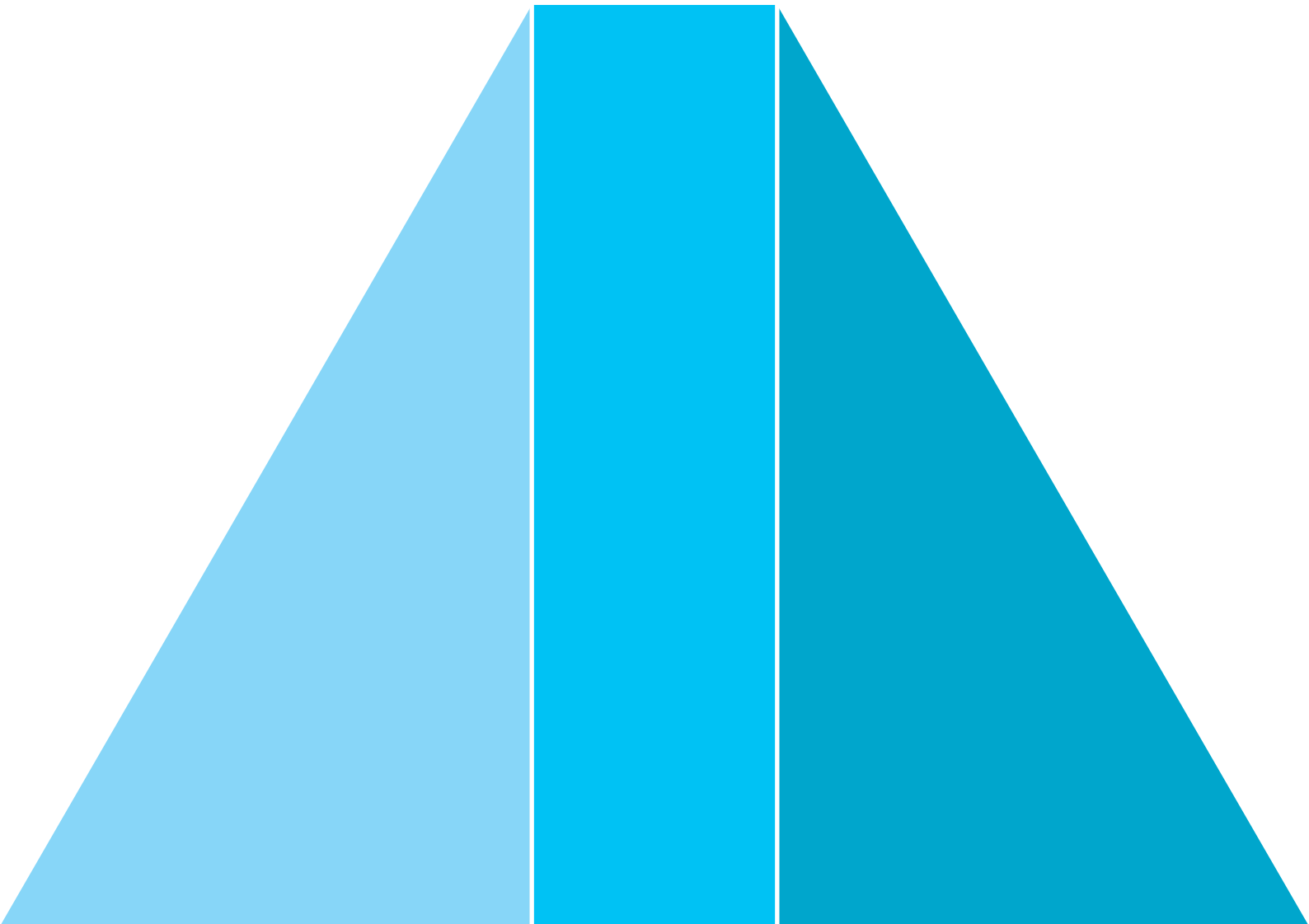


MASTER CIRCULAR BUSINESS WITH THE VALUE HILL





This paper provides a practical tool and language to position your business in a circular context and to identify gaps and opportunities to transition to a circular business strategy.

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Businesses incorporating the circular economy into their strategies perceive it as practical as well as a journey. Clear-cut, practical and scientific tools for this journey are beneficial to them and the Value Hill is such a tool.

**- Antoine Heideveld, Director
Het Groene Brein**



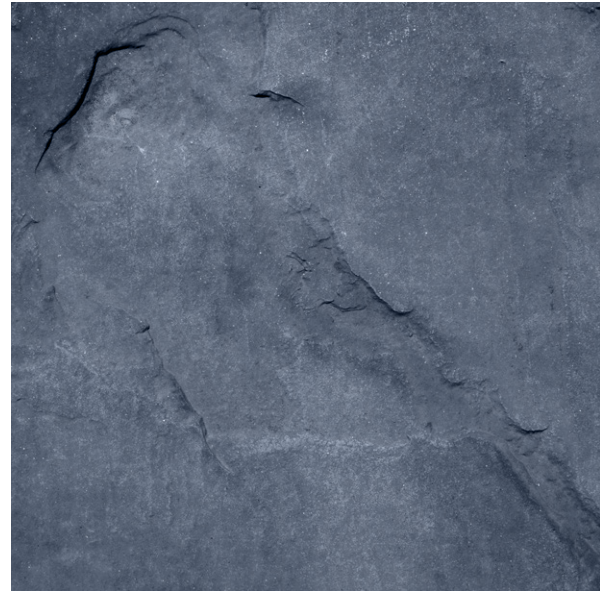
The Value Hill provides a great graphic to support storytelling on circular business strategies.

**- Stephan Sicars, Director
Environment Department UNIDO**

BACKGROUND

We live in a time of transition, where solutions are being sought out to resolve big societal, economic and environmental challenges. To address these challenges, we need to organise our activities and especially the way we do business in a different way. In a linear economy resources are extracted as if there are no limits and economic prosperity is the end goal for many businesses. However, this way of operating does not consider our social and environmental values. New business models are being invented to optimise these values while maintaining economic viability. This shift in the way we do business is from quantity (selling as many products as possible) to quality (creating a business model around a product's longevity and closing resource cycles).

While researching financial barriers for entrepreneurs with circular business strategies, we encountered many different categorisations and listings of circular business models. This enforced



the demand for a simple, balanced categorisation of these strategies and an overview of the circular business models that currently exist. In the report “Money Makes The World Go Round” (FinanCE Working Group 2016), a simple categorisation was established that enabled structuring for corresponding financial challenges. This categorisation was seen as a clear framework, especially for entrepreneurs transitioning towards a circular business model. Therefore this categorisation was extended with a corresponding appealing visual of the Value Hill (Hinfelaar et al., 2016).

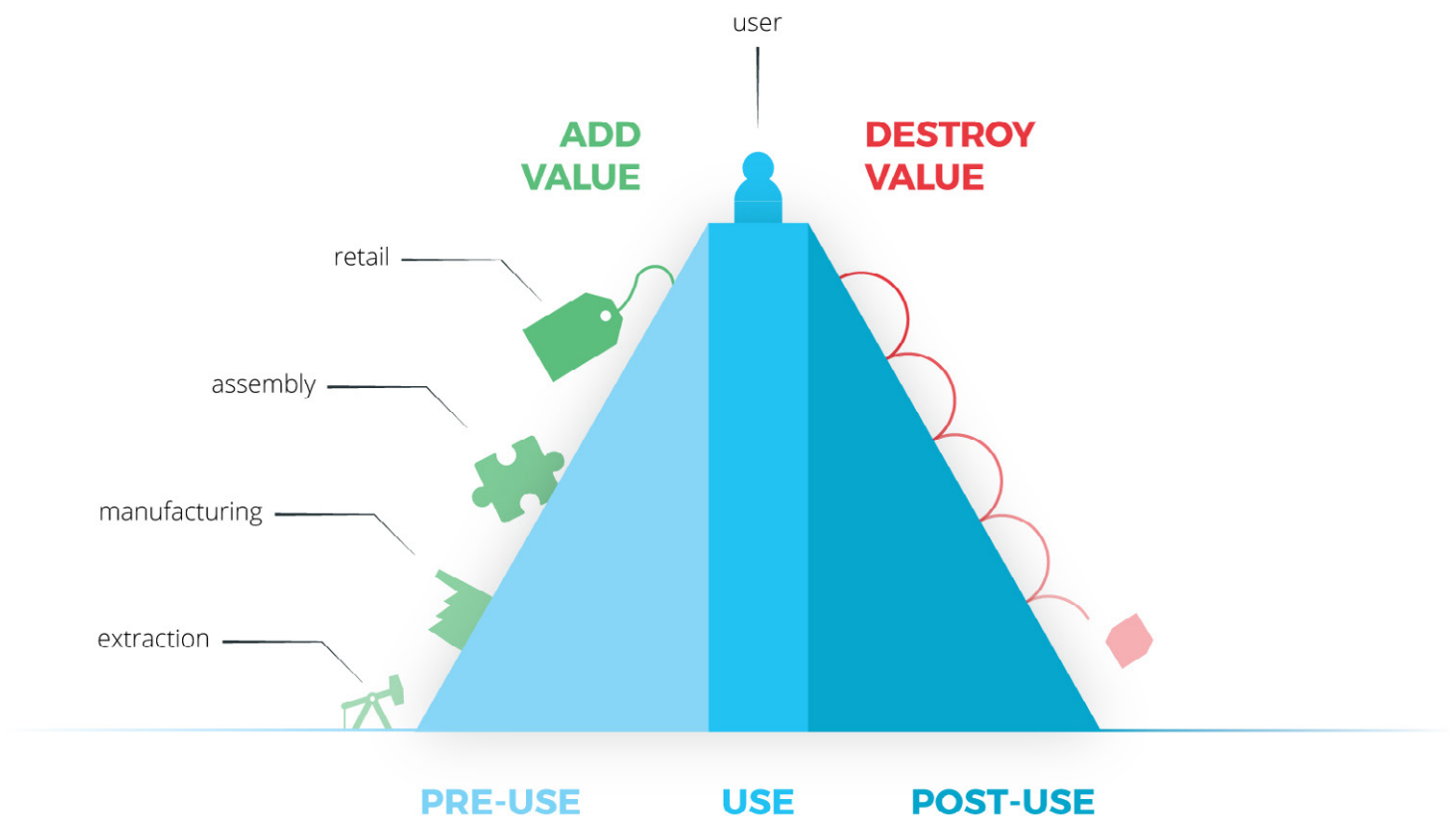
This paper presents the Value Hill: a circular business strategy tool that provides companies with an understanding of how to position their business in a circular context and to develop future strategies for a circular economy. Additionally, the Value Hill provides an overview of the circular partners and collaborations essential to the success of a circular value network.

THE VALUE HILL IN A LINEAR ECONOMY

From a business perspective the circular economy makes sense: reuse of materials can save costs and service models can deliver new business propositions and revenues. Circular businesses allow products to stay at their highest level of value for as long as possible (Ellen MacArthur Foundation, 2015; Bocken et al., 2016; Kraaijenhagen et al., 2016).

All over the world we have developed sophisticated ways to design, produce, distribute and sell goods. By extracting resources from the earth, refining them for manufacturing, assembling them into products and distributing them to consumers, value is added at every step. After the consumer uses the product however, its value goes downhill.

Business models are generally sales oriented and therefore revenues come mainly from selling as many products as possible. This creates an incentive for producers to design products that have a relatively short lifespan in order to continuously sell new products. The old products end up in landfills or are incinerated, quickly destroying the value that was created in the manufacturing process. This complete lifecycle is illustrated below in the Value Hill. Value is added as the product is developed (the left-side uphill slope) and once the product reaches the top of the hill, the product's value is at its maximum and after a relatively short lifecycle the product's value is destroyed quickly and value rapidly goes downhill.

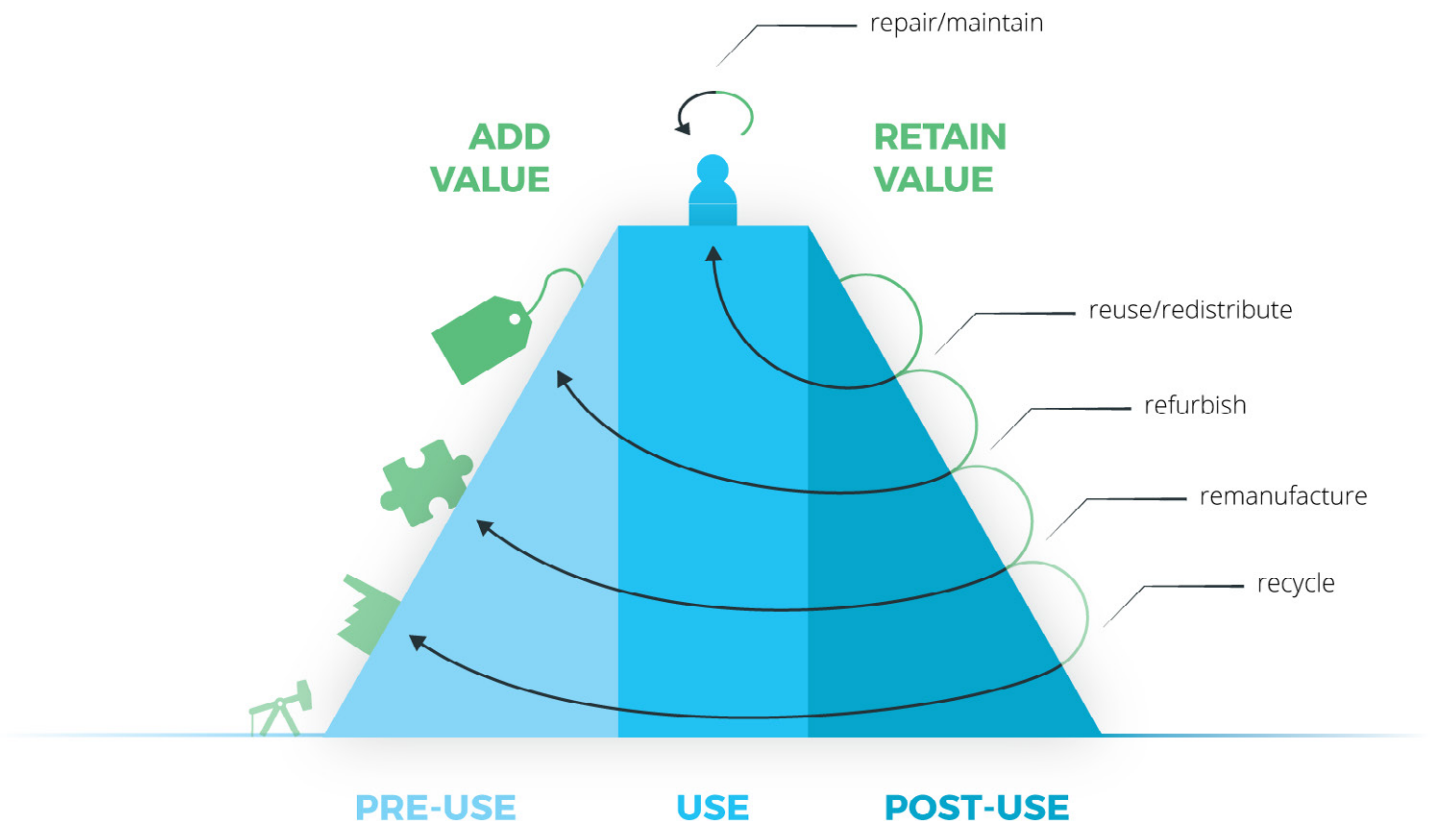


THE VALUE HILL IN A CIRCULAR ECONOMY

Keep products for as long as possible at their highest value on the Value Hill

The idea of a circular economy is inspired by eco-systems in which the waste of one system is food for another (Ellen MacArthur Foundation, 2013). Circular businesses aim to retain a product's added value for as long as possible, if not forever. In the context of the Value Hill, value is added while the product moves "uphill" and circular strategies keep the product at its highest value (top of the hill) for as long as possible. Products are designed to be long lasting and are suitable for maintenance and repair, thus slowing resource loops (Bocken et al., 2016) and prolonging the use phase of the product. When a product is ready to start its downhill journey, it is done as slowly as possible so that its useful resources can still be of service to other

systems as illustrated in the Value Hill below. In summary, the path that products take while travelling up and down the Value Hill is divided in three phases. The pre-use phase (mining, production, distribution) is displayed on the left as value is added in every step and the product moves uphill. The second phase is the in-use phase and is depicted at the top of the hill. Here the value of a product is at its highest. And the third phase is the post-use phase, where the product loses value as it moves downhill. However, by feeding the complete product or its components back into a previous phase (e.g. by providing second hand products they flow directly back into the use phase), value is retained. In every phase different business activities take place.



CIRCULAR BUSINESS STRATEGIES ON THE VALUE HILL

The transition to a circular economy and its corresponding differences in the way businesses are organised have two main challenges. The first is the need for a business to maintain control over its resources. This means that products need to be tracked and returned once they are no longer in use. The second challenge is to preserve a product at its highest value and optimise its residual value.

To maintain control of resources and preserve a product's value, various business activities must take place. These different business activities can be placed into four categories on the Value Hill: Circular Design, Optimal Use, Value Recovery, and Network Organisation. In order for these activities to be successful, collaboration between the circular value network partners is essential.

Uphill: Circular Design

The first category, Circular Design, corresponds to business activities that occur during the pre-use or the design, production and distribution phase of a product. These activities are positioned on the upward slope of the Value Hill and are focussed on prolonging the use phase (e.g. product longevity), accounting for end-of-life suitability (e.g. modularity), minimising resource-intensiveness and re-using existing products, components or materials.

This category contains for example the Circular Supplies business model (Lacy en Rutqvist, 2015) that “introduces fully renewable, recyclable or biodegradable materials that can be used in consecutive lifecycles”. But also the classic long life business models that sell products with a long life at a high price (Bakker et al., 2014).



Example Circular Design: Fairphone

DESIGN The Fairphone (second edition) is an Android smartphone that's built with longevity in mind and is the first modular phone on the market. Designed for reparability, spare parts are offered in an online shop together with instructions on how to replace broken parts. This way, the design of the product has changed the relationship between consumers and their phones.

MATERIALS In addition, materials are used that support local economies and include conflict-free minerals from the Democratic Republic of the Congo to stimulate alternative solutions.

MANUFACTURING Fairphone works closely with manufacturers that want to invest in employee wellbeing. They believe that factory workers deserve safe conditions, fair wages and worker representation.

Tophill: Optimal Use

The second category, Optimal Use, relates to the in-use phase of a product. Business models in this category seek to optimise the use of the product by providing services or add-ons to extend the lifetime of a product or provide ways to improve productivity of a product. These business models are positioned on top of the Value Hill.

A much-explored business model is the product-service-system (PSS) model (Tukker, 2004), where companies create bundles of products and services that are of greater value together than

they are alone, and provides business with greater control over their resources. These PSS models are organised through leasing, renting, pay-per-use or performance-based business models, which allow for the ownership to remain with the service provider. These models have the potential to decouple profit from production and enhance product productivity (Sonerud 2014).

Examples of other models in this category are sharing platforms (Lacy en Rutqvist, 2015; Stegeman, 2015) or life extension strategies (Stegeman, 2015).



Example Optimal Use: Bundles

PERFORMANCE-BASED Bundles developed a pay-per-wash business model that focused on selling packages of washing cycles ('bundles') instead of washing machines.

LIFE-EXTENSION & LESS-INTENSIVE RESOURCE USE By attaching a device to their washing machines the company is able to maintain ownership of the machines while monitoring their usage. Statistics gathered from the machine are displayed on the Wash-App, which provides the customer with insights into the overall cost of doing their laundry, including energy, water and detergent consumption. This not only reduces the costs for the customer, but also extends the life of the machine.



Downhill: Value Recovery

The third category, Value Recovery, involves the post-use phase of a product. These business models generate revenue by capturing the value from used products (formerly known as waste or by-products). Value Recovery involves using recaptured materials, providing refurbished products,

selling second hand products, and facilitating remanufacturing and recycling. These business strategies correspond to resource recovery (Accenture 2014), the gap exploiter model (Bakker et al., 2014), extending product value (Bocken et al., 2016) and waste value models (Stegeman 2015).

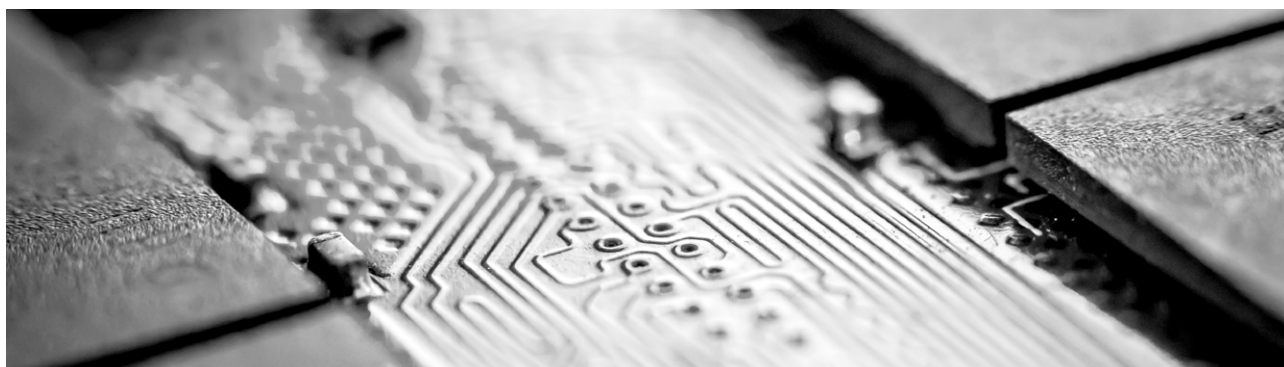


Example Value Recovery: Recover-E

RECAPTURE E-WASTE Recover-E recaptures used ICT equipment from businesses and private users. The products are cleaned and refurbished, their software is updated and the equipment is re-marketed. Products can be returned for a buyback price that depends on the state of the equipment.

TRACK & TRACE The Recover-E Program works with a track and trace system that provides an overview of ICT equipment and its component parts at every stage of the product's lifecycle, from initial purchase to end-of-life. Through this system product and waste flows can be optimised.

SHARED RESPONSIBILITY By involving everyone from product owner and user, to recoverer and recycler, there is no waste. Instead, transparency is increased throughout the chain by encouraging each player to contribute to and take responsibility for the solution.



Doing business in one of the three aforementioned categories does not automatically create a circular business. There is a need for services and coordination of information (transparency), material, energy and money flows. Therefore, a fourth overarching category has been identified: Network Organisation.



Network Organisation

The last category, Network Organisation, involves business activities that involve the management and coordination of circular value networks. This entails coordination and management of resource flows, optimising incentives and other supporting activities in a circular network.

At this moment, there are companies such as Recover-E and Dutch aWEARness (see example below) that have taken on the role of chain director, but there is still a need for joint coordination, which requires new ways of organising and structuring collaboration in circular value networks.



Example Network Organization: Dutch aWEARness

Dutch aWEARness provides 100% recyclable uniforms and corporate wear for businesses and organisations. They aim to create a business model that allows for shared ownership of materials throughout its circular value network.

CIRCULAR CHAIN MANAGEMENT As chain director, Dutch aWEARness is responsible for transparency throughout the value network. Their challenge is to create incentives to keep materials cycling throughout the product's lifecycle. To do this, Dutch aWEARness created a tool, the Circular Content Management System (CCMS), which is a circular track and trace system in which all partners in the supply chain are involved.



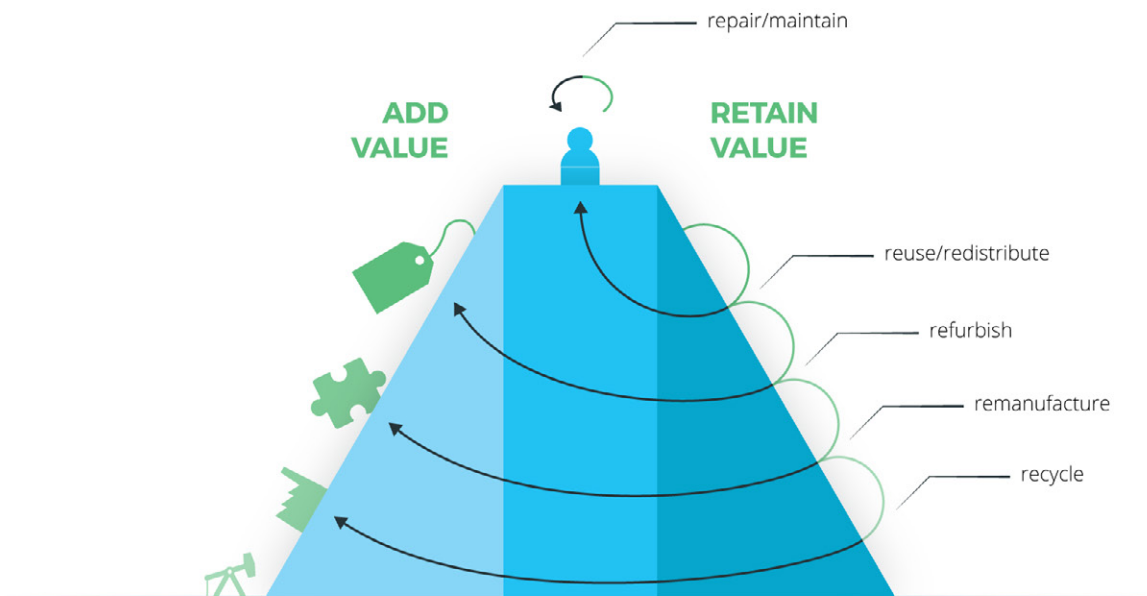
Note that these circular business strategy categories are not mutually exclusive. It may well be that businesses apply multiple strategies in conjunction with their business management. Business model categories are positioned on the Value Hill on the following page.



THE VALUE HILL AS A BUSINESS STRATEGY TOOL

The Value Hill proposes a categorisation based on the lifecycle phases of a product: pre-, in- and post- use of a product. This allows businesses to position themselves on the Value Hill and understand possible circular strategies they can

implement as well as missing partners in their circular network. An overview of circular business models corresponding to the Value Hill categories is given below. A detailed description of these business models can be found in Appendix A.



CIRCULAR DESIGN	OPTIMAL USE	VALUE RECOVERY
<p>Design products and materials with the aim of long term value retention:</p> <p>Product Design, Circular Materials, Classic Long Life, Encourage Sufficiency</p>	<p>Support better usage and product productivity:</p> <p>Product as a Service, Life Extension, Sharing Platforms, Sell and buy back, Repair & Maintenance Service</p>	<p>Capture value after user life:</p> <p>2nd hand seller, Refurbisher, Recycler, Recaptured material supplier</p>
NETWORK ORGANISATION		
<p>Manage information, materials, money flows:</p> <p>Value management, Process design, Tracing facility, Recovery provider</p>		

4 STEPS TOWARDS A CIRCULAR BUSINESS STRATEGY WITH THE VALUE HILL

Step 1: Position your current business model on the Value Hill

The first step is to position your current business model and product design on the Value Hill: What categories does it belong? What activities are closest to your current business activities?

Step 2: Position your value chain partners on the Value Hill

The second step is to position your current value chain partners on the Value Hill: What relationships already exist?

Step 3: Identify gaps and opportunities in your circular value network

What relationships, collaborations or activities are needed to increase circularity in your value network?

Step 4: Formulate your future circular business strategy

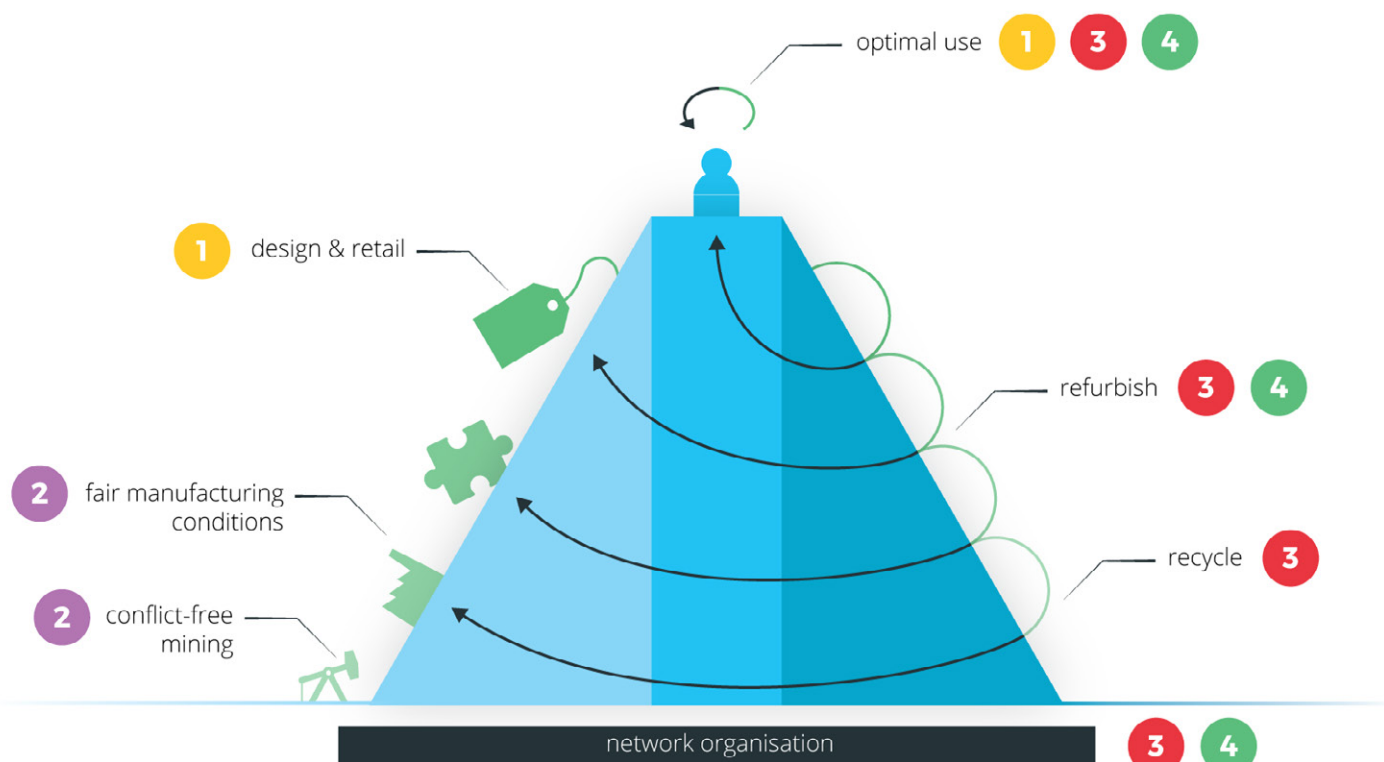
What business model and partners are relevant for your future strategy? What is the impact of that? Look at the Appendix A for a list of possible business models, to be inspired.

An illustration of Fairphone transitioning to a more circular business strategy through the four steps is given below.



The Value Hill framework gives us insight in how to keep on building our business model for the circular economy: extracting maximal value of our modular long-lasting product and insight in collaborations we need to engage in to succeed

- Miquel Ballester, Operator Relations Fairphone



Example: Increasing Fairphone's circularity in 4 steps

Step 1: Position your current business model on the Value Hill

Currently Fairphone is responsible for the design, retail and distribution of Fairphones. In addition they offer a self-repair service for broken parts through an online shop.

Step 2: Position your value chain partners on the Value Hill

Fairphone is working closely with miners in the Democratic Republic of the Congo to stimulate conflict-free materials. The wellbeing of workers in factories where the phones are manufactured is also very important to Fairphone and they have established close relationships with their manufacturers.

Step 3: Identify gaps and opportunities in your circular value network

Currently the phones are sold. This means Fairphone loses control of the phones and it is unclear how many will be returned after they reach the end-of-use phase. This can be seen as a 'leakage' of valuable assets (technology, design, materials).

Step 4: Formulate your future circular business strategy

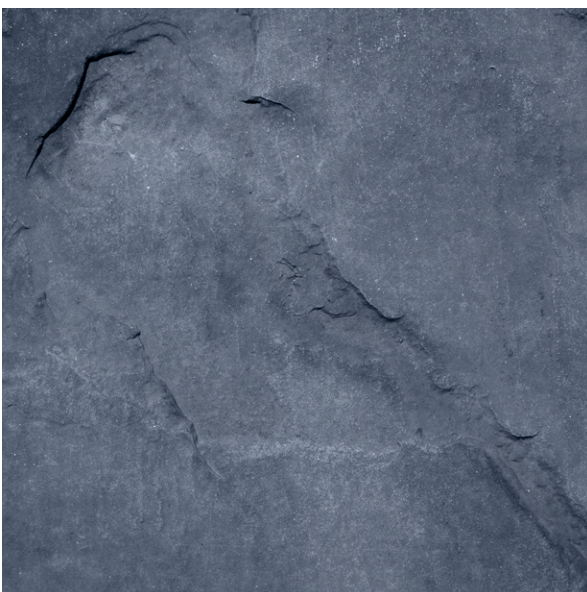
Following Fairphone's ambition to be an industry leader not only in the design of their phone but also in ensuring maximum use of materials after they reach the end-of-use phase, is an important topic. The unique hardware model of Fairphone allows for a more circular business model, which could be realised by, for example, installing a Product as a Service model.

| CONCLUDING NOTES

The Value Hill framework can be easily enhanced with additional or new business models that have yet to be invented. It categorises circular business models by the position they have in the value network according to their business activities. It therefore provides an easy to use tool for entrepreneurs to position themselves and explore gaps and opportunities in their circular value network.

To complete and substantiate the proposed Value Hill framework, business that are concerned with managing, supporting and connecting circular business models (i.e. Network Organisation) need to be further explored. More insight is to be gained from theory and practice around collaborative organisations and their potential business model logic.

In the future, iteratively testing and validating the Value Hill tool on different cases can also further substantiate it. This could result in different Value Hills for different product types, sectors or markets.



APPENDIX A

Value Hill Category	Business Model	Description
Circular Design (Uphill)	Circular product design	Designing products with their end-of-life in mind by making them easy to maintain, repair, upgrade, refurbish or remanufacture
	Classic long life	Delivering longevity of a product with high levels of guarantees and services for a high price upfront.
	Encourage sufficiency	A high price per product can justify lower volumes
	Circular materials	Utilise input materials such as renewable energy, bio-based-, less resource intensive- or fully recyclable materials
Optimal Use (Tophill)	Life Extension	Sells consumables, spare parts and add-ons to support the longevity of products
	Repair & Maintenance Service	Repairs, maintains and possibly upgrades products that are still in use
	Product leasing (Product as a Service)	Delivers access to a product rather than the product itself so that the service provider retains ownership of the product. The primary revenue stream comes from payments for the use of the product and a single user uses the product at any given time.
	Product renting (Product as a Service)	Delivers access to a product rather than the product itself so that the service provider retains ownership of the product. The primary revenue stream comes from payments for the use of the product and different users use the product sequentially.
	Performance provider (Product as a Service)	Delivers product performance rather than the product itself through a combination of product and services, where no predetermined product is involved and the service provider retains ownership of the product. The primary revenue stream is payments for performance of the product, i.e. pay-per-service unit or another functional result.
	Sharing Platforms	Enables an increased utilization rate of products by enabling or offering shared use/access or ownership through which, different users use the product sequentially.
	Sell and buy-back	Provides a product and agrees on repurchasing the product after some time.

Value Hill Category	Business Model	Description
Value Recovery (Downhill)	Recaptured material supplier	Supplies recaptured materials and components to substitute the use of virgin or recycled material
	Refurbisher	Refurbishes used products if necessary and re-sells them
	Second hand seller	Provides used products
	Remanufacturer	Provides products from recaptured materials and components.
	Recycling facility	Transforms waste into raw materials. Additional revenue can be created through pioneering work in recycling technology.
Network Organisation (Cross-hill)	Recovery provider	Provides take back systems and collection services to recover useful resources out of disposed products or by-products
	Process design	Provides services around processes that increase the re-use potential and recyclability of industrial and other products, by-products and waste streams
	Value management	Provides services around managing information, materials, transparency, payments and governance in a circular value network. For example ICT solutions for smart contracts and payment systems, or consultancy on circular management systems.
	Tracing facility	Services to facilitate the trading and the marketing of secondary raw materials

Table 1. Detailed Overview of Business Models per Value Hill category

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