REPORTS OF THE FINNISH ENVIRONMENT INSTITUTE 26 | 2018

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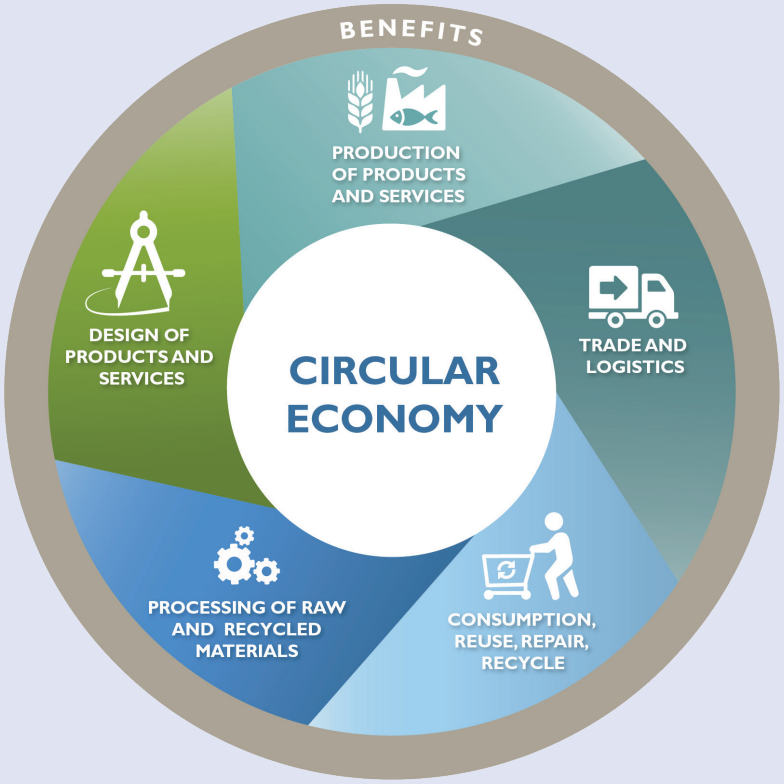

BENEFITS

- Minimized pollution, climate emissions, waste and use of raw materials
- Preservation of natural systems
- Increased competitiveness
- New markets
- Employment opportunities
- Social benefits

Finnish Environment Institute

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Programme for Sustainable Circular Economy

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ABSTRACT

Circular Economy for Sustainable Development

As a new paradigm for economic development, the circular economy has significant environmental, economic and social benefits at the global scale. The circular economy concept highlights the notion of replacing the 'end-of-life' in current production and consumption practices by reducing, reusing, and recycling products and materials in production, distribution and consumption processes. Promoting circularity aims to accomplish sustainable development, and the circular economy has links to many of the 17 Sustainable Development Goals (SDGs) approved by the United Nations in 2015.

This report is a background contribution asked by the Independent group of scientists writing the Global Sustainable Development Report (GSDR) 2019. The GSDR 2019 is the first in a series of comprehensive, in-depth Reports that will be produced every four years to inform the High-level Political Forum on Sustainable Development convened under the auspices of the General Assembly. Thus, this background report seeks to provide a condensed package on the circular economy; the concept, its history, potentials, business opportunities, management and measurement.

Some of the key messages entail that moving towards a circular economy presents vast opportunities for businesses of various kind, and that increasing the material circularity of economy can also be a way to alleviate poverty. Yet, the systemic and disruptive changes required for a circular economy transition will not take place without significant changes to existing regulatory structures.

Keywords: circular economy; sustainable development; Sustainable Development Goals; Agenda 2030; business; poverty eradication; management; measurement; policy; regulation

TIIVISTELMÄ

Kiertotaloudella kohti kestävää kehitystä

Kiertotaloutta voidaan pitää uutena taloudellisen kehityksen paradigmana, johon liittyy merkittäviä ympäristöön, talouteen ja sosiaaliseen kehitykseen liittyviä mahdollisuuksia maailmanlaajuisesti. Kiertotalouden ideana on korvata lineaariset kulutus- ja tuotantokäytännöt toimilla, jotka tähtäävät materiaalisten panosten ja tuotteiden vähentämiseen, uudelleenkäyttöön ja kierrättämiseen. Kiertotaloudessa pyritään laajasti kestävän kehityksen edistämiseen. Vastaavasti monet YK:n 17:stä kestävän kehityksen SDG-tavoitteesta (2015) edistävät kiertotaloutta.

Tämä raportti on tuotettu taustamateriaaliksi riippumattomalle tutkijaryhmälle, joka työstää vuonna 2019 julkaistavaa maailman kestävän kehityksen raporttia (Global Sustainable Development Report, GSDR). Näitä kattavia kestävän kehityksen raportteja tullaan jatkossa julkaisemaan joka neljäs vuosi, ja niiden tarkoituksena on informoida YK:n yleiskokouksen alla toimivaa korkean tason kestävän kehityksen foorumia. Tässä taustaraportissa pyritään siis tarjoamaan tiivis tietopaketti kiertotalouden käsitteestä, historiasta, potentiaalista, liiketoimintamahdollisuuksista, hallinnasta ja mittaamisesta.

Tärkeimpiin havaintoihin kuuluu, että kiertotalous tarjoaa runsaasti erilaisia liiketoiminnan mahdollisuuksia, ja että kiertotalous voi olla myös yksi keino torjua köyhyyttä. Siirtymä kohti kiertotaloutta vaatii kuitenkin tämänhetkisestä järjestelmästä selvästi poikkeavia ja ravisuttaviakin systeemisiä muutoksia. Tämä tarkoittaa, että myös politiikan on muututtava voimakkaasti kiertotaloutta tukevaan suuntaan.

Asiasanat: kiertotalous; kestävä kehitys; kestävän kehityksen tavoitteet; Agenda 2030; liiketoiminta; köyhyyden torjunta; hallinta; mittaaminen; politiikka; sääntely

Cirkulär ekonomi och hållbar utveckling

Som ett nytt paradigm för den ekonomiska utvecklingen har den cirkulära ekonomin betydande miljömässiga, ekonomiska och sociala fördelar på det globala planet. Konceptet cirkulär ekonomi lyfter fram tanken om att ersätta ”slutet på livscykeln” i nuvarande praxis kring produktion och konsumtion genom att minska, återanvända och återvinna produkter och material i produktions-, distributions- och konsumtionsprocesserna. Genom främjandet av en cirkulär ekonomi strävar man efter hållbar utveckling, och den cirkulära ekonomin har kopplingar till många av de 17 mål för hållbar utveckling som godkändes av Förenta Nationerna år 2015.

Denna rapport är skriven som bakgrund till den globala rapporten om hållbar utveckling (Global Sustainable Development Report, GSDR) 2019. GSDR 2019 är den första i en serie av heltäckande och fördjupade rapporter som kommer att publiceras vart fjärde år för att informera FN:s högnivåpolitiska forum för hållbar utveckling, som lyder under generalförsamlingen. Denna bakgrundsrapport strävar alltså efter att ge ett kortfattat informationspaket om cirkulär ekonomi; konceptet, dess historia och potential, affärsmöjligheter, ledning och mätning.

Till nyckelbudskapen hör att en övergång till en cirkulär ekonomi ger stora möjligheter till olika typer av affärsverksamhet och att en ökning av cirkulationen av material inom ekonomin även kan vara ett sätt att minska fattigdomen. De förändringar som krävs för en övergång till en cirkulär ekonomi kommer dock att påverka och störa hela systemet, och kommer inte att genomföras utan betydande förändringar i existerande regelverk.

Nyckelord: cirkulär ekonomi; hållbar utveckling; mål för hållbar utveckling; Agenda 2030; affärsverksamhet; utrotande av fattigdom; ledning; mätning; policy; regelverk

CONTENTS

1 Introduction

The circular economy (CE) is a paradigm for economic development and a policy initiative. It is a response to the unsustainable, conventional 'take-make-dispose' economic model. The CE brings a multi-level transition towards cyclical closed-loop systems by minimising the intake of natural resources (Ellen MacArthur Foundation 2013, Murray et al. 2015). Kircherr et al. (2017) have defined the CE as "an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, [and] recycling […] materials in production/distribution and consumption processes, […], with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations".

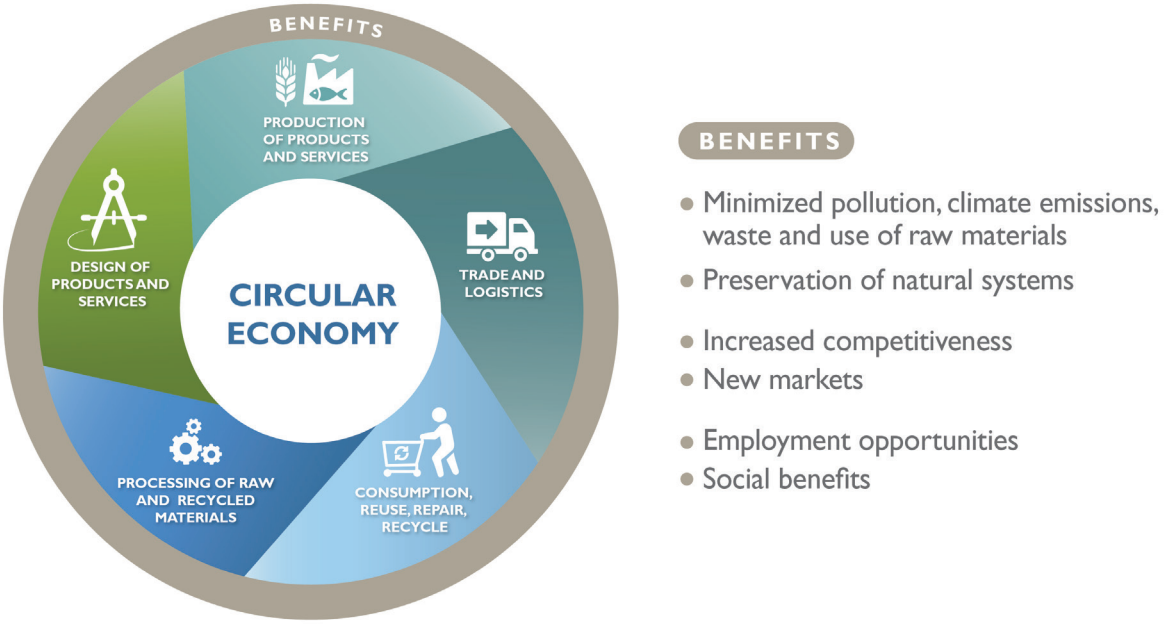
The CE has links to many of the 17 Sustainable Development Goals (SDGs) approved by the United Nations in 2015. These include goals such as no poverty (SDG1), responsible consumption and production (SDG12), sustainable cities and communities (SDG11), and the promotion of inclusive and sustainable industrialization and innovation (SDG9).

There is substantial potential for creating more circular material flows, as the global economy has been estimated to be only 9% circular (de Wit et al 2018). Closing this circularity gap would bring significant environmental and socio-economic benefits. For example in Europe, it has been estimated that by taking advantage of the rapid technological development, the CE could create resource productivity growth of up to 3% annually. Further, following the CE scenario would bring a 7% increase in gross domestic product (GDP) as compared to current development, with additional benefits for employment (Ellen McArthur Foundation et al. 2015). Implementing the CE would also help to cut greenhouse gas emissions. Emissions in industries consuming plastics, steel, aluminium and cement could be cut by more than half[1] by 2050 (Material Economics 2018).

The CE has also been expected to bring benefits to companies and municipalities due to a reduction in the need for waste management, resource efficiency gains and reductions in environmental externalities such as pollution. Further, the CE has potential to create economic and social benefits such as new jobs, opportunities and increased welfare for low income households and improvement in trade balances. (Ellen McArthur Foundation et al. 2015; Ghisellini et al. 2016; Lazarevic and Valve 2017; Wijkman and Skånberg 2016).

[1] 296 Mt CO2 per year out of 530 Mt in total

The key components of the CE concept and the potential benefits of its implementation can be found from Picture 1.



Picture1. Circular economy and its benefits

The short history and current state of circular economy

Efficient use of existing natural resources has been a long-standing human quest (See Box 1 on the case of date palm industry in the Gulf Basin). However, the current CE concept stems from ecological economics, environmental economics, and industrial ecology that have been developed to balance the environmental burden of industrialised countries (Murray et al. 2015; Ghisellini et al. 2016).

Germany was among the pioneers with the *Closed Substance Cycle Waste Management Act* (1994). In the year 2000, Japan initiated a plan to establish a recycling-base society that aimed to promote waste measures and recycling comprehensively and systematically. Further, China's engagement with the circular economy started in 1998, and the approach was formally accepted by the central government in 2002 (Yuan et al. 2006). Even though the Chinese approach has been more waste-oriented than the current European one, China was the first country to use the term circular economy in the context of waste and resource policy.

Box 1. The ancient roots of circular economy - the case of date palm industry in the Gulf Basin

While the CE is a novel term, some of the practices that follow the definition have ancient roots. Archaeological findings from the island of Delma in the Gulf Basin have demonstrated that people used agricultural by-products from date palm cultivation for the construction of houses around 6,000 BC. The recycling of biological waste has been going on for around 8,000 years (if not longer) and it was a fundamental ingredient for survival in regions with extremely hot climates and scarce resources. The date palm tree itself, called in the region "the tree of life", was and still is mainly used for food production. Oases ecosystems had an important environmental role to play; apart from enhancing desert micro-climates they offered shade for the cultivation of fruits and vegetables.

Each year after the date palm harvest, dry palm leaves would have been cut and used in ingenious ways for the construction of cities, villages and individual houses. In the 1950s, Dubai, in the United Arab Emirates, housed 12,000 people in 4,000 date palm leaf houses. Parts of the leaves were used for small scale products such as boats, beds, mats and baskets; palm tree fibre was woven into rope, and other tree elements such as pollen are still being used in pharmaceutical industries.

Desert communities are small and scattered, hence recycling was small scale and local, driven by the Bedouin communities themselves until the 1970s. Since the discovery of oil, there has been a decline in recycling practices, yet an increase in the production of dates. Re-engaging with these ancient practices does not require re-design of a value chain that no longer exists, but social and developmental transformation of entire nations and regions. With regions that have experienced fast-paced economic development, the notion of history is partly in transition. Thus, local communities themselves—and the local governments—need to embrace the transition to circular economy in the manner they find suited for their social and economic aspirations.

Currently, Europe is a pioneer when it comes to CE policy development. In 2014, the European Commission published its communication *Towards a circular economy: a zero waste programme for Europe* (European Commission 2014). A year later, *Closing the loop - An EU action plan for the Circular Economy* (European Commission, 2015) package was released with a more ambitious and holistic approach. The package was supplemented in 2018, when the European Commission adopted a set of new measures, including an EU Strategy for Plastics in the Circular Economy; a Communication on options to address the interface between chemical, product and waste legislation; a Monitoring Framework on progress towards a circular economy; and a Report on Critical Raw Materials and the circular economy (European Commission 2018).

Following the activities on the European Union level, many member states including Finland, the Netherlands, Scotland and France have launched CE strategies and initiatives. Finland was the first country in the world to launch a road map to a circular economy in 2016 facilitated by Sitra and in cooperation with all relevant ministries, the business sector and other key stakeholders (Sitra 2016).

Following the roadmap, Finland intends to be a pioneer and frontrunner in the circular economy by 2025. The first steps will be taken and actionable projects implemented within five identified focus areas, based on Finland's national strengths. The focus areas include sustainable food system; forest-based loops; technical loops; transport and logistics; and common action involving legislators, companies, universities and research institutes, consumers and citizens and regions in order to achieve systemic change. The roadmap is dynamic and will be revised in 2018-2019.

Despite the considerable progress in CE policy initiatives, significant efforts are still needed in order to mainstream the CE and overcome the multiple barriers in the path, including first and foremost cultural and market barriers (Kirchherr et al. 2018). The cultural barriers refer primarily to the lack of consumer interest and awareness as well as a hesitant corporate culture.

Further, market barriers are induced by a lack of synergistic governmental interventions to accelerate the transition towards a CE. Additionally, as analysis of the CE policy development in China shows, CE policies often focus on the resource flows and production efficiency, while tools and policies regarding consumption are lacking (Zhu et al. 2018).

2 Circular economy as a business and technology case

Circular economy is enabled by novel business models (Kirchher et al. 2017). It has been estimated that, in Europe alone, the CE could create direct primary-resource benefits worth 600 billion euros by 2030 (Ellen MacArthur foundation et al., 2015). Unlocking these gains presents great opportunities for business.

Circular economy business model types are diverse and range from the conversion of non-recyclable waste materials into usable heat, electricity or fuel to product leasing models and new production technologies such as 3D printing (Lewandowski 2016). The Ellen MacArthur Foundation (2015) has presented a categorization to six business models (ReSOLVE):

- **Regenerate** refers to shifting to renewable energy and materials.
- **Share** denotes the sharing and recycling economy as well as prolonging the life of products.
- **Optimise** refers to increased efficiency, waste minimization and utilization of information and communications technology (ICT).
- **Loop** is defined as closing the technical and biological material cycles.
- **Virtualise** deals with direct and indirect dematerialization.
- **Exchange** calls for the utilization of novel materials and technologies.

Finland has made pioneering work in mapping the best national business cases that promote circular economy (Sitra 2018). The cases are categorized and can be used to exemplify different circular economy business models:

Regenerate, Exchange and Loop: Kotkamills - Easy-to-recycle, biodegradable paper cups and packaging. Renewable cardboard products can be used instead of fossil-based plastic products. Conventional paper cups have been difficult to recycle because they have a plastic coating inside. The coating developed by Kotkamills offers a way to produce recyclable, biodegradable cardboard packaging. After use, the fibres are easy to extract and recycle as raw materials.

Optimize and Loop: Fortum - Used plastics as a recycled raw material. The majority of plastic material usually ends up in landfills, incinerators or nature. Fortum is reducing that amount with the Riihimäki Circular Economy Village, where plastic waste collected throughout Finland is processed into recycled plastic. The company's business has also diversified from waste processing to the supply of raw materials.

Share (Product-life extension): Valtra - Remanufactured tractor gearboxes. Valtra has managed to create a new and profitable business from remanufacturing used gearboxes. This extends the life cycle of a product, and saves energy and materials compared to manufacturing new gearboxes. The customer quickly receives a new gearbox to replace the broken one. A deposit scheme has been created to ensure the return of old gearboxes.

Share (Product as a service): MaaS Global - Mobility without the hassle of car ownership. Consumers spend a lot of money buying cars, which then end up being used relatively little. The Whim service by MaaS Global offers an alternative way: consumers can use this one-stop service to access different forms of transport for a monthly charge. The service helps to make the transport system more efficient, and the potential global market is worth hundreds of billions of euros.

Share (Sharing platforms): Skipperi - Go to sea with the help of a peer-to-peer boat rental service. With Skipperi's service anyone with adequate skills can rent a boat. The service enables e.g. sailing without the need of owning a boat, and makes it easier to try sailing. Meanwhile, the boat owners can earn some extra money to cover the often high costs of owning a boat.

Technological development features vast opportunities for the circular economy. For example, data collection technologies, such as Radio Frequency Identification (RFID) or Internet of Things (IoT), could help to track material flows and to collect information across the value chain. Data integration technologies such as Product Lifecycle Management (PLM) systems could integrate information across multiple life cycles and across various stakeholders in the value chain. Further, artificial intelligence could be applied to support process and system optimization based on vast amounts of data (Pagoropoulos et al. 2017).

3 Promoting, managing and measuring circular economy

The transition from the current linear 'take-make-dispose' economic model to a more circular economic system will require fundamental changes in technologies, markets, user-practices and institutions. While the competition for scarce resources is promoting experimentation in new technologies and business models, the systemic and disruptive changes required for transition will not take place without significant changes in existing regulatory structures (Wilts and O'Brien 2008).

There is need for both new policies supporting novel technologies, markets and business models - and renewal and withdrawal of current policies promoting linear economy in multiple ways (cf. Kivimaa and Kern 2016). For example, the current suite of European Union waste related legislative proposals aim at phasing out landfilling by 2025 for certain recyclable waste streams (including plastics, paper, metals, glass and bio-waste). Such regulatory measures have a destabilising effect on the landfilling practices and business models that have historically dominated European waste management.

Various policy instruments adopted to promote resource efficiency, eco-design and waste management exist in several countries. However, these are often scattered, weak and disproportionately divided along the sectors of economy. Existing measures are mostly targeted at recycling waste into new raw materials. They include requirements to sort waste, landfill diversion, charges and taxes, and extended producer responsibility for different products (e.g. Seppälä et al. 2016). These instruments have been mainly introduced to enhance safe waste management.

Radical policy changes needed

Whilst policy instruments that target the end-of-life phase are required in circular economy policy mixes, the CE is much more than waste management. There is a great need for policy instruments that focus on upstream phases such as product design and service development. In general, carefully prepared, consistent, coherent and credible policy mixes are needed (cf. Rogge and Reichardt 2016) to enhance product lifetime extension and reduced use of natural resources. These goals are, however, much closer to the core of production and consumption systems. Thus, it is much more problematic for legislators to directly regulate them (cf. Kautto 2008).

Additionally, it must be remembered that new policy instruments do not exist in a vacuum and must be designed in the context of existing policy mixes and regulatory systems. In the UK, a series of non-binding Quality Protocols have been developed to regulate the use of specific waste streams for specific applications. It has been an attempt to strike a balance between the protection of human health and the environment, on the one hand, and reducing the regulatory burden on e.g. businesses on the other hand (Kauppila et al 2018; see also Box 2 on managing chemicals in circular economy).

Thus, while companies seek opportunities to implement business models based on reuse and remanufacturing, policies promoting product lifetime extension are still in their infancy. Important initiatives being discussed include e.g. eco-design standards for minimum product lifetime, guarantee statements, requirements for the availability of spare parts and repair services (German Environment Agency 2017; EEA 2017). Systems of extended producer responsibility should be reformulated to support their original goals of sustainable material use and eco-design (Lifset et al. 2013).

Finally, apart from policies aimed at supporting existing practices in linear economy, transformation is hindered by many other path-dependencies. These include investments in current infrastructures of production and waste management. The transition towards cyclical closed loop systems is not only a question of environmental policies. It will require a re-assessment of all public policies and investments, and a fundamental reform of the economic model as a whole.

Box 2. Managing chemicals in a circular economy

Managing chemicals in the CE is essential so that hazardous substances in material cycles do not entail any risks to humans or the environment. Risks may arise especially in materials which have a long life cycle and a history of extensive chemical use, such as construction materials. A pressing question is how to recognize hazardous substances in material cycles when waste materials vary by age and origin, and some hazardous substances may have entered new life cycles.

In a sustainable CE, chemicals are used to improve the quality of products, so that they last long and may also be reused. However, reducing the use of hazardous substances is a goal that needs to be striven to. Further, there is a need to learn how hazardous substances behave throughout the life cycle of a product. In order to control the possible risks, information about chemicals should remain with the product during its whole life cycle (Kauppi et al. 2017). In this context, one of the greatest challenges is the constantly increasing lists of hazardous substances, such as the list of persistent organic compounds (POPs) and the candidate list in the EU REACH legislation that identifies substances of very high concern (SVHCs).

In short, balancing safety and sustainability factors in the CE requires efforts within the spheres of both science and policy. In the field of research , general overviews (e.g. Hunt et al 2018), systematic approaches (Bodar et al. 2018) and case-specific research (Rochetti et al. 2018) are all needed for transparent consideration of hazardous substances in material cycles, re-use and recycling. In Europe, the ambitious re-use and recycling targets should be addressed carefully, keeping in mind the standards set by the chemical legislation. For example, the question of what kind of impact hazardous substances in materials and products imported from outside the EU cause for material cycles inside the EU is not yet understood.

Picture 2. Chemical information should accompany a product throughout the whole life cycle.

Measuring success towards a circular economy

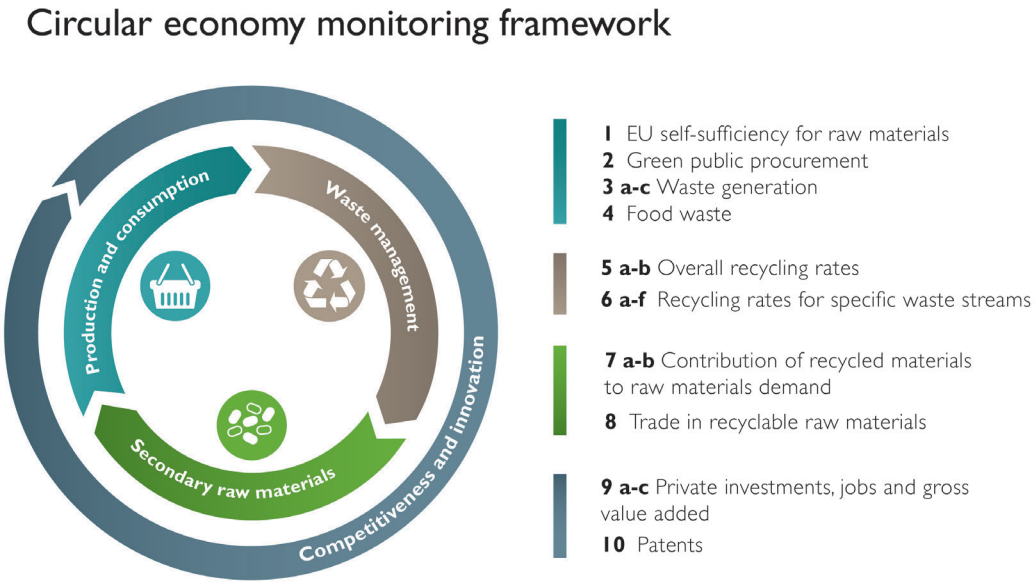
In the transition to a more circular economy, monitoring the most important trends and patterns is key to understand how the various elements of the CE are developing and have developed over time. Monitoring is also needed to help identify success factors in countries and regions and to assess whether sufficient action has been taken. The CE includes various different aspects (cf. Picture 1) and there is no one measure to indicate progress.

One way to understand the big picture of circular economy is a material flow diagram. Material flow diagrams show the flow of all raw materials throughout the economy. For instance, in the EU, 8 billion tons of raw materials enter the economy (Mayer et al. 2018): 2.2 billion tons of waste is generated, of which 0.6 billion tons is recycled.

On national and regional levels, a range of possible circular economy indicators exist. These indicators measure e.g. resource use and resource efficiency, the data for which is collected by organizations such as the Organisation for Economic Co-operation and Development (OECD) and Eurostat (Resource efficiency scoreboard).

However, one of the pioneering holistic indicator sets developed especially for measuring successful development toward the CE, is the European Commission's circular economy monitoring framework launched in 2018 (European Commission 2018a) (see Picture 3). The EU monitoring framework includes a set of ten indicators grouped into four stages and aspects of the CE. The results of monitoring should form the basis for setting new priorities for various stakeholders towards the long-term objective of a circular economy.

For example, the European CE measures show that generation of waste[2] decreased in relation to GDP but increased per domestic material consumption during 2006-2014. For municipal wastes, the recycling rate has increased during recent years in the EU and was 45% in 2015. However, the ratio of the circular use of materials to the overall material use was only 11% (Eurostat 2018).



Picture 3. The circular economy monitoring framework of the European Commission (2018a)

[2] Excluding mineral wastes

4 Social aspects of circular economy and poverty eradication

At the heart of *Transforming our World: the 2030 Agenda for Sustainable Development* is the eradication of poverty whilst recognizing the integrated and indivisible economic, social and environmental dimensions of sustainable development. The recommendation to see interlinking between these dimensions and all seventeen Sustainable Development Goals is also an opportunity to begin to link circular economy with a social context of poverty.

According to the World Bank nearly 1.1 billion people have moved out of extreme poverty since 1990. In 2013, 767 million people lived on less than $1.90 a day, down from 1.85 billion in 1990. The reduction in extreme poverty in recent years has been driven by the East and South Asian regions, notably China, Indonesia and India.

Rising middle-classes in recent decades have demonstrated an increase in consumption habits and a throwaway culture of buying something new as signs of social progress. These developments have caused challenges to e.g. waste treatment capacities of many countries and led to various urban health problems.

At the same time, many economies outside the OECD have also been able to recycle higher percentages of waste than some OECD countries. For example, the plastic recycling rate is 42% in South Africa. Meanwhile, only 6% of plastic is recycled in the USA. Informal economy can be a major contributor for circular economy in many developing nations. (Kreamer-Mbula 2018)

There is a scope for North–South collaboration in capacity building that can also be directed towards innovation in technology development and transfer. Intermediate and enabling technologies that bring upscaling of existing technologies on the ground defined by the UNFCCC Climate Change Convention and the Kyoto Protocol as endogenous technologies may prove to be the fastest and most cost-effective way to eradicate poverty in the least developed countries (LDC). However, the upscaling of endogenous capacities and technologies, the role of indigenous people and local cultures in technological and economic transformation are undefined as yet and because of that not properly understood.

We are only at the beginning of a journey commenced in 1992 with The Rio Declaration on Environment and Development, with subsequent climate change conventions calling for equitable benefits for indigenous and local communities. Those willing to exploit traditional knowledge systems in a commercial way need to take into consideration the recommendation from the Convention of Biological Diversity of 1992 Preamble. This states that one must recognise "[t]he close and traditional dependence of many indigenous and local communities embodying traditional lifestyles and biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and principles relevant to the conservation of biological diversity and the sustainable use of its components".

5 A global transformation towards circular economy

During the past few years, some African countries have stood up as pioneers promoting circular economy. These include Rwanda, South Africa, and Nigeria who launched the African Circular Economy Alliance in late 2017[3]. The idea is to develop, together with the World Economic Forum and the Global Environment Facility, a continent wide alliance that will spur Africa's transformation to a circular economy.

The idea is to deliver economic growth, jobs and positive environmental outcomes for Africa. The opportunities provided by enhanced industrial symbioses have been highlighted by many experts. Thus, the idea is to learn from the best practices and cases of each participating country and to bring together public and private sector leaders from across the continent to drive the agenda further.

For example, the Nigerian company African Foundries uses scrap iron to manufacture steel for construction. The electricity needed to smelt the metal comes from a gas power plant that uses natural gas. Using the by-product of oil drilling inhibits its wasting by e.g. flaring.

On global scale, World Circular Economy Forums (WCEFs) have emerged as important global meeting points for CE thinkers and doers around the world. The WCEFs examine how businesses can seize new opportunities through circular economy solutions and how the circular economy contributes to achieving the UN Sustainable Development Goals (SDGs).

Indeed, implementing the circular economy and the SDGs at large must go hand in hand. However, contradictions may arise if e.g. the reuse of materials is promoted without adequate attention to hazardous substances and the potential risks imposed by them on employees, consumers and users (see Box 2 for more details).

Thus, one interesting question on global scale is whether the promotion of CE would benefit from an international process tailored for its purpose or whether the goals set by e.g. the SDGs are enough. For example, goal 12 on ensuring sustainable consumption and production patterns promotes sustainable management and efficient use of natural resources, halving global per capita food waste and reducing all waste flows substantially as well as rationalizing inefficient fossil-fuel subsidies. These goals stand also at the heart of the circular economy.

While global goal-setting is a highly relevant pursuit, even more important is to take action on circular economy: to start experimenting with both business cases and policy instruments, to share the best practices - and to learn from one another.

[3] Nigeria, South Africa and Rwanda launch African Circular Economy Alliance, 17 November 2017, http://www.minirena.gov.rw/index.php?id=61&tx_ttnews%5Btt_news%5D=626&cHash=ab3bcf1d3f35d26f9094ab3f9bdabbdc

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As a new paradigm for economic development, the circular economy has significant environmental, economic and social benefits at the global scale. The circular economy concept highlights the notion of replacing the 'end-of-life' in current production and consumption practices by reducing, reusing, and recycling products and materials in production, distribution and consumption processes. Promoting circularity aims to accomplish sustainable development, and the circular economy has links to many of the 17 Sustainable Development Goals (SDGs) approved by the United Nations in 2015.

This report is a background contribution asked by the Independent group of scientists writing the Global Sustainable Development Report (GSDR) 2019. The GSDR 2019 is the first in a series of comprehensive, in-depth Reports that will be produced every four years to inform the High-level Political Forum on Sustainable Development convened under the auspices of the General Assembly. Thus, this background report seeks to provide a condensed package on the circular economy; the concept, its history, potentials, business opportunities, management and measurement.

Some of the key messages entail that moving towards a circular economy presents vast opportunities for businesses of various kind, and that increasing the material circularity of economy can also be a way to alleviate poverty. Yet, the systemic and disruptive changes required for a circular economy transition will not take place without significant changes to existing regulatory structures.

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SYKE

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