shift.

- Other potential effects and the rise of product standards in the EU

A unique yet summary study conducted by Lucas, Kram and Hanemaaijer (2016) attempted to assess both the positive and negative impacts on the GS that a CE transition in EU and Netherlands may have. The study found that these effects are context-specific, and they differ on the basis of the product group entailed, the step of CE implementation and according to the value of the product. The authors mostly confirm the findings of the just discussed study made by de Jong et al. (2016) but also go further reflecting on the potential effects of the export of end-of-life products to the GS. According to Lucas et al. (2016), the reuse and recycling of electronic products in developing countries is conceivably connected to poor labour conditions and negative impacts on health. This is particularly true for the products designed without consideration for CE principles. In the second place, the study cautions against the "rebound effect", already seen when tackling the limits to CE that are posed by the physical scale of the economy. Finally, this study has the merit of bringing to the table a discussion about the higher product standards set by the EU. According to the authors, the higher standards can have a positive effect on the GS, as they may

improve social conditions, income and environment. Furthermore, they observe that these higher standards may persuade European companies to move their production to the GS, positively impacting the economies, but possibly affecting the environment and population's health negatively. This is due, in particular, to the lack of legislative measures in the GS aimed at protecting the environment and safeguarding people's health.

The stated issue of EU's rising product standards to enhance its "circularity" and environmental sustainability is indeed crucial. The effect caused by the externalisation of the EU's standards has a specific name: Brussels effect. Unfortunately, the literature on this effect is meagre, and its implications understudied, however, thanks to the theoretical work made by Anu Bradford (2012) it is possible to argue that the CE regulations adopted by the EU can impact the GS. Precisely, according to Bradford, the Brussels effect refers to the "underestimated global power that the European Union is exercising through its legal institutions and standards" (ibid.:1). The EU exerts such an influence that its unilateral regulations and standards ended up prevailing other national regulations outside the EU in sectors such as privacy protection, chemicals, food and anti-trust, for instance. The most significative example is arguably offered by the EU's RoHS (Restriction of Hazardous Substances) Directive, which since 2003 forbids the release into the environment of hazardous substances from end-of-life electrical and electronic products (Selin & VanDeveer, 2006; Bradford, 2012). The RoHS regulations when introduced were stricter than those in force in other countries, such as U.S., China and Japan; therefore, the foreign manufacturers who wanted to sell their products in EU were urged to meet the market's requirements. Subsequently, since it is more convenient to create the same products for all the markets, the large multinational firms and foreign manufacturers have gradually started to make their entire production compliant with RoHS standards. This process is considered by Bradford (2012) a constant mechanism through which the Brussels effect generally spreads. Furthermore, a second mechanism is that of the de jure spread, which occurs when influential companies that adapted to the stricter regulations attempt to gain a competitive advantage in their primary markets by pressuring for the adoption of similar rules in their own countries. For instance, Japan, China, South Korea and even California have adopted laws alike to the RoHS to protect their economies and safeguard the environment.

However, this is only a single example of EU regulations that have prompted changes in other jurisdictions and, more importantly, that have imposed on foreign firms to adopt EU's standards in order not to be left out from the trade. Another example offered by Bradford is that of the "REACH" (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulation for the chemicals industry. The REACH requires manufacturers and importers to collect and forward to EU authorities all the information available about chemicals' properties and their effects on humans and the

environment. In contrast, the regulatory approach in the U.S. is based on the opposite approach and considers all the chemicals in the market safe, shifting the burden to assess the safety on the regulators. This difference has been impacting the U.S. chemicals production in many ways. First, many foreign manufacturers have decided to switch to the stricter REACH standards. Many large multinational companies such as Unilever, Ikea, Lego, Mattel now comply with the REACH requirements, and therefore they now create for the U.S.' market products accordingly. Secondly, the de jure effect abovementioned is pressuring the U.S. government to change the domestic regulations to conform to the EU. A further example is finally that of the WEEE directive on the waste from electrical and electronic equipment, which aims to increase the amount of e-waste recovered and recycled (Selin & VanDeveer, 2006).

According to the studies on the Brussels effect, the influence of the EU's policy towards sustainable development on international markets has both economic and political impact (e.g. Falkner, 2007). For Bradford, the Brussels effect represents an excellent opportunity both for other developed economies, whose consumers may be eager to accept the stricter standards to have safer products and protect the environment, and for the developing countries. The impact of this effect on the GS, hitherto, has been scarcely investigated and certainly needs to be analysed by future researches. The researches available on the Brussels effect tend to address the clash between EU and U.S. regulations chiefly (e.g. Kelemen, 2010; Bach & Newman. 2007), which is enlightening but only indirectly relevant for the scope of the current investigation. However, according to Bradford, the advantage for the developing countries consists of outsourcing "their regulatory pursuits to a more resourceful agency" (Bradford, 2012:53). Furthermore, consumers can benefit from the environmental protection offered by EU regulations.

According to Gower and Schröder (2016), as well, the future change of EU's product standards may be positive. First, the EU may set regulations that make easier recycling and safer to recover by-products and work with waste. Thus, products sent to the GS could be managed without treating the environment or people's health. Second, if the EU will decide to exclude some materials from the products approved in its market, this decision will affect the export-oriented economies directly. Possibly, through the Brussels effect, EU may as well influence the policies of other countries, with an even more significant impact on the GS. Gower and Schröder expect this impact to be positive because it can help to reduce the environmental impact in the GS (ibid.). However, it should be considered that new reductions in imports can further undermine export-oriented economies, conceivably with worse consequences than those projected by de Jong et al. (2016).

It can be argued that if high-income economies find it challenging to level-up their standards to meet EU's requirements, it is easy to imagine that the low-income ones may face worse economic,

technological and knowledge-based obstacles. Nevertheless, as already voiced, the inadequacy of sound scientific knowledge does not allow for discussing further the consequences.

b. *The Chinese ban over scrap materials import*

It is not only the Global North which is impacting the global market with its unilateral policies and regulations, but also China has recently started to change the dynamic of global trade by adopting a new Circular Economy strategy. The Chinese ban over waste imports is proving to be highly problematic both for developed and developing countries.

In 2017 China, which has been for decades the world's largest scrap importer, introduced its first ban, called "Prohibition of Foreign Garbage Imports: the Reform Plan on Solid Waste Import Management", with the purpose of completely forbid the imports of several classes of waste, including some plastics, vanadium slag, unsorted waste paper, and waste textile materials (Tan et al., 2018). Later, in 2018, China added other 32 categories of forbidden solid waste imports to its list (Redling & Toto, 2018). Since then, the ban has already impacted in many ways several countries all over the world. Among the GN countries, the U.S., which is the largest world's exporter of scrap, is already struggling to manage its contaminated scrap materials (Clarke & Howard, 2018). Australia, similarly, urgently needs a new strategy to deal with the great quantities of recyclable materials, in order to avoid them to finish in landfills (Smyth, 2018). The high cost to manage waste internally has *de facto* driven for decades GN countries to export their scrap materials, also encouraged by the cheap cost of the exports to countries with a less-developed waste management sector and by the loose regulations in force there (Brooks et al., 2018).

However, this measure is due to China's commitment to shift to a CE and it is part of the Chinese president's campaign against pollution and environmental hazards. It is acknowledged that for years nonrecyclable materials reached China mixed with recyclable wastes, and since 2006 the Chinese government has struggled to fight the contraband of illegal wastes (Tan et al., 2018). In 2017, it emerged from an investigation that 1074 out of 1792 Chinese importers of solid waste were violating the regulations. In the same year, in 6 months only the Chinese Customs seized 260,000 tonnes of waste (ibid.). Anyway, the ban did not solve the serious issue, it only displaced it.

The exports of plastic scrap from the U.S. and other GN countries to the GS have surged in the last months, mostly towards Southeast Asian countries such as Malaysia, Thailand, Vietnam, Indonesia (e.g. Parker, 2018; Staub, 2018; Tan et al., 2018). Thailand saw an increase in its import of waste polyethylene of 875% (Staub, 2018), and Malaysia's import of mixed plastics increased by 1985% from the U.S. alone from mid-2016 to mid-2017 (Clarke & Howard, 2018). The complications arising from the exponential increase of waste with which these developing countries have to deal now

are alarming. Environmental contamination and health issues have already been affecting the GS for decades and now onwards the situation can only deteriorate.
The possible solution involves increasing the commitment to recycle or dispose of the waste where it is produced, possibly through international environment regulations (Tan et al., 2018), and avoiding drowning with waste the Asian countries that are already dealing with a waste crisis projected to worsen.

This issue, however, is anything but a new concern for the GS countries, which have long been the destination of transboundary waste transports from the GN. While traded waste may sometimes be a source of revenue for developing countries, which treat it and recycle it limiting the resort to natural resources, often hazardous substances are shipped as well. The effect of toxic materials on people's health and on the environment is manifest, and it is later addressed when discussing the main waste management issues.

c. *The barriers that lock the GS countries*

Large comprehensive studies on the barriers that prevent the GS from adopting effective CE policies are lacking, in contrast to what has been observed for the GN, and chiefly for the EU.
It should be remarked that most of the barriers addressed that challenge the Global North's implementation represent a problem also for the South, where often the adverse effects are more intense. It is not deemed suitable a categorisation of the barriers similar to that adopted for the GN. In this context, given the lack of systematic studies that tackle the issues of developing countries, it is preferable to adopt a thematic approach to the literature, which makes possible the emergence of the crucial issues. There are numerous studies that look into specific sectors or CE activities. Most of the studies focus on the problems connected with waste management strategies, and portray the shortcomings with two main approaches:on the one hand, there are studies questioning the waste management strategies adopted in the GS, with a dominant focus on the e-waste management; on the other hand, there are more generic studies that call into question the quality of jobs created by the CE.

- The main challenges of waste management

Solid waste management (SWM, henceforth) is the most critical issue in developing countries. As previously seen, the greatest opportunity that GS countries associate with the Circular Economy transition is the potential of better waste management. Likewise, if the GN would accomplish the CE transition, the first advantage for the GS could be the mitigation of the waste emergency, thanks to a tangible limitation of the imports of hazardous, non-recyclable and non-recoverable waste.

The waste emergency, being related to population growth and to the rise of living standards, is predominantly serious in GS cities. Therefore, municipal SWM is a key critical aspect to address, and its importance is reflected in the literature (e.g. Diaz, 2011; Vergara & Tchobanoglous, 2012; Mmereki et al., 2016).

In order to assess the challenges of SWM in the GS, Brunner and Fellner (2007) studied the strategies adopted by three cities: Vienna, Damascus and Dhaka. This study precedes the widespread of CE worldwide, but it helps to identify some key barriers. It is based on the assumption that GS has less economic resources per capita to invest in the SWM, and that the primary goal of SWM is different between GN and GS. In industrialised countries, the CE policies chiefly focus on implementing extended recycling strategies and the newest technologies to improve the quality of the by-products and maximise the profit. In developing countries, instead, the primary concern of SWM strategies is usually to limit the health's risks and environmental impacts. Thus, Brunner and Fellner maintain that the priority is to ensure a complete collection service, while advanced SWM measures common in the GN risk to be too expensive and to have possible detrimental effects on health, because of the lack of know-how and techniques. Furthermore, the adoption of advanced SWM strategies has a limited benefit if the collection rate is small. To sum up, the first problem in the GS is the lack of effective collecting strategies, thus leaving inhabitants exposed to harmful emissions. Diffused SWM practices usually do not protect human health nor provide valuable benefits in case of a lack of investments. However, even when financial resources are not the barrier, it is found that the technically difficult implementation or the opposition of local stakeholders are the main hindrances (ibid.).

The same difficulties are confirmed by the data collected in a more recent report of the World Bank (2012). Comparing the SWM practices by income level, the main shortcomings for the low-income countries are related to the limited and inefficient collection of waste, the high collection costs that absorb up to the 90% of the investments, to the low technology of the waste disposal sites, which are usually open dumps with no environmental controls. Recycling is diffused but dominated by the informal sector, while composting and incineration are rare because of the costs associated and the operational difficulties.

A study centred on developing countries by Wilson, Velis and Rodic (2013) compare municipal SWM strategies across GS countries, both by activity and governance approach. They recognise some problems that tend to affect developing countries and common shortcomings in their strategies. In relation to waste collection, for instance, the service coverage may be inconsistent. Often there are differences between the collection rate in rich neighbourhoods and business districts, that can reach the 100%, and the collection in low-income neighbourhoods, where

sometimes there is not such a service at all. The barriers that often prevent the improvement of SWM strategies are identified in governance issues. According to the authors, lack of investments and expensive operating costs are the key obstacle, but foreign development aid investments usually cover the initial costs for creating the infrastructures, but hardly ever subsidise the ongoing operating costs. The study also confirms the findings of Brunner and Fellner's analysis (2007). While safe disposal and energy recovery are common and are considered a source of profit in the GN, in the South the lack of technologies does not consent it. This is due to the consistency of the solid waste, usually high in the organic component in the GS, which cannot be properly treated to be disposed of by way of thermal processing.

To summarise, the lack of financial autonomy, stakeholders' inclusion and solid institutions are the most critical issue on which GS's governments should work if they want to promote a circularity and ensure sustainable management of the waste.

There are two systematic analyses of the barriers that prevent the successful SWM in the Global South, which confirm these obstacles, but also provide a breakdown of several others. The two analyses evidence the same groups of factors that affect the SWM strategies in GS. Mmereki, Baldwin and Li (2016) are the authors of a recent comparative analysis of solid WM in developed, developing and lesser developed states, and they review a wide literature in order to identify what they call the "inhibitors of change". The scholars determine that SWM is much less efficient in the GS compared to the GN for the following reasons: policy discontinuity, poor or slow planning, ineffective implementation, ineffective organisational structure, weak institutional context, legal limitations, lack of knowledge and awareness, scarce citizens' participation, technological inefficiencies, corruption, insufficiency of social acceptance and fickleness, inadequate financial resources, lack of public-private partnerships, absence of developmental programmes' evaluation. The second analysis, carried out by Guerrero et al. (2012), enumerates highly specific issues that may hinder the completion of the SWM processes. The only factors that stand out refer to the possibility that informal waste pickers may collect recyclables, the poor quality of roads that make the transportation difficult, the influence on households' attitudes exerted by income, size of the families, education, gender influence, peer influence.

Clearly, a big part of these "inhibitors" reminds some of the hindrances listed for the developed countries, such as the legal restrictions, the lack of awareness, inadequate technological development. However, there are barriers not experienced in the GN. For instance, leader's interests and low priority of SWM are identified by scholars as a key weakness (e.g. Diaz, 2012; Mmereki et al., 2016; Guerrero et al., 2013). In the GS, often the political interest, coupled with discontinuous, slow and ineffective planning, make more appealing short-term programmes that

can quickly generate smaller profit than investing in long-term projects that would take long to bring benefits. Corruption and lack of transparency, too, can hinder the realisation of solid strategies. The problematic involvement of private actors in sustainable projects, for instance, is another concrete difference with the GN. The collaboration between public and private actors could help solve other issues, because it may ensure access to capital in all the phases of a project, but also to expertise and support in decision-making. The participation of the private sector may, broadly speaking, remedy the problems that the government has faced, and improve the efficiency and success of a green policy (Coad, 2005).

Finally, it should be noted that a substantial part of the literature engages specifically with the rapidly increasing electrical and electronic waste (or e-waste). E-waste management is a GS's serious issue because e-waste comprehends both valuable materials and toxic substances that expose to health and environmental risk. E-waste management has been tackled from many points of view for its peculiarities that add to the problems identified for SWM several others related to its harmfulness. Therefore, there are studies that address human health's concerns related to heavy metals release, provably dangerous for waste pickers, recyclers and for the residents near recycling site and landfills (e.g. Song & Li, 2014; Grant et al., 2013; Man et al., 2012). Other studies look at specific problems connected to the management of e-waste in GS and the inadequate legislation (e.g. Bakhiyi et al., 2018; Ikhlayel, 2018; Garlapati, 2015), which are similar to those of the generic SWM. Some other studies are worried specifically for the environmental management of e-waste, which is generally inadequate and exposes air, soil, freshwater to enduring pollution (e.g. Chakraborty et al., 2016; Zeng et al., 2017) Finally, the literature engages with international cross-boundary e-waste transport (e.g. Tansel, 2016; Man et al., 2012).

- The quality of the employment created

The potentialities of the green employment have been outlined both for the GS and for the GN. Additionally, it has been evidenced that a large part of the jobs that will be created in the GN consists of low-skills and middle-skills jobs with low and medium wages. Even if there is a lack of similar broad investigations about green jobs' quality with a focus on GS, it is possible to infer that a comparable outcome may be expected. However, there is a certain interest for green jobs related to SWM, and great attention is paid to the disadvantages relate to the job of the waste pickers, who represent a large part of the green jobs in developing countries (e.g. Gutberlet et al., 2017).

The more thorough scrutiny of the conditions of the informal waste pickers (IWP) is that of Velis (2017), who lists the main challenges that workers in this sector face. IWP are considered by many scholars an essential part of the Circular Economy in the GS and key actors for SWM (e.g. Gutberlet

et al., 2017; Gu et al., 2015; Velis, 2017), and their delicate conditions make them a key concern for policy-makers and academics.

First of all, it should be clarified that the conditions and activities in which they are involved vary greatly, and therefore generalisations should be avoided (Velis, 2017). For instance, IWP could work alone, organised in cooperatives or directed by criminal organisations. Governments sometimes are proactive in the attempt to include and formalise this category, other times are the cooperatives or civil society to push for their rights' recognition and receive support.

However, among the many serious concerns for IWP, the most relevant are the serious health risks to which they are exposed, especially women, children and the vulnerable categories that are often employed. A report on IWP in Latin America indicates that cuts and injuries, respiratory illnesses, infections, biological contaminations from medical waste, heavy metal poisoning, and even violence at work are frequent (Lethbridge, 2017). It also indicates that adequate training and protective equipment and rarely provided, mostly because of the informality of the employment.

Secondly, these vulnerable categories in such an informal and degraded environment are at risk to be exploited by criminal organisations and middlemen, which sometimes even resort to child labour (Velis, 2017). Additionally, these workers are often subjected to further marginalisation because of their activities. Damage to the environment, jeopardy of the public health, tax evasion and the uncertainty of profits are additional concerns which are hardly addressed.

- Other notable hindrances

There are other kinds of barriers and unresolved issues in the GS. Most of these are not thoroughly investigated but they prove to be critical and arguably need to be further developed by research.

For instance, a study on the problematic approach of the GS to the sharing economy (SE) (Retamal & Dominish, 2017) highlights that developing countries may find more challenging to engage in its dynamics fully. The first reason is the widespread lack of trust, which is higher in Africa and Latin America than it is in Europe. Asia, on the other side, performs much better in societal trust and should not be affected by this difficulty. Trust is an essential feature of the SE because it is a prerequisite for sharing personal data or relying on the service provider. A second hindrance to the success of the SE is the cultural expectation towards ownership, which is momentous mostly in Thailand and Vietnam. Lack of technology, mobile coverage, unavailability of electronic payment systems are further key obstacles to the access SE services. Finally, also faulty or missing regulations and the lack of personal assets or skills, including law literacy, prevent the spread of this model in the GS.

It is found outstanding, in conclusion, the focus of a research of ten Brink, Kettunen and Watkins (2017) on European outermost regions. The research evidences the existence of unique barriers

that preclude the successful engagement in CE policies of these regions. For the scope of the present study, it is deemed appropriate to include the European remotest countries in the analysis of the GS, for several reasons. Firstly, they are comprised because of the high environmental risks to which they are exposed, the low levels of energy and food security, the flawed infrastructural development, the limited financial capacity that look alike GS' conditions. Secondly, it is remarkable that most of the challenges faced by these regions are actually consistent with the GS' barriers described. However, it is clear that are further hindrances. In the first place, their dimension and remoteness impede the attainment of economies of scale, making it difficult to regulate the land use and prevent an efficient collection, recovery and disposal of the waste. Often, there is also limited landfill capacity, especially on islands. The dependence on imports from the mainland or other countries means that the products they use are designed and produced elsewhere. This is troublesome because it implies that these territories have no control over the production of the commodities but are responsible for their end-of-life disposal, which makes hard to adopt an extensive CE strategy. Finally, the scarcity of data available on their implementation of green policies makes difficult to assess progress and even to set specific targets. Another study on WM in islands and isolated systems (Santamarta et al., 2014) also highlights the additional burden often represented by high population density and tourism and corroborates the urgency of all the issues already tackled.

All these issues, both those related to the sharing economy and those that affect remote areas, are context-specific and not ordinary, but they are here considered sound examples of the many typologies of secondary problems that the GS countries may experience, due to financial constraints, social and cultural norms, lack of technologies that are taken for granted in the GN, inability to reach economies of scale.

4.3.4. Summary and implications for the research

To assess the identified barriers, the drawbacks and the downsides of the CE strategy is a complex task. First and foremost, the section demonstrates that a comprehensive global approach is necessary. Looking at the local, country or even regional level proves to be a reductive approach because it makes unfeasible a broad understanding of the drawbacks that undermine the efficacy of the CE strategy on global grounds.

At the regional level, the EU is the main subject of the numerous formal studies on the GN. As explained earlier in this paper, the number of academic studies on the barriers that affect the CE implementation have steadily increased in the last years. Thus, the identification of the obstacles

and the analysis of the solutions is currently a crucial objective of CE research. However, the significance of the research that concentrates on the GN is limited, if equally substantial research does not deal with the GS, because it prevents a fruitful contrast of problems and needs that the CE strategy should target. Furthermore, to a certain extent, the analysis of GS's difficulties should be a priority objective, because some of the most compelling emergencies take place there.

Therefore, the section analyses also the problems that afflict the GS, and it does it from a global perspective, in order to overcome the limitations implied by the existing research. First, in the GS are identified some wide-ranging challenges, often partially in common with GN countries, such as cultural and technological ones. Second, there are specific issues, that in the GN have been overcome years ago and are hardly deemed critical nowadays, which are, inter alia, related to the waste management crisis: health risks, rampant corruption, unprotected jobs in unsafe conditions.

However, looking at the bigger picture, at the mutual interactions between countries and at the global trade flows, some less obvious, yet powerful dynamics, emerged. Key drawbacks of CE strategies that affect the GS came to light. The first category of problems identified is a direct consequence of actions and decisions taken by actors in the GN. The problem displacement instances, for example, refer to CE policies that in order to pursue an advantage, usually an economic one in the GN, cause collateral damages that affect the GS.

Another impact on the GS attributable to CE strategies implemented in the GN concerns export-oriented developing economies. Indeed, it is contended that a GN transition to the CE would have deep impacts on the countries that rely on raw material exports. Thus, the lack of attention for the effects that curbing economic growth from natural resources entail is limiting.

A third macro effect here identified that is affecting the markets worldwide is the "Brussels Effect", which refers to the global power exercised by the EU through its legal institutions and standards. The impacts on the markets of other GN countries are known, nonetheless, it is ignored how rising products' standards influence the trade with the GS.

Finally, a change of course of the CE strategy of China, which has led to the ban over the imports of scrap materials, has altered the global trade flows of waste. Within few months after the ban came in force, the trade patterns that brought scrap materials from the GN, especially the U.S., to the GS were not ceased. Thailand, Malaysia, Indonesia, despite their struggle to deal with their own waste, are rapidly absorbing the waste streams with which the GN is not capable of dealing.

What all these forces at play have in common are the underlying mechanisms that govern them. The globalisation of businesses deserves close attention because it is continuously changing the global dynamics and may represent a crucial challenge for the CE model.

4.4. Assessment of the Circular Economy's limits

In this section, the benefits, barriers, key issues and strategies presented in earlier sections are interpreted in relation to the developed framework. The aim of this section is to assess the positioning of developing and developed countries in the CE global strategy and to evaluate the flaws of the approach of the CE.

First and foremost, it must be stated that this study is problem-oriented and aims to address a real-life issue with great global implications. Therefore, the analysis of the results and the discussion do not engage with a specific theory but intends to expose the critical shortcomings of the CE research and to address them.

This study is significant for CE research because it exposes a greatly overlooked issue which needed to be addressed with the most inclusive approach possible. A systematic analysis of the implementation of the Circular Economy model across the world was compulsory because the CE is a contemporary core strategy in Europe and other countries worldwide for pursuing global Sustainable Development.

The CE model emerges within the Sustainable Development context as a new and viable strategy which promises to safeguard the environment and boost economic growth.

The concern that laid the foundations for the current study is that the Circular Economy to be deemed a viable global strategy should be assessed in its ability to concretely address global issues. Thus, the analysis of the academic research, policy papers, think-tanks' reports was identified as a necessary approach to understand how this strategy deals with developing countries, the primary target of SD.

The analysis acknowledges the existence of economic, structural and technological differences in the Global South and in the Global North, and it finds that the CE model proves to be only partially able to deal with the problems of developing countries. There are not insurmountable obstacles to tackle, but the weakness of the CE model is identified in its short-sightedness.

While the analysis has identified that the greatest advantages in terms of economic growth are currently reserved to industrialised high-income economies, for the low-income countries there are potential benefits in terms of business development, increased environmental protection and, indirectly, economic growth. The studies available on the policies already implemented in the GS are scarce, but the reviewed global reports and country-specific figures suggest that some positive outcomes can be expected.

There are, anyway, serious unresolved issues that need to be addressed at the local and national levels in the GS. It is especially required that the waste management crisis is tackled on multiple

fronts by the civil society, organisations, local and national governments, although the lack of awareness is the most complex problem to deal with.

However, what this analysis has found to be the most critical problem of the CE is the narrow perspective that the model reveals.
The neglected drawbacks of the CE transboundary strategies, the overlooked economic risks involved for export-oriented economies, the ignored impacts of the EU global power exercised through its increased standards, the incapability to address the trade of waste between GN and GS, appear to be disconcerting issues.

Thus, does the implementation of Circular Economy worldwide enhance mechanisms of inequality between developing and developed countries?

It is hard to answer this question because in the light of the findings it is possible to agree that this model, when applied locally, nationally or regionally, entails some good opportunities for both GS and GN countries and environmental benefits for the current and future generations. The main shortcoming found, it must be stressed, is its perspective.

The Circular Economy national and regional strategies have proved that they cannot identify nor have the tools to contrast global transboundary issues. Although the influence that the EU can exert on the markets, it is observed that its dimension is inadequate.
What the CE fails to see is that there are global business networks that exercise control over the fragmented production processes that it targets. In the global capitalistic economy, it is common knowledge that the economic activities are organised across countries. The dispersion of production activities that are required to bring a product from its conceptualisation to its end-of-life stage is what is referred to as the Global Value Chain, but only when it transcends the national boundaries (e.g. Gereffi et al., 2001; Gibbon et al., 2008). While the set of activities entailed by the value chain can all take place within the boundaries of a country, sometimes these boundaries are exceeded during the development of a product to add it value, and thus these activities are part of a Global Value Chain (GVC, hitherto) (ibid.). The GVCs may even appear as a chain of complex networks developed at the global or regional level (UNCTAD, 2013).
Therefore, the CE strategies, which are characterised by a specific focus on production activities and target a country or region, miss the overall picture, and a comprehensive global approach is confirmed to be necessary. Since the objective of the CE model is primarily identified in environmental and economic global improvements, the perspective of the GVCs could call attention to the serious unaddressed drawbacks identified. These disconcerting issues are

identified as the factors that may jeopardise the economic growth of developing countries and the environment and therefore result in the failure of the CE model.

A similar interpretation of the limits of the CE has been found in a perspective "piece" of Schroeder, Dewick, Kusi-Sarpong, and Hofstetter (2018). As per the scholars:

> *"Issues of growing inequality are not sufficiently addressed by current circular economy approaches. Powerful countries and transnational corporate actors already control the majority of GVCs and even in a circular system, they are likely to continue to capture the resources and capital they need, exacerbating existing inequalities"* (Schroeder et al., 2018:77).

The narrowness and idealisation of the CE perspective are also identified in other critiques to the CE model (e.g. Gregson et al., 2015; Pomponi & Moncaster, 2017). However, the application of the GVCs perspective to the CE model seems to be unexplored. It may, therefore, be appropriate for research to move in this direction, in order to realise if the integration of the Circular Economy model and the system of Global Value Chains is achievable and with which results.

5. CONCLUSIONS

As regards the Global North economies, the benefits that are driving the shift to the Circular Economy are numerous, in-depth analysed and backed by studies and statistics across different industry sectors; they encompass environmentally-strategic gains and wellbeing perspectives. As regards the Global South the situation varies. Studies on developing countries are limited, and this is the raison d'être of the investigation, but they are also found to be less thorough and systematic. Overall, they do not identify as many drivers as those that stimulate the GN's shift, and several exceptional barriers that prevent the effective implementation there of the CE are not addressed significantly. Problematic waste management and environmental degradation are deemed the most critical problems. However, CE strategies aim to control these issues, and there is evidence that environmental protection and job creation may be achievable if the right priorities are set and the suitable policies adopted. Obstacles such as the lack of awareness of citizens are common both in the North and the South, while others like policy discontinuity, poor planning, ineffective implementation of regulations, and weak institutional context are distinctive of the GS and should be addressed with urgency.

However, the value of this study lies in its the identification of critical global dynamics, partly unintentionally encouraged by CE policies, that the CE model cannot address because of their transnational dimension. These dynamics are:

- the drawbacks implied in CE transboundary strategies;
- the economic risks created to export-oriented low-income economies;
- the impacts of the EU global power exercised through its norms and standards;
- the trade of waste from GN to GS countries that hardly manage their own waste.

These dangerous dynamics appear to be overlooked, and it is possibly owing to their transboundary dimension, that the CE may not understand because of its narrow focus on local, national and regional dynamics.

The transboundary dimension of trade dynamics difficult to tackle is the result of the existence of Global Value Chains, generally coordinated by transnational corporations. The activities and processes targeted by CE policies are only a small part of an integrated system which eludes the national and regional economic schemes.

Therefore, the current study suggests that in order to address these dynamics future research should investigate how the Circular Economy can communicate with GVCs.

In order to move forward in this direction, it would be valuable to conduct a study that applies the Global Value Chain framework to the global Circular Economy structure and that analyses the dynamics and relationships between the actors involved in a determined value chain. Indeed "the comprehensive nature of the framework allows policymakers to answer questions regarding development issues that have not been addressed by previous paradigms" (Gereffi & Fernandez-Stark, 2011:2).

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