THIRD YEAR
report project

circular

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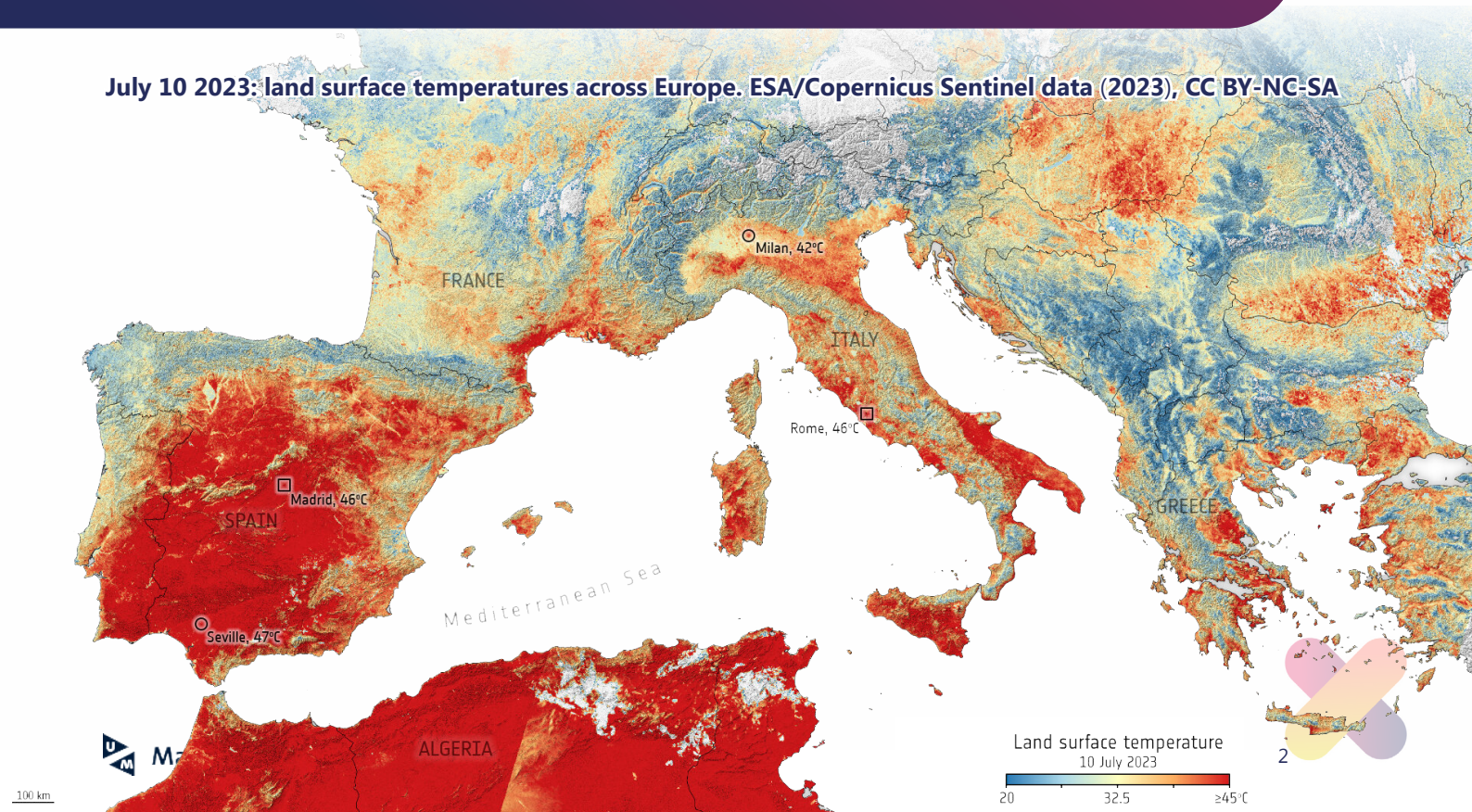
CONTEXT OF PROJECT CIRCULAR X

Last summer has been one of extremes across the globe: land and sea water temperature rises, wildfires, loss of artic ice... The below is just one of the pictures that shows the impacts of a changing climate. We need to fight climate change, amongst others with ***more circularity!***

Read below for updates on how team Circular X aimed to contribute during the last project year. Circular X continued work on the 'challenging' strategies in the circular economy: sufficiency and regeneration. We also continued working on tools and methods, and scaling up circular businesses.

The 3rd year Circular X report is structured as follows:

What's new?
What did we learn?
The New Business Models Conference 2023
Who's new?
About Circular X
New Circular X studies referred to in this report



July 10 2023: land surface temperatures across Europe. ESA/Copernicus Sentinel data (2023), CC BY-NC-SA

WHAT'S NEW?

The Circular X team expanded in terms of new team members and topics. Below, some highlights on new topics can be found.

CIRCULARITY FOR RENEWABLES

To meet our climate targets and tackle the climate crisis, renewable energy is a prerequisite. Both solar and wind energy are anticipated to grow exponentially, but innovations are also driving replacements.

The PhD research of Julia Smid is tackling circularity in the wind turbine industry, through a collaborative research project with TU Delft called Lichen Blades.

The PhD research of Roger Nyffenegger investigates circular economy options for the solar industry, in particular to slow the loop, by focusing on reuse options. This work builds on a former joint EU project called **CIRCUSOL**.

CIRCULARITY IN CITIES

Marco van Hees is investigating how consumer products like furniture can be reused or upcycled rather than being disposed of in a city context, through cases and experiments with stakeholders. As an increasing amount of people lives in cities, it is important to also understand how to make the city-context 'circular'. This research is happening through collaborative work on the Urban Upcycling project, which is funded by RAAK Pro and involves a consortium of Dutch cities, large and small furniture manufacturers, retailers and designers, regional waste management companies, educational institutions and non-profits.

Hannah Lou King (see '**Who's new?**') also started her PhD on 1 September 2023 to investigate the combination of circular strategies and decarbonization in the built environment. Her work will be conducted as part of EU project DRASTIC led by VITO in Belgium with multiple partners from the building sector.

Together with Catherine de Wolf and Sultan Çetin, Nancy Bocken will also publish a book on **the Circular Digital Built Environment**, that will be out later in 2023. This book gives inspiration to key decision-makers on how to bridge circular with digital innovations to help transform the sector and cities. Watch this space!

CIRCULARITY AND SOCIAL IMPACT

The social impact of the circular economy is often overlooked, but highly important as a circular economy requires a reorganization of ways of working to put the R-strategies (reuse, remanufacture, recycle, etc.) into practice.

Led by PhD researcher Melanie Valencia, based at KU Leuven, and co-supervised by Nancy Bocken, a new study on the potential **social contribution of the circular economy** was published. The study created a framework to enhance the integration of social impact in the circular economy framework.

A new PhD project by Wim Van Opstal (based at VITO) on the social economy for a circular transition will start in September (see '**Who's new**?').

REGENERATIVE BUSINESS

To study regenerative business, Jan Konietzko, Ankita Das and Nancy Bocken conducted a literature and practice review and focus groups with sustainability experts and indigenous groups. The research paper can be found **here**.

Ankita Das continued her work on a regenerative business database, following the successfully launched **sufficiency in business database.**

Kirsi Salonen started a joint PhD project mid-August 2023, between LUT Finland and Maastricht University to investigate regenerative business models further (see '**Who's new?**').

WHAT DID WE LEARN?

1. THE TRANSITION TO A REGENERATIVE BUSINESS

Based on the recent collaborative **study on regenerative business**, Jan Konietzko reflected on the several shifts that will be necessary for business to become regenerative. These are the important steps towards a regenerative business:

1. From shareholder to stakeholder profits: rather than just generating shareholder value, regenerative business models allow for value capture across natural, social and cultural capital. Patagonia is leading the way when it announced changes to its legal structure and that "nature is now our only shareholder".

2. From false to true prices: current prices do not reflect their true cost. To incentivize the emergence of regenerative business models, products and services should reflect their true price and internalize costs and benefits that are currently externalized. This would make some products more expensive, like meat or cars, but also make other products cheaper, like apples.

3. From human to planetary health: regenerative business models take a broad perspective on health and recognize that the health of people is closely linked to the health of nature. Products and services are designed so that they improve the health of people and the planet.

4. From footprint to handprint assessments: rather than just measuring the negative impacts of business, like the environmental footprint, which accounts for all the impacts of products and services along their life cycle, regenerative business models also put an eye on their handprint: the positive changes that their products and services create. The handprint is the difference between the footprint of an offered product or service and the footprint of a product, service or behaviour that the former substitutes or replaces.

5. From human to nature rights: while a lot of businesses struggle to respect human rights in their supply chain and have a lot to do to guarantee respecting human rights, regenerative business models take a more holistic view on rights and seek ways of doing business that acknowledge and respect human and animal rights.

2. SCALING UP IMPACT

Through **this study** led by Deanna Han (**Han et al., 2023b**), the aim was to understand what scaling means for circular businesses and how they can achieve impact. We looked into 19 circular start-ups (who become scale-ups!) across eight sectors, operating in 10+ countries, to uncover distinct pathways to scaling up circularity. To achieve scale, these start-ups adopt a two-pronged approach: they use both commercial and impact scaling activities. We discovered that circular start-ups prioritize creating system-level change in addition to generating revenue.
Two lessons learned are:

1. Successful circular start-ups are actively involved in developing new policies and cultivating sustainable consumption behaviors.

2. Revenue alone cannot reflect the true impact or 'success' or 'scale' of circular businesses. We need to develop new qualitative and quantitative indicators to measure diverse ways of impact.

Deanna also presented at the New Business Model Conference that took place in June 2023 in Maastricht, the Netherlands:
Han, D., Dijk, M., & Bocken, N. M. P. (2023a). Circular business internationalization: a literature and practice review. New Business Models Conference Proceedings 2023. Maastricht University Press.

This study investigated the scaling up and internationalization process of circular business models with a focus on the choice of locations and evolutionary pathways of networks. Through their practice research on circular businesses, three observations can be made:

1. The rate of internationalization depends on the chosen circular business model. For example, digital platform enabled circular business models *(e.g. Too Good To Go)* expand much faster than those that rely on brick-and-mortar stores *(e.g. Nudie Jeans repair shops)*

2. Internationalization requires a "glocal" strategy that combines both adaptation to local specificities as well as global integration

3. A strong network is necessary to create and capture value internationally for sustainable and environmental impact

You can contact Deanna at **d.han@maastrichtuniversity.nl** in case you want to find out more or collaborate.

3. AVOIDING REBOUND EFFECTS

Ankita Das presented the following study at the 5th Product Lifetimes and the Environment (PLATE) Conference in Finland:
Das, A., Bocken, N., Konietzko, J. (2023). A qualitative framework for mapping rebound effects of different circular business model archetypes. 5th Product Lifetimes and the Environment (PLATE) Conference, 31 May - 2 June, Espoo, Finland.

This work followed **her earlier study** that showed that companies, although they intend well, rarely measure the impact of circular business model innovations. At the very least, in the circular business model design phase, unintended consequences should therefore be avoided. The goal of the study was to create a categorisation of rebound effects, or, unintended consequences that can undermine the planned environmental impact reduction of different circular business model archetypes. Through a systematic literature review of 33 empirical articles on circular economy rebounds, the authors categorized them into a framework (**Table 1**) that could help practitioners be better informed while making decisions about the circular strategies they wish to pursue while in the business model experimentation phase. The future goal is to build on this research and create a business model ideation tool that includes rebound prevention strategies.

Table 1. Framework of rebound effects (full details and sources in Das et al., 2023).

Circular Business Model Archetypes	Potential Rebound Effects
Dematerialised or Sufficiency *(E.g., Demand reduction services, Encourage sufficiency)*	• Risk of increased exports to other markets with less environmental awareness to make up for reduced consumption. • Re-spending (of time, money and energy) by consumers in other areas due to economic savings
Collaborative Consumption *(E.g., Sharing economy, Co-access)*	• Increased logistics (and subsequently related energy and financial costs) required to maintain sharing services. • Increased cleaning costs in terms of heat, water, energy, etc. • In the case of car sharing, modal shift away from previously environmentally friendly activities such as biking, public transport, and walking. • Increase in consumption due to improved accessibility of products.
Product-Service Systems *(E.g., , Rental, Hire, Leasing, Pay-per-use)*	• Increased logistics (and subsequently related energy and financial costs) required to maintain sharing services. • Increased cleaning costs in terms of heat, water, energy, etc.

Circular Business Model Archetypes	Potential Rebound Effects
Long Life *(E.g., Products with life extension services, Reduce, Repair, Modular design, Refill, Upgrading)*	• Increased energy and raw material use in product life extension services. • In the case of modularity, could encourage replacement leading to higher rate of upgrade than conventional products. Also, a more complex design can mean the product does not work as intended. • If product is replaced earlier rather than repaired, then the value is lost • Potential for overproduction of components to keep in pace with demand
Next Life *(E.g., Direct reuse, Next life sales, Refurbish, Remanufacture, Incentivised return & reuse, Recycling)*	• High energy use in manufacturing. • Risk of imperfect substitution of primary materials with secondary materials. • Increased CO2 emissions if recycling rate is slow and inefficient. • Remanufacturing may prolong the life of outdated technologies that are more polluting (for e.g., old car engines or refrigerators).
Circular Sourcing *(E.g., Source circular supplies, Industrial Symbiosis, Renewable energy, Using bio-materials)*	• Re-spending (of time, money and energy) by consumers in other areas due to economic savings. • Adopting new technologies may lead to increased waste and shorter product life times. • New innovations cannibalizing existing environmentally friendly alternatives. • Reduced consumption may lead to increased exports to markets with less environmental awareness.

You can contact Ankita at **a.das@maastrichtuniversity.nl** in case you want to find out more or collaborate.

4. THE PRACTICES OF URBAN UPCYCLING

Marco van Hees presented the following study at the New Business Models Conference in 2023:

Van Hees, M., Oskam I., Bocken, N. (2023) Business models of collaborative urban upcycling initiatives: Understanding how strategic partnerships accelerate upcycling of discarded furniture and interior design products. New Business Models Conference 2023.

Urban upcycling is a new plan or action aimed at re-using or converting discarded products, components or materials into something of higher value, functionality and/or quality in their second life in partnership with the city's stakeholders (citizens, community, business and knowledge stakeholders). Based on interviews and research archives of 12 collaborative Urban Upcycling initiatives, we examined partnerships that occur in circular economy business models (CEBM) for upcycling of municipal bulky waste streams and the contribution of these partnerships to the development of CEBMs for urban upcycling:

1. We found that various types of partnerships occur in urban upcycling: partnerships with public stakeholders, which involve four stakeholder types (public, private, non-profit and educational) and a wide variety of bottom-up private partnerships.

2. Collaborative business models in urban upcycling generate social and environmental impact by a surprising variety and combination of services and financial revenue models, such as fees for project- or consultancy services, training and education, leasing-, rental-, or licence fees for using upcycled products or technology, subscription-based platform access or offering take-back and repair services that generate additional revenue and customer retention.

You can contact Marco at **Marco.VanHees@maastrichtuniversity.nl** in case you want to find out more or want to make suggestions for Urban Upcycling examples.

5. CIRCULAR ECONOMY FOR THE WIND TURBINE SECTOR

Julia Smid presented the following work at the New Business Models Conference:
Smid, J. G., Bluntz, C., & Bocken, N. M. P. (2023). Circular Strategies for the Wind Turbine Industry: An Analysis of Supply Chain Configurations. New Business Models Conference Proceedings 2023. Maastricht University Press.

The study assessed which circular strategies companies within the wind turbine industry have already implemented and which circular strategies they plan to implement in the future. Based on literature, an initial circular strategy framework for the wind turbine industry was developed. Next, interviews were conducted with representatives from companies across the entire supply chain, including raw material suppliers, component and wind turbine manufacturers, energy companies, companies responsible for logistics and companies involved in the next life cycle of a wind turbine. Through these interviews, it became evident which circular strategies play a role in different places within the industry's supply chain:

1. So far, the strategies that occur the most do not only result in the creation of environmental value, but also economic value. For example, strategies such as reducing the usage of energy and resources and the reuse/ refurbishment of components, are circular strategies with clear economic benefits and occur quite often.

2. Overall, circularity in the wind industry is still emerging and not yet a strategic element of how companies typically do business.

You can contact Julia at Julia.Smid@maastrichtuniversity.nl in case you want to find out more or want to participate in one of her future studies.

6. CIRCULAR ECONOMY FOR THE SOLAR PV SECTOR

As a result of the recent upheavals in the photovoltaic industry, considerable research has been put into the analysis of the role of solar (and circular) photovoltaic business models acting as catalysts for these upheavals. We contributed to this by analyzing the value proposition, creation, delivery, and capture of product-service-system-related solar business models. Roger Nyffenegger's PhD research:

- describes how product-service-system-related photovoltaic business models are created, deliver, and capture value,
- presents six decision criteria that are central during the decision process for the "right" photovoltaic business model: cost structure, investment needs, revenue opportunities, degree of flexibility, competence distribution and life cycle assessment.

This **conference paper (Nyffenegger et al., 2023b)** presents first results, while the overall study on this topic is being finalized.

A second paper (Nyffeneger et al., 2023a) studied the reuse business models and the policies relevant for the European PV industry, in view of the predicted increase in photovoltaic waste and Europe's dependence on imports of photovoltaic modules. We identified four main business models:

1. Opportunity-driven diversifiers: recycling companies who expand their business activities into reuse to generate new sources of revenue;

2. Socially-driven orchestrator: small, often non-profit organizations who organize the procurement of old modules, their refurbishment in social institutions, and new installation on roofs of non-profit or public organizations;

3. Turnover-oriented trader: companies who buy large quantities of old photovoltaic modules and ship them to non-European countries without testing the modules functionality;

4. State-approved collector: organization who is dedicated to ensure a nationwide take-back system and practices reuse besides recycling activities.

Two policies are relevant for reuse or "circular" solar, but do not (yet) enforce reuse:
1. the Ecodesign regulation and **2.** the Directive on Waste from Electrical and Electronic Equipment.

Generally, the reuse of photovoltaic modules is rather a niche activity to date and policies currently do not contain the necessary measures to encourage the emergence and expansion of reuse. The conference paper (Nyffenegger et al., 2023a) is available **here (p.731-737).**

You can contact Roger at **roger.nyffenegger@bfh.ch** in case you want to find out more or want to participate in one of his future studies.

7. NEW INSIGHT IN SUFFICIENCY

In Niessen et al. (2023b) on **sufficiency as trend or tradition**, we wanted to learn from established companies who currently promote sufficiency. Have they always advocated sufficiency or have they changed recently? We looked at long-standing businesses that promote durable products: Levi's, Miele and Denby Pottery. We reviewed historical advertisements and current communication and found they had different pathways to sufficiency. Even if durability was a long-time value, it might only have resurfaced recently when sustainability became popular. In addition, some messaging is contradictory, promoting sufficiency while offering discounts. Three learnings are that:

1. Sufficiency values are not new and can be revived from past generations;

2. One way to promote sufficiency is through products and services for long-time use;

3. Businesses need to send consistent messages to be credible.

In another 2023 study, Niessen et al. (2023b) on the **Impact of business sufficiency strategies on consumer practices**, we analyzed if the effort of one business to promote sufficient (sustainable) consumption practices can impact their customers. We studied bicycle subscription service Swapfiets and found that a subscription can promote a modal shift towards cycling. Our key learnings were:

- **42%** of researched customers cycled longer distances, and **52%** more often with the subscription than before;
- Most cycling trips replaced public transport, walking or car journeys;
- The modal shift to cycling did not always persist after ending the subscription, with a relocation to less cycling-friendly cities being a main reason to move to other modes of transport.
- In terms of making the vehicles last long, respondents disagreed whether they treat the subscription vehicle better or worse than one they might own.

Laura also presented at the 5th Product Lifetimes and the Environment (PLATE) Conference in Finland:
Niessen, L. & Bocken, N. (2023). Transforming Sustainable Business as Usual – A tool encouraging businesses to go further. 5th Product Lifetimes and the Environment (PLATE) Conference, 31 May - 2 June, Espoo, Finland.

This study was about the need to transform human activity to return into the limits of the planet. For business, this means moving beyond the status quo and fully integrating environmental and social concerns. Business (model) tools can drive such innovation. Therefore, we developed The Road Ahead, a business tool in the form of a board game that encourages advanced sustainability actions. Based on a hierarchy of Sustainable Business Models, the game takes players from business action on efficiency, over net zero, circularity and sufficiency, towards regeneration and flourishing. The board game provides information at the same time as questioning assumptions. The game tool is being tested and adjusted with various participants.

You can contact Laura at **L.Niessen@maastrichtuniversity.nl** in case you want to find out more or collaborate.

NEW BUSINESS MODELS CONFERENCE 2023

Team Circular X co-organized the 2023 International Conference on New Business Models (NBM 2023), chaired by Dr Abel Gonzalez, Prof Juliette Koning, and Prof Nancy Bocken, at Maastricht University. The conference brought together a multidisciplinary community of scholars and industry leaders who are exploring innovative ways of developing the next generation of business models to tackle environmental and societal challenges. The conference served as a platform for exchanging knowledge, ideas, and experiences, with topics spotlighted by Circular X such as experimentation – in a session hosted by Ilka Weissbrod, Sveinung Jørgensen, Lars Pedersen and Nancy Bocken - regeneration and sufficiency. Circular X team members presented on tools to support sustainable business model innovation, rebound effects, scaling up, circular solar PV, urban upcycling, and regeneration. The full conference proceedings are available **here.**

WHO'S NEW?

Kirsi Salonen

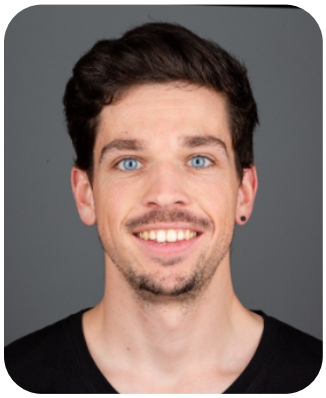
Kirsi Salonen joined the team as a PhD student in collaboration with LUT, Finland in August 2023. Her thesis will examine regenerative strategies and business models and contribute to the current research field of sustainable business strategies, business models, and ecosystems. She will be studying how companies can develop strategies that allow the regeneration of environmental and social systems. In addition to the key characteristics of regenerative business strategies/business models her research will look at the institutional drivers and barriers for regenerative business as well as building regenerative supply chains. The research will focus on linkages between regenerative business and human rights, and the role of stakeholders/rightsholders in regenerative business models or ecosystems that support/enable them. Her PhD will be supervised by Paavo Ritala (LUT) and Nancy Bocken.

Hannah Lou Kings

Hannah Lou Kings has started her PhD on circular business models and ecosystems in the built environment in September 2023. She will be part of the DRASTIC EU Horizon project and co-supervised by Nancy Bocken and Veronique Vasseur. Previously, Hannah Lou completed the M.Sc. in Sustainability Science, Policy and Society at Maastricht University where she investigated the impact of alternative building practices to reduce embodied and operational energy, as well as waste repurposing, bio-based materials and circular construction. In her Master's research, Hannah Lou looked at the socio-economic impact of an alternatively built environment, and at barriers or benefits to choosing alternative instead of conventional building practices. For project DRASTIC, she will work on mapping the complete ecosystem for innovation solutions to help decarbonize and improve the circularity of the construction industry, develop and test circular business model and ecosystems solutions, and investigate social acceptance of new sustainable and circular models.

Wim Van Opstal joined the team as an external PhD student in September 2023. He is a researcher on circular business models at the Flemish Institute for Technological Research (VITO). His thesis will examine organizational capabilities for a circular transition. He will study the institutional comparative advantages of different organizational forms (such as associations, cooperatives, and social enterprises) to implement and embed circular economy strategies. Apart from a theoretical contribution, his PhD research encompasses empirical work on circular business models in solar photovoltaics, the informal circular economy, and collaborations between circular startups and work integration social enterprises.

Wim Van Opstal



Roger Nyffenegger

Roger Nyffenegger joined the Circular X team in 2022 to do a PhD on Circular Business Models in the solar industry. Roger Nyffenegger is an external PhD student at the Maastricht Sustainability Institute, researching at the University of Applied Science in Bern, Switzerland. Before his PhD, Roger was part of the EU-Horizon 2020 project **CIRCUSOL** ("circular business models for the solar power industry"), where he developed a database facilitating circular activities in the European solar industry. Currently, Roger is involved in a project called **Swiss PV Circle**, experimenting with reuse business models in the Swiss solar industry. Previously, Roger completed his Bachelor's degree in Business Administration at the University of St. Gallen, Switzerland, with an exchange at the Singapore Management University. He then worked in an industrial company and a bank before graduating from a double degree Master in Business Innovation and CEMS International Management at the University of St. Gallen and the École des hautes études commerciales Paris. After his studies, Roger worked in the circular economy start-up Grover in Berlin as a business development and sales manager, building up the B2B business.

Marco van Hees

Marco van Hees has joined the Circular X team in 2022 as a PhD researcher on upcycling strategies and circular business models. He studies upcycling strategies and circular business model development in the furniture and interior design industry, funded through the "Urban Upcycling" RAAK-PRO research project. Marco has been working in academia for many years, as a lecturer in Business Engineering at the Amsterdam University of Applied Sciences, teaching students and developing educational projects related to the circular economy, such as sustainable business development, quality management and sustainable international entrepreneurship. He also has been working as a business model researcher with involvement in various projects at the AUAS Centre of Expertise City Net Zero, such as: closing urban resource cycles through decentralised treatment of organic waste (ReOrganise 2015-2017); incentives and measures for electric vehicles in cities (U-Smile 2017-2018); and developing business model strategies for reusing end-of-life products, components and materials in new products (Repurpose Driven Design & Manufacturing 2019-2021). In his spare time, he runs a beekeeping academy in the Amsterdam metropole region and works as a volunteer for the Dutch NGO www.pum.nl supporting SME-sustainable entrepreneurship in emerging countries.

Julia Smid

Julia Smid has joined the Circular X team as a PhD researcher in 2022. Previously, she did a Bachelor on Business Administration at Groningen University, with an exchange at the National Tsing Hua University in Hsinchu, Taiwan. On top of her bachelor's degree, she completed an extracurricular propaedeutic exam in Dutch law. Afterwards, she completed a master's in International Business and Management and worked as a teaching assistant for four years. Next to her Master studies, she interned in business development and export for the African market at Royal Smilde in Heerenveen. This internship formed the basis for her thesis on creating shared value through collaboration with local actors in emerging markets (applied to companies that use solar energy). Julia works as a PhD in Circular Business Models and Value Chains as part of the LICHEN Blade project, which is a collaboration between TU Delft and Maastricht University. The project aims to innovate wind turbine blades in such a way that their life-time is extended and it is technically and economically feasible to reuse the blade material.

Research visitors Alexa Boeckel and Zuzana Prochazkova

Alexa visited us from Leuphana University in Lüneburg and researches sustainable entrepreneurship in the circular economy, with a focus on the transformative potential of circular startups. A collaborative paper was presented at the **Academy of Management Conference 2023, titled: The Power of Words: Formation of Partnerships through Circular Startups.**

Zuzana joined us from the International University of Catalonia with a focus on studying how product service system business model could positively influence the market uptake of more complex digitally controllable systems, such as mobile solar shading. She presented her collaborative work with Circular X **on Identifying potential drivers to implement circular business models in the sun shading industry** at the New Business Models Conference 2023.

ABOUT

Circular X focuses on circular service business models: business models that allow companies to slow, close, and narrow resource loops and regenerate the natural environment, supported by services such as maintenance and repair, refurbishment, remanufacturing, and recycling. Products can be sold directly to the customer with high levels of service or warrantees to allow for product longevity, but they may also be offered 'as a service' through rental, lease, subscription, or pay-per-use models. Think for instance about clothing rental or car sharing. Product based companies have started to experiment with these service models, to increase the resource efficiency of their offerings, make their offerings future proof, build closer customer relationships, and to generate recurring revenue. However, circular service business models are far from mainstream, and research focused on experimentation – the process of change towards new service business models – is little understood.

Project **Circular X** is a 5-year project running from mid-2020 till 2025 at Maastricht Sustainability Institute, funded by the **European Research Council [ERC]**. It has four key objectives:

1. *Advancing understanding of CSBMs; their emergence and impacts*
2. *Advancing knowledge on CSBM experimentation*
3. *Developing CSBM experimentation tools*
4. *Designing and deploying CSBM experimentation labs*

This report summarizes the outcomes of the second year into the project. It details the project timeline and progress, coverage in the media, launched tools for companies, publications and collaborations with businesses to connect research to real world experiences of driving circularity.

CONTACT DETAILS

Are you a business and are you interested in the Circular X research agenda and do you fit the Circular X core sectors (food, mobility, energy-using appliances, housing/ construction)? Do you want to serve as a Circular X case study? Are you a researcher with a clear research idea related to Circular X? Do you have any other queries related to the Circular X project? Please contact us at: **info@circularx.eu**

The Circular X team is based at Maastricht Sustainability Institute (MSI), School of Business and Economics, Maastricht University, Tapijn 11-D, P.O. Box 616, 6200 MD Maastricht, The Netherlands. The project lead Prof Dr Nancy Bocken can be contacted at: **Nancy.Bocken@maastrichtuniversity.nl**

This project has received funding from the European Union's Horizon 2020's European Research Council (ERC) funding scheme under grant agreement No 850159

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Das, A., Bocken, N., Konietzko, J. (2023). A qualitative framework for mapping rebound effects of different circular business model archetypes. 5th Product Lifetimes and the Environment (PLATE) Conference, 31 May - 2 June, Espoo, Finland.

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Han, D., Konietzko, J., Dijk, M., & Bocken, N. (2023b). How do circular start-ups achieve scale?. Sustainable Production and Consumption. https://doi.org/10.1016/j.spc.2023.06.007

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