



# Zirkuläre Dienstleistungsökosysteme – Wie digitale Plattformen den Übergang zur Circular Economy unterstützen können

**Julia Fehrer**

**November 11<sup>th</sup> 2023**

[No Title]

# WHERE WE HAVE COME FROM...



<https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>

# ...AND WHAT NOW?

[No Title]



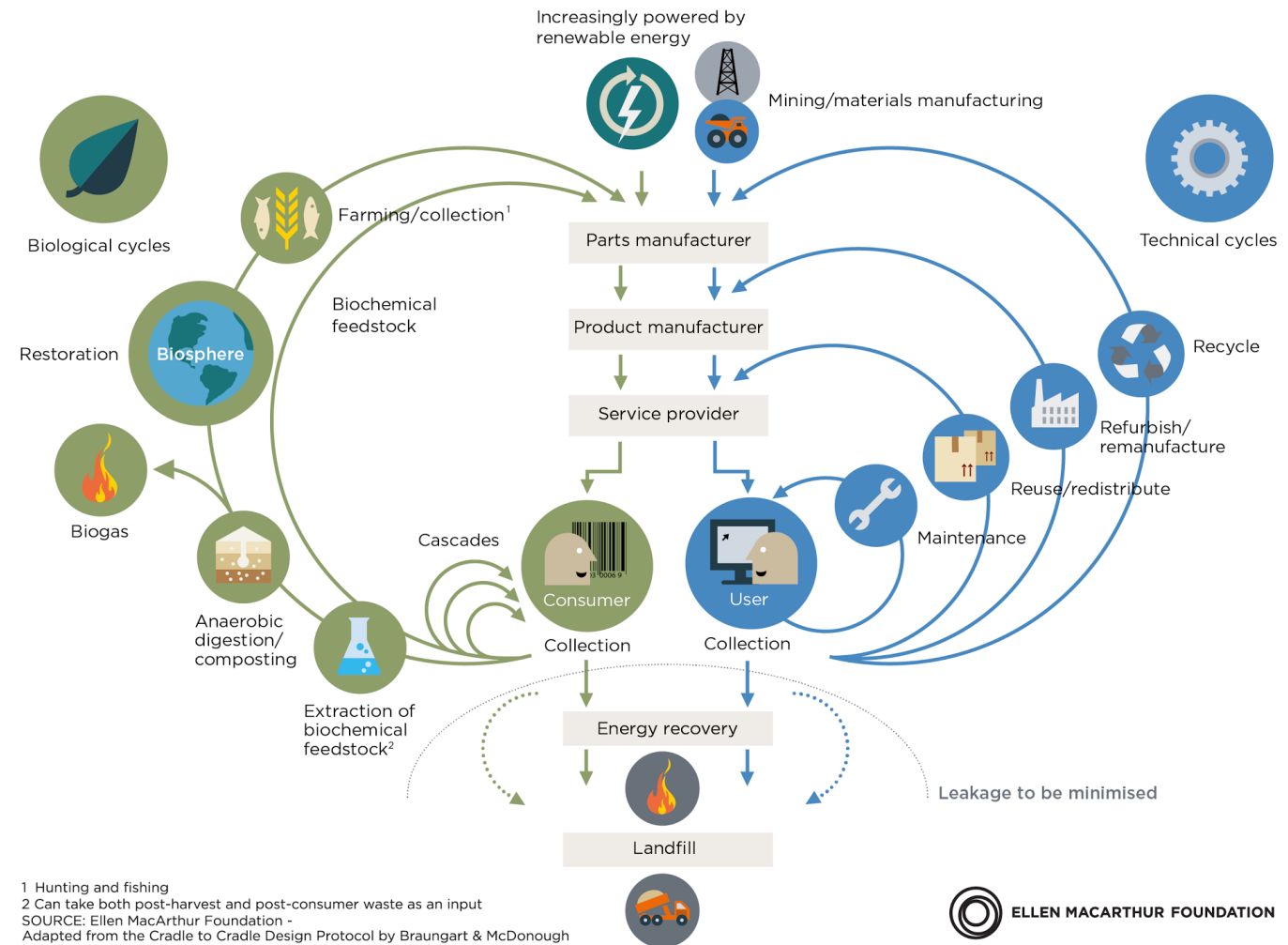
<https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>

# Circular Economy

- Geschlossenes Kreislaufsystem ohne Abfall, durch:
  - Wiederverwendung und -verwertung
  - Reparatur
  - Recycling
  - Minimalkonsum
  - Zugang zur Funktionalität

→ **SERVICE**

CIRCULAR ECONOMY - an industrial system that is restorative by design




1 Hunting and fishing

2 Can take both post-harvest and post-consumer waste as an input

SOURCE: Ellen MacArthur Foundation -

Adapted from the Cradle to Cradle Design Protocol by Braungart & McDonough

# DAT MAKES SENSE



Obwohl die Aussichten vielversprechend sind, drängende Nachhaltigkeitsprobleme bestehen, politische Unterstützung in vielen Ländern vorhanden ist und jahrzehntelange Debatten in der professionellen und akademischen Literatur geführt wurden, sind **nur 8.6% aller Geschäftsmodelle zirkulär.**

*(Fehrer & Wieland, 2021).*

# DAT MAKES SENSE

***Aber warum?***

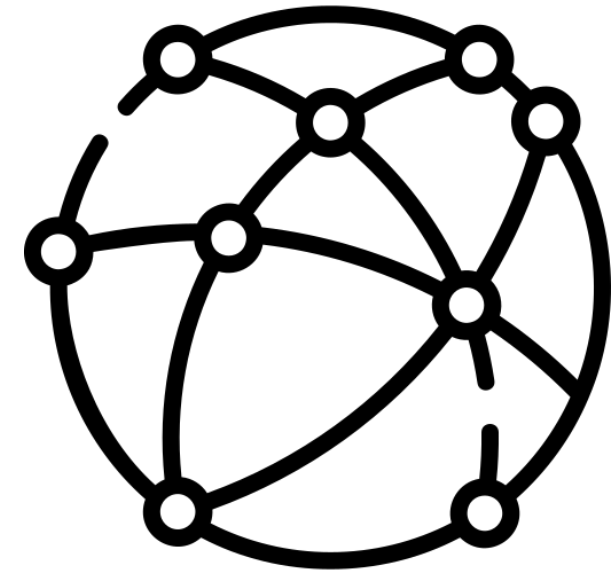
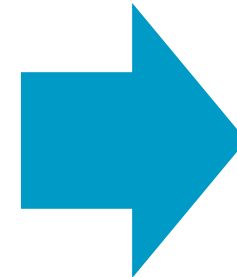
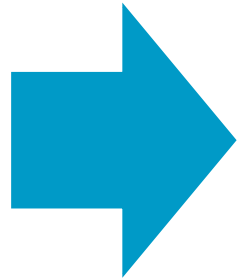
**PROBLEM**



***... weil es kompliziert ist***

**PROBLEM**

*wicked*



- Linear
- Unternehmenszentriert

- Circular
- **Aber immer noch** unternehmenszentriert

- Circular
- **Und ökosystemisch**


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Journal of Service Research

[Impact Factor](#)

 Open access |   | Research article | First published online July 12, 2023

## Shaping Circular Service Ecosystems

[Julia A. Fehrer](#)  , [Joya A. Kemper](#) , and [Jonathan J. Baker](#) [View all authors and affiliations](#)

[OnlineFirst](#) | <https://doi.org/10.1177/10946705231188670>

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# Neuseelands Kunststoffindustrie

*“New Zealand is one of the highest generators of waste per person in the world. On average, every year each New Zealander sends approximately 750 kg waste to landfill, and much of this could be recycled, re-processed or reused”*

*“We need to catch up with those countries showing the way, and then move forward”*

*Environment Minister David Parker (October 2021)*

- Plastikimporte **~575,000 tonnes/a** (\$2250M),
- Mülldeponie **~ 380,000 tonnes/a**
- Davon Recyclingsammelstelle **34%** (~195,000 tonnes/a)
- Davon recycled ~25%**

**ENGINEERING**



**Johan Verbeek**



**Simon Bickerton**

**MARKET**



**Julia Fehrer**

**DESIGN**



**Deb Polson**



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HĪKINA WHAKATUTUKI

**MBIE FUNDED PROGRAMME (2023-2027):**

**Shaping a Circular Market System for Plastics in New Zealand**



LINEAR  
MARKET FOR  
PLASTICS



ENVISIONING  
CIRCULAR MARKET  
FOR PLASTICS

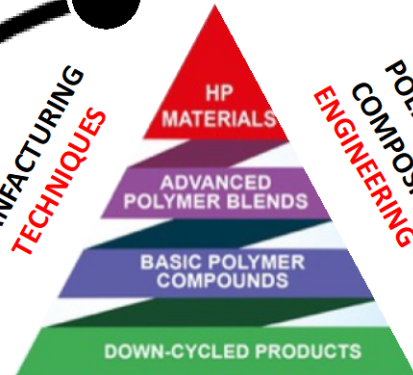


CO-DEVELOPING  
DIGITAL  
INFRASTRUCTURE  
AND TOOLS

ENGAGING IN AND SHAPING  
CIRCULAR MARKET



MANUFACTURING  
TECHNIQUES



INNOVATIVE  
CIRCULAR DESIGN

POLYMER &  
COMPOSITE  
ENGINEERING

Market facing research RAs 1.3 and 1.4

Technology research RAs 1.1 and 1.2

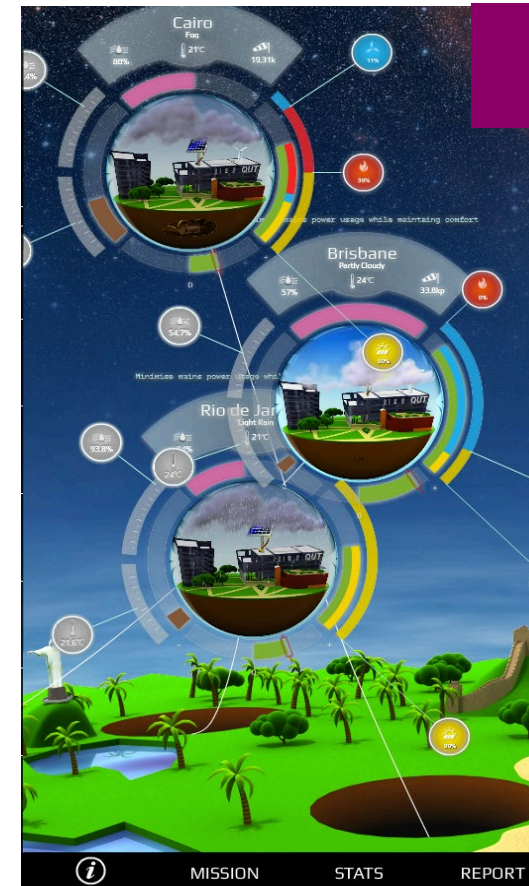
## Gestaltung eines Zirkuläre Dienstleistungsökosystems mit der Kunststoffindustrie



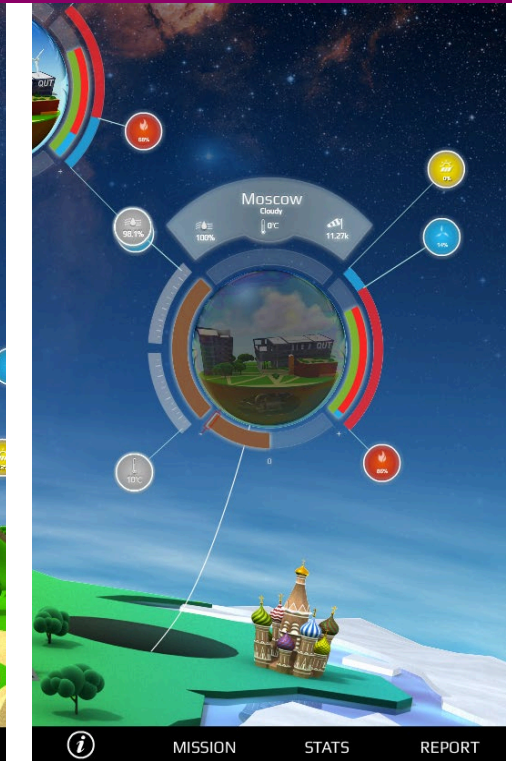
- A. Ingenieurtechnische Herausforderung: Neue Marktchancen durch neuartige Technologien, die recycelte Kunststoffe zu Hochleistungspolymeren umformen.
- B. Service-Design-Herausforderung: Neue digitale Infrastruktur (Digital Twin) und digitale Plattform, um in einer Kreislaufwirtschaft teilzunehmen.

The ECOS project draws on the practice of Eco-Visualisation, a term used to encapsulate the important merging of environmental data visualization with the philosophy of sustainability.

1. Multi-sourced **live** data, expert-driven system logic, and authenticated processing formulas
2. Contextual User Interface for experimentation
3. Machine Learning for ongoing upgrades
4. Multi-platform custom exports/applications (public screens, personalised apps, gov reports etc) for adoption and policy influence



# DIGITAL TWIN



Group 1 & 2 (Inner layers)

Create a Stakeholder Map

1. Discuss Business Definition, Exchange and Supply Chain Network of the stakeholders in New Zealand's plastic industry
2. Write discussion points down on post-its

Group 3 & 4 (Outer layers)

Create a Stakeholder Map

1. Discuss Rules of the Game, Representations and Supply Chain Network of the New Zealand's plastic industry
2. Write discussion points down on post-its





**Fehlen einer wirtschaftlich rentablen landesweiten Infrastruktur zur Kunststoffherstellung und -recycling.**

**Unattraktive Marktbedingungen:  
kleiner Markt, schwierige Skalierbarkeit, Einfacher Zugang zu billigem Plastik**

*“Where it doesn't help, though, is that transition to a circular economy for plastics. Packaging is what's going into curbside. Packaging, quite frankly, even though I know it gets us all headaches, is actually the easy part of this. It's the products, it's the medical devices that we're using, It's the automobiles, it's our buildings. It's everything else other than packaging. Where there is actually our biggest next challenge in terms of circular economy for plastics” (Plastic Industry Association)*

Fehlende langfristige Vision,  
mangelnde staatliche  
Intervention und  
Politikgestaltung zur Förderung  
der Nachhaltigkeit

Fehlende  
Qualitätsstandards  
für den Import von  
Kunststoffen

Ausländische  
Vorschriften  
beeinflussen den Export  
von neuseeländischen  
Produkten und  
Materialien.

*RGB 1 “[...] so we talked a bit about products that are coming into New Zealand that are made from recycled plastics already been recycled once from overseas, somebody else's waste coming to New Zealand and then it's going into our landfill? So, if there's not a great deal of scrutiny*



Trotz starker industrieller Netzwerke besteht die Sorge, dass die Zusammenarbeit fragmentiert ist und die Kommunikation inkonsistent ist.

*“We shouldn't be competing in the space that we are competing in. We are actually wasting a lot of our energy. We are not utilising our brains in a way that gets us all there. So we're not moving everyone along because of all the different ways we work.”  
(Consultant)*

*“I think it's all about exchanging knowledge. But it is not as easy for different businesses when being competitive. It limits what you're sharing in the market. That also comes into play. So it's not such an easy collaboration.” (Manufacturer 1)*

*“[...] One interesting conundrum is one of us posted on good collaboration in New Zealand associations, businesses and government. And then, right next to it was too much lobbying by businesses. That's quite interesting because that speaks to the complexity of things. While they're working well but will immediately be seen as part of that pushing government in that direction.” (Research Institute)*

**Die Kunststoffindustrie Neuseelands verfügt derzeit nicht über eine umfassende Dateninfrastruktur und vollen Zugang zu Daten bezüglich:**

- Kunststoffprodukte und -verpackungen, die nach Neuseeland eingeführt werden
- Informationen über Kunststoffabfälle und welche/wie viel davon auf Deponien landet
- Rohstoffe und Produkte entlang der Lieferkette

**Bedarf an Vernetzung und Datenaustausch zwischen den Branchen.**

*“A significant amount of data is lacking for doing things differently and making decisions on what we do in the future. We need data. [...]. Then we looked at how to measure things, which I don't think we got a wide range of different ways of measuring stuff. Personally, I think things like carbon dioxide emission reductions are a good one to look at, but that's just one element and how do we measure it?” (Research Institute)*

*A number of industries should get together to bring the information together. My weight of waste could be usable in a totally different industry. We don't have that interconnectedness between industries. ... It should not be just limited to the plastics industry. It is particularly important for a country like NZ because our market size is so small. The possibility of recycling or a circular economy is eliminated because of our size population. (Plastic Industry Association 2)*

## Digitale Technologien verbessern:

- ✓ Verbessern Effizienz in Geschäftsprozessen und reduzieren Abfälle
- ✓ Fördern Dienstleistungsinnovationen, wie „Products-as-a-Service“- und neue Plattformlösungen mit dem Potenzial Materialverbrauch und Produktion zu reduzieren
- ✓ Ermöglichen Echtzeit-Datenübermittlungen um Lieferketten und Ressourcenrückgewinnung zu optimieren, und Produktlebenszyklusmanagement zu unterstützen
- ✓ Ermöglichen datengetriebene Analysen, die bei makroökonomischer Planung und politischen Reformen

## Digitale Technologien schaffen neue Probleme:

- ✓ Fördern Überkonsums durch „vermeintlich“ begrenzte Lebensdauer von Hardware, Ansammlung von Elektroschrott
- ✓ Digitaler Infrastrukturen, wie Datenmanagement, Serverbetrieb und dezentrale Entscheidungsfindung steigern Verbrauch von seltenen Erden und Energie
- ✓ Rechtlichen, ethischen und technischen Herausforderungen bezüglich Datenschutz, Datenbesitz, Rechenschaftspflicht und Sicherheit
- ✓ Erfordert oft erhebliche Investitionen und birgt das Risiko, Stakeholder Upstream der Lieferkette auszuschließen.
- ✓ Dominanz von Plattform-Unternehmen / Tech Giants erschwert es Regulierung und dämpft den Einfluss von Regierungen
- ✓ Verschärfung der digitalen Kluft zwischen Entwicklungs- und Industrienationen.



UNIVERSITY OF  
AUCKLAND  
Waipapa Taumata Rau  
NEW ZEALAND

CEBUS Circular Economy in Business  
**BUSINESS SCHOOL**

A vibrant yellow-green fern with multiple fronds is growing in a crevice between large, grey, textured rocks. The fern is the central focus of the image, contrasting sharply with the dark, shadowed rock crevice and the lighter grey rock surfaces. The background is a soft-focus view of more rocks and a dark, shadowed area.

**LET'S DISCUSS!**

**HERZLICHEN DANK!**

**Zirkuläre Dienstleistungsökosysteme – Wie digitale Plattformen den  
Übergang zur Circular Economy unterstützen können**

**Julia Fehrer**

**November 11<sup>th</sup> 2023**

Contact:



[j.Fehrer@auckland.ac.nz](mailto:j.Fehrer@auckland.ac.nz)

