Two megatrends leading towards a Switzerland of the future – the interplay of circular economy and digitalisation
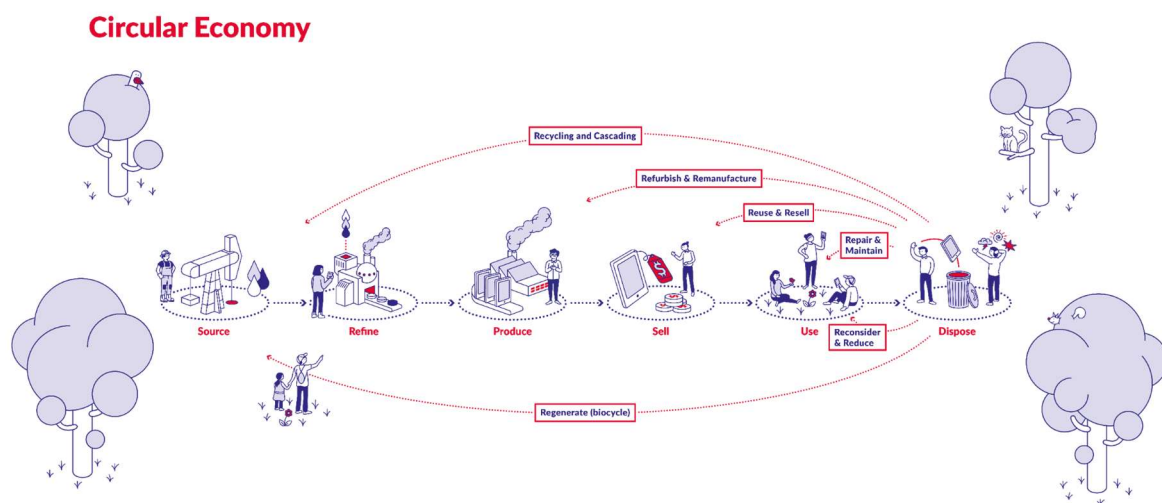
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Whitepaper in short

- Circular economy and digitalisation have the power to create a more sustainable future for the planet, humans, and the economy.
- This whitepaper explores the ways in which digital technologies can become key enablers of the circular economy, bringing important benefits to all.
- What is the status of the development of innovative solutions, supportive policies and frameworks in Switzerland, and which products are already pioneering this field today?

Chapter Overview

Circular economy (CE) and digitalisation are the two megatrends that are shaping the 21st century, influencing the way economy, society and the environment develop and interact. For a long time, these two trends have been seen as divergent or even conflicting. On the one hand, our world is becoming more and more digital. Digitalisation saturates and changes almost every aspect of our lives. And on the other side, it is becoming ever more apparent that the way we live and do business is having a negative impact on our planet. It is obvious that we cannot continue as we have so far; we need more sustainable development in all areas of life. This whitepaper explores the ways in which digital technologies could become key enablers of the circular economy, bringing important benefits to companies, consumers, and the environment. While this potential remains largely untapped, possible ways to bridge the gap between theory and practice are also discussed, particularly when it comes to developing innovative solutions, supportive policies and framework conditions.

The transition to a circular economy is both a necessity and an opportunity to create stable long-term economic, social and environmental benefits. Circular economy and digitalisation are increasingly being studied, developed and adopted by a growing number of academics, policymakers and companies. Although some stakeholders are beginning to make the connection between these two innovative approaches and explore them, they are still mainly treated as separate fields. This creates a knowledge gap between the theoretical potential of linking CE with digital technologies and the expected but largely unrealised potential in practice.

For this reason, this whitepaper aims to understand the links between these two megatrends, highlighting the challenges and opportunities that could arise from their convergence. It presents how a sector that is a priori considered as an issue can be

integrated instead as part of the solution, with digital technologies enabling CE by improving the collection, organisation and analysis of data and information, helping companies by increasing flexibility and optimising processes. The analysis is enriched by exploring such links in the current European and Swiss policy fields, presenting case studies of enterprises that are already putting into practice such connections and highlighting collaboration opportunities to engage in the further development of CE.

As two recognised organisations in the fields of circular economy and digitalisation, digitalswitzerland and sanu durabilitas decided to join forces to develop this whitepaper, answering to issues identified as central for the future of Switzerland.

1. What is Circular Economy and why does it matter?

Linear Economy

Source   Refine   Produce   Sell   Use   Dispose
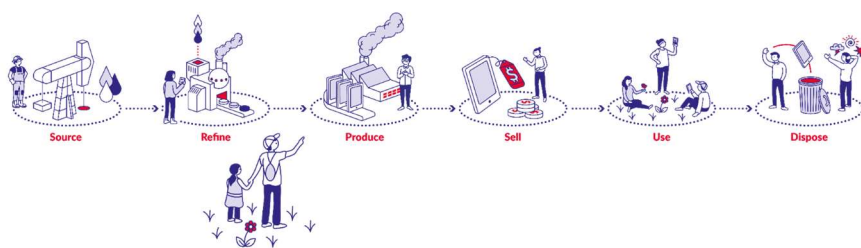
Today's conventional understanding of the economy relies on a so-called linear system, often described as "take-make-waste". This model implies an ever-increasing extraction of natural resources, demand on energy and labour and the disposal of massive amounts of waste – resulting in impacts along the entire value chain (e.g. CO_2 emissions, biodiversity losses and social impacts). It fails to recognise the high economic, environmental and social costs associated with the extraction, processing

and disposal of resources and must therefore be regarded as unsustainable in the long term.

A concept quickly gaining momentum in the research and policy fields as a solution to the issues mentioned is circular economy (CE). The core idea of a CE is to maintain the value of products, materials and resources in the economy for as long as possible and to minimise the generation of waste, pollution and emissions through eco-design and the development of new business models. Overall, CE offers a set of strategies to contribute to sustainability, in particular by helping reach the Sustainable Development Goal 12 (Sustainable consumption and production), established by the United Nations, mitigating and adapting to climate change, and protecting biodiversity. CE promotes sustainable development in all its dimensions, fostering cooperation and partnerships among a wide range of stakeholders.
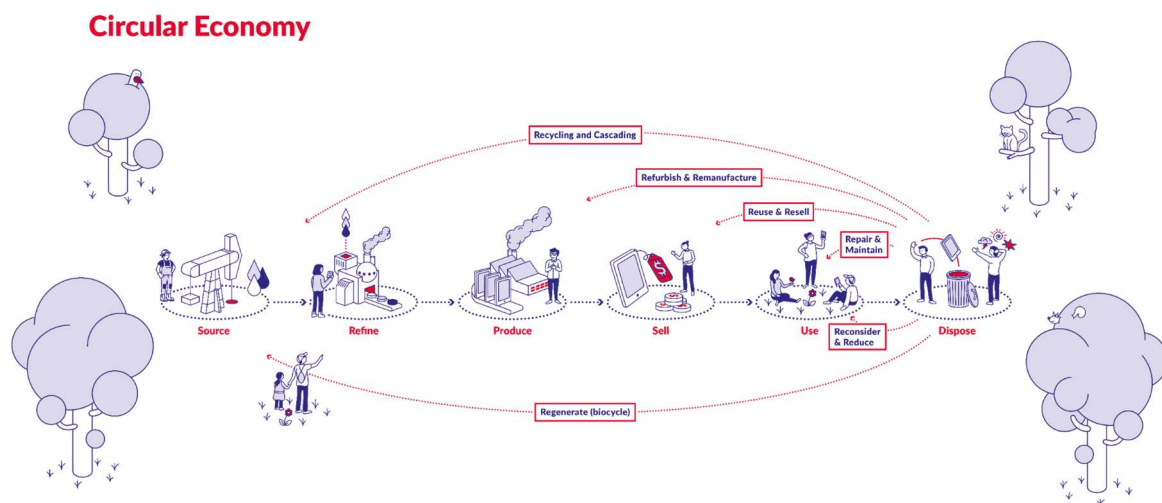
Circular Economy

2. Digitalisation as enabler of Circular Economy

The transition to a CE applied to all product categories and sectors can create real and far-reaching opportunities to build an innovative, prosperous and sustainable

economy for decades to come. Yet, this potential remains currently largely untapped. One of the main reasons for this is the lack of tools and access to information[1], which are fundamental to implementing circular business models.
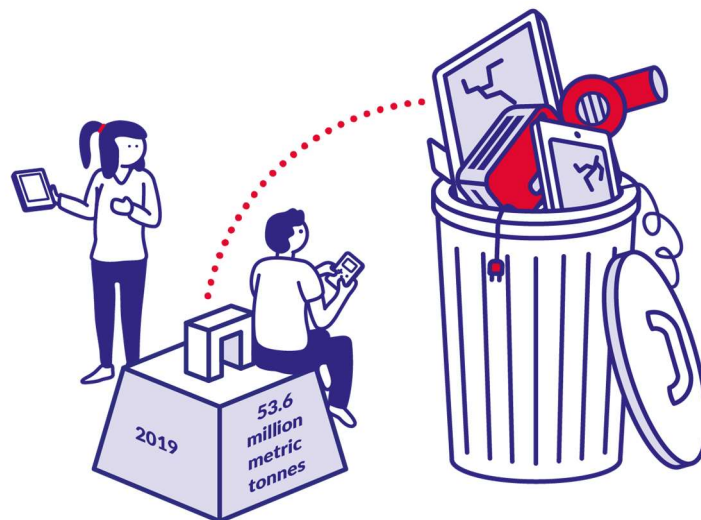

On average, the total weight of global electronic and electrical equipment consumption increases by 2.5 million metric tonnes per year – which produced 53.6 million metric tonnes of e-waste in 2019 (of which 82.6% not treated in an environmentally-sound manner) (Forti et al., 2020)

If, on the one hand, home appliances and electronic products are part of the problem, on the other hand, integrating digital technologies can be part of the solution. Indeed, information and communication technologies allow for an increased interconnection among actors at all societal levels. They can increase and improve collection and analysis of information, facilitating network creation and promoting flexibility. Digital technologies can support companies in becoming more innovative and competitive, making them resilient to new challenges. The transition of many companies towards digitalised models has been recently observed as a response to the Covid-19 crisis and is expected to help overcome other challenges in the future (such as optimising agriculture and making it more resilient to climate change[2]). With the above characteristics, digitalisation presents a strong potential to help achieve CE and thus get a step closer to sustainability goals. Opportunities come with risks that have to be

taken into account and cared for, such as data-misuse, privacy issues, cyberattacks, and others[3].

For circular business models to work, data, information and knowledge about material flows are needed. This includes information about what products are made of and in what quantities, where they come from, where they are located, what their state and quality are, etc.

On the manufacturing side, for example, transparent access to data can inform about processes throughout the value chain (e.g. resource consumption of a product, usage details, end-of-life treatment, product condition, etc.), making it possible to optimise the product lifecycle using smart solutions to reduce resource consumption, energy use, logistics routes, and waste production. Digital technologies can also help improve product design and attract target consumers. Such optimisations not only contribute to circularity and thus sustainability but can also decrease the companies' costs. On the customer side, digitalisation can simplify and automate the provision of technical support and maintenance. Moreover, digital technologies can distribute ownership and knowledge across different levels of society, promoting the development of more connected and durable relationships with customers and end users[4]. This can be done by enabling sharing models and product-service systems[5].
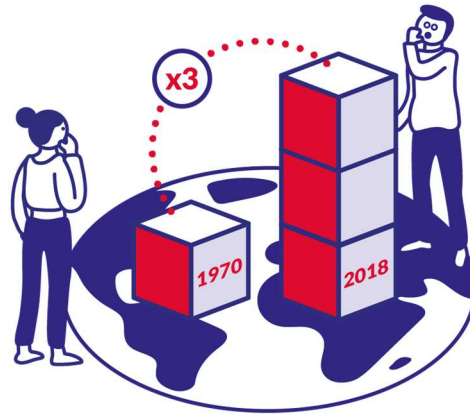
Global material consumption has more than tripled since 1970 (OECD, 2018)

Digital paths to a Circular Economy

There are different ways how digitalisation can enable CE, which require different digital technologies. "Collect" and "understand" (I & II) form the necessary starting point that makes the other paths 1. to 4. possible.

I. Collect

Because of the global reach of value chains and the variety of stakeholders involved in them, collecting data is a necessity for improving transparency and thus generating the necessary set of data for circular business models to work. Thus, digital technologies such as sensors, chips, QR codes and barcodes are essential for tracking and tracing of materials and products along the value chain, and providing data about the time, location and quality of the scanned item.

II. Understand

Once all the raw data is collected, digital technologies are needed to integrate and make sense of it. Innovative systems such as big data, cloud, fog and edge computing allow the data to be aggregated and contextualised to prepare it for further analysis. Once the data is processed into information, data analytics technologies can give it

meaning by transforming it into knowledge upon which decisions can be made. To do so, techniques such as artificial intelligence, machine learning, and deep learning combine the data with insights and foresights.

1. Connect
CE involves a variety of stakeholders and products along the entire value chain. For this reason, digital technologies play a central role in building networks by connecting data, devices and partners.

Indeed, technologies such as distributed ledger technologies (such as blockchain) can register transactions between different stakeholders along the value chain, making knowledge highly available and transparent.

Digital materials / products passports can connect and present all collected data about the origin, durability, composition, reuse, repair, dismantling possibilities, and end-of-life handling of a material or product. The digital product passport gives each item a unique ID so that it can be identified and information about its properties is readily available.

Also, thanks to the Internet of Things, devices can be connected within and to users: Internet connection allows devices to share real-time data, coordinate and optimise their functioning (e.g. the coffee machine turns on when the alarm goes off) and allows users to monitor and control the appliances remotely. Through online platforms, digitalisation simplifies the connection between different and distant partners, and enables relationship building and knowledge sharing with stakeholders on the other side of the world.

2. Create
Innovative technologies allow transforming production into a more participative process. Online platforms make it possible for consumers to help shape the product they purchase, making it more closely tailored to their needs. They can also facilitate access to local products and stakeholders in the production process by connecting consumers with local producers. Moreover, technologies such as 3D printing distribute manufacturing by bringing consumers closer to the origin of their products.

3. Optimise
By collecting and understanding data along the entire value chain, artificial intelligence and machine learning can be integrated into electrical and electronic

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devices to automate part of their function and optimise processes. Applications for this include automated manufacturing processes, sensors and machine learning to optimise the use phase (e.g. matching energy and detergent to the amount of laundry in a washing machine), or robots for optimal waste separation. Digital technologies that optimise the use phase of products make it possible to extend the life of products, a central strategy of CE.

4. Virtualise

Moving activities from the material world to the virtual world can allow dematerialisation of the economy and, ideally, decreasing resource demand. This can also be seen in a larger sense through sharing models and product-service-systems, where digital technologies can simplify the transition from products to services (examples are car sharing, which is made possible thanks to online applications and digital sensors, or the virtualisation of rooms, which removes the necessity to use physical rooms by allowing instead to organise full events and conferences online).

Today, global human-made mass (such as buildings, plastics, etc.) exceeds all living biomass ([Elhacham et al., 2020](#))

3. Challenges hindering digital technology-aided CE

Besides opportunities that digitalisation can provide to CE, there are also some challenges that make the implementation of digital technologies more complex and decrease their sustainability potential.

Technological challenges

Coupled with the complex and innovative character of circular business models, a missing interoperability between different technologies, a lack of infrastructure and a general risk aversion make it less likely for stakeholders to experiment in the fields of CE and digitalisation. Moreover, many actors are reluctant to embrace digitalisation for fear of security and privacy issues[6].

Policy challenges

A general challenge of both digitalisation and CE are their ambiguous definitions[7] and the existing gap between theoretical knowledge and their actual implementation[8].

Besides, the definitions and the norms that accompany these two innovative approaches are often shaped by private stakeholders. This can create conflicts or inconsistencies with public norms and legal framing coming from governments. Developing a coherent framework with consistent definitions within a process that involves a wide variety of actors is therefore important to benefit from all the opportunities that digital technologies can create for a circular economy.
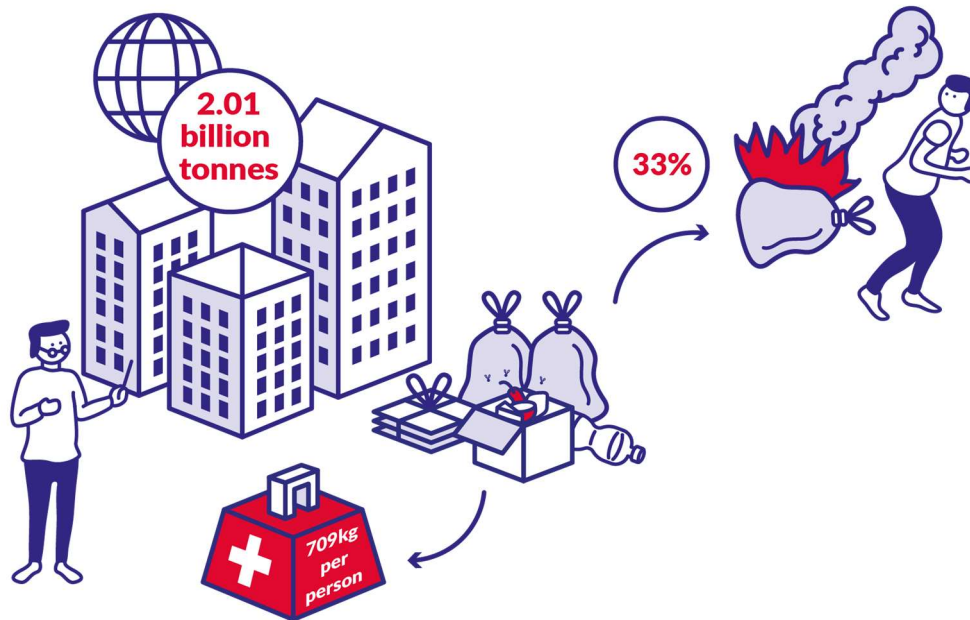
Globally, 2.01 billion tonnes of municipal solid waste are produced annually, with at least 33 percent of that not managed in an environmentally safe manner (Kaza et al., 2018). Switzerland, with 709 kg of municipal waste generated per person in 2019, was Europe's fourth biggest waste producer (Eurostat, 2021).

Sustainability challenges

Another critical challenge of digitalisation is that, depending on how it is implemented, it can bring adverse effects on sustainability and therefore counteract circular economy goals.

Indeed, digitalisation is sometimes used by producers to increase consumption through planned obsolescence. Moreover, the rise of digitalisation can lead to increased demand for electronic devices, increasing in turn resource consumption and waste production. Energy demand is also expected to increase. Depending on the energy mix used, this could cause negative impacts on the environment.

One of the main issues of digital products is their need for rare minerals (and in particular of scarce rare earths) and the complexity of treating them at the end-of-life.

Even though digital devices are mainly consumed in industrialised countries, the mining of primary resources and the treatment of e-waste are often delocalised

to developing countries, where they have significant social and environmental impacts[9].

Another risk associated with digitalisation are rebound effects: as already mentioned, the optimisation of processes could decrease final costs, which in turn could motivate more consumption, negating the benefits enabled by digital technologies[10].
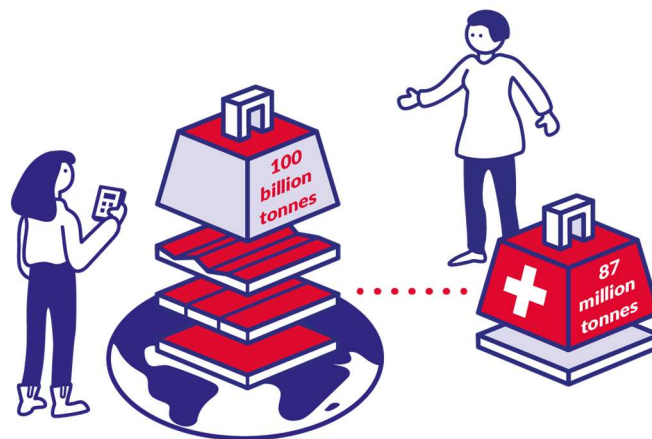

100 billion tonnes of materials enter the global economy every year ([Circle Economy, 2021](#)), of which 87 million tonnes enter the Swiss economy ([Empa, 2021](#))

4. The need for guidelines and clear frameworks

Digitalisation can have a positive or negative impact on the development of sustainable CE depending on how it is implemented. **Specific measures and**

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framework conditions are therefore necessary when making CE and digital technologies converge.

One fundamental element, however not the only one, for a coherent and sustainable development of digitalisation and CE is the **establishment of clear legal frameworks and guidelines**. They are important for the standardisation of products or parts, as well as for providing reliable definitions and metrics in view of the future developments of these concepts. Institutions at different levels of governance (e.g. supranational or national) can define rules and targets to ensure that the market develops in a way that is beneficial for society, the economy and the environment[11].
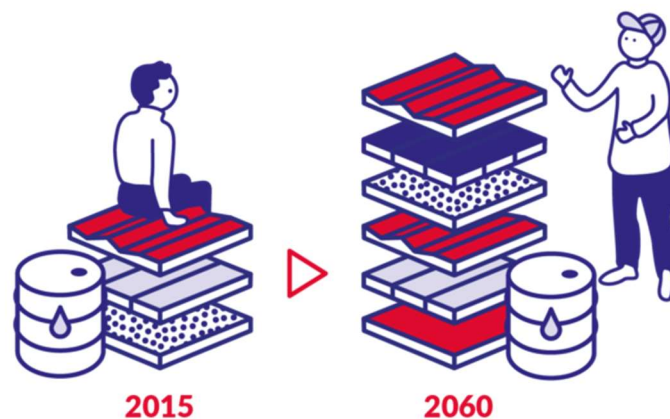
Under current trends, it is expected that global material extraction would double by 2060 compared to 2015 (OECD, 2018)

Developments in the European Union

From a conceptual perspective, digitalisation must be seen **as a means to an end of a circular economy** and not as an end in itself: innovation has to be done to solve existing concrete issues and not for the simple sake of it. This applies in the same way to a circular economy, which must be seen as a means to achieving sustainability. Doing so can help set the right path to integrate the two principles from the outset and to develop innovative business models in the right way. In order to be sure to

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have an effect from the implementation of digitalisation and circular economy, it is important to implement a thorough assessment of the potential to minimise environmental impacts along the entire value chain. This can be done, for example, by systematically applying impact assessment methods (such as Life Cycle Assessment, carbon footprint, or greenhouse gas protocol) to estimate possible adverse effects[12].

In the past, policies concerning CE and digital technologies mainly targeted the issues linked to hardware (i.e. the physical parts of electronic devices) – tackling for example eco-design, planned obsolescence, and repair possibilities. However, policies are now evolving to also include digitalisation as an opportunity, promoting its innovation and its role as enabler of CE.

The European Union represents a good example of such policy progress: over the last years several directives and strategies combining CE with digitalisation have been developed.
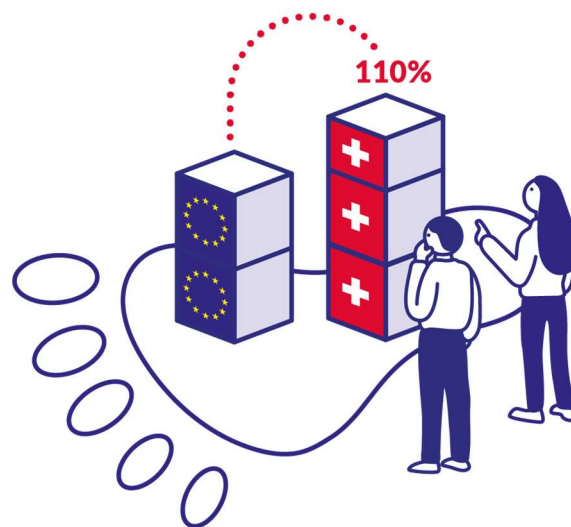

Switzerland's material footprint was equivalent to 110% of the European average between 2000 and 2012 (EEA, 2015)

Indeed, how to make Europe greener and more digital were recognised by the European Commission as the two critical challenges of our times – deciding to target

them as [the main priorities between 2019 and 2024](). This was done through two leading initiatives: the [European Green Deal]() and the [Digital Strategy]().

The Green Deal contains a variety of points highlighting the central role of digital technologies in supporting a green transition, while at the same time pointing out the need to avoid adverse effects from digitalisation.
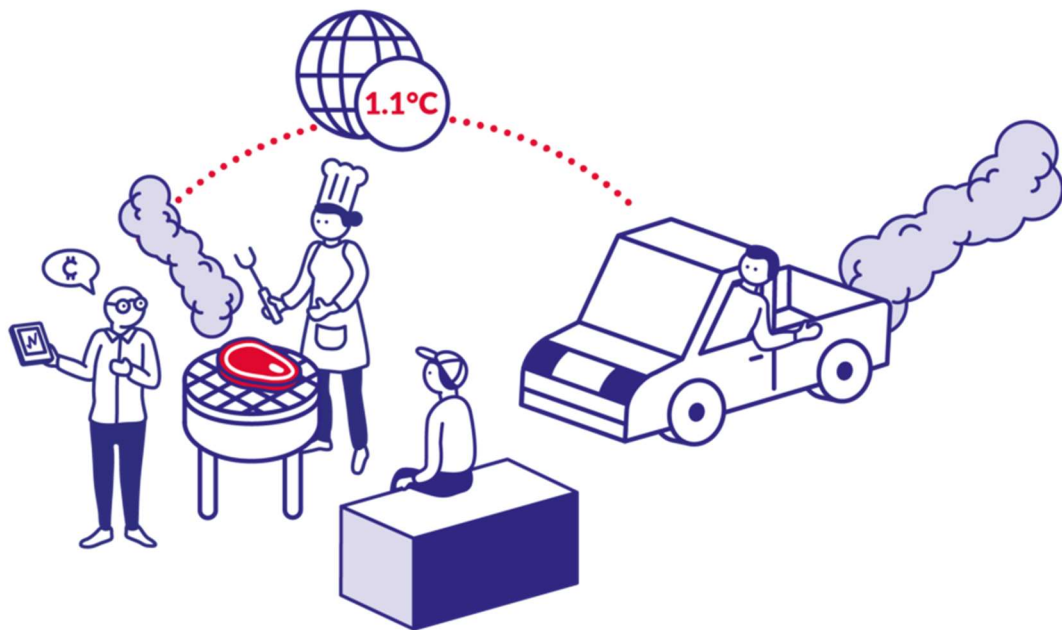
Until 2020, human activities caused 1.1-degrees of global warming ([IPCC, 2018]())
Under the European Green Deal, a number of resolutions targeting [European SMEs](), [consumers]() and [future CE developments]() were adopted between 2020 and 2021. These texts propose several actions tackling CE and digitalisation, such as:

- **Preventing the production of e-waste**: e.g. through the introduction of a common charger for electronic devices.
- Improving **collection and treatment** of electrical waste and electronic equipment.
- **Prolonging products' lifetime**: implement the right to repair, improve access to spare parts and upgradability, act against built-in obsolescence.
- **Improving consumers' information**: enhance traceability and collection of information about products' quality (conditions of production, durability, dismantling possibilities, etc.) through digital product passports, clearly showcase information to consumers (e.g. via harmonised labelling system),

develop a common European data space for smart circular applications, raise awareness on the environmental footprint of unnecessary data.
- **Decreasing hazardous substances** in electrical and electronic equipment.

The Digital Strategy complements and overlaps with the Green Deal by setting rules that ensure a safe development of digital technologies while respecting the climate-neutrality objectives. It also provides financial support to make digital technologies accessible to European businesses and citizens[13].

The actions proposed by the leading initiatives are expected to develop into legislation with binding power. Indeed, the Commission is looking into the possibility to amend existing directives (e.g. the Ecodesign and Energy Labelling Directives, the existing consumer protection legislations, etc.) or propose new stand-alone legislation. Such propositions should be presented in the following months[14].

Despite binding regulations that have yet to be defined, it is obvious that the European Union is taking important steps forward in setting the ground for a sustainable and digital future economy, targeting all the different facets of these innovative models.

Why is this relevant for Switzerland?
In 2018, 60% of the goods consumed in Switzerland came from Europe, making it one of the most important trading partners. To maintain a competitive advantage, Swiss companies have a strong interest in adapting to the European policy progress[15]. Swiss stakeholders also have an interest in following policy developments in the European Union, as it is easier for them to be inspired and emulate such developments at the Swiss level, as the way is already paved, rather than having to "reinvent the wheel".

Developments in Switzerland
In recent years, Switzerland has made **important progress in the field of CE**. In fact, since 2017, there have been many **parliamentary interventions** targeting this topic. In line with these developments, the Parliament is now developing an initiative for the development of CE in Switzerland, with the goal of including the efficient use of

resources and an improved end-of-life treatment of waste in the Environmental Protection Act.

In 2019, there were also several interventions on the topic of **extending the life cycle of products**, calling for clearer information on the expected life and repairability of products, prolonging warranties, improving access to spare parts, and tackling programmed obsolescence. The Federal Council will answer these demands by presenting a draft act, subject to developments of the European law.

Like the European Union, Switzerland also has a digital strategy[16]. Yet, despite the demands in recent parliamentary interventions, the latest 2020 strategy does not address **the link between CE and digitalisation, CE is not even mentioned**.

Recently, an interpellation directly linking circular economy and digitalisation was deposed by Adèle Thorens Goumaz – representative at the Swiss Council of States (Greens), demanding for clarity on how Switzerland is going to move forward concerning material and product passports.

Clearly, Switzerland is **lagging behind** compared to the developments in the European Union when it comes to developing a clear framework for a sustainable and circular digitalisation. Future developments in Switzerland should get **inspired by the many policies at European level**. It is hoped that the next digital strategy will finally consider the convergence of CE and digitalisation.
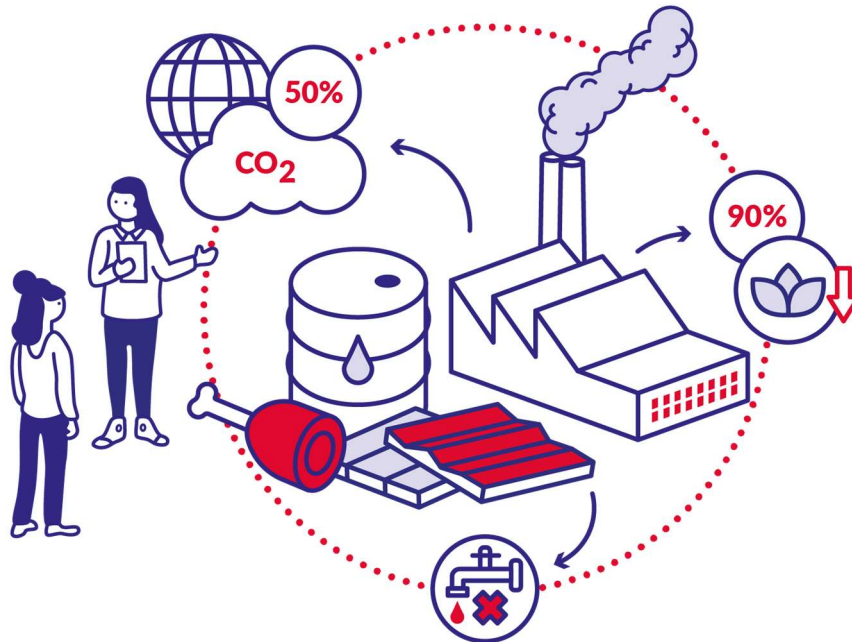
The extraction and processing of resources into materials, fuels, and food represent half of global greenhouse gas emissions production, and is responsible for more than 90% of biodiversity loss and water scarcity (IRP, 2019)

5. Pioneering circular business models

There are many compelling reasons for companies to integrate the principle of the circular economy into their business models. Currently, this market model is still lived with restraint, but there are exciting initiatives already underway in Switzerland that are certainly worth mentioning.

Swisscom's Buyback Business

The use of electronic devices is part of our everyday life. Naturally, e-waste is constantly increasing[17]. With its Buyback Business, Swisscom is giving mobile phones and tablets a second life and combating the rising number of electronic waste. To do this, Swisscom has partnered with Recommerce Solutions Switzerland. Together they offer a circular solution for all commercially registered companies in Switzerland, including non-Swisscom customers via their commercial platform. An online platform facilitates the exchange of information between customers and service providers. Any owner of an old mobile device can simply share information about its condition with Swisscom, which can then develop an offer.

Not only fully functional devices are considered, but also damaged ones, as these still hold value. Thanks to certified software, all data is deleted entirely and securely once devices are sent to the Recommerce Solutions Switzerland processing center. There the devices undergo a thorough check-up to define the remaining value resulting in offers to the selling parties.

The organisation selling old devices has the choice of either receiving the agreed payment or donating the amount to SOS Children's Villages. In other words, Swiss Companies can benefit monetarily themselves or use it to help others while contributing to a more circular Switzerland.

Eon & Microsoft: digital product passport for fashion
Eon's Internet of Things (IoT) platform is another great example of a circular business model. Aiming for exactly the opposite of "take, make, waste," Eon is leveraging digitalisation to redefine the business of fashion.

The circular business model of Eon's IoT satisfies the needs of today's digitally-oriented customers for an entire industry. The New York-based tech startup aims to tag each piece of clothing with a digital ID. This digital twin is generated by Eon's IoT platform. Thanks to the clothing's ID, they become connected products, and brands or retailers can build relationships with their customers that last a very long time, because the data gives them new insights into customer demand. The connected products platform is also built to provide additional services such as rental, resale, peer-to-peer exchange, and recycling, to name a few.

But how does all this data become accessible? When Eon creates a product on their platform, each piece of clothing receives a digital birth certificate and product

passport. This gives clothes a label – similar to the tag we already know, which gives us information on how to wash an item – with an embedded tag, such as a QR Code. This code makes it possible to track the lifecycle of, say, a pair of jeans or a jacket. The collected information is stored and summarised in a product dashboard on Eon's IoT platform. A digital ID, and with it, this platform, allows fashion industry players to track and retrieve clothing so that it is not "lost" after the sale. Eon believes that being able to track and monetise the lifecycle and current value of a piece of clothing can lead to less environmental and economic waste. Microsoft plays an important role in this, with Microsoft Cognitive Services enabling the collection, sorting, and storage of every record. Eon's circular approach to the fashion industry can be a leading example for other industries as well.

Madaster Platform: a central register for building materials

Madaster's mission is to reduce waste in the construction sector by giving building materials an identity.

They believe that with an identity, the material cannot go to waste. That's why they created a central register – a digital library – of materials: The Madaster Platform. Aiming for a circular economy, Madaster supports all real estate and construction stakeholders in their transition.

Among other innovative organisations, Raiffeisen Schweiz, SBB, Swiss Prime Site AG, and Swiss Re AG are on board and will contribute significantly to the development of the Madaster Platform in Switzerland.

"Raiffeisen is committed to sustainability. We finance a large part of mortgages in Switzerland and in this context supported the establishment of Madaster in Switzerland and its mission to strengthen circular economy thinking in the resource-intensive construction sector. It is key for sustainable development to keep resources in production cycles to the maximum extent possible."
Dr. Christian Hofer, Head Corporate Responsibility & Sustainability Raiffeisen Switzerland

The platform is designed to store, manage and share material data such as quality, origin and location, as well as their circular and financial value. Based on this, Madaster can create material passports containing information on all parts of a building. The insights gained help evaluate the reuse potential of real estate. The Madaster platform is a service provided to various stakeholders in the real estate and construction industry; from designers and architects to construction and demolition

companies, private real estate owners and governments. The platform creates value in five areas:

1. Design: When designing a building, the platform can help architects and designers to consult their clients in choosing circular materials.
2. Construction: Construction companies can consult the platform to search for used material which they can buy in the right quantity at a fair price.
3. Use: Instead of depreciating the value of a building to 0 or even below, it can be depreciated positively, representing the reuse value of all the materials in that building. Thanks to Madaster, the material flow during the building's use is fully tracked – data that supports multiple uses of those same materials.
4. Dismantle and Sales: Madaster also supports deconstruction companies. By helping with inventory when a building is demolished, it supports the resale of materials.
5. Reuse: Providing detailed material information, Madaster supports business models that follow a reuse philosophy. The central register fosters and simplifies the use of digital marketplaces. Thanks to detailed information long before the material becomes available again, supply and demand can be matched.

With all this information, Madaster believes in making the recycling and reusing of material simpler. Building scraps should no longer go to waste, but can be reused. With the introduction of their material passport, they are using digitalisation to enable a circular economy in the construction and real estate industry.

On Running introduces rentable running shoe

Subscriptions to streaming or mobile services are widely popular. Even grocery boxes are delivered to our doorsteps, and with this, the list of possible subscriptions is not conclusive. On Running offers a circular system that is not so different from other subscriptions. With their new [Cyclon](#) running shoes, they introduced a zero-waste product that no one but On will ever own. The circular and fully-vegan shoes are only available by subscription. Users pay a monthly fee and once the shoes reach the end of their current life cycle, the subscriber can request a new pair and return the current pair of shoes for recycling. The shoes are roughly designed to last six to nine months, so subscribers can exchange their Cyclon twice a year.

On Running is breaking new ground with the material used, as they are replacing synthetic plastic with bio-based plastic, which is derived from the beans of a castor

bean plant. One of the material's benefits is that its resource regenerates naturally. Also, unlike other agriculture resources, the castor plant grows extremely well in a meager landscape. This is beneficial because growing castor beans does not reduce the amount of land needed for farming. On top of that, all parts of the Cyclon are made from the same material family, which makes recycling easy. In one piece, the shoes can be returned to their raw material, from where they are given a new life in the form of a new pair of Cyclon running shoes.

With this circular approach, On Running leads the way towards becoming a more sustainable retailer and setting an example for other industry players. At the same time, On encourages consumers to throw away less and rent instead.

6. Call for Collaboration: the ecosystem approach

Engaging in innovative multi-stakeholder ecosystem approaches can help create synergies and address the challenges of CE and digitalisation to achieve a more sustainable future. To do so and avoid undesirable negative impacts, cooperation among actors is needed to further develop innovative business models and favorable policy frameworks that drive sustainable development.

Collaborative Innovation with Leap
The Leap platform – a digitalswitzerland programme – aims to bring together diverse stakeholders from the Swiss ecosystem who share sustainable challenges and exchange ideas on possible solutions. The joint goal is to develop concrete innovations that contribute to solving the challenges addressed.

This year, as part of a workshop series, Leap addressed sustainability challenges and innovation potentials with a special focus on Circular Economy and Decarbonisation. Such workshops support the exchange of perspectives and knowledge on sustainability and digitalisation, creating an open forum for stakeholders.

The implementation-oriented approach of Leap enables new ways of collaboration on sustainability through innovation and project management support, communication and the digitalswitzerland network. Participating stakeholders drafted ideas on how smart digital technologies such as the Internet of Things can contribute to the transition towards a circular economy in Switzerland. Here you can find these initial project ideas that have been co-created.

Do you want to participate in our workshops to co-create more ideas on how to leverage digitalisation to create sustainable business models? Join us here for the upcoming workshops on tourism, food & retail systems aiming at delivering forward looking solutions!

Leap is currently working on the WISER flagship proposal for Innosuisse, which focuses on streamlined sharing of knowledge on decarbonisation efforts with the co-creation of digital services. Against the backdrop of the Paris Climate Agreement, we are taking a closer look at the ambitious net zero goals that Swiss organisations have set for themselves.

"With the WISER flagship, we intend to address and solve two transversal challenges that need to be considered on the way to a net zero Switzerland: simplifying the analysis and exchange of data on GHG emissions from various stakeholders to then enable more efficient, informed & automated actions to tackle climate change."
Didier Beloin-St-Pierre, Scientific Lead from Empa

The initiative counts private companies, cities and research institutes as partners who will jointly design use-cases to implement the proposed solutions.

These are just a few examples of multi-stakeholder innovation projects yet about to start. If you are interested in getting involved or want to address the challenges of the digital age, do not hesitate to contact Leap. Whether to learn more about the platform, or discuss a pressing challenge in your industry, there are many opportunities worth considering. Find a starting point and the network you need to get started. Find all the information you need here.

Knowledge transfer with sanu durabilitas
Circular economy and digitalisation are topics that are constantly evolving and consequently reveal over time innovative and complex new angles in which they can be analysed and understood by different actors. In this context, sanu durabilitas

organises *roundtables* as part of the Circular Economy Switzerland Movement, designed to start the conversation on complex topics. The idea of these events is to bring together a variety of practitioners who are not normally involved in the CE domain and who usually do not collaborate with each other.

Gathering a number of key players around a table to discuss pioneering CE topics allows them to move away from the "silo mentality" and stimulate the development of new collaborations. Such discussion can provide the impetus to innovative ideas that can then result in political engagement and business initiatives.

Roundtables are held with a group of selected actors involved in the field under discussion to develop meaningful conclusions. These conclusions are collected and summarised in take-home messages to deepen the discussion and also begin the conversation with a broader audience.

Another project applying a collaborative approach is the Circular Innovation Ecosystem Sessions. This project, organised by sanu durabilitas thanks to the support of Innosuisse, aims to close the existing knowledge gaps between science and business in the domain of CE and to foster the transition from theory to implementation.

The first Circular Innovation Ecosystem Session addresses the complex topic of methods for measuring and evaluating a circular economy. The event wants to face this challenge by merging theory and practice. **More information on the event and on the subscription can be found** here**.**

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Notes

1 Kristoffersen, E., Blomsma, F., Mikalef, P., & Li, J. (2020). The smart circular economy: A digital-enabled circular strategies framework for manufacturing companies. *Journal of Business Research*, *120*, 241-261. https://doi.org/10.1016/j.jbusres.2020.07.044

2 Healthy agriculture regards food production as a biological cycle of natural resources. Circular economy strategies help make our food and agricultural sectors more resilient and sustainable. For more details see: https://circular-economy-switzerland.ch/arguments/?lang=fr

3 Seele, P., & Lock, I. (2017). The game-changing potential of digitalization for sustainability: possibilities, perils, and pathways. *Sustainability Science*, *12*(2), 183-185. https://doi.org/10.1007/s11625-017-0426-4

4 Antikainen, M., Uusitalo, T., & Kivikytö-Reponen, P. (2018). Digitalisation as an enabler of circular economy. *Procedia CIRP*, *73*, 45-49. https://doi.org/10.1016/j.procir.2018.04.027

5 The key idea behind product-service systems is that consumers are provided with the utility of the products, instead of the product itself. By using a service to meet consumers' needs rather than a physical object, more needs can be met with lower material and energy requirements. (For more details see: https://docplayer.net/331811-The-role-of-product-service-systems-in-a-sustainable-society.html)

6 Antikainen, et al., 2018.

7 Kristoffersen, et al., 2020.

8 Pagoropoulos, A., Pigosso, D. C., & McAloone, T. C. (2017). The emergent role of digital technologies in the Circular Economy: A review. *Procedia CIRP*, *64*, 19-24. https://doi.org/10.1016/j.procir.2017.02.047

9 Pohl, J., & Finkbeiner, M. (2017). Digitalisation for sustainability? Challenges in environmental assessment of digital services. INFORMATIK 2017. https://dx.doi.org/10.18420/in2017_199

10 Itten, R., Hischier, R., Andrae, A. S., Bieser, J. C., Cabernard, L., Falke, A., ... & Preist, C. (2020). Digital transformation—life cycle assessment of digital services, multifunctional devices and cloud computing. *The International Journal of Life Cycle Assessment*, 1-6. https://doi.org/10.1007/s11367-020-01801-0

11 Osburg, T., & Lohrmann, C. (2017). *Sustainability in a digital world*. Springer International. https://link.springer.com/content/pdf/10.1007/978-3-319-54603-2.pdf

12 Konietzko, J., Bocken, N., & Hultink, E. J. (2020). A Tool to analyze, ideate and develop circular innovation ecosystems. *Sustainability*, *12*(1), 417. https://doi.org/10.3390/su12010417

13 For more information on the intended measures and fields of action: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age_en

14 The whole process has been delayed because of Covid-19.

15 PwC and WWF (2021). *Circularity as the new normal – White paper. Future fitting Swiss businesses*. Zürich: PwC, WWF. Available at: https://www.wwf.ch/sites/default/files/doc-2021-01/Circularity-as-the-new-normal_whitepaper-EN.pdf

16 Swiss digital strategies have been published every two years since 1998. They contain action plans and specific measures to tackle the development of digitalisation in different sectors, such as education, infrastructure, security, political participation, economy and environment. The focus of the environmental measures has been mainly on energy and mobility.

17 https://www.bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/electrical-and-electronic-equipment.html