Ministry of Economic Affairs and
Climate Policy of the Netherlands

Quick Scan Circular Business Models

Inspiration for organising value retention in loops

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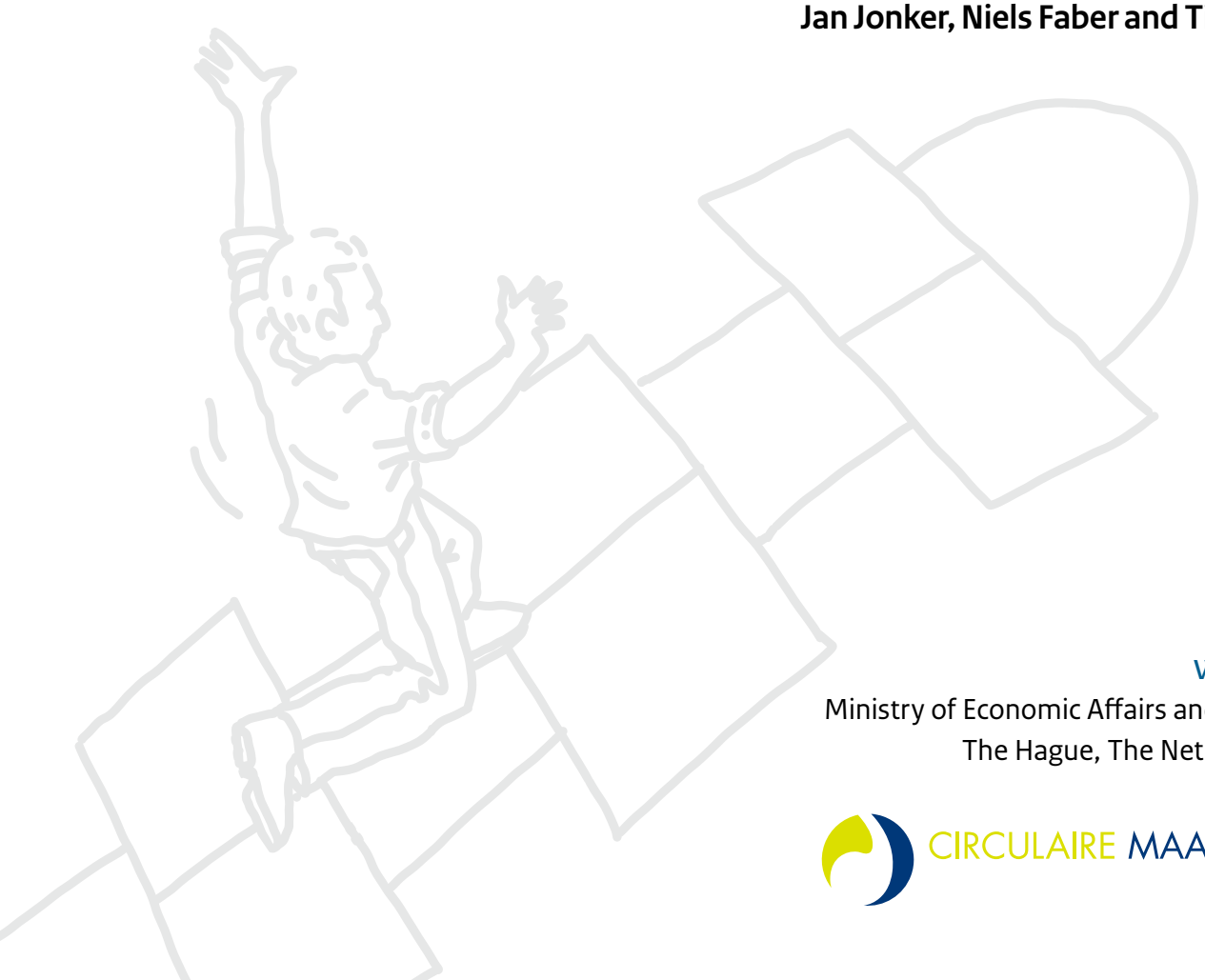

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CIRCULAIRE MAAKINDUSTRIE

FOREWORD

The Dutch Government is committed to accelerating the transition to a climate-neutral and circular economy by 2050. In addition to other policies, we do this in the government-wide Circular Economy Implementation Program 2021–2023 , where we collaborate with various ministries, local authorities, knowledge institutions, the business community and NGOs.

Combating climate change and environmental degradation is absolutely necessary for the future of Europe and the world. The European Green Deal, roadmap to a sustainable European economy, underlines this. In 2019, the EU member states agreed that the European Union will become climate neutral by 2050 at the latest.

As part of the Green Deal, in March 2020 the European Commission presented the Circular Economy Action Plan and 'Fit for 55' in July 2021, the roadmap to reduce greenhouse gas emissions in the EU by 55% by 2030 in comparison with greenhouse gas emissions in 1990. These plans will also have major consequences for the Netherlands.

"We are in a time of fundamental change. We have a climate crisis, and we are in an industrial revolution. The way we work and produce, everything is going to change."

FRANS TIMMERMANS

Circular economy focuses on our use of raw materials and the optimal use of products and raw materials in closed production cycles. The circular economy makes a significant contribution to the climate challenge, to reducing environmental pollution, to halting the loss of biodiversity and to increasing security of supply. Worldwide, 45% of greenhouse gas emissions are related to the use of raw materials . TNO and Ecorys have calculated that the circular economy can make a substantial additional contribution of 7.2 megatons of CO_2 reduction . This requires a significant change in the way we work, produce and consume. But the circular economy also offers new opportunities, such as new business opportunities.

To be able to produce and consume differently, a new way of thinking and new business models are needed. This publication offers guidance to entrepreneurs. That is why we are enthusiastic about this publication. Because the entrepreneurs will shape the transition to a circular economy.

Therefore, we hope that this publication will inspire and support entrepreneurs in making their circular business models leaner and better. The Dutch government will continue to actively support you where your enterprise will find that useful.

For now, we would like to wish you a lot of success and opportunities with your current and future circular business models!

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This Quick Scan offers an approach to developing a circular business model. It has been developed primarily with the manufacturing industry in mind, although it can also be used in other sectors.

It consists of three parts: (1) an introduction explaining the background and central concepts, (2) an overview of seven business model categories that form the classification, and (3) the actual Quick Scan.

Going through the Quick Scan in Part 3 takes about 30 minutes. It has been designed in such a way that, if necessary, the first two parts can be skipped when time is scarce. If the introduction and the classification are also to be read, it is wise to allow for an hour.

The Quick Scan exists in two versions: the version in this paper, and an interactive version which can be found on the Business Model Lab website (https://businessmodellab.nl/tools).

The result of the Quick Scan consists of two parts:

1. A brief analysis of where you stand as an organisation when it comes to organising sustainably and circularly and formulating your ambition for the coming years.
2. An exploration of the business model that best suits your competencies and ambition.

Knowledge cards

This Quick Scan is based on a recently (2021) developed classification of circular business models. It consists of seven different (basic) models. These models are introduced in Part One. Part Two contains a concise description of each of these business models, illustrated with current case descriptions. We call these 'Knowledge Cards'.

Additional resources

At the end of the Quick Scan, several useful instruments, training opportunities, and networks are mentioned that can be consulted if there is a need for follow-up. The annex contains a glossary of terms.

Discussion boxes

The Quick Scan includes discussion boxes at various points. The function of the discussion boxes is to draw attention to various underlying questions. They are not part of the actual Quick Scan.

SDGs

It is not easy to combine knowledge and insights on the circular economy and its classification in a compact (working) document. This means that we have not included all kinds of related topics, such as the Sustainable Development Goals (SDGs). This is unfortunate, but our ambition was to keep things as concise as possible.

Abbreviations

In this text, the following abbreviations are used:
CBM: Circular Business Models
CE: Circular Economy
For the sake of readability, 'circular business models' is also abbreviated to 'business models' (BM). Where reference is made to the classification of circular business models, this is also referred to as 'basic models' or 'basic circular models' for the sake of readability.

Who is this Quick Scan intended for?

This Quick Scan is intended for entrepreneurs, primarily in the manufacturing industry. Three groups of entrepreneurs are distinguished. For each of these groups, a specific track can be followed, focusing on different circular business models (CBM). These tracks are:

1. **Newcomer**. This track is aimed at entrepreneurs who have yet to start or who have just started, and who are looking for a CBM. Central is an introduction to the basic principles of the Circular Economy (CE) and a discussion of the use and need of CBMs. Several operational circular models are presented, with example cases given.
2. **Keep going**. This track focuses on entrepreneurs who are already engaged in sustainable and circular business and are looking for new opportunities, for inspiration. What else is possible? Here too, case studies are used to illustrate what is possible and what is already available, but it also addresses the difficult challenges of organising in a circular way.
3. **Frontrunners**. This third and final track is aimed at entrepreneurs who are already working hard (and are perhaps the frontrunners in their sector) but at the same time want to take a critical look at their current CBM and prepare for the future. In this third route, the focus is not on the examples (although these are not lacking) but much more on developments such as the Extended Producer Responsibility (EPR) and Producer Ownership (PO).

There is no obligation to follow any of these tracks. They are purely meant as guides in using the Quick Scan and the classification of circular business models.

PART 1
Background

1.1 Introduction to sustainability and circularity

The coming decades will be marked by fundamental social and economic changes. These are commonly referred to as *transformations* and *transitions*. Companies and organisations can make a positive and fundamental contribution to these changes. This means that in their value proposition, in their (own) organisation, and in the value chain, they contribute (together with partners) to creating sustainability and circularity. This ambition has (major) consequences for current business models. These models are – not surprisingly – based on the principles of a linear economy. Organisations and companies are also 'framed' in that economy: think of bookkeeping, accounting, rules and regulations, and, last but not least, taxes. But if the economy is changing rapidly, the question arises as to how long an existing business model remains viable. This Quick Scan helps to shape changes in that respect by looking at existing practices and business models, linking them to ambition, and then exploring the possibilities of circular business models.

In summary:

- The transition to a sustainable and circular economy is a society-wide endeavour of increasing urgency.
- Companies are essential in realising this transition and can make an important contribution through their strategy and business propositions.
- This Quick Scan helps to make this challenge concrete by looking at existing and future business models with the intention of driving sustainability and circularity.

This Quick Scan consists of three parts:

1. The first part contains an introduction explaining the circular economy, its connection with sustainability, and an overview of existing and future circular business models.
2. The second part – Knowledge cards: Classification of circular business models – gives an overview of seven circular business models illustrated with actual case studies.
3. The third part contains the actual Quick Scan. In two phases and ten building blocks, a concise qualitative analysis is made of the state of affairs in the organisation, and an exploration is carried out to adapt an existing or develop a new business model.

Finally, suggestions are made to provide some support in the further development of a CBM. This consists of additional instruments, training possibilities and networks. Using this support is an entirely free choice. A glossary of terms is then provided in the annex.

If you don't have time, you can skip parts one and two and start directly with the Quick Scan. If this leads to questions or a need for clarification, you can of course always return to the earlier parts.

Relevance of the circular economy

In recent years, the CE has attracted growing political and economic attention. At the heart of the CE is organising the value retention of products,

components, and commodities (both processed and unprocessed) in loops. The aim of organising in this way is to reduce the negative impact and increase efficiency of use throughout the lifecycle of an object. Business models offer a range of (strategic) approaches to give shape to a variety of forms of value retention leading to ample value-creation opportunities. They are therefore a key element in giving operational practicality to the circular economy. There is a variety of arguments as to why the CE matters:

- Attention to the climate is no longer a matter of debate: we are moving from marginal eco-efficiency on a voluntary basis to a society-wide urgent necessity.
- Responsibility for future generations: leaving the world a better place for the generations that follow.
- Risks: rising commodity prices, inability to deliver, liability, environmental impact.
- External pressure from customers etc., production according to new requirements – because otherwise, they go 'elsewhere'.
- Reputational damage and a growing number of national and international Climate Change Litigation cases.
- Requirements of financial institutions such as investors or banks (ensuring continuity).
- Increasing legislation and regulations (including the EU Green Deal, Extended Producer Responsibility (EPR), and the consequences of the 'Fit for 55' policy).

At the request of the Dutch Ministry of Economic Affairs and Climate, research was conducted to find what business models are already available for the CE. The main focus in that research was on the manufacturing industry. In addition, the research looked at the developments that can be expected in the coming years and what they imply for future business models. Central to these developments is the growing emphasis on integrated responsibility for one or more lifecycles of products, components and materials. This will lead to more extensive forms of accounting based on (interactive) tracking and tracing, the use of QR-codes, and material passports.

Discussion box
Without the know-how, technology, and production methods of the linear economy, we will not achieve a circular economy. But we should transform the present one into a radically sustainable linear economy.

Together, the existing and new business models lead to an overview of seven clearly distinguishable circular business models. These are introduced and briefly described in this introduction. But first, we introduce several key concepts that are crucial in the CE and thus play a role in this Quick Scan.

1.2 What is the circular economy all about?

The circular economy can be characterised by seven principles:

1. *Value retention*. The core of the circular economy is the systematic organisation of value retention in loops of materials (both raw and processed), components, and products.
2. *Lifecycle extension*. Loops are the basis for lifecycle extension. This leads to different designs, smarter maintenance, and the use of new (substituted) and refurbished materials.
3. *Organisation*. Organising can be done in several ways: (1) within one's organisation, (2) in value chains, (3) in a loop (bearing in mind that loops themselves can be shaped in a variety of ways), or (4) in a system of loops (ecology).
4. *Loop phases*. Six phases can be identified during the lifecycle of a loop: (1) design, (2) make, (3) operate, (4) maintain, (5) reuse, and (6) recover.
5. *Value Creation*. Organising value retention leads to various moments of value creation. There are three dominant forms: (1) transforming, (2) recycling, (3) circularising. Simultaneously,

there is always a relationship between social values and ecology/biodiversity.

6 *Business and revenue models*. Value creation and retention take shape in different business models; these can be combined with a great variety of revenue models.

7 *Impact*. The ambition is to organise for there to be less (or preferably no) negative impact in the making, functioning, and discarding of objects. This characteristic is common to sustainability and circularity.

While loops can be characterised by six phases, in practice, things are much messier. Phases do not follow each other 'neatly' but are mixed and repeated.

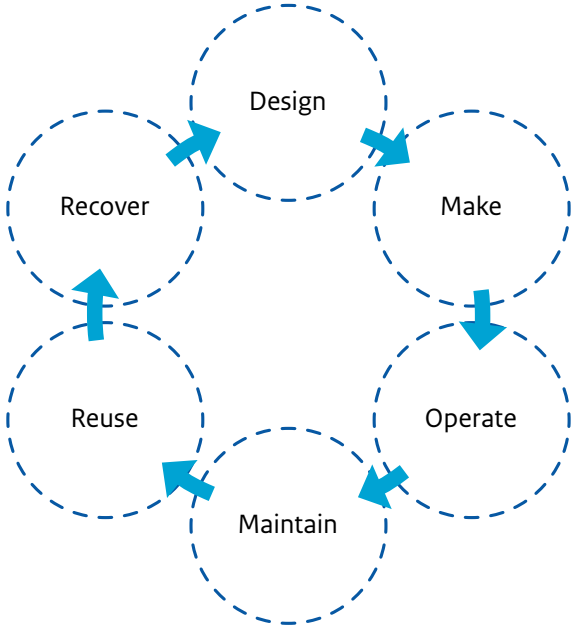

FIGURE 1 *Ideal phases in a loop.*

Value retention and creation

Organising in loops is the basis for lifetime extension, which in turn is the basis for value creation. *Value retention* is the central principle of the circular economy. The aim is to safeguard (through design, maintenance, refurbishment, substitution, etc.) the functional and material value of products, components, and commodities for as long as possible. Working on value retention is the basis for various moments and forms of *value creation*. This means that there are multiple and repeated revenue moments (earning opportunities) during the lifecycle of a product, and the opportunity for economic value creation. Yet there is always the necessity to create social and ecological values. Aiming for these three values in a balanced way is commonly referred to as *multiple value creation* (or the Triple Bottom Line).

Discussion box
This Quick Scan focuses first and foremost on 'dead' materials such as metals and minerals. But what about materials in the biological loop? What do lifetime extension, value retention and value creation mean in that respect?

Organising value retention in loops leads to:

- More efficient use of materials (both raw and processed), components, and products (resource efficiency).
- Less use of 'virgin' materials during production and the actual use of products.
- Lower impact with reuse of materials.
- Multiple forms of 'profit' (ecological, economic, and social).
- Fewer risks in the supply chain.

This comes into effect provided that the qualities and properties remain intact. Organising loops, however, requires extra energy, virgin materials (or substitution), manpower, mobility, and so on. In turn this requires careful consideration of the so-called sustainability–circularity balance. After all, a product can be made very sustainable, but that does not make it circular. The reverse is also true.

Discussion box
The circular economy will not get off the ground without far-reaching digitalisation (and the associated datafication). After all, it is about combining the 'Internet of Things' (IoT) with the 'Internet of Services' (IoS) and the 'Internet of Materials' (IoM). To make this work calls for an interactive materials-resources-maintenance passport.

The conjoined twins of sustainability and circularity

Talking about organising circularly means talking about sustainability in the same breath.
Sustainability is about reducing the use of materials (both raw and processed), fossil energy, and also the reduction of negative emissions etc. during the process of making, using, and disposing of a product, its components, or its materials. Working on sustainability is in line with a linear economy and can be seen as working on improvements under the condition that production must take place within the production and absorption capacity of the earth.

Working on sustainability is also linked to a circular economy. Circularity is about organising the retention value of both raw and processed materials, components, and products in loops, which leads to an extension of the lifespan, less use of materials, and a lower (environmental) impact. To achieve this requires organising in loops, leading in turn to a fundamentally different economic structure. These profound changes are called a *transition*.

Thinking differently about time

Time also plays an important role in organising with loops. Product groups in loops have different time horizons, from minutes to decades (and longer) with different impacts – in making as well as using. This has a major impact on the nature and design of the business model. To illustrate, we have broken this down into three time horizons: short-term, medium-term and long-term.

Thinking differently about time leads to several new questions:

- Should the scope and time horizon of a specific product, its parts, or used materials be on the label of a product in the near future?
- What are the organisational consequences of thinking in different time horizons, especially if they are combined in a product (and if that is quickly the case)?
- What are the legal consequences in terms of responsibility and liability (and within which (national or international) legal-institutional framework)?

Supporting processes

And then there is yet another noteworthy aspect. Organising in loops always requires supporting processes. It is useful to know which supporting processes are crucial to which business models and whether an organisation has the knowledge and competencies in-house or can call them in from its chain or network.

Discussion box
Sustainability is not the same as circularity, and vice-versa. But they do need each other. Finding the right balance is not self-evident.

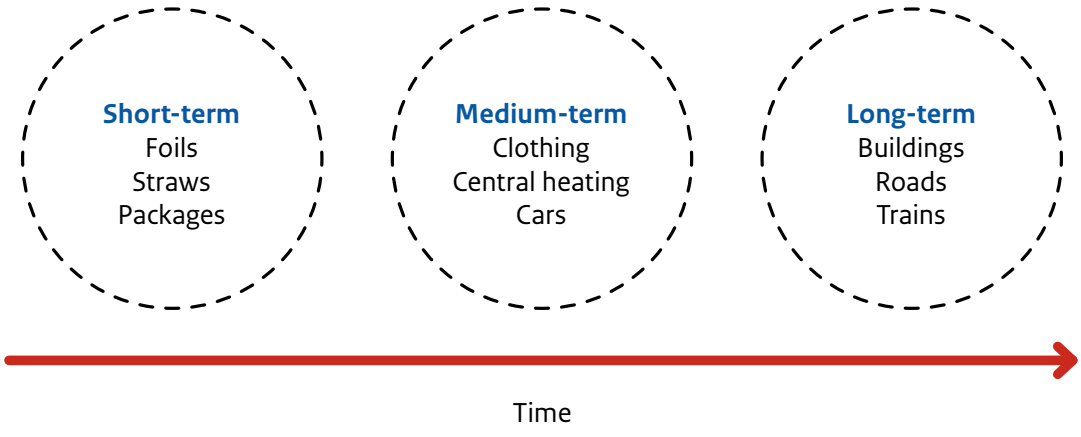

FIGURE 2 *Different time horizons*

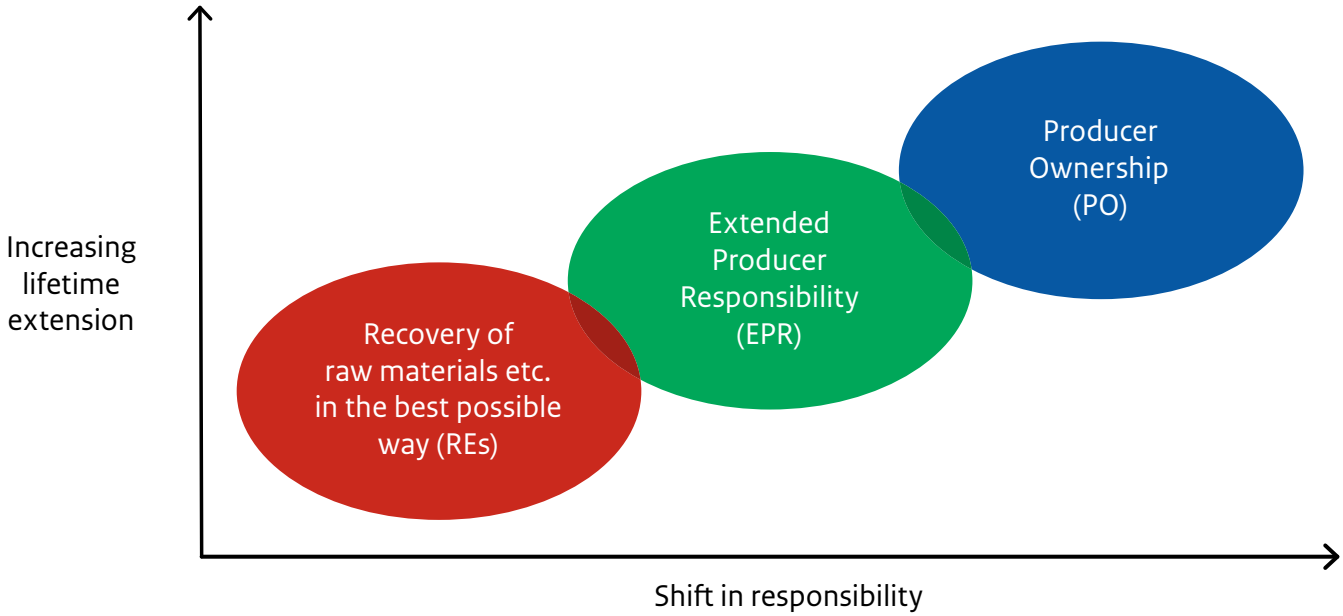

FIGURE 3 *A shift of responsibility*

A shift of responsibility

The research which forms the basis for the classification presented in this first part shows that in the coming years the responsibility for a product will increasingly shift towards the producer. There is a movement from consumer (customer) ownership through growing responsibility for the end-of-life phase (Extended Producer Responsibility, coming into effect approximately 2024/2025) to the producer taking responsibility for the entire lifecycle. The EU calls this 'Producer Ownership', though it should actually be called 'Producer Lifecycle Responsibility/Ownership' to better express the consequences of this development. This has far-reaching consequences for certain products, product groups and materials being used. By this change in responsibility, the producer becomes in principle the raw material *supplier* of his products. This has different implications for various sectors (e.g. construction, mobility, fashion, greenhouse horticulture). It goes without saying that this trend towards greater responsibility should be reflected in appropriate business models.

1.3 The core of business models

What is a business model?

A business model provides a logic for creating and retaining value: a way of organising in an organisation, a value chain, or a loop to create and retain value. It consists of three building blocks: (1) the value proposition, (2) the organisational model including the parties involved, and (3) one or more revenue models.

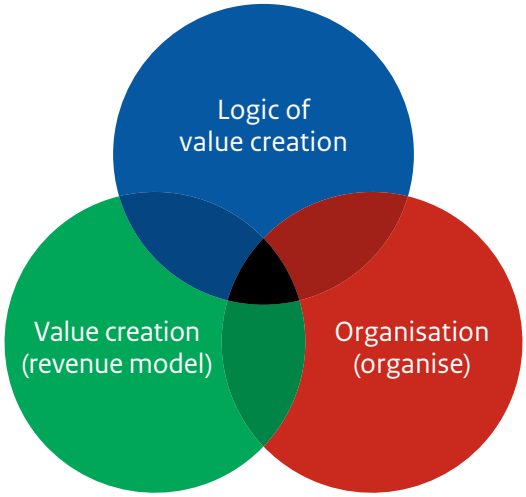

FIGURE 4 *Building blocks of a business model*

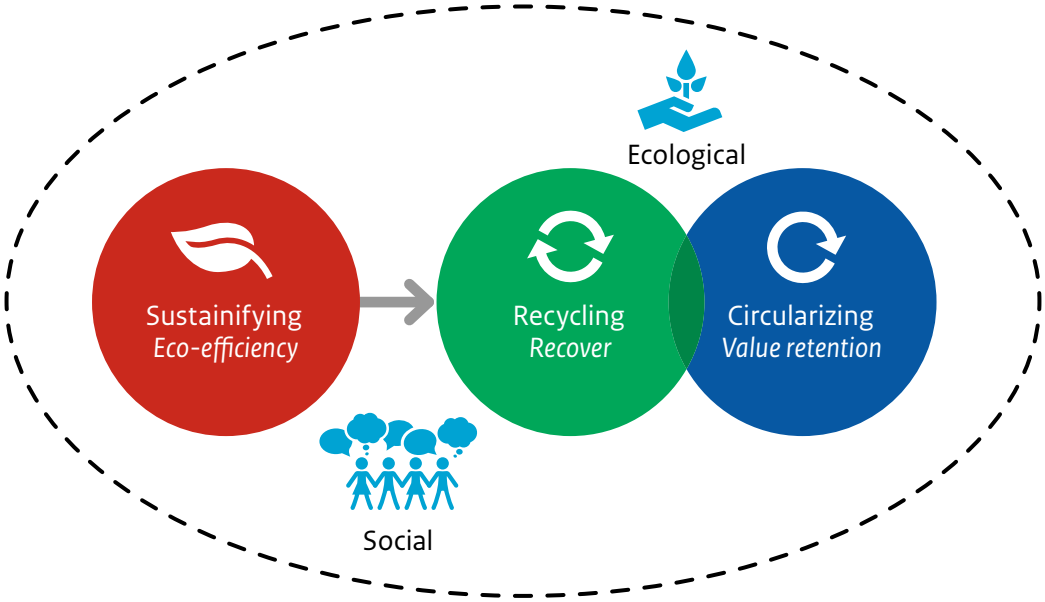

FIGURE 5 *Forms of value creation*

Business models create the basis for transactions between parties (e.g. Business2Consumers, Consumers2Consumers, or Busines2Business). This implies there is an exchange, a performance, and a counterbalance. In the process of value creation based on transactions, several values are always created simultaneously for and by the parties involved. This is commonly referred to as *multiple value creation*. Values are subjective, and context (place and time) and person dependent. What is of value is determined by the parties involved and is not intrinsically linked to a good, service, or event. So, what is of value to one person need not be of value to another, even though they may be in the same transaction, and at the same time and moment.

When is a business model circular? There are several important characteristics. They are not mutually exclusive, but can be valid at the same time:

- There is horizontal and vertical chain integration (e.g. the use of one's own waste in new packaging).
- The ambition to organise one or more loops (as a company or in a cluster of companies and organisations and networks).
- Strategically the aim is to reduce impact compared to the linear alternatives.
- Organising is shaped in such a way as to preserve the value of both raw and processed materials, components, and products and to use them over and over again in multiple loops.
- There are often different forms of servitisation (product-as-a-service) giving way to use various revenue models.

1.4 Classification of circular business models

For this Quick Scan, a classification has been made providing an overview of existing and future circular business models. This classification is based on professional and academic publications between 2014 and 2021. This yielded 21 pre-existing classifications of the CBM, which have been compared and condensed. In addition, recent EU documentation – in particular referring to the 'Green Deal' and 'Fit for 55' – has been studied. This resulted in seven basic types of circular business models. Five of these models are already in use, albeit in very different capacities, and two are still under development.

The seven models in the classification are:

1. Resource models
2. Design models
3. Lifetime extension models
4. Platform (sharing) models
5. Product-as-a-Service models (PAAS)

6 End-of-Life models
7 Lifecycle models

Each of these models is briefly described in Part 2 of this Quick Scan (Classification of Circular Business Models) and is illustrated with current examples.

10	Refuse: avoid both virgin and processed materials.
9	Reduce: reduce the use of raw and processed virgin materials.
8	Rethink & Redesign: design or redesign of a product or component with sustainability and circularity as starting points.
7	Re-use: Re-use: reusing products, components, or virgin materials (whether or not they have previously been refurbished).
6	Repair: regular maintenance and repair, whether or not combined with redesign and digitisation.
5	Refurbish: refurbish products and parts such that they are 'like new'.
4	Remanufacture: making new products or parts from previously made products and/or parts.
3	Repurpose: reusing products and/or parts but with a different purpose/function, whether or not combined with Refurbish.
2	Recycle: conversion of products and parts to virgin materials and reuse.
1	Recover: energy recovery from materials (also called *thermal upcycling*)

TABLE 1 *Overview of R-strategies*

Organisational choices to make a business model concrete

Besides the choice for a basic business model, there are four other (organisational) building blocks where choices need to be made. These choices are:

1 *Strategy*. What is an appropriate strategic choice given your ambition and focus? Here the commonly used R-strategies are provided. This is a list of ten strategies that increasingly (from bottom to top) help to shape sustainability and circularity (see Table 1, above).
2 *Form of organisation*. The realisation of a CBM often leads to a different form of organisation. Choices have to be made from a focus on the internal organisation via horizontal and vertical value-chain integration to organising in loops, and ultimately in a complex system of organisations, value chains and loops. The complexity of these choices increases exponentially.
3 *Supporting processes*. Organising, by definition, requires supporting processes. This section of the Quick Scan addresses which processes are critical to a particular type of CBM. Think of reverse logistics, specific competencies, or digitisation.
4 *Revenue models*. Last but not least, a CBM requires a revenue model. This may involve a revenue stream (and is often called 'the business case') but issues such as reducing CO_2 emissions or working with a True Price should also be considered.

Certainly, the first three of these building blocks belong to management sciences, only now viewed not from a (conventional) linear economy perspective, but instead from a circular perspective.
The revenue models deserve special attention.

Revenue models

These models show how an organisation, a value chain, or a loop generates revenue(s), the nature of those revenue(s), and for whom the revenues are generated (obviously customers, but also stakeholders). Not infrequently, this is also referred to as the 'business case'. Even more confusing is the fact that the business model (the logic of value creation) and business case (Where is the revenue stream? Can this be done?) are often mentioned in one breath. But there is more than just turnover or margin. Increasingly, additional requirements are at stake, such as emission-free construction or contributions to CO_2 reduction. But also, for example, a design to enable reparation or reuse.

Revenue models can be stacked; it's all about the mix and match that fits a particular situation. The trick is to choose the revenue models that make this possible.

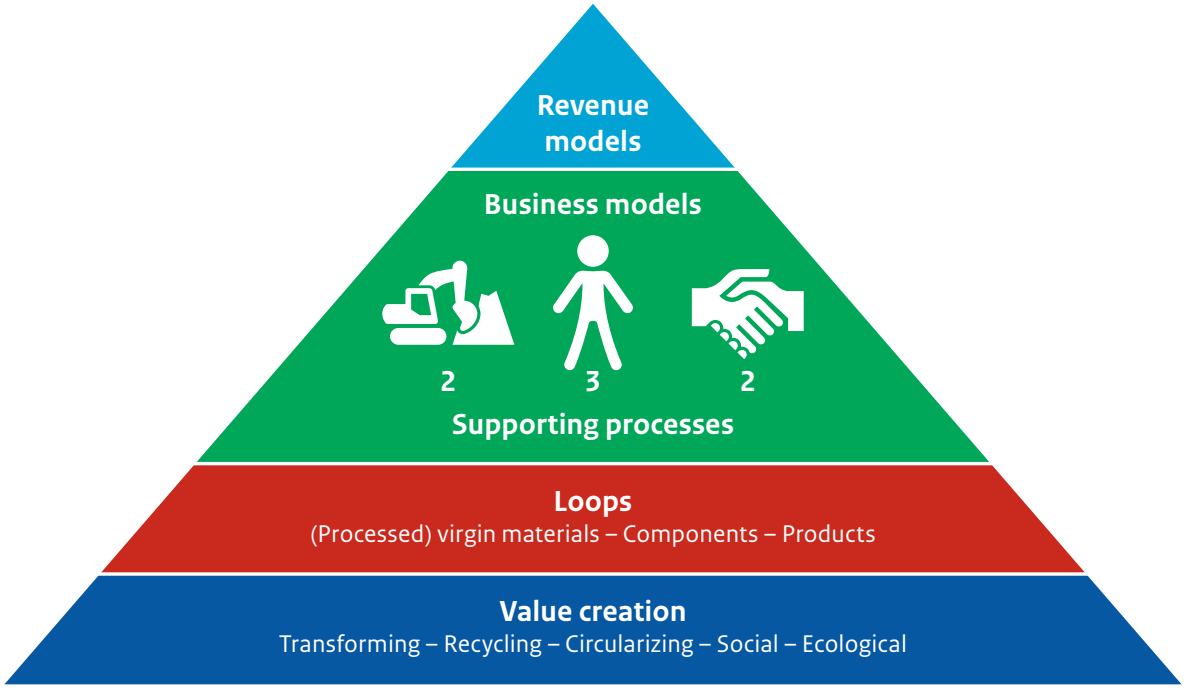

FIGURE 6 *Circular Business Models Pyramid*

In the end, addressing sustainability and circularity in a business model means that:

- Choosing a revenue model is the last step in shaping a sustainable or circular business model. But those who want to can start there.
- There is a wide range of revenue models to choose from (see overview in Part 3.3.5).
- Many business models have not one, but a combination of revenue models.
- When choosing revenue models, it is crucial to consider and combine the various forms of value creation.

Which revenue model (or combination of models) fits which business models is mainly a question of entrepreneurship. In the Circular Business Models Pyramid above, all elements have been brought together, thus providing an overview of the various principles and choices.

1.5 About change and transition

Organising the CE calls for – and leads to – a radically different organisational approach at various institutional levels (organisational, value chains, and institutions). Its realisation leads to changes at various levels: changes in organisations, changes in and between organisations, changes in and between sectors (after all, there is a change from value chains to loops), and changes in systems (which accommodates the previous two changes).

The realisation of a CE with the existing linear economy as its starting point leads to unmistakably interrelated forms of organisational, technological, economic, and institutional change – in organisations, between organisations, and within systems. These can be classified according to the degree of impact:

1 *Organisational change*. The focus is on the organisation (possibly with part of the value chain), improving the existing practices to various degrees.
2 *Transformation*. The focus is on arriving at new solutions (whether full or partial), based on existing technology and competencies supplemented with new ones.
3 *Transition*. The focus is on a radically different concept (paradigm shift) to achieve a new system or subsystem design.

As an economy at large we have a great tradition in organisational improvement, but when it comes to transformation or even transition we often lack the collective competencies. To talk about transformation and transition is easy, but when it comes to real practice, we talk with passion when we actually only realise improvements of the existing system. Whatever the case may be, the following applies:

- Working on sustainability and circularity in one's organisation or in the chain will inevitably involve issues related to change.
- These can have more or less impact.
- If it is only a question of adapting to the existing situation, then it is a question of improvement – even if some people call it innovation.
- When it comes to creating a new business proposition based on existing procedures and competencies, then we can call it a transformation.
- If there is a radical change in the way we work, with new procedures, new agreements in the chain, and new government rules, we can speak of a transition.
- Working on sustainability can be seen as an improvement or a transformation. Working on the circular economy inevitably leads to transition.

These changes affect the design of business models in various ways. The X-Curve below visualises these developments.

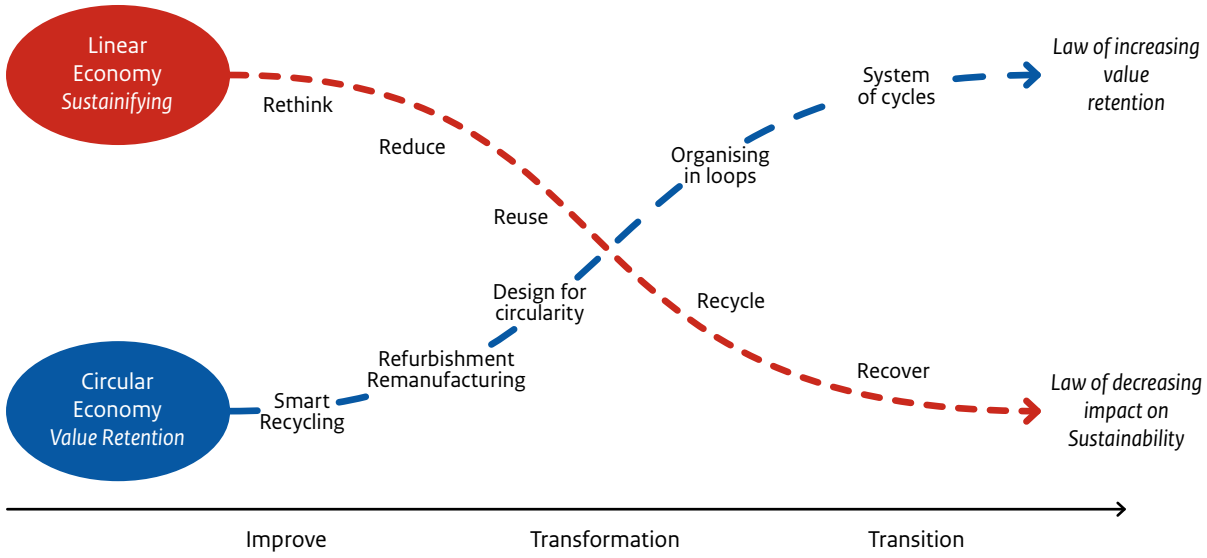

FIGURE 7 *X-Curve – correlation between linear and circular impact*

PART 2

Classification of circular business models

2.1 Characteristics of circular business models

For this Quick Scan, a classification of existing and future CBMs was drawn up. This was based on a systematic inventory of professional and academic publications from 2014 to 2021. This yielded 21 existing classifications, which were then compared and condensed. In addition, policy- and tool-oriented EU documents on the CE and more on particular CBMs were added. This led to the identification of seven CBM groups, described as Knowledge Cards in this section. Taking this approach is done deliberately since each model can be used in a variety of ways and combined with other models.

The seven Knowledge Card models in the classification are:

1. Resource models
2. Design models
3. Lifetime extension models
4. Platform (sharing) models
5. Product-as-a-Service models (PAAS)
6. End-of-Life models
7. Lifecycle models

Five of these models are in use – albeit in very different capacities – and two are still under development.

These models form the basis of the Quick Scan in Part 3.

Below is a list of the models' characteristics. On the following pages, each of these models is described based on these characteristics and illustrated using mainly Dutch cases.

- *Focus*. What is the primary focus of the CBM? Is it on the designing, making, functioning, maintaining, reusing, or recovering of products, components, or (raw or processed) virgin materials?
- *Value creation (multiple)*. What value(s) will be created for whom with this BM? Is it a combination of transforming, recycling, and circularising social and/or ecological value? The starting point is that value creation with a broader scope has a higher impact.
- *Organisation*. What is the nature of the organisation that the business model requires? Is it about an internal organisation, about the (value) chain, about organising a loop, or about an entire system? The organisational form is becoming increasingly complex. The more complex the form, the more complicated it is to realise, but the higher the impact.
- *Strategy*. Several so-called R-strategies have been developed over time. The ten most common ones that run from high to low impact (the R-ladder) are: Refuse (refuse certain materials), Rethink (redesign), Reduce (reduce and refuse the use of virgin materials), Reuse, Repair, Refurbish, Remanufacture (make new), Repurpose, Recycle, and finally Recover (often mainly heat recovery). The question is which strategy or combination best fits the business model. The higher a strategy is on the R-ladder, the higher its impact.
- *Support*. What supporting processes are critical to this circular business model? (Digitalisation/datafication, logistics, competencies, (technical

e.g. hardware) infrastructure, design of (production) processes, inventory management, material mediation platforms, quality assurance, etc.)

- *Revenue model*. Which revenue model – or combination of models – fits this CBM best? Increasingly, it is not only purely monetary models that are considered, but also integral pricing such as 'True Price' or CO_2 pricing. The broader the scope of a revenue model and the more factors it considers, the greater the impact.
- *Impact*. What is the impact of this business model? Is it about risk reduction, security of commodities, material savings, CO_2 reduction, restoration of the environment, job creation ... or a combination of all these? The more of the latter, the higher the impact. This can be deduced from the judgements given above under (2), (3), (4), and (6).

2.2 Resource models

The essence of these models is the recovery of parts and raw/processed materials at the end of the lifecycle (discard phase). These can be given a new purpose (whether or not they have been refurbished first). Virgin materials can also be processed into a result with a higher or lower value (upcycling and downcycling). Once all these possibilities have been exhausted, the remaining option is to regain (thermal) value, known as *recovery*.

1 Focus: dismantle, recover, reuse, remanufacture
2 Value creation: primary recycling for products in the value chain with indirect social job creation and environmental impact (reduced commodity footprint)
3 Organisation: end of value chain and a possible new loop
4 Strategy: recycle, repurpose, reuse and recover
5 Support: return logistics, technical infrastructure, disassembly protocols, quality assurance
6 Revenue model: sale of residual flows and (gross) recyclates
7 Impact: material savings, job creation, CO_2 reduction

CASES

Van Werven (NL) is a service provider in the field of recycling that converts virgin materials (such as construction and demolition waste, plastic and green waste) into (among other things) biomass or various mono flows. The company operates in the Industry & Production sector. In 2019, the company processed 542,282 tonnes of waste, generating a turnover of € 100 million. Processing this waste prevented 216,974 tonnes of CO_2 emissions compared to the production of virgin material. (https://www.vanwerven.nl/)

HKS (NL) specialises in the recycling of iron, metals, and electronics. From this, new commodities are made that can be used by smelters and producers. HKS offers two organisational options: parties can deliver their waste to HKS, or HKS can take care of the entire process from collection to new resource creation. The company is active in the Industry & Production sector. HKS processes 1.8 million tonnes of scrap per year and has annual sales of € 500 million (2020 data). (https://www.hksmetals.eu/)

RetourMatras (NL) processes discarded mattresses into new mattresses. The company processes 1.5 million discarded mattresses per year that would otherwise be incinerated. These mattresses are collected from, among other places, recycling centres and bed shops. RetourMatras works together with companies such as IKEA, Renewi, and Auping to promote the recycling of the mattresses. The company is active in the Industry & Production sector. (https://www.retourmatras.nl/)

2.3 Design models

The essence of design models is to design products so that they fit within the logic of circularity. Design models focus on delivering designs for new products and redesigning existing products, and designing and redesigning production, distribution, and take-back systems that close loops for circular products. These include (1) design for repair and maintenance, (2) design for recovery and recycling, and (3) design for lifetime extension. This is at odds with the linear economy principle of 'planned obsolescence'. Circular design means designing based on the principles of (1) longevity, (2) ease of repair, (3) modular composition and easy disassembly, (4) use or incentivisation of reusable materials, and (5) use of bio-based materials (under the condition that these materials do not harm biodiversity).

1. *Focus*: design products and production processes
2. *Value creation*: transforming, recycling, and circularising
3. *Organisation*: internal organisation, chain, and loop
4. *Strategy*: rethink, redesign, reduce
5. *Support*: competencies, design of production processes, return logistics
6. *Revenue model*: a combination of design, functional use, and maintenance sales of a product or its component parts
7. *Impact*: material savings, usage savings, better material recovery, CO_2 reduction.

CASES

Patagonia (US) is a company that designs clothing of the highest possible quality (longevity, multi-functionalism, and non-aging). The design allows for repair, reuse, and recycling (after use). By 2020, Patagonia had repaired 101,706 garments. In addition, 87% of the fabrics used were made from recycled materials. Patagonia has an annual worldwide turnover of over € 1 billion. (www.patagonia.com)

Fairphone (NL) designs sustainable phones that last as long as possible. Fairphone does this by focusing on replaceable modules that consumers can repair themselves. Fairphone sold 165,000 phones between 2013 and 2018. (www.fairphone.com)

Peeze (NL) produces coffee focused on a circular design. Peeze designs bio-based and compostable coffee cups, aluminium-free and compostable coffee bags, and coffee cups made from sugarcane waste. Peeze has an annual turnover of more than € 16 million. The coffee is produced in a CO_2-neutral way. (www.peeze.nl)

2.4 Lifetime Extension Models

The essence of these models is to extend the lifespan of products, components, and raw and processed materials. This type of business model focuses in particular on (1) repair, (2) maintenance, (3) refurbishment, (4) replacement/substitution of parts, (5) remanufacturing, (6) repurposing, and (7) reuse. The aim is to preserve a product and the components used in their original qualities and functionality for as long as possible. A frequently chosen form to achieve an extended lifespan is product-as-a-service or servitisation.

1. *Focus*: regular maintenance, reuse
2. *Value creation*: transforming, circularising
3. *Organisation*: organisation, chain, network, and possibly loop
4. *Strategy*: reduce, reuse, repair, refurbish, remanufacture, repurpose
5. *Support*: suitable designs (see various design models), competencies, digital, technical, and logistical infrastructure
6. *Revenue model*: different variations of product-as-a-service (PAAS), data and analytics-as-a-service, maintenance and inspection, buy-back
7. *Impact*: material savings (both raw and processed materials).

CASES

Interface (US) is a global manufacturer of commercial flooring (tiles and carpet). As part of Interface's ReEntry programme, used carpets are reclaimed and repurposed in several ways: the carpets are reused as flooring (reuse), converted to other products or services (repurpose), used as materials (recycle), or, if necessary, used as a support fuel in the cement industry (recover). Between 2016 and 2021 Interface recovered 22,000 tonnes of end-of-life carpet. (www.interface.com)

ecoATM (US) is a leader in reducing electronic waste and creating value from used electronics. ecoATM owns 4,457 kiosks where consumers can sell their phones. Since 2009, ecoATM has purchased more than 28 million electronic devices, and refurbished, resold, or environmentally recycled them. (www.ecoatm.com)

RePack (FI) provides online retailers with reusable packaging materials made from recycled material. After use, the user returns the packaging to RePack, who then checks, cleans, and redistributes the packaging for reuse. In 2020, RePack made a profit of € 680,000. (www.repack.com)

ReBlend (NL) focuses on the realisation of circular textiles. ReBlend develops a closed textile loop in which textile products are made from end-of-life textiles that would otherwise be burned or disposed of in a low-grade manner. ReBlend manages to achieve an environmental profit of € 15.76 saved environmental costs per kilogram of ReBlend cotton compared to average textiles. (www.reblend.nl)

2.5 Platform (sharing) models

The core of platform (sharing) models is to increase the use of the existing functional capacity of assets (products) that are already in circulation. The assumption is that there is a lot of overcapacity available. By investing in digital 'commerce' through a website (platform), the intensity of use can be increased. On average, consumer products are used for a short to a very short period (e.g. 8 to 12 minutes for a drill). Platform (sharing) models aim to extend the lifespan by increasing the efficiency of the use of the product, its components, and the resources it contains. Platform (sharing) models focus on providing access to products. An additional effect is that by providing access to products, fewer products are needed to meet the required functionalities.

1 *Focus*: function, maintain and reuse
2 *Value creation*: transforming
3 *Organisation*: network
4 *Strategy*: reduce
5 *Support*: digitisation & datafication, material mediation platforms
6 *Revenue model*: shared ownership, open access, pooling, access
7 *Impact*: material savings.

CASES

FLOOW2 (LU) is a business-to-business, asset-sharing platform where companies and organisations can share, rent and sell unused products, services, waste, and materials/residual materials. In this way, waste is reduced, additional revenue is generated, and costs are lowered. Together, in 2019 users created € 129,154,864 extra turnover, 163,751,138 kilograms of CO_2, and 659,100 connections. (www.floow2.com)

Peerby (NL) is a consumer-to-consumer platform that makes it possible to borrow and lend items, since 80% of items are not used more than once a month. Peerby lists all the items that can be borrowed and rented in the neighbourhood. By sharing, less needs to be produced, which reduces CO_2 emissions. Peerby has 200,000 users. (www.peerby.com)

iFixit (US) is a consumer-to-consumer platform that hosts repair manuals to allow people to repair their devices themselves to reduce electronic waste. Users can create their repair manuals for a device, and these can be edited and improved by other users. There are 76,893 free manuals on iFixit. (www.ifixit.com)

2.6 Product-as-a-Service models (PAAS)

In Product-as-a-Service models, maximum effort is made to provide a user with access to the function of a product. The user no longer automatically becomes the owner of the product. Agreements are made concerning (1) the use of a product (access), (2) a certain performance level in terms of functionality, (3) several conditions including the quality of the performance and a predetermined fee. Product-as-a-service leads to performance arrangements (dematerialisation).

1. *Focus*: function
2. *Value creation*: transforming (through better utilisation)
3. *Organisation*: network
4. *Strategy*: reduce
5. *Support*: digitisation and datafication, competencies
6. *Revenue model*: subscription, sharing concepts without ownership, lease, pay-per-use, product-as-a-service, rental
7. *Impact*: material savings.

CASES

Swapfiets (NL) is a company that offers bikes for a fixed monthly fee, which includes maintenance. The company remains the owner of the bike. Swapfiets has over 250,000 bikes in circulation in nine countries and has started a collaboration with Roetz-Bikes to have bikes remanufactured at the end of the first lifecycle so they can be used again. (https://swapfiets.nl/)

MUD Jeans (NL) offers the use of a pair of jeans for a fixed amount per month, after which the consumer is motivated to return the jeans. Purchase is also possible. It has a turnover of € 1.6 million (2020) and sold 45,000 pairs of jeans in 2020. (https://mudjeans.nl/)

Signify (NL) offers light as a service, whereby a monthly fee is paid. Installation and maintenance are included. The company currently connects more than 86 million light points and uses these light points as efficiently as possible by exploiting their unused potential. Signify was founded by Philips and now has an annual revenue of € 6.5 billion (2020). (https://www.signify.com/nl-nl)

2.7 End-of-Life models

European legislation regarding obligations for producers has led to the implementation of the Extended Producer Responsibility (EPR). Producers and importers retain responsibility for the products they make even after the use or disposal phase. This means that producers and importers retain responsibility for the collection and safe and proper processing of the products they have made/imported. End-of-life models give substance to this by registering and tracking products and materials (passively and interactively) in a detailed and increasingly digital way. To realise this, these business models are characterised by the use of data and digitalisation of products and virgin materials. This also creates insight into the current and future commodity supply and its quality. This can be supported by a materials passport that records the composition of a product during design and production. In addition, 'track and trace' systems are used to follow products during the usage phase, and producers/importers gain insight into

the development and location of materials stock over time.

1 *Focus*: function, maintain, reuse, recover
2 *Value creation*: circularising
3 *Organisation*: chain, loop (system)
4 *Strategy*: reduce, reuse
5 *Support*: digitisation & datafication, technical infrastructure, stock management
6 *Revenue model*: data and analytics-as-a-service, maintenance and inspection
7 *Impact*: material savings, reuse, CO_2 reduction.

CASES

Interseroh (DE) offers business services in the field of closing loops. Interseroh offers its customers assistance in improving the sustainability performance of the company. It supports ALDI, for example, in making its packaging material circular. In 2020, Interseroh made € 704.6 million in sales. (https://www.interseroh.de/)

MAN Fleet Management (DE) helps companies to manage their truck fleets efficiently. It supports them in reducing CO_2 emissions and ensures they keep track of depreciation. In addition, MAN alerts the fleet owner about the expiration of required documents and reminds them of maintenance and inspections when they are due. MAN offers this service when their trucks are sold. In 2020, 118,000 trucks and buses were sold. (https://www.man-fleetmanagement.co.uk/)

I:CO (DE) offers an innovative take-back system for clothing and shoes to circulate in product and resource loops. The collection takes place at participating retail locations and the delivery party receives compensation. I:CO processes about 500 tonnes of used clothes and shoes every day in 74 countries. I:CO works together with major brands like H&M, Adidas, Esprit and Jack&Jones. (https://www.ico-spirit.com/en/)

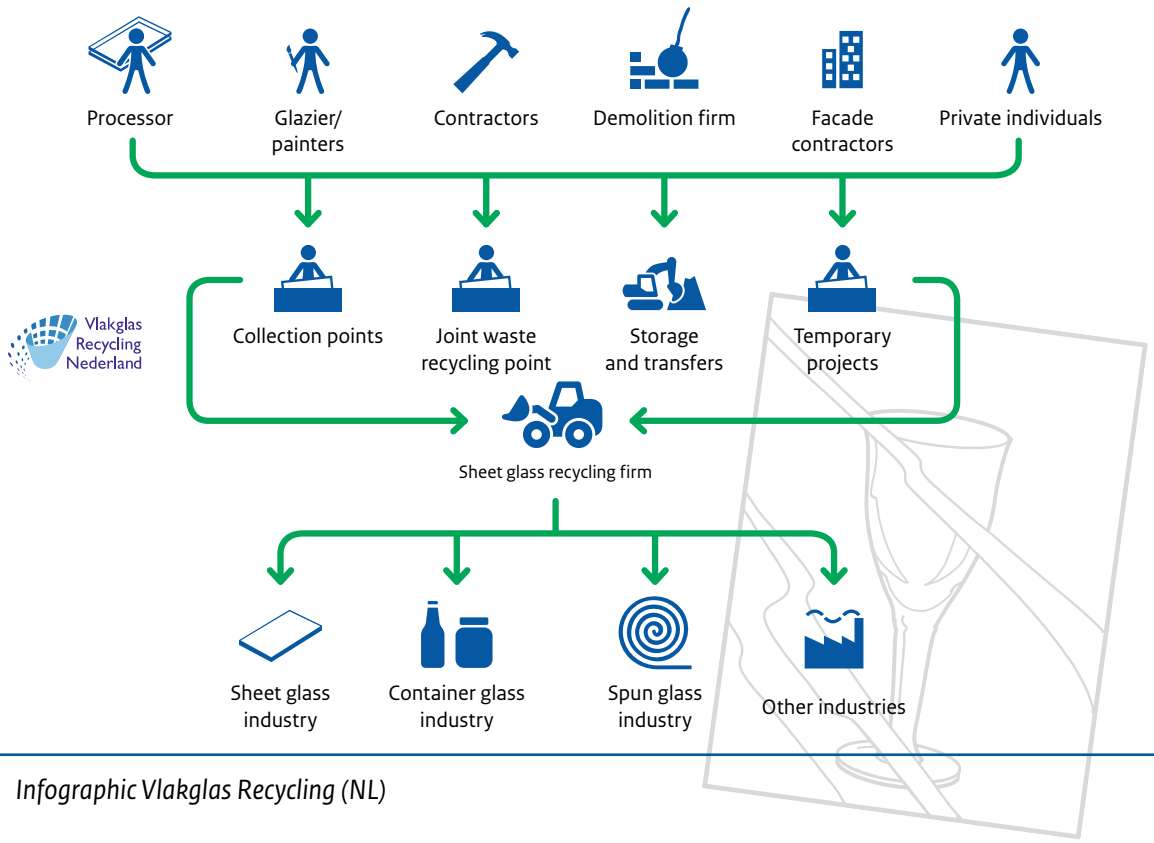

FIGURE 8 *Infographic Vlakglas Recycling (NL)*

Vlakglas Recycling Nederland (NL) collects waste sheet glass and takes it to a recycling company for processing into new glass, such as double-glazing, mirrors, and interior glazing. Sheet glass is used in residential and non-residential construction. Clean sheet glass is 100% reusable. Through re-use, one kilogram of broken glass saves 1.2 kilograms of primary resources. Since its founding in 2002, Vlakglas has collected over 1.384 million tonnes of sheet glass waste. In 2020, almost 87,500 tonnes of plate glass was collected and offered for recycling. (www.vlakglasrecycling.nl)

2.8 Lifecycle models

The basic principle of lifecycle models is that producers retain ownership of the products (including components and used materials) they make throughout the entire lifecycle (the Producer Ownership principle or Producer Lifecycle Ownership). These business models then aim for full servitisation. Producers keep maximum control over the materials they use in their products, including the recyclates recovered from them, and can thus close the entire loop. The ambition to be able to fully close loops is leading the choice for virgin materials, product design, service organisation, and supporting processes such as product and take-back systems and digitalisation.

1 **Focus**: design, make, function, maintain, reuse, recover
2 **Value creation**: transforming, recycling, circularising, social, ecological
3 **Organisation**: loop, system
4 **Strategy**: rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle
5 **Support**: digitisation & datafication, return logistics, competencies, quality assurance
6 **Revenue model**: subscription, use of residual flows and recyclates, buy-back, lease, maintenance and inspection, extended lifespan, guarantee
7 **Impact**: virgin material savings, CO_2 reduction.

CASES

BlueMovement (NL), part of BSH Huishoudapparaten (BSH household appliances), is a subscription model in which consumers choose to use an appliance instead of owning one. During the subscription period, which varies from six months to six years, BlueMovement carries out repairs free of charge. At the end of the subscription period, devices are refurbished and reused. At the end of its lifecycle, the device is recycled. In this way, materials are used for as long as possible. BSH carries out its business activities without leaving an ecological footprint. In 2020, BSH had a turnover of € 13.9 billion. (https://www.bluemovement.com/nl-nl)

Gerrard Street (NL) produces headphones circularly, focused on reaching the longest possible lifespan to prevent electronic waste. The headphones are designed in a modular way so that parts can be repaired in case of defect or wear. Gerrard Street will take back the old parts for repair, reuse, or recycling. Consumers can choose whether to buy the headphones with a lifetime warranty or to use them via subscription. Since its inception in 2015, Gerrard Street has saved 2,000 headphones from the electronic waste pile (2020). (https://gerrardstreet.nl/)

Kodibox (BE) provides movers with solid plastic moving boxes. Movers can rent the moving boxes. The moving boxes can be reused 400 times and are 100% recyclable. The plastic moving boxes emit sixteen times less CO_2 than cardboard boxes. Kodibox is part of Vervaet Verhuis which has an annual turnover of € 800,000 (2019). (https://www.kodibox.be/nl)

Logge (NL) provides customised work in circular office design. Logge only uses renewable materials and ultimately wants to bring all products back into the material loop so that there is no more waste. Logge uses different methods for circular interior design: (1) circular interior, (2) circular interior with buy-back guarantee, (3) service of circular interior (Product-as-a-Service (PAAS)), (4) material passport, and (5) true price. In addition to circular projects, Logge also focuses on projects that reuse or refurbish existing materials. Since 2016, Logge has completed 41 projects with a variety of clients (e.g. PA Consulting Group, Baker & McKenzie, DSM). (https://logge.nl/)

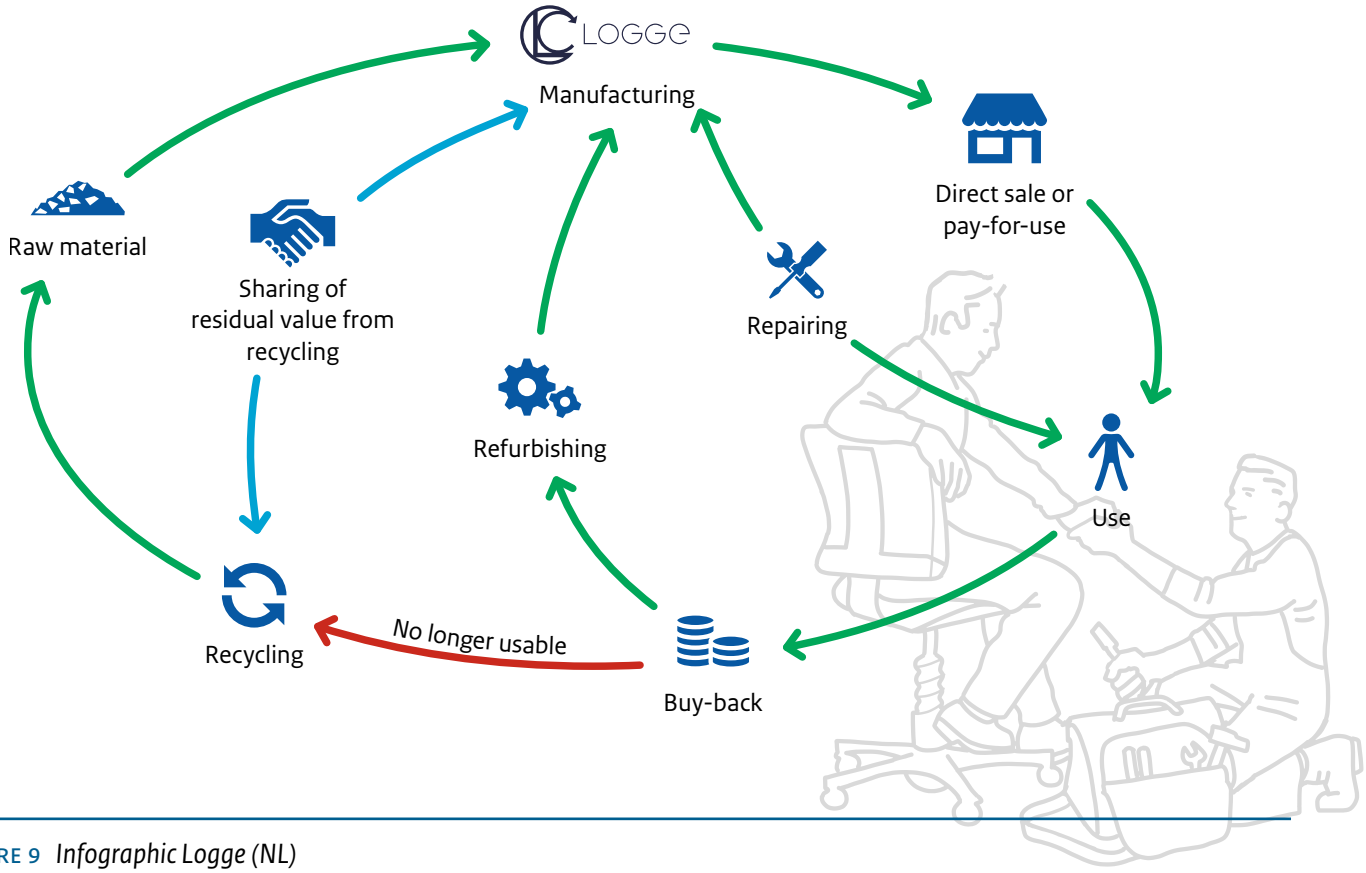

FIGURE 9 *Infographic Logge (NL)*

PART 3
Quick Scan

3.1 Structure of the Quick Scan

The Quick Scan consists of two phases and ten building blocks.

In this first part of the Quick Scan, you will examine, based on five building blocks, where you stand with your organisation when it comes to organising sustainably and circularly. This is done based on questions that you are asked to score on a five-point scale. For each building block, you will find a separate set of randomly ordered questions. It is a Quick Scan, so there is a quick analysis. The result is a 'total picture' and helps gauge whether you are a beginner, advanced, or a frontrunner in the field of sustainability and circularity.

Phase one: determining the position

1 *Priority*. What priority does it have to organise sustainably and circularly?
2 *Experience*. Where do we currently stand when it comes to organising sustainably and circularly?
3 *Ambition*. Where do we want to go as a company when it comes to organising sustainably and circularly?
4 *Current business model*. To what extent is organising sustainably and circularly already included in our current business model?
5 *Outcome, Quick Scan Part 1*: Where do we stand as a company based on the above four analyses?

In the second part of the Quick Scan, you look at five building blocks that can be used to design a sustainable and circular business model or to adapt an existing business model. These building blocks are:

Phase two: developing or adapting the business model

1 Base type of business model. Which choice of base model best fits your ambition from the offered classification of circular base models?
2 R-strategy. Then choose from one, or a combination, of the so-called R-strategies to fill out your base type of circular model.

FIGURE 10 *Structure of Quick Scan*

3 Organisational form. What is the most appropriate organisational form?
4 Supporting processes. Which supporting processes are crucial (and do you know about them)?
5 Revenue models. Choose one or more revenue models from the large selection.

The result of the choices you make from this second set of five building blocks is always a self-chosen mix & match. You look at what you think fits your situation and ambition. So there is no right or wrong, or better or worse choice. The aim is to find what business model best suits your current experience and ambitions, based on your choices.

In this Quick Scan, we have chosen to look primarily at the use of raw and processed virgin materials and their impact. However, social and ecological sustainability is just as important.

3.2 Phase one: determining the position

3.2.1 DETERMINING PRIORITY

Why is organising sustainably and circularly important for your company?

Please circle the answers that apply to you on a scale from 1 (not applicable) to 5 (very applicable). More than one answer may apply.

Add up your scores. The result is: . . . (fill in your score).

- Between 10 and 20 points: organising sustainably and circularly is not a priority at the moment.
- Between 21 and 30 points: organising sustainably and circularly is already known to you, but there are still many opportunities to strengthen this.
- Higher than 30 points: organising sustainably and circularly is currently a high priority for you.

☐	It is financially attractive through subsidies, for example.	1 2 3 4 5
☐	To get staff, we do need to be sustainable and circular.	1 2 3 4 5
☐	As a company, we have the ambition to be sustainable and circular.	1 2 3 4 5
☐	Working on sustainability and circularity has a positive influence on our market position.	1 2 3 4 5
☐	We want to avoid problems with resource scarcity in the future.	1 2 3 4 5
☐	It is already important to our business.	1 2 3 4 5
☐	We'll soon have legislation to comply with.	1 2 3 4 5
☐	Our customers will increasingly expect it from us.	1 2 3 4 5

3.2.2 EXPERIENCE WITH ORGANISING SUSTAINABLY AND CIRCULARLY

What have you done up to now in terms of organising sustainably and circularly?

Please circle the answers that apply to you on a scale from 1 (not applicable) to 5 (very applicable). More than one answer may apply.

☐	Organising sustainably and circularly is already known to us.	1 2 3 4 5
☐	Our production is already more efficient and we produce less waste.	1 2 3 4 5
☐	We use recycled materials in our products whenever possible.	1 2 3 4 5
☐	Organising circularly is not a choice but a strategic necessity.	1 2 3 4 5
☐	We are saving energy and have started to generate our own.	1 2 3 4 5
☐	Internally, we are working towards a fully circular production process.	1 2 3 4 5
☐	We have started to develop the chain circularly, in cooperation with parties in the chain.	1 2 3 4 5
☐	We are in the process of taking back our products (or parts) after use.	1 2 3 4 5

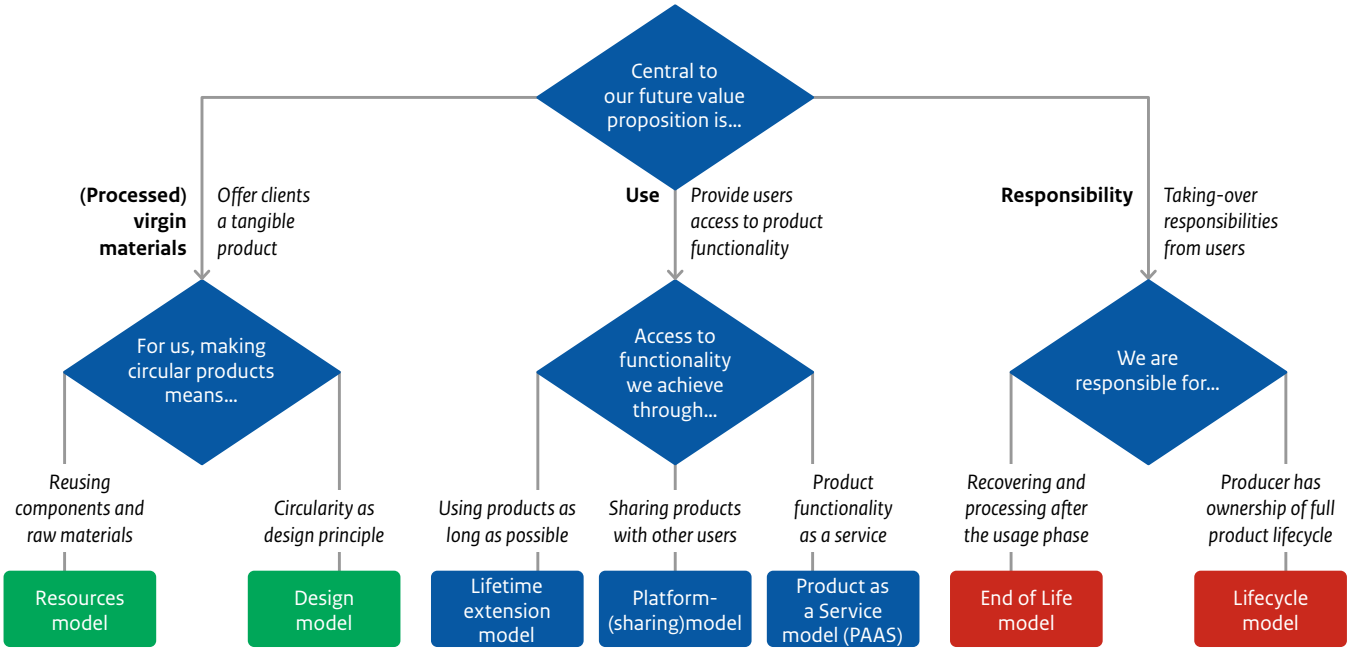

FIGURE 11 *Flowchart for CBM ambition*

Add up your scores. The result is: . . . (fill in your score).

- Between 10 and 20 points: you have a starting point.
- Between 21 and 30 points: you are already making good progress and have perhaps reached a point where taking action is the norm.
- Higher than 30 points: this means that sustainability and circularity are core issues for your company. Organising sustainably and circularly is a core concern for your company.

3.2.3 AMBITION

How do you want to develop further in the coming years in the field of organising sustainably and circularly?

Please circle the answers that apply to you on a scale from 1 (not applicable) to 5 (very applicable). More than one answer may apply.

☐	We have clear plans for the coming years.	1 2 3 4 5
☐	We want to work towards production with reclaimed and recycled materials.	1 2 3 4 5
☐	We are going to make the design and maintenance of our products circular.	1 2 3 4 5
☐	Our customers will only see our products if they purchase a service.	1 2 3 4 5
☐	We are moving towards full lifecycle responsibility for our products.	1 2 3 4 5
☐	We adapt to legislation and regulations step by step.	1 2 3 4 5
☐	In about 10 years we want to be a circular and sustainable company.	1 2 3 4 5

Add up your scores. The result is: . . . (fill in your score).

- Between 10 and 20 points: you are not really engaged with organising sustainably and circularly.
- Between 21 and 30 points: you have clearly started with organising sustainably and circularly but there are still plenty more steps to take.
- Higher than 30 points: you are already well on your way with organising sustainably and circularly.

Look at the flow chart in Figure 11 and determine what your ambition is.

Please indicate your ambition below and complete the statements:

- For us, making circular products means . . . . . .
- We provide access to functionality through . . .
- We are responsible for . . . . . .

It may be that the above answers are not unambiguous but rather lead to a mixed response. Should that be the case, please indicate where your priority lies.

- Our priority (for at least the next five years?) is . . . . . .

3.2.4 CURRENT BUSINESS MODEL

To what extent is organising sustainably and circularly already part of your organisation and incorporated in your business model?

☐	We have been taking a critical look at our current business model for years.	1 2 3 4 5
☐	We are looking at how product-as-a-service can be embedded in addition to service.	1 2 3 4 5
☐	We use our waste as recycled material for new products more and more often.	1 2 3 4 5
☐	The value retention of products is central for us, right from the design phase.	1 2 3 4 5
☐	The law requires us to process a percentage of recycled material.	1 2 3 4 5
☐	We try to close a loop with partners.	1 2 3 4 5
☐	We offer our customers digitisation and tracking of products in use in order to propose service just-in-time (JIT), or even before.	1 2 3 4 5

Please circle the answers that apply to you on a scale from 1 (not applicable) to 5 (very applicable). More than one answer may apply.

Add up your scores. The result is: . . . (fill in your score).

- Between 10 and 20 points: you most likely have a conventional business model, based on a purely financially driven model.
- Between 21 and 30 points: in some respects, you are already working on incorporating sustainability and circularity into your business model, such as (for example) crediting or the inclusion of return flows.
- Higher than 30 points: it is clear that you have already implemented sustainability and circularity in your business model and are committed to, for example, collective business models and working with true price.

3.2.5 RESULTS OF THE FIRST PHASE

At the end of the five steps of the first stage, you perform a post-analysis calculation, which has a visual result – a so-called radar plot. Proceed as follows:

- Copy the scores from the previous four analyses.
- Plot these in the radar plot below.
- Connect the scores with a line.

This provides a visualisation of your scores. This way you can see at a glance what your strengths and weaknesses are.

Interpretation:

- *Score per axis of 10–20*: you are still at the beginning of organising sustainably and circularly.
- *Score per axis of 21–30*: you have clearly started but there are still a lot of steps to take.
- *Score per axis of 31–40*: you are a frontrunner and looking for inspiration for the 'next step'.

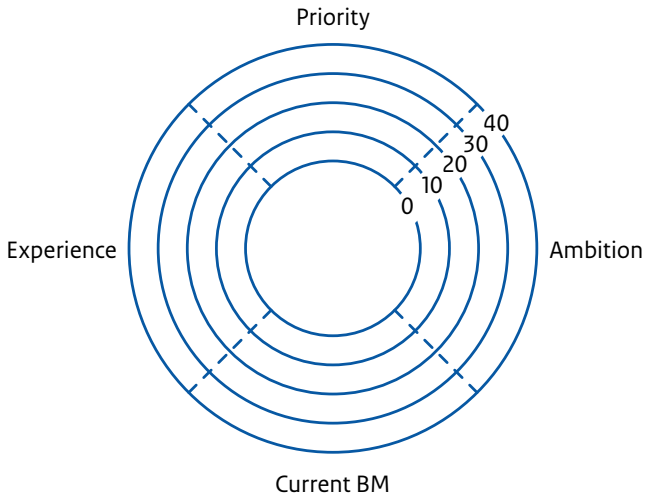

FIGURE 12 *Radar plot*

3.3 Phase two: developing or adapting the business model

In this second phase of the Quick Scan, you look at five building blocks that can be used to design a sustainable and circular business model. These are listed below in the order in which they are discussed and in view of the central question that is asked. The base type of circular business model is presented in Part Two. The other building blocks are presented in Part One.

- *Base type business model*. Which base type (or combination) of circular business model best fits your current experience and ambitions?
- *R-strategies*. Which R-strategy/ies best matches the result of your Quick Scan and, in particular, your ambition?
- *Organisational form*. What form of organisation can you best choose to realise that ambition?
- *Supporting processes*. Which supporting processes are crucial for the realisation of this business model (and do you have the knowledge and capacity for this in-house)?
- *Revenue models*. Which revenue model (or mix of models) best fits the choices made earlier?

3.3.1 BASE TYPE OF BUSINESS MODEL

Which base type (or combination) of circular business model best fits your current experience and ambitions?

For an introduction to these models, see Part One. In Part Two these models are presented based on their characteristics and on examples provided. There follows another overview of the seven circular business models used in this Quick Scan:

Models (1) and (2) focus more on the recovery and reuse of virgin materials (both raw and processed).

1 Resource models
2 Design models

Models (3), (4) and (5) focus on different and more efficient forms of use and utilisation.

3 Lifetime extension models
4 Platform (sharing) models
5 Product-as-a-Service models (PAAS)

Models (6) and (7) are future models and paint a picture of increasing producer responsibility.

6 End-of-Life models
7 Lifecycle models

- Choose from one, or possibly a combination, of several models and briefly explain the motivation for your choice: . . . . . .

3.3.2 CHOICE OF R-STRATEGY

Which R-strategy/ies best match the result of your Quick Scan, and in particular your ambition?

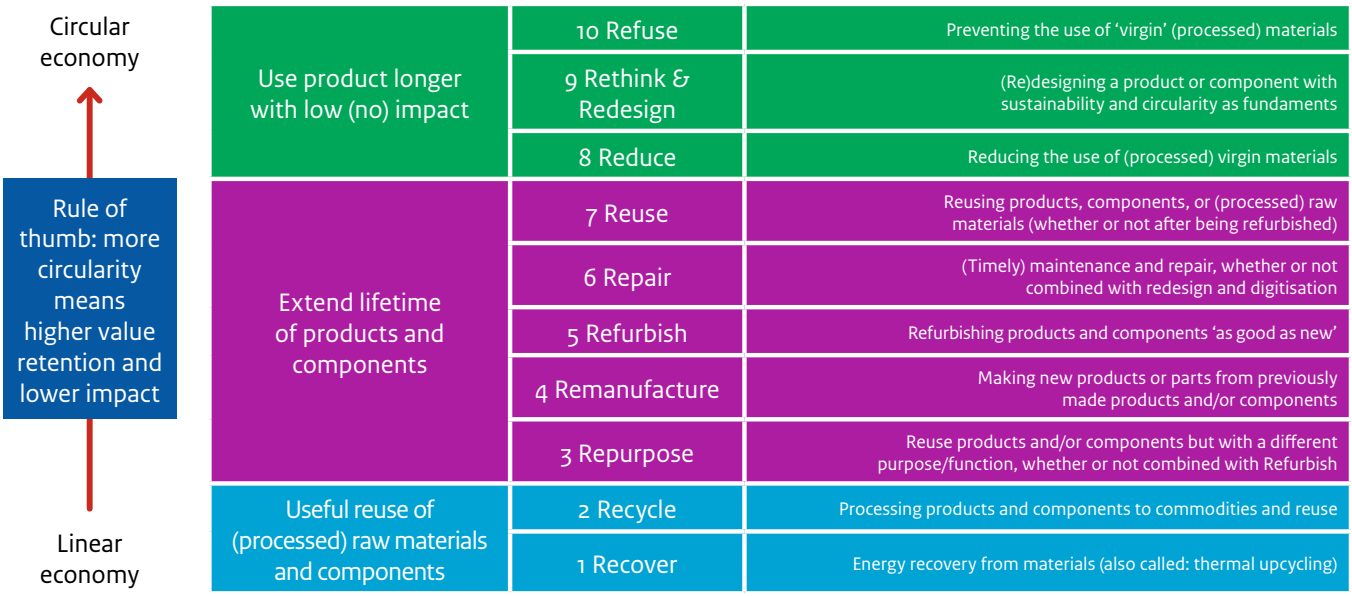

FIGURE 13 *The R-strategies*

The overview of 10 R-strategies shows a range of strategies that can help shape your sustainable and circular ambitions. The choice of strategy gives a further interpretation of the previously chosen circular base model. The different strategies are ranked based on increasing impact.

- Choose from one or more strategies and briefly explain the motivation for your choice: . . . . . .

3.3.3 ORGANISATIONAL FORM

What form of organisation can you best choose to realise that ambition?

A business model requires making choices, doing things, bringing people together, setting things in motion … in short, it requires organising. Working towards a sustainable and circular economy increasingly requires a different way of working together: from a pure focus on one's organisation to more and more attention for stakeholders, to working on co-operation (and shared revenue models) instead of competition. Realising this requires thinking about the choice of the organisation's form. This Quick Scan distinguishes four organisational forms:

1. The classical organisation (as we know it today)
2. Horizontal and vertical value chain integration
3. A multi-party loop
4. A system of loops and value chains.

It is not smart to choose multiple organisational forms at the same time. Then the number of parties involved in your business model increases exponentially and you risk getting an unmanageable (and also uncontrollable) complexity.

- Choose the form of organisation that suits you best and briefly explain the motivation for your choice: . . . . . .

3.3.4 SUPPORTING PROCESSES

Which supporting processes are crucial for the realisation of this business model (and do you have the knowledge and capacity for this in-house)?

Whatever business model you develop or adapt, there will always be a need for supporting processes. Think of return logistics, technical infrastructure, or quality control. Organising one or more

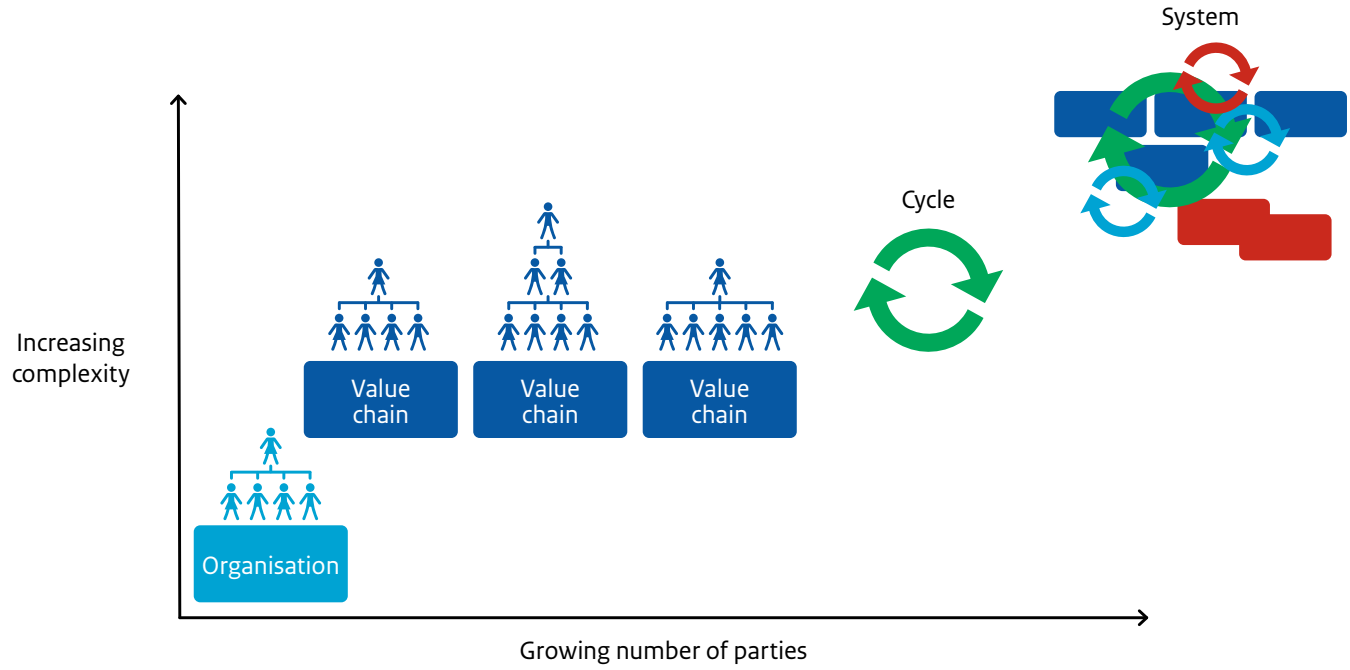

FIGURE 14 *Overview of organisational forms*

of these processes can be crucial to the success or failure of what you want to do. A schematic overview is given below. This has been kept limited for practical reasons.

Indicate what you consider – given the previous choices – to be crucial supporting processes. Choices here are limited to three (but there are of course more possibilities). If possible, check whether you already have the knowledge, competencies, and organisation for these processes in-house or in your network/value chain.

FIGURE 15 *Supporting processes*

1 Supporting process:

- Knowledge and Competencies this requires
- Organisation(in-house,network/valuechain)

2 Supporting process:

- Knowledge and Competencies this requires
- Organisation(in-house,network/valuechain)

3 Supporting process:

- Knowledge and Competencies this requires
- Organisation(in-house,network/valuechain)

3.3.5 REVENUE MODELS

Which revenue model (or mix of) will be chosen that best fits the choices made earlier? Choose one or more revenue models from the large selection.

Revenue models show how an organisation, a value chain, or a loop generates income, what the nature of that income is, and for whom it does that (obviously for customers but also for stakeholders). This is often referred to as the 'business case'. Even more confusing is that the business model (the logic of value creation) and business case (Where is the revenue stream? Can this be done?) are mentioned in one breath. But there is more to it than just turnover or margin. Increasingly, additional requirements are set, such as emission-free construction or contributions to CO_2 reduction. But also, for example, a contribution to enable reuse. Revenue models can therefore be stacked: it's all about the combination that fits a particular situation. The trick is to choose the revenue models that make that possible. Below is an alphabetical overview of the revenue models available.

Indicate what you consider – given the previous choices – to be one or more of the most suitable revenue models. Choices here are (again) limited

Access	Extended lifetime (with or without warranty – possibility to buy additional warranty time)	Sales (transaction with the transfer of ownership)
Analytics-as-a-Service (AAAS) including remote monitoring and diagnostics	Freemium model (with limited scope services for example)	Settlement based on less (operational) use of virgin materials
Barter (goods against goods, services against services, or a non-monetary combination)	Lease (financial and operational)	Shared ownership – in whole or in part
Bonus-Malus arrangement	Maintenance and inspection (whether or not based on datafication and digitalisation – see DAAS)	Sharing concepts without ownership (partial and full)
Buy-back (with or without guarantee of repurchase value)	Marketplace (C2C, B2B, B2C, and C2B)	Smart pricing (depending on usage, behaviour, governance, quality at the end of usage, etc.)
Circularity contribution (formerly the disposal contribution)	Open Access (paying revenue in advance and then releasing it)	Subscription (to time, performance, access, etc., with or without a usage component)
Compensation such as ETS or tree planting	Pay-per-Performance, Performance-as-a-Service, or Pay-per-Use – paying for actual performance	True price (retail and hidden costs)
Cross-selling (easy to combine with e.g. Freemium)	Pooling (owned, leased, partial, full, etc.)	Use of recycled materials (legally required, or used voluntarily independent of legislation)
Data-as-a-Service (DAAS) – easy to combine with AAAS	Product-as-a-Service (PAAS) and its many variants such as Fashion-as-a-Service (FAAS), Mobility-as-a-Service (MAAS).	Use of residual flows (legally required, or used voluntarily independent of legislation)
Deposit	Production on demand (the famous 'Just in Time' approach – JIT)	Voucher discount on trade-in/new purchase (branded/non-branded)
Emission reduction such as CO2 impact reduction, PFAS reduction, or emission-free production	Rental (i.e. usage per time unit)	Warranty (extended, extra, lifetime)

TABLE 2 *Overview of revenue models*

to three (but there are of course more possibilities). If possible, find out where you already see this revenue model (or combination of models) in practice.

1 Revenue model:
   - Can be combined with
   - Can also be combined with
   - Already successfully applied in practice

2 Revenue model:
   - Can be combined with
   - Can also be combined with
   - Already successfully applied in practice

3 Revenue model:
   - Can be combined with
   - Can also be combined with
   - Already successfully applied in practice

3.4 Findings of the Quick Scan and how to get started

3.4.1 SYNTHESIS

In this last part of the Quick Scan, you are invited to synthesise your previous answers. This is qualitative. All in all, it provides a picture that you can use to adapt an existing business model or to design a new business model. This is done based on the following central question:

What is the result of your choice to create a new business model or to adapt an existing business model?

Based on this synthesis, two follow-up questions can be asked. Does it lead to a new value proposition, and if so, what is it?

Copy (if convenient) the previously given answers.

- Choice of the base type of circular business model:
- Choice of R-strategy/ies:
- Choice of organisational form:
- Choice of supporting processes:
- Choice of revenue models:

3.4.2 VALUE PROPOSITION

If the outcome of this Quick Scan is a new business model, how would you best describe its value proposition?

It can be useful to test this new value proposition with employees, colleagues, and customers.

3.4.3 CHANGES

If the outcome of this Quick Scan results in the modification of an existing business model, how would you best describe the nature of the changes that this requires?

We make a distinction here between three levels of change, classified according to the degree of impact:

- Improvement
- Transformation
- Transition
- The focus of this business model is mainly on realising improvements and changes in the course of events in the organisation. Be as specific as possible about which improvements etc. it concerns.

- This business model requires a fundamentally different way of working that turns the existing way of doing things on its head. Be as specific as possible about the nature of the transformation.

- If this is our ambition, we will have to work together to develop a different system – which may take 10 years or more. Be as specific as possible about what the system transition entails.

3.5 Inspiration for the next step

Using this Quick Scan should provide insight into your existing business model and offer building blocks to adapt that model or to develop a new one when it comes to sustainability and circularity. The assessment is done in a so-called 'qualitative' way: the focus is not on calculating but on the design of a circular business model. The result is a concept which has had to be developed in more detail. Some help to do so might come in handy. Below, support is provided in the form of some suggestions for additional tools, training opportunities, and networks. The suggestions provided here just represent the tip of the iceberg since much more is available. Consider it to be a source of inspiration for the next step.

Additional tools

BUSINESS MODEL TEMPLATE

The Business Model Template offers an interactive practical structure for the development of a sustainable business model. The template consists of ten building blocks divided into three phases: the Definition phase, the Design phase, and the Result phase. The building blocks are developed per phase and consistently connected to each other. It thus supports the joint creation of a value proposition with a positive impact. More information: https://businessmodellab.nl/tools/business-model-template

CIRCULARITY CHECK

The Circularity Check is primarily intended as a product-based tool for self-evaluation by companies, from SMEs to multinationals. It is a free, online scan tool with a questionnaire of about 60 questions that determines a circularity score for a specific product and/or service. Is the product circular and sustainable, and if so, to what extent? A score is assigned to each question. The higher the score the better. The outcome of the check is a % that indicates how circular your product/service is. The check also provides partial scores on design/procurement/manufacturing, delivery, use, recovery and sustainability. More information: https://ecopreneur.eu/circularity-check-landing-page/

PARTNER & STAKEHOLDER ANALYSIS

The Partner & Stakeholder radar helps to identify who the partners and stakeholders of a company are. It helps to see which partners the company depends on and what their influence is on the company. This way you can determine which relationships with partners and stakeholders need to be maintained. More information: https://businessmodellab.nl/tools/partner-radar

ORGANISING CIRCULARLY

The Organising Circularly drawing tool makes it easy to sketch a loop. The drawing tool offers a library of symbols and arrows in the style of the book Organising Circularly. Users can draw freely or use one of the offered templates as a starting point. Once drawn, the loops can easily be saved for later editing. More information: https://businessmodellab.nl/tools/circulair-organiseren

Training opportunities

CHANGING THE GAME

The call has been getting louder for years. If we want to solve sustainability problems, then the system and the markets have to change. That sounds fantastic and smart. But what does it mean and how do we set about doing it? The secret of sustainability is to understand what phase of system change we are in and then to ensure that the right parties do the right things. You will learn how this works for your organisation and your role as a leader in the five-day Changing the Game training scheme. More information: https://leadsustainablechange.org/the-course/

CIRCO

The circular economy does not come about by itself. CIRCO focuses on creating a new market. With the support of the government, CIRCO activates entrepreneurs and creative professionals to design or redesign products, services, and business models to do business circularly. This makes organising circularly possible in many cases. CIRCO has developed a proven method, the Circular Business Design Tracks. More about what CIRCO has to offer: https://www.circonl.nl

SME GROWTH SUBSIDY (BELGIUM)

The SME Growth grant gives support to companies that are taking the first step towards organising sustainably and circularly (or are already active in this and want to take the next substantial step). The company receives a subsidy for the purchase of advice from an external service provider or for the recruitment of a new strategic employee. The project focuses on one or more circular economy strategies with a view to efficient and smart use of materials or closing material loops. More about this offer by the Belgian agent VLAIO: https://www.vlaio.be/nl/subsidies-financiering/kmo-groeisubsidie/wat-houdt-deze-subsidie

CIRCLE SPEED (BELGIUM)

A unique training programme on circular and energy-efficient business tailored to SMEs and independent entrepreneurs. During the training, entrepreneurs are guided to review and adapt their business model. This is achieved through classroom sessions, webinars, company visits, and personal coaching. The participants will work towards a solution with their specific case. Finally, the updated business plans are subjected to a feasibility study. More about the Circle Speed offer: https://www.circlespeed.be

BUSINESS MODEL TEMPLATE (MOOC)

A Massive Open Online Course (MOOC) entitled Organising for Sustainability has been developed by 12 higher education institutions (partly thanks to a SURF grant) to help them develop a sustainable or circular business model. The MOOC is aimed at students, start-ups, and entrepreneurs who use the Business Model Template (BMT) to work systematically on developing a new or modified sustainable, circular, or social business model. Click here for more information: https://mooc.saxion.nl/courses/course-v1:SAXION+OfS1+2122q1/about?utm_source=MOOC+Organizing+for+Sustainability. The MOOC is based on our book Organizing for Sustainability, also available as a free download: https://link.springer.com/book/10.1007/978-3-030-78157-6

Networks

In Europe, there is a rich variety of National and International networks (sometimes also called 'hubs') when it comes to fostering the circular economy. Some are exclusively business oriented, others are more focused on developing knowledge. It is impossible to provide an overview of all these networks since in the Netherlands alone we have already counted 42 of them. Some of these networks are mentioned below, purely as examples.

ELLEN MACARTHUR FOUNDATION

The Ellen MacArthur Foundation works to accelerate the transition to a circular economy. It develops and promotes the idea of a circular economy, and works with business, academia, policymakers, and institutions to mobilise systems solutions at scale, globally. It is a charity committed to creating a circular economy, which is designed to eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature, leading to an economic system that delivers better outcomes for people and the environment. It supports organisations and individuals with formal learning opportunities through its circular economy courses, and creates resources for teachers and academics. https://ellenmacarthurfoundation.org

EUROPEAN CIRCULAR ECONOMY STAKEHOLDER FORUM

This website is a joint initiative by the European Commission and the European Economic and Social Committee bringing together stakeholders active in the broad field of the circular economy in Europe. As a 'network of networks', it goes beyond sectorial activities and highlights cross-sector opportunities. It provides a meeting place for stakeholders to share and scale up effective solutions and address specific challenges. The platform bridges existing initiatives at the local, regional and national levels, and supports the implementation of the circular economy. It provides almost daily updates on news and events, an extensive toolbox with a variety of tools and guidelines, an overview of national CE networks, and much more. https://circulareconomy.europa.eu/platform/

HET GROENE BREIN (NL)

With a network of almost 150 scientists, Het Groene Brein (The Green Brains) supports entrepreneurs who want to take steps towards a new, sustainable economy. In concrete programmes, it connects science, businesses, and other parties in realising radical innovations and answering concrete sustainability questions from organisations. More information: https://hetgroenebrein.nl

MVO NEDERLAND (NL)

MVO Nederland is a movement of entrepreneurs in the new economy. It forms a network of partners that innovate and implement together to achieve the new economy. Entrepreneurs take a share in the new economy with MVO Nederland and future-proof their businesses. More information: https://www.mvonederland.nl

NORDIC CIRCULAR HUBS

The project establishes a Nordic network, aiming to support the practical development of Industrial-Urban Symbiosis (IUS) practices in the Nordic regions by increasing communication and cooperation among key stakeholders. Furthermore, building on the existing experiences, Nordic Circular Hubs aims to develop a replicable 'Nordic symbiosis model' for accelerated regional circular business development. https://www.nordicinnovation.org

VLAANDEREN CIRCULAIR (FLANDERS CIRCULAR) (BELGIUM)

Flanders Circular is a hub and inspiration for the circular economy in Flanders. It is a partnership of authorities, companies, and the knowledge institutions taking action together. In addition, Flanders Circular is a broader movement of citizens, entrepreneurs, civil society organisations, local authorities, and more who want to set up initiatives in the circular economy. We actively connect and support them. https://vlaanderen-circulair.be/nl

A glossary of terms can be found in the Annex (Glossary).

Biological cycle Preserving value in the biological loop involves creating and using materials which (1) fulfil the function(s) for which they are intended during the usage phase. In doing so, these materials are selected and processed in such a way that (2) they retain their basic biological properties and can thus (3) be incorporated into the biological decomposition processes when they are discarded. Finally, these biological materials are (4) derived from biological growth processes. (5) Under the same conditions, biological materials are a potentially infinite source for construction materials, provided that their 'source' remains of equal quality.

The *Circular Manufacturing Industry Implementation Programme* is a partnership of industry, government, and knowledge institutions that is committed to the circular transition of the Dutch manufacturing industry. *Circular Economy and Smart Industry (CESI)* shows that digitisation and new technologies offer many opportunities for the efficient use of virgin materials and the high-quality reuse of products. https://circulairemaakindustrie.nl/themaproject/smartcirculair/

Circularity is about organising retention of the value of virgin materials (both raw and processed), components, and products in loops, which leads to an extension of the lifespan and has a lower environmental impact.

CMP1 (Circular Materials Plan 1) will succeed LAP3 in 2024. CMP1 is intended to extend the scope of LAP3 and to focus more on the higher steps in the waste hierarchy, such as recycling and prevention. In addition, the regulations contained in the CMP are to be made more directly binding.

Datafication is the realisation of value from data.

Eco-efficiency is the aim of producing goods and services with lower consumption of virgin materials coupled with lower waste production and pollution (sustainability).

Ecology of loops (system) is a combination of different organisational forms (internal organisation, value chains, networks, and loops).

European Green Deal is a programme that aims to combat climate change. With the Green Deal, Europe would become a climate-neutral continent in 2050, with no greenhouse gas emissions and economic growth without resource depletion.

Extended Producer Responsibility (EPR) is a set of measures to ensure that producers take financial responsibility or financial and organisational responsibility for managing the waste phase of a product's lifecycle. https://www.uu.nl/sites/default/files/White-paper-over-Transitiepaden-voor-uitgebreide-producentenverantwoordelijkheid-op-weg-naar-een-circulaire-economie.pdf

'*Fit for 55*' is a package of measures taken by the European Commission to reduce greenhouse gas emissions in the EU by 55% in 2030 compared to 1990 levels. https://ecer.minbuza.nl/-/fit-for-55-pakket-van-europese-commissie-moet-leiden-tot-bereiken-van-klimaatdoel-en-door-de-eu

Impact is the effect, often powerful and sometimes lasting, that an event, action, or choice has on people and their natural, institutional, and/or social environment, and thus on the course of events, which in the long term arises from that effect. Impact can be measured by the nature of the change that takes place as a result of an event, action, or choice made.

LAP3 (Landelijk Afvalbeheerplan 3) is the most recent policy framework for waste in the circular economy in the Netherlands. All government authorities must take LAP3 into account when carrying out their duties in the field of waste. LAP3 is valid until the end of 2023. https://www.afvalcirculair.nl/onderwerpen/beleid-circulaire/landelijk/

Lifecycle is a cycle that a product goes through from development to decline. Among other things, reuse and recycling can extend the lifecycle of products.

Life extension is the pursuit of designing high-quality high-end products that last, smarter maintenance, and the use of new and refurbished materials and resources.

A *loop* is a (closed) process in which a certain complex of virgin materials in various compositions or functionalities succeed each other, but in which the initial state is reached again. Schematically, a loop can be drawn as a circle or circular movement.

Network is a collection of interconnected organisations, both across sectors and value chains, working together to extract virgin materials, process them and ultimately make products from them. The collection of organisations carries out activities collectively to create value.

Producer Ownership means that the producer retains ownership of a product or service and has the responsibility to ensure that products and materials are used efficiently throughout their lifecycle and are reused and recycled where appropriate. https://www.sitra.fi/en/articles/the-eus-sustainable-product-policy-framework-and-producer-ownership-models-are-key-to-mainstreaming-circular-business-models/

The *R-ladder indicates* the degree of circularity based on various *R-strategies*. From high to low on the R-ladder: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover. The higher on the R-ladder, the lower the use of virgin materials.

Substitution is the aim to replace virgin materials with sustainable or bio-based materials.

Sustainability is about reduced use of virgin materials (both raw and processed), fossil energy, and the reduction of negative emissions etc. during the process of making, using, and disposing of a product, its components, or virgin materials.

Value chain is a chain of organisations working together to extract virgin materials, process them and ultimately make products from them. The chain of organisations collectively carries out activities to create value.

Value creation is the basis for different moments and forms of value creation. The first means that there are several revenue-earning moments during a product's lifecycle. The second means that there is economic, social, and ecological value creation. This is commonly referred to as multiple value creation.

Value retention is the central principle of the circular economy. The aim is to safeguard (through design, maintenance, refurbishment, substitution, etc.) functional and material value so that products, components, and virgin materials last as long as possible.

Niels Faber is a researcher at Radboud University Nijmegen and a lecturer at Hanze University of Applied Sciences Groningen. His research focuses on the organisational aspects of sustainability and circular economy. This translates into themes such as new forms of organising, in particular the circular economy, the transition that this entails, and measuring progress in this regard. He has published numerous academic and professional articles and is co-editor with Jan Jonker of several books, including *Organizing for Sustainability* and the MOOC *Organizing for Sustainability*. He can be reached via e-mail: n.r.faber@gmail.com

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Thomas Hobé (assistant) has an interdisciplinary background with recurring themes like sustainability, circular economy, and our planet. He believes it is important that organising circularly and sustainably is made attractive in order to work towards achieving the climate objectives more quickly. With his work as a research assistant to this research on the classification of circular business models, he hopes to make a significant contribution to the field of sustainable business at the beginning of his career.

Jan Jonker is Emeritus Professor of Sustainable Business Practice at Radboud University Nijmegen. His work focuses on three interrelated themes: strategy, the development of new business models, and transition. In recent years, his work has increasingly focused on the transition issues of sustainability and circularity. With the help of many people, he wrote the bestsellers *Duurzaam Denken, Doen* (2010), *Nieuwe Business Modellen* (2015), *Circulair Organiseren* (2018) and *Sustainable Organising* (2021). With Niels Faber, he was also co-editor of the MOOC *Organizing for Sustainability*. He can be reached via email: janjonker@me.com

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ACCOUNTABILITY
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DISCLAIMER
Although the Ministry of Economic Affairs and Climate is the initiator of this research on circular business models and the Quick Scan – they, or any of the other sponsors – cannot be held responsible or accountable for any insights, opinions, or choices that are expressed in this Quick Scan. Only the authors are responsible and can be held liable for this.

LANGUAGE DISCRIMINATION
In no way is the intention of the use of male and/or female pronouns (her, his, him, she, he) discriminatory. Wherever 'she' is used in this text, 'he' can and may be read as well and where we use 'he', 'she' can and may be read. By using these gender binary pronouns, we in no way wish to exclude non-binary persons. The use of 'he' and 'she' as referents and as demonstrative pronouns is only intended to guarantee the readability of the text.

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During the development of this Quick Scan and the underlying research, the valuable feedback of many different reviewers has been incorporated. In the development of the classification, these were mainly specialists in the fields of policy, recycling, professional associations, and the wider circular economy. For the development of the Quick Scan, reviewers were mainly people from the field of organisational practice. We are very grateful to them for their constructive contributions. The extent to which and how their suggestions are incorporated is and remains entirely the responsibility of the authors.

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