

How the Circular Economy can benefit from the Digital Revolution

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In a circular economy, materials are more durable and easier to repair, reuse and recycle while waste is turned into a resource. In addition, processes from production to waste management become more resource efficient. Innovative business models enable companies to create value by selling services rather than products. Digital technologies will be pivotal in bringing about this systemic change. The European Union (EU) has to make the most of digital solutions for the benefit of a circular economy. This requires addressing the barriers to their uptake, enabling the free flow of data across borders, fostering trust in the data economy, and maximising synergies between the digital and circular economy agendas.

The benefits of digitalisation for a circular economy

The creation, extraction, processing, and sharing of data enabled by digital technologies such as sensors, connected devices and online platforms will lead to a smarter use of resources. By providing data on the state of components in real time, sensors placed on products like tires and elevators enable companies to anticipate failures and know when to maintain, replace or repair components. This enables **predictive maintenance** and extends the lifetime of a product.

Companies can also sell **products as a service** by using sensors to monitor their usage. Users pay a fee based on consumption while companies retain ownership of the product. This is a mutually beneficial partnership: companies receive a continuous revenue stream and have an incentive to keep their products longer in use, while consumers only have to pay for what they need.

Digital technologies can also encourage more **sustainable consumption patterns**. For instance, smartphone applications could be used to read the digital passport of a product, providing information about the materials and resources used for its production, along with its durability, reusability, and recyclability.

Digitalisation can contribute to lifting some of the barriers that currently prevent the **recycling and recovery of materials**. While the current lack of traceability of hazardous chemicals is an impediment to the increase of recycling rates, the web-based tool 'Chemycal'¹ uses blockchain open-source software to store and exchange information so that users can track these chemicals throughout the supply chain.

Making the most of digital solutions

To harness the full potential of these solutions, it is necessary to first address the **barriers** to their uptake. Too many companies remain unaware of their existence or their potential in terms of resource efficiency gains. Financing is also critical. Too often, businesses lack the financial resources to adopt a more circular business model. Similarly, access to data and its free flow across borders is hampered by insufficient digital infrastructure, inadequate interoperability between systems, geo-blocking and a reluctance from companies and individuals to share their data.

There is a role for the EU policy framework in promoting the use of digital technologies to achieve circular economy objectives. Stakeholders need to be able to collect, process, share and reuse data in a secure environment. In that respect, initiatives envisioned as part of the European Commission's Digital Single Market mid-term review of 10 May 2017 are relevant for the circular economy.

- The **free flow of non-personal data** across the EU could make it easier for companies to analyse and transfer data and scale up innovative – including circular – business models. In this regard, various regulations have been introduced recently: The 'Building a

¹ More information available at <https://chemycal.com/>

European data economy' Strategy outlined in January 2017, which aims to maximise the potential of digital data for the benefit of economy and society and the proposal for a regulation on the free flow of non-personal data issued on 13 September 2017; Better understanding is needed about the potential implications of regulations, aimed at building a European data economy, for the circular economy.

- **Trust** is also paramount. To engage in circular economy practices, stakeholders need to be able to collect, process and share data in a trustworthy and secure environment. As a corollary to the free flow of data, it is crucial to clarify the circumstances regarding the access and use of this data. Stakeholders along the value chain need to be aware of the conditions for liability, confidentiality, interoperability and be granted fair access and use under these conditions. In addition, provisions in the Commission's Cybersecurity Package (adopted in September 2017) that aim to make connected objects more cyber-secure and the General Data Protection Regulation entering into force in May 2018 could also benefit the circular economy. Nevertheless, more legal and technological guarantees are required to convince businesses and consumers that their data is protected from cybersecurity threats and that they can safely develop and use digital tools to reach environmental objectives.
- **Blockchain technology** should be further explored as it can help to gain more knowledge on material cycles and processes through the value chain and enable to share data in a secure environment.² Launched in February 2018, the Blockchain Observatory and Forum will examine the potential of this technology. It would do well to also look into its impact on the environment. As the Commission is planning to allocate EUR 340 million to projects that use blockchain technology by 2020, specifically targeting projects that seek to achieve circular economy objectives could have multiple other benefits as well.
- **Online platforms** enable the creation of collaborative economy models whereby consumers can share, exchange, buy and sell used or new goods as well as services. Unused products find a new life instead of being discarded, while consumers can earn or save some extra money. The Commission acknowledged the link between online platforms and the collaborative economy by connecting its 'European Agenda for the Collaborative Economy' with its Communication on 'Online Platforms and the Digital Single Market', respectively issued in June and May 2016. Both mention the need to increase consumers' trust in these platforms, including by introducing tougher consumer protection measures. Raising awareness on the environmental benefits of these solutions could also support their uptake by consumers and entrepreneurs.
- **Upgrading digital skills** calls for additional investments as highlighted in the Digital Single Market mid-term review. More efforts must be made to ensure that entrepreneurs that wish to develop circular business models can acquire the necessary digital skills.

In short, the transition towards a smarter use of resources will only make headway if Europeans make the most of digitalisation. This implies understanding the linkages and exploiting the synergies between the digital and the circular economy agendas. The EU must promote the smart use of data and digital solutions with a view to encouraging the transition towards a circular economy. If Europe does not move in this direction, opportunities to close material loops and improve processes will be missed. Fragmented initiatives could emerge, but a genuine systemic change will remain elusive.

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In the course of 2018-19, the EPC [Digital Roadmap for a Circular Economy](#) Task Force will continue to explore how digitalisation can support the transition to a circular economy. The Task Force aims to develop a roadmap for action that will boost the synergies between the circular economy and digital agendas.

Disclaimer: The views expressed in this Commentary are the sole responsibility of the author.

² Blockchain is a digitised, decentralised, public ledger used to store data. Information is available to authorised participants and traceable within the ledger. As a decentralised network with advanced cryptography, it is very difficult to take down or corrupt. This technology could contribute to increasing the transparency and traceability of supply chains by facilitating the exchange of information between stakeholders operating at different levels of the value chain (suppliers, wholesalers, retailers, recyclers...).