ABN·AMRO

The Value of All Things

Circularity across sectors

September 2017

Contents

A bank with impact

ABN AMRO may be a bank, but with us it is not just about money. We play a broader role in society, both in and outside the Netherlands. We want to add value for our clients, employees, society and shareholders by pursuing an active and relevant sustainability policy, for example in the fields of human rights, social entrepreneurship and the environment. When it comes to environmental issues, the circular economy is where we can – and want to – make an impact.

In theory, the circular economy is an irresistible concept. Everything we produce can be degraded and put back into circulation. As few raw materials as possible are lost and the impact of the economy on natural resources is minimised. In practice, things are more complex. If the Dutch government wants to fulfil its ambition of creating an entirely circular economy by 2050, thousands of large and small businesses will have to switch to a new business model in the years ahead.

This is a profound and ambitious transition, and we want to boost the momentum going, not just because of the government's objectives or because of the action that is required to stop climate change and the depletion of natural resources, but also because consumers are starting to behave differently and use resources in a different way. We are transitioning from consuming to *sharing and reusing*. The traditional – linear – economy is changing into a – circular – sharing economy and is challenging established businesses. Those businesses need to reinvent themselves to become more sustainable. ABN AMRO is working proactively with clients who want to switch to a circular business model. We use sector knowledge to bring businesses together in the chain so that we can take concrete steps together.

Thought leadership alone is not enough to make an impact and actually achieve the goal of a circular economy. Action leadership is what we need. That is why we will experiment with financing new business and ownership models for our business associates, for instance through our Innovation Center and our Sustainable Finance Desk. This is how we combine insights into circular business models with our knowledge of financial products and risk management. This will allow our clients to make the difference in the circular economy with their business. Joining hands with our clients, we aim to achieve three goals by 2020:

- €1 billion in financing for circular assets
- 100 circular financing facilities
- a 1-million-ton reduction in carbon emissions

Will the Netherlands truly have a circular economy by 2050? We have a long and challenging road ahead of us, but we will do it! As a bank, we can play a decisive role. To do so, we need to work closely with knowledge institutes and the government, but most of all with you, a business owner. It is your motives, new ideas and perseverance that form the basis for the transition to a circular economy. Please use this report as an inspiration for our interactions, for instance at CIRCL, our circular pavilion in Amsterdam, where we can exchange knowledge and creative ideas with the ultimate aim of fulfilling your circular ambitions.

Kees van Dijkhuizen
CEO ABN AMRO

The Netherlands circular in 2050

'The circular economy' is a term that is used increasingly in the media, whether it be in the general press or in professional journals and academic publications. This is not surprising: there is a growing realisation that we can – and must – protect our planet. What is more, the Dutch government wants us to be circular by 2050. With that objective in mind, it is supporting dozens of programmes: from encouraging innovative start-ups to helping SMEs to make the circular transition. A good example is the *Ruimte in Regels voor Groene Groei* programme, in which context the government is working with businesses in a critical assessment of the statutory restrictions that stand in the way of innovation in the circular economy. That makes this economy attractive not only to start-ups or multinationals, but also to SMEs.

SMEs are the engine behind the Dutch economy; this makes them crucial in the transition to a circular economy. A shift towards circularity in this segment can trigger a revolution. But SMEs are highly diverse and each sector is faced with a broad and challenging playing field. In this report, we will first explain what the circular economy entails exactly and what business models are most prevalent. Then we will give the floor to ABN AMRO sector bankers, who will talk about their specific area of expertise. They will explain the field of play in their respective sectors and go on to offer practical solutions that will help your business overcome its circularity challenges. This report aims to provide inspiring and useful insights for SMEs.

What exactly is the circular economy?

Today, 'buying something' still means purchasing a product in a one-off transaction. We use the product and then discard it. In short, we are dealing with a linear system of value chains that has become dominant over the past two centuries or so. The circular economy aims to change this consumption pattern to a circular system. In this process, the goal is to minimise value destruction and maximise the reusability of products and raw materials.

'Oh, you mean recycling', is a common response. Yes and no. Recycling is certainly part of the circular economy, but it involves much more than that. Circularity means switching from an economic model based essentially on take-make-waste to a circular system that makes it possible to:

- use products over longer periods of time;
- make the best possible use of assets;
- continue using materials in an endless cycle.

It is actually business logic, made possible by policy and business models aimed at an economy that is intrinsically waste-free. The circular economy thus offers a practical solution to the growing shortage of raw materials. To this end, the circular philosophy should be reflected not only in product design but also in the business models of enterprises. In other words, circularity needs to take root at management level.

> "There's growing interest in a world in which products are given a second lease of life, components are reused and raw materials are recovered where possible. For me, this is what a circular economy is about: making use of existing options and thinking about new processes. Then you can work towards an economy that is actually future-proof. I believe you can never totally avoid using new raw materials. But that is fine as long as you manage to prevent wasting resources."
>
> **Rogier van Camp, founder and CEO of Leapp**

The circular economy is nothing new. Many sectors are already partly circular, in some cases without even realising it. Many retail businesses carry out repairs, for example. A cobbler repairs shoes so they do not have to be discarded. Another example would be a specialist agricultural equipment contractor that relieves farmers from the requirement to own machinery. They can rent the equipment instead, including the people that operate it. As a result, we need less agricultural equipment and the existing equipment put to better use.

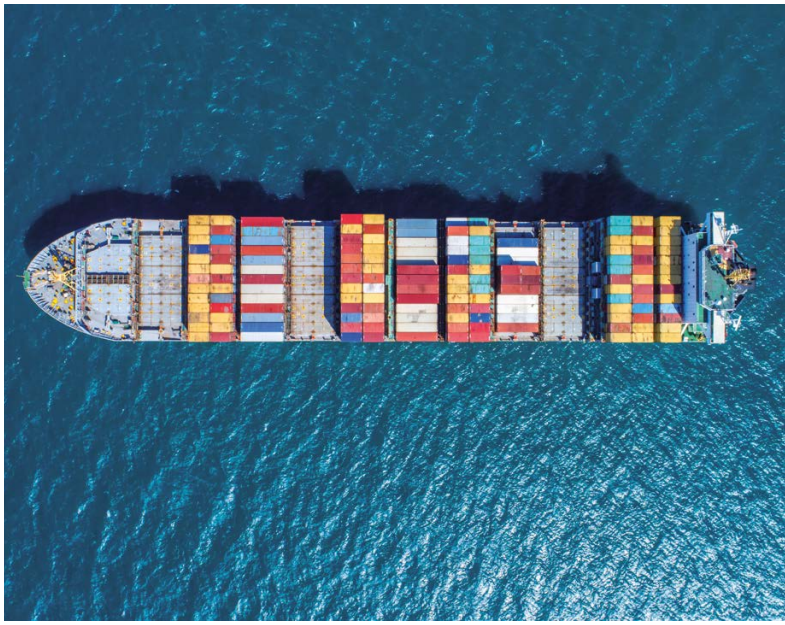
The circular economy is driven primarily by start-ups and pioneers. They are successful because they use new technologies and business models. Given the fast pace of these developments and the fact that the government is embracing circularity as well, the circular economy can accelerate, although that does require the support of experienced entrepreneurs. After all, they know the processes, obstacles and opportunities in the sector in which they operate – in short, the entire field of play. From that vantage point, they are particularly well-placed to make a success of the circular economy. A number of larger companies have already started along this path, because they see the potential of the circular economy. Whether they are acting based on social responsibility, entrepreneurship or cost-cutting potential, they have all decided to experiment with circular business models.

Circular economy: niche or necessity?

According to United Nations estimates, the global population will have increased by a billion people in 2030. A further billion will have been added by 2050, taking the planet's total population to 9.5 billion. Not only is the number of people rising, but many of them are also becoming wealthier. That increasing prosperity is boosting demand for goods in almost all corners of the world. All those people not only need to be fed, but they also have to have the chance to put a roof over their heads and provide for themselves. This will require vast amounts of energy and raw materials.

Up until now, a large supply of raw materials, fossil energy and technological innovation was sufficient to meet rising consumer demand. But a study by the Global Footprint Network shows that the natural resources that have facilitated this growth so far are becoming exhausted. In other words, our current consumption and production patterns have pushed us to the limit of what our planet can cope with. And in some cases that limit has already been exceeded. The Global Footprint Network has calculated that, in 2012, 1.6 times the biocapacity of the earth was needed to meet our consumption requirements. Over a short period of time, people can obviously cut down trees faster than they can grow back. Or catch more fish than are spawned. But it goes without saying that that cannot continue.

So something has to change and that change is often thought to embodied in a transition to a circular economy.



What are things like in the Netherlands?

In the Netherlands, we are already on the right track. We lead the way, for instance. in waste recycling, partly because we are increasingly aware that waste flows are actually cash flows. No less than 80 percent of Dutch waste is put to good use after it has been processed. Examples include the recycling of paper and glass, but also the generation of electricity and heat from the incineration of household waste. We are also spending more on repairs, revenues of charity shops has doubled in a space of a decade and the percentage of phosphorus used in Dutch agriculture in a natural cycle has risen to 92 percent.

These are good results, but there is still plenty of room for improvement. Materials in particular are still used as biomass and converted into energy by means of 'low-value' recycling, for instance. This means that the value of the material (or raw material) decreases rather than being stable or even increasing. The latter phenomenon is known as upcycling and is still in its infancy. The percentage of food waste in the Netherlands remains relatively high: 38 percent of the food suitable for human consumption is used for animal feed or thrown away – on average around 50 kilograms per person per year. We also increasingly own consumer goods, so the raw material footprint per person has risen: from 13.1 tons in 2004 to 13.7 tons in 2014. Carbon emissions in the Netherlands have also increased again over the past two years.

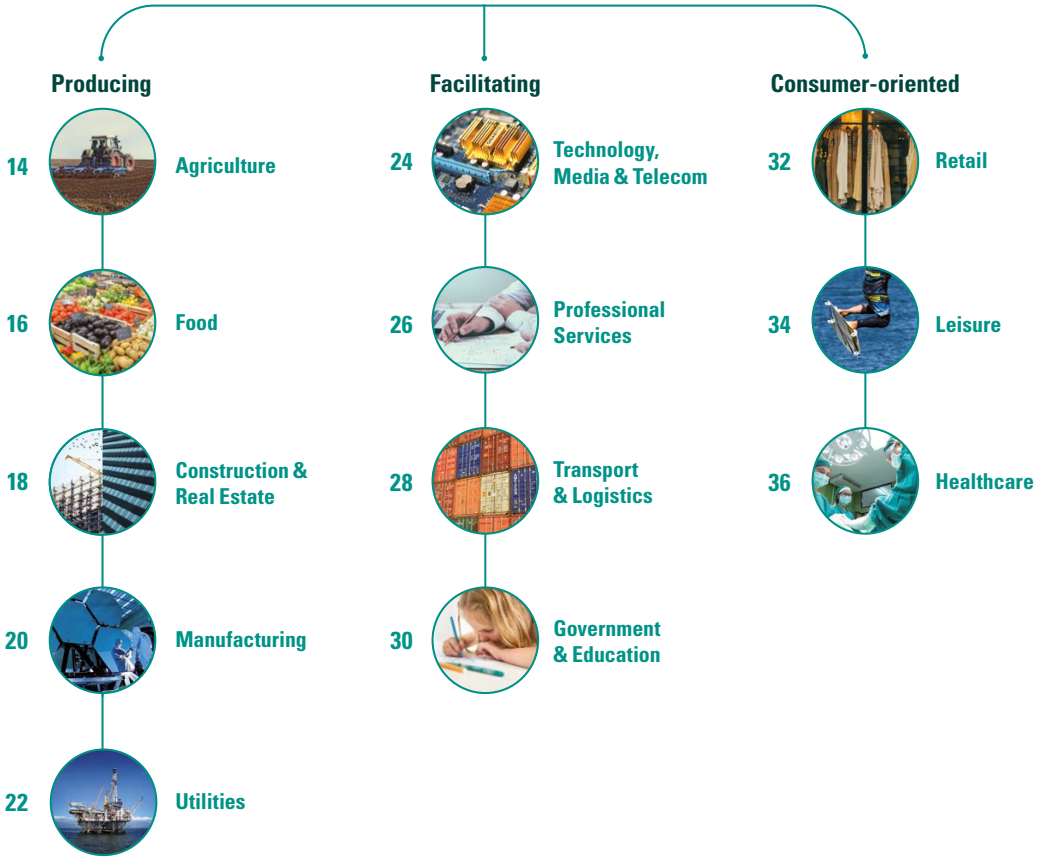
Tone at the top

All things considered, the transition to a circular economy is necessary, in the Netherlands too. The Dutch government acknowledges this and last year presented its nationwide The Netherlands Circular in 2050 programme, outlining how we can turn our economy into a sustainably driven, entirely circular economy by 2050. The first ambitious target is to reduce the use of primary raw materials, such as metals and fossil energy sources, including as oil and coal, by 50 percent. Another goal is to cut food waste in half by 2030. In January 2017, the Dutch government launched the Raw Materials Accord, by which the cabinet adopts transition agendas with social organisations and businesses to achieve its objectives. ABN AMRO is a signatory to this accord.

All lights are green

Not only is the Dutch government on board, but knowledge institutes are increasingly engaging with the circular economy as well. Universities and consulting firms, for example, are investigating where the opportunities lie and what needs to be done to remove obstacles. But the main issue is that more and more companies from different sectors are backing the circular concept. They are entering this new economic field as pioneers. They are looking for innovative solutions to the problems facing us as a society and are exploring the relevant business models. Building on the circular economy means creating, experimenting and sharing knowledge and skills. And that is precisely where businesses and the financial sector can help each other out. Depending on their operations, businesses can play different roles in the circular economy. We have defined three such roles in this publication; these roles cover the 13 sectors that we serve as a bank. Of course, this is not set in stone, because these sectors are highly diverse in terms of their operations. But the allocation of roles provides a framework for building the circular economy by establishing a connection from each sector: with businesses in that sector and with those outside it.

Sectors defined in this report



In **producing sectors**, the link with the circular economy is obvious. They are directly involved as far as the extraction and consumption of raw materials is concerned.

In **faciliterende sectoren**, the link is more difficult to identify, although the situation ranges from sector to sector. Transport & Logistics and Technology, Media & Telecom (TMT) very clearly have a facilitating role, for instance when it comes to circular logistics flows or support for and continued development of technological applications that are indispensable for the circular economy. Professional Services can also occupy an influential position, for example where consultancy and law firms, as well as temporary employment agencies are concerned. After all, the circular economy is based on a new way of thinking, innovating and using human resources.

The **consumer-oriented sectors** are assigned various roles. As major buyers of real estate, they can, for example, impose requirements on the circular construction of commercial buildings. Retail and Leisure also have a unique opportunity to inspire and educate consumers. Festivals, for instance, are miniature biotopes that are ideal for experimenting with circularity and where the public can become acquainted with the potential of the circular economy.

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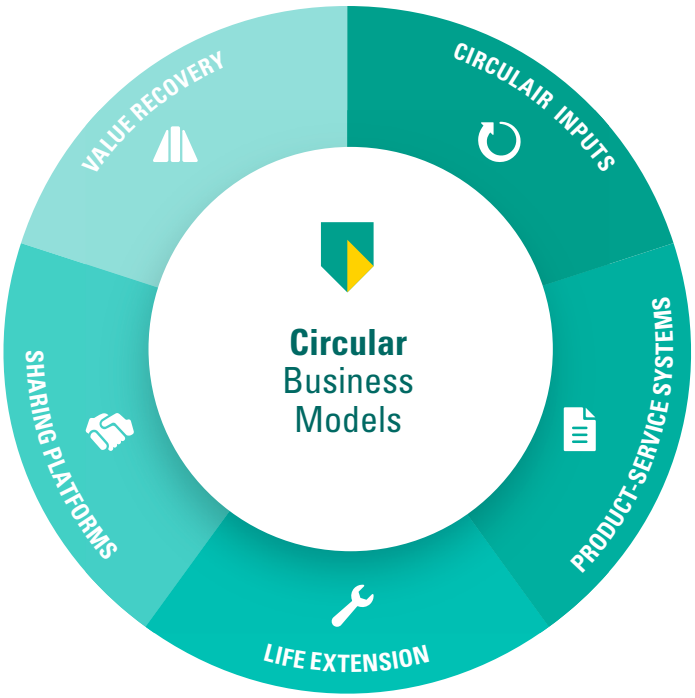
Business models in the circular economy

In this publication, we describe five circular business models, based on the book *Waste to Wealth: Creating Advantage in a Circular Economy*[1]. These business models differ greatly, also in terms of their applicability to each sector:

- Circular inputs
- Product-service systems
- Life extension
- Sharing platforms
- Value recovery



1. Circular inputs: creation of circular raw materials

In this business model, companies find or create raw materials that are completely renewable, biodegradable or reusable. These companies earn their money by developing these types of raw materials and form the basis for the transition to an entirely circular economy. This business model is logically applicable to the producing sectors. **Utilities**, for example, are major suppliers of renewable energy. The capacity for wind and solar energy is growing fast, making these types of energy cheaper and more widely used. **Manufacturing** is also experimenting extensively with new biodegradable and renewable raw materials. An example of these is bioplastic, which requires no or fewer fossil raw materials.

Finally, this business model applies to the **agricultural sector**. Agriculture supplies raw materials for products such as biomass, one of the ingredients for the production of green gas. Other important players are buyers of circular inputs, such as the **Construction & Real Estate** and **Transport & Logistics** sectors. Both are major consumers of fossil fuels. Jointly, they account for more than 50 percent of total carbon emissions in the Netherlands. They serve as a catalyst for the use of circular inputs. Companies in these sectors also have large volumes of data. And that is essential for the feedback loop for producing sectors. Usage data can also accelerate and improve the creation of new raw materials.

1 Peter Lacy & Jakob Rutqvist (2015, Palgrave Macmillan Ltd).

2. Product-service systems: from owner to renter

Product-service systems are an alternative to the traditional purchase/sale business model. Instead of waiving ownership rights, the producer or seller remains the owner of the product, meaning that a user has it on loan and pays a fee, usually on the basis of use, but subscription models are possible too. This business model is most appropriate for companies that are the owners of a product. These are often found in **Manufacturing**, particularly in the manufacturing industry.

But other sectors are achieving a substantial impact with this business model as well. Here too, **TMT**, for example, is an important enabler for streamlining product-service systems. By using AI (artificial intelligence) and smart IT networks, this sector can, for instance, help to predict maintenance intervals.

The **Healthcare, Professional Services and Government & Education** sectors are also important customers, which is why they are co-decisive in the success of this business model. Although this model is applicable to B2C, B2B currently offers the greatest potential. A good example is Siemens. Over the past seven years, Siemens Healthineers has entered into MES (Managed Equipment Service) partnerships with nine hospitals. Siemens arranges for the availability, maintenance and replacement of equipment, so hospitals can concentrate on their core business.

3. Product life extension: don't throw away, repair

It sounds so simple: repairing or selling things to give them a second lease of life, rather than just throwing them away. This is easier said than done. A product's life is extended at the beginning of the chain. **Manufacturing**, for instance, makes sure that products are created to be more robust or modular. That means they last longer and certain components can easily be replaced.

But the life of products can also be extended close to the consumer. **Retailers**, for example, not only sell products, but often repair them as well. In some cases, they even refurbish them. At the end of its life cycle, a product is repaired and cleaned for a new, often final user. Leapp is an example of a company that does this for Apple products, which they buy, refurbish and then sell back to consumers, both online and in their stores.

Costs are also a major obstacle to product life extension. If a second-hand device costs more than a new product, consumers will most probably choose the new one. As a result, it is the combination of costs for repair/refurbishment and the residual product value that counts. In other words, the notion of 'value' – of the product itself and of the materials used to produce play an important role here as well.

> "The processing of return flows can pose a challenge to companies, to put it mildly. Their success in this area hinges on their genuine commitment to working with us."
>
> **Jan Willem Bosman Jansen, CEO and founder of GRO**

"It's not about the most expensive options or the device that is most versatile. The trick is to translate the customer's healthcare requirement into the right medical technology solution. I always compare to buying a car: two mid-range cars may well be a better option than one top-of-the-line model. Choosing the right option allows hospitals to treat more patients without compromising on quality."

Sjaak van der Pouw,
Director Enterprise Services & Business Innovation, Siemens Healthineers

4. Sharing platforms: sharing underutilisation or overcapacity

This is about making more efficient use of raw materials and the products made from these materials. This can be achieved, for instance, by extending the useful life of those products, but also by streamlining their use. In other words, overcapacity or underutilisation of an asset should be avoided as much as possible. Sharing platforms are the solution. If you have a car, but hardly use it, you might as well let your neighbour use it. That is a practical solution too, because then the neighbour does not have to buy their own car.

Another example concerns an **Agricultural** business that needs a harvester to harvest its crops. Financially this business is by no means always better off owning such a mower itself or to have specialist staff who can operate it. That is why the agricultural sector has specialist equipment contractors that have traditionally operated on the basis of the circular business model.

The **Leisure** sector boasts major and well-known examples of sharing platforms, such as Airbnb and Uber. **Retail** also has well-known sharing platforms, such as Peerby (sharing of household equipment and workman's tools) and Snappcar (car sharing).

The **TMT** (Technology, Media & Telecom) sector is an essential enabler for the success of sharing platforms. Many sharing platforms are consumer-to-consumer-based, but they also offer business-to-business potential.

"I want to entice consumers to choose products that protect the environment on the condition that it doesn't hurt them in the wallet, because they'll soon lose interest if they suddenly have to pay a high price for a product because it's green. You have to eliminate that obstacle if you want to encourage circularity. As a business, you need to make sure that your proposition ties in with the user's primary wishes, or you should at least try to approximate this. Your product has to be sexy. That applies not only to consumer electronics, but to everything you approach from a circular perspective."

Rogier van Camp, founder and CEO of Leapp

5. Value recovery: from waste to value

The concept of value recovery was described in the 1987 Bruntland Report entitled 'Our Common Future', in which the UN first called for sustainable development. This principle is considered important from a sustainability perspective, but it also make sense from a business economics point of view. After all, why would anyone throw away something of value? This logic makes value recovery one of the most prominent aspects of sustainable development and of a circular economy.

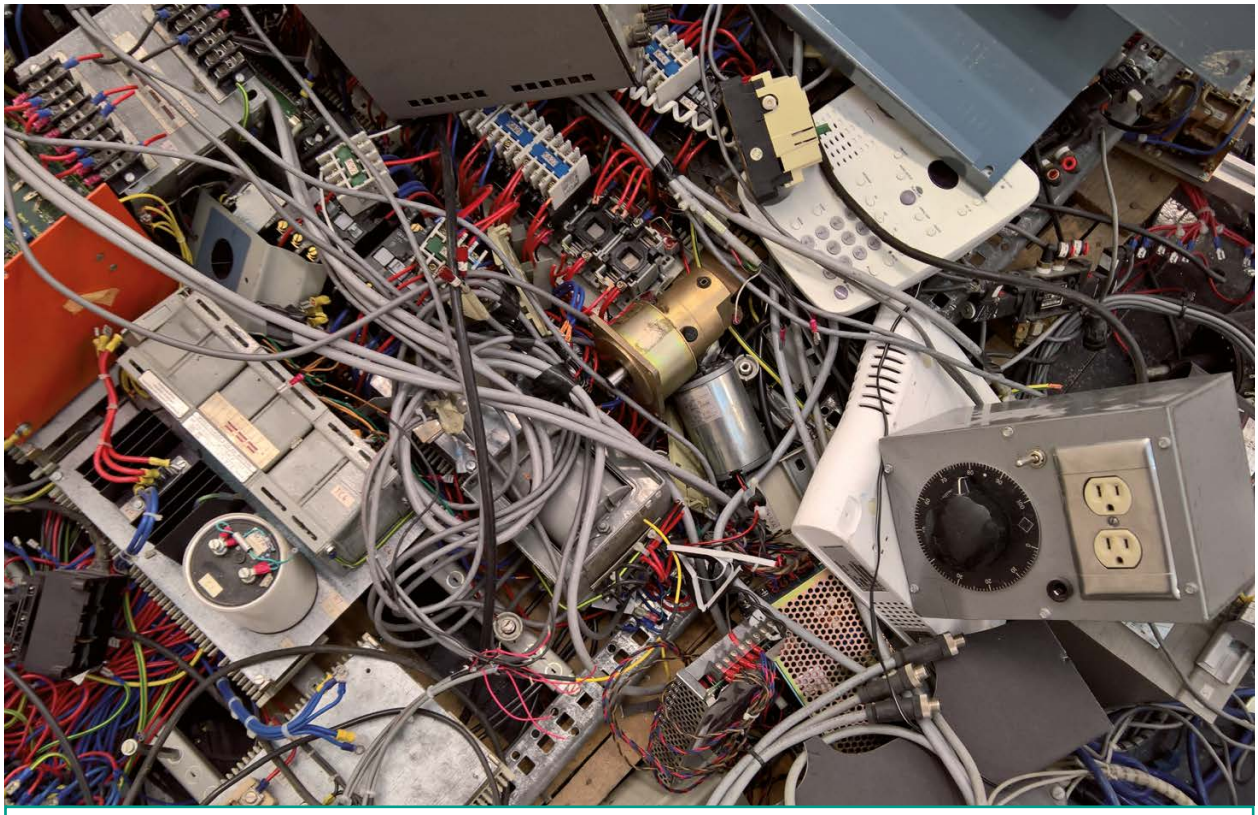
Construction & Real Estate is well-placed to apply this business model. Circular construction makes it possible to extract raw materials from a building and reuse them. Scarcity of raw materials is an important driver in this respect given that, in addition to value of the property itself, the costs of extracting value are important as well. In short, the sums must add up from a cost perspective. The more expensive the raw material, the more advanced the methods used to recover them can be. For this reason, traditional recycling is no longer sufficient: in the circular economy, the terms downcycling and upcycling are used. The aim is to preserve as much value as possible or even add value in the case of upcycling. **Food** is a sector that is moving full steam ahead with this process. Green Recycled Organics (GRO), for instance, grows oyster mushrooms on coffee grounds.

"If businesses trusted each other more and collaborated better, they could make much more use of each other's assets. Just think of idle trucks, expensive equipment and warehouse space. And what about staff? Teaming up saves costs and lets a business absorb peaks and troughs without hiring extra staff. Requirements can be managed fast, conveniently and effectively via digital sharing platforms such as ours. Sometimes you come across the most obvious examples: a business park where every firm has a hydraulic device for the window cleaner to reach the windows on the top floor. It's used twice, three times a year. And yet they don't share that type of equipment."

Kim Tjoa, founder and CEO of Floow2

The success of a company that uses this business model depends on many factors: the value of the raw material, the cost of recovering it and its substitution potential. Facilitating logistics are key in value recovery. Recovering the value of a raw material must be worth it. The overall price and value picture must be right.

With reverse logistics (managing return flows), the **Transport & Logistics** sector can serve as an enabler and make an important contribution to the circular economy. Teamwork, but technical support too, is crucial for reverse logistics. 12Return supports the circular supply chain with cloud-based solutions.



"We should develop many more smart systems for return flows. That has been a major problem up to now, while returns could supply important raw materials for a future circular economy. I believe major producers of consumer electronics, for example, should encourage consumers and businesses to return the products they once manufactured themselves. That would offer them new opportunities for interacting with the customer; interactions such as those are highly valued. The key point is that the product has value. It can be refurbished or recycled. And what has to be discarded can be processed responsibly. That will save manufacturers from ending up in Greenpeace's annual report featuring in a picture taken in Ghana showing a little black boy on a garbage belt sitting next to a television or computer with their name on it."

Stef de Bont, CEO and founder of 12Return

Promising business models in each sector

	Circulair inputs	Product-service systems	Product life extension	Sharing platforms	Value recovery
Agriculture	●	●			●
Food	●				●
Construction & Real Estate	●	●	●		
Manufacturing	●	●	●		
Utilities	●			●	●
Technology, Media & Telecom		●	●	●	
Professional Services	●	●			
Transport & Logistics				●	●
Government & Education			●		●
Retail		●	●	●	
Leisure	●	●			
Healthcare	●	●		●	

For 13 different sectors, the sector bankers looked for business models that they consider to be the most promising for businesses in their sector. The findings are shown in the matrix above. The diagram shows how diverse the sectors are, but demonstrates also that every sector has a natural preference for certain business models that can contribute to a circular economy.

It is important to realise that the circular economy is not limited by definition to a single sector, but has ecosystems and cross-sector interrelations. That is why teamwork is important, but you cannot escape the effect of the field of play in which a business operates. With good knowledge and appreciation of this field of play, a realistic picture can be painted of the opportunities and threats inherent in a specific sector. A linear business model can then be turned into a circular model. An approach focusing on individual sectors increases the risk of a silo mentality. That is not what we have in mind with this publication. The circular economy demands flexibility and teamwork outside the boundaries of individual sectors. That said, from ABN AMRO's perspective, the individual sector is a logical starting point from which to develop and accelerate the circular philosophy. In the following sections, we will examine the possible ways in which businesses can support this acceleration in each sector.

Agriculture: circular by nature

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Nutrition, health and the environment are important themes for consumers, governments and NGOs. Society's demands of food production and end products are rising constantly. But such demands tie in well with farming tradition. After all, farmers and growers make economical use of their most cherished possession: land. Stewardship and circularity are in the genes of the agricultural sector.

Circular by tradition

Agricultural production has used residual and waste flows from its own and other sectors for centuries. Before World War II, for example, a good harvest was inconceivable without the use of animal manure. That made manure a valuable product. Pig were fed the farm's and the family's leftovers.

This sector still is largely circular. Residual products from the food industry continue to be the most important ingredient in the animal feed industry, which has consequently amassed a wealth of knowledge of hundreds of residual products. Plant residues are also used, for instance as raw materials for construction materials, textiles, cardboard, chemicals and plastics.

In addition, the use and registration of biomass is essential, because it helps to reduce carbon emissions. Economical use of raw materials is also crucial, as is careful and efficient food production, partly to prevent waste. Sensors and data analysis (Smart Farming) offer additional opportunities in this regard.

Fertile soil: the basis for circularity

Two matters are vitally important to farmers and growers: healthy and fertile land and a clean and manageable water supply. The soil is passed on from generation to generation. With wind turbines, solar panels, anaerobic manure digestion or geothermal heat, agricultural businesses contribute to the production of renewable energy. Together, farmers and growers jointly supply 42 percent of our renewable energy, while they only consume 4.5 percent of all energy themselves. And horticulture even uses waste carbon as a growth accelerant for plants.

Lowest environmental impact worldwide

The Netherlands is an efficient *and* productive country. Its agricultural products have the lowest environmental impact worldwide per kilo and unit of nutritional value. In 2015, the use of pesticides fell to less than half of the level in the 1980s. Over the same period, the impact of these types of products on natural resources decreased sharply, while production per hectare rose.

Arable farming and horticulture increasingly use natural enemies and biological agents to control pests. Moreover, antibiotics use in livestock production declined by 64.4 percent between 2009 and 2016. The use of antibiotics that pose resistance risks has dropped significantly as well. As a result, resistance levels in livestock farming have fallen substantially. That performance has garnered much international appreciation for the Netherlands.

Taking the lead thanks to quality marks and mindset

The reduced environmental impact and improved animal welfare are partly due to quality marks, for instance for barns. These quality marks have contributed to innovative action. Here are some examples:

- Groen Label Kas
- Milieukeur
- Maatlat Duurzame Veehouderij
- Beter Leven

Farmers and growers themselves also make a substantial contribution. They are intrinsically motivated to produce efficiently and with due care. In fact, few other countries produce as efficiently as the Dutch. Dutch players in agribusiness (genetics, production systems, livestock feed and knowledge) operate around the world. Many emerging markets see the Netherlands as a leading example.

Circular business models in the agricultural sector

The agricultural sector offers plenty of opportunities for profitable business models. By using residual products and limiting waste, businesses can reduce their costs and increase yields – with less environmental impact. These cycles can be closed in individual companies. But cooperation between companies in and outside the sector provides an additional boost.

Circular inputs

Residual flows from sugar and starch production are suitable for use as a raw material for the packaging or textile industry. Residues from plants and manure can be used to generate energy. And plant residues stay on the land, improving soil fertility. A focus on this – and on stewardship in general – helps to ensure that future generations can continue to reap the benefits of our agricultural land. Furthermore, plant breeding, cultivation methods and chain optimisation mean products have longer shelf lives, which prevents waste.

Circularity is increasingly attracting attention in urban areas as well. Cities are in fact actually ecosystems too, with a continuous stream of energy, food and waste. But there is a certain degree of scarcity, as is reflected in the high price of land and small plots, so we need to deal with this efficiently. Indoor farming helps to close urban cycles more effectively and reduce the logistical impact.

Product-service systems

Many agricultural businesses use the services of contractors. This type of teamwork ties in well with the circular economy. Thanks to modern equipment, the use of contractors leads to efficiency, lower costs and innovation. Every replacement machine comes with new technology. That puts contractors at the forefront of smart farming. By linking equipment data to external data – such as field maps produced using drones or satellite images – waste and the use of chemicals and fertilisers can be reduced. The contractors that are pioneering this approach are developing towards offering Smart Farming as a Service.

Value recovery

Agriculture and horticulture are essential in a circular economy, both as suppliers of raw materials, but also as users of waste streams. Businesses can increase their circularity thanks to the transition from waste to raw materials. That means more efficient use of energy, water, nutrients and soil. By limiting losses and waste, it is possible to enhance the value of residual products and produce and generate as much renewable energy as possible.

There are plenty of examples in the sector, such as the successful farms that combine arable and dairy farming. Or glasshouse horticulture businesses that use carbon emissions from the petrochemical industry via the OCAP pipeline. Livestock farming is developing many initiatives aimed at recycling minerals and turning manure into a raw material for energy generation. And horticulture supplies fibres from plant residues to the paper and clothing industries.

Food: from waste to product

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The global population is growing, from seven billion now to over nine billion in 2050. The number of middle-class consumers is on the rise as well. They have more spending power and want to eat not only nutritious food but 'western' food. Animal proteins are still the main staple in this diet.

Scarcity and volatile commodity prices

In the decades ahead, these developments will put more pressure on our global food system and the availability of agricultural land, water and raw materials. This, in turn, will lead to scarcity and volatile (commodity) prices. Creative solutions are required in all links in the food production and value chain (in short, from farmer to consumer) to ease the pressure on our food system. As well as preventing food waste (2 billion kilograms from production to kitchen sink each year), this means

- using raw materials efficiently
- looking for alternative raw materials
- reusing residual products

The transition from a linear food chain to a chain with circular elements limits the dependence on and use of scarce raw materials. That is why an increasing number of companies in the food value chain are seeking out alternative solutions for their raw material requirements. Either alone or with partners. Driven by idealism or based on economic motives. The acceleration of technological developments offers increasing potential to do so. To illustrate: Some raw material elements were worthless until recently, but now they are being reused. Energy from residual flows is also being generated with increasing efficiency.

Arrival of the climatarian

Consumers are developing an increasing interest in the food they eat: they want to know what is on their plate and are sensitive to information about it. Over the coming years, they will make more and more allowance for the ecological footprint of products and businesses in their food purchases. What is more, the impact of a product and business practices on the climate will increasingly become decisive factors in a business's brand score and reputation. The conscious consumer is becoming a 'climatarian'.

Circular business models in the food industry

Digital applications to prevent waste are becoming more and more commonplace for the consumer. These include personalised 'shopping lists' based on a person's physiological characteristics. For example, consumers can buy products that are good for their particular body and in the right quantities. And then there are **sharing platforms**, such as smart fridges which 'look' to see what the neighbours have to spare to prevent waste. But the largest gain in the next five years will lie in the use of **circular inputs** and **value recovery**. Just consider the following examples.

Circular inputs

Residual waste from the food production process – such as potato peel – is often used in biomass plants, as animal feed or is incinerated. The challenge therefore is to extract even more value from those flows by making them suitable for human consumption.

This is often at odds with strict hygiene rules for the processing of food. That said, we increasingly see examples of this being a success – often minor, but inspiring all the same. These include:

- bread baked from residual flows (brewer's grains) from the brewing process (BrouwBrood)
- beer brewed from unused potatoes (Pieperbier)
- soup made from oyster mushrooms grown on coffee grounds from office machines

In the third example, coffee beans are used several times for different purposes. Business models based on this strongly emphasise 'the narrative', helping to raise awareness among consumers that food is too valuable to throw away. The resulting products can generate additional revenues and margins within the current offering.

But circular principles can also be applied on a larger scale and 'anonymously'. Cargill, for example, processes soya to make food products in the Port of Amsterdam. Phosphate is obtained from the soybean meal, which Cargill's neighbour ICL Fertilizers uses in the fertiliser production process. In other words, the soya residues replace the phosphate that would otherwise be extracted from mines, e.g. in Morocco.

Value recovery

Thanks to information systems and collaboration inside and outside chains, there is a steadily growing understanding of residual flows. They form the basis for better (and often more lucrative) value extraction. Key questions in this regard are:

- Which residual flows are there in a company's own or other food chains?
- Where can these best be used/reused?
- Can we allocate process steps differently over a chain?

Close collaboration, information provision and chain management are essential conditions for success. By understanding each other's production process, residual flows can move throughout the chain. Only then can new circular forms of collaboration and cycles be made possible.

Food companies with a circular business model use science, technology and data to create maximum value, and, in some cases, for sector-foreign applications from residual products. This working method calls for more chain creation, with participants having knowledge of all the links, not only those in front of or behind them. It is also important to forge relationships with parties in other sectors to see how and where value can best be extracted. This can lead to a different cost and revenue allocation within and between chains/cycles.

Teeuwissen Group processes by-products from the meat sector – such as intestines – to make new raw materials for the food, animal feed and pharmaceutical industries. In collaboration with slaughterhouses and scientists, slaughterhouse waste is used as an input for new production cycles: from the skin of a smoked sausage to high-grade raw materials for medicines, e.g. Heparin, a blood anti-coagulant. This is how slaughterhouse waste becomes a raw material with a potentially sustainable social impact.

More sustainable production with more brand score: yes, we can

Replacing (scarce) raw materials in food with raw materials from residual products will not only make the production process more sustainable but also strengthen consumer engagement with brands, thereby increasing brand score, particularly when circular concepts have been created at local level, i.e. when they are recognisable and accessible.

Construction & Real Estate: tomorrow starts today

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From design and completion to demolition or redevelopment: the Construction & Real Estate field is broad and has many different players. It consists of a series of activities that jointly cover the entire life cycle of buildings and infrastructure. Together, they not only form a key economic driver, but they are also major users of raw materials and energy.

Construction and buildings

Existing buildings consume major amounts of energy (about 40 percent in the Netherlands) and primary raw materials (about 40 percent as well). In the Netherlands, that comes down to approximately 250 million tons a year of sand, wood, cement, steel, etc. In addition, around 40 percent of waste in the Netherlands is construction-related, amounting to around 24 million tons each year. The extraction and production of construction materials requires a great deal of energy, which mainly comes from fossil fuels. Carbon emissions per kilogram of material in construction are high, opening up promising potential for reuse.

Increasing energy efficiency in built environment

Sustainability in new builds is almost a given now due to the introduction and use of energy labels and BREEAM standards. With the Carbon Performance Ladder, the infrastructure sector is concerned with the carbon emissions of all the parties involved in a development. Both developments were largely triggered by requirements in laws and regulations and have led to innovations being developed by market operators.

The number of new builds added each year is relatively low, however. Increased sustainability in existing buildings has a much bigger impact. Those existing buildings consume approximately 40 percent of all energy in the Netherlands and are actually a huge repository for valuable materials and raw materials.

Less waste, more policy

As well as being a major consumer of energy, the Construction & Real Estate sector is also a major consumer of primary and other raw materials. There are a lot of potential gains to be made in the short term, if only due to the enormous quantities involved. The sector is thoroughly aware of that. To illustrate: the first circular developments and tenders have already been seen and there are many start-ups and grown-ups operating in this area. In collaboration with the private sector, the government is developing policy with the aim to reducing raw material use and creating circular chains. The Netherlands Circular in 2015 programme, the Raw Materials Agreement and the Concrete Agreement are just a few examples of such policies.

Value recovery: large gains to be has

Value in buildings is mainly associated with the value of the site and the difference between rental income and operating costs. The residual value of the buildings still tends to be secondary, which is logical in the transition from a linear to a circular economy. With the existing business models, nowadays it is not always profitable to dismantle buildings instead of demolishing them. That said, buildings (or properties) are increasingly regarded and valued as a source of raw materials: a great example of the emergence of the circular economy.

Pioneering in Delta Development Park 2020

Delta Development Park 2020 is the sustainable cradle-to-cradle business Park in Hoofddorp where all buildings also serve as a materials repository. Right from the outset, there has been an open dialogue between the developer/architect, the builder and its suppliers on the possibilities and impossibilities associated with this new way of building. This has led to a relationship of trust between the partners. Transparency about the cost and the profit margin was a starting point for achieving this dialogue. In addition, it allowed the partners to quickly identify any opportunities and threats and it created broad support among the partners involved. Together with Delta, ABN AMRO also developed new computing models for the value development materials.

Circular business models in Construction & Real Estate

Life extension

Construction developments require a major investment in time, money, energy and raw materials. If they become obsolete, they often lose their primary function – even if, technically, they have not yet reached the end of their life cycle. If a building structure offers scope for being adapted to contemporary demands or a change of function, many of the original investments retain their value. Extension of the life of a property and a product, 're-use and re-duce', has an enormous impact.

Circular inputs

Circular inputs concern energy and raw materials. Where energy is concerned, sustainability measures in buildings can reduce consumption and residual energy use can be supplemented with green electricity (circular input), resulting in a huge reduction in carbon emissions.

Where raw materials are concerned, opportunities are increasingly seen in recycling and reuse of construction products, both in demolition and in new developments. More bio-based materials will also be used. Industry is moving full steam ahead with innovations in products from renewable raw materials.

Product-service systems

There is much to be gained from new forms of collaboration in the fragmented supply chain. Such collaboration results in products that tie in better with the circular economy. It also contributes to the transition from 'ownership' to 'use' and the associated new business models. Producers themselves want to be and stay 'masters' of their product and raw materials. As a result, more and more parts will be used 'as a service'. ABN AMRO is experimenting amply with these principles, for instance in the CIRCL circular pavilion.

Collaboration is essential

Together, building owners, users and property developers are playing an important role in the transition towards a sustainable and circular economy. They are creating the preconditions for construction and buildings.

From the very first idea, architects are expected to use their creativity and power of persuasion to contribute to detachable details, pure materialisation and perception. Everyone will have to get used to a different perception of architecture, with fewer raw materials, second-hand components and unprocessed materials.

The transition to a circular economy will be boosted by engaging in a dialogue with the supply chain partners on topics such as energy and raw materials and using LCA/LCC rather than cost in the calculations. This will also call for a different input from the partners in the chain; it requires a 'yes we can' mindset.

Manufacturing: new raw materials, new business models

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Manufacturing plays a major role in the transition to a circular economy. And that is not only because of the potential for saving energy and raw materials. The sector is also the driver behind the development of new, sustainable technologies and business models: from rubber based on dandelions to product-service systems that take the burden off customers' shoulders.

With a share of approximately 15 percent of GDP, Manufacturing is a very important segment of the Dutch economy. The sector is a catalyst for innovation, exports and jobs, but is also highly raw material and energy-intensive. To illustrate: around 60 percent of energy in the Netherlands is used by industrial companies.

Chemical companies on the right track

With the signing of the Raw Materials Agreement and the Energy Saving Agreement, manufacturing has taken important steps towards a more energy-efficient and circular economy. Targets are also being agreed in specific sectors, for example in the chemical industry. With a revenue of more than €50 billion and its position at the beginning of many value chains, the chemical industry has a key role in making the Netherlands circular. Or this reason, the sector has expressed its ambition of lowering greenhouse gas emissions by 40 percent by 2030 compared to 2005. In 2017 – halfway through the period – a reduction of almost 20 percent has been achieved. The low-hanging fruit, such as less energy waste in the process and the purchase of green energy, has been picked. The remaining carbon reduction now needs to come from more complex and circular solutions, e.g. the use of biomass and the closure of the materials chain through recycling.

True costs of production weigh increasingly heavily

Reuse of products and materials is a joint responsibility of producers, the government and consumers. But the trend is that new European legislation is increasingly assigning responsibility to manufacturing. This calls for investments in product and process innovation. Innovative companies in manufacturing are actively looking for new, bio-based and biodegradable chemicals, plastics and materials that can be readily recycled and have less environmental impact. Unfortunately, this search is laborious. Availability and pricing are major barriers to rapid market adaptation. Oil is simply too cheap; as a result, bioplastics are often more expensive than oil-based products. Fortunately, the government and large multinationals are increasingly setting the right example. In their procurement and purchasing, they are not only looking at pricing, but also at the true costs, including the impact on the environment and social costs, such as working conditions. If a large number of SMEs move in the same direction, the circular transition will be sped up enormously.

Circular business models in manufacturing

By making more economical use of existing raw materials and developing new, reusable raw materials, Manufacturing can make strides in transitioning to a circular economy. But the largest circular gains are to be had from extending the life of products and equipment. Software also plays an important role: various manufacturers are already making intelligent use of predictive maintenance and big data analysis to extend the life of their products.

More room for regional players

The main challenges for manufacturing are long-term availability and affordability of energy and critical raw materials, such as rare-earth elements (e.g. neodymium for batteries). That is why the sector is fully committed to reducing energy and material consumption in production, for instance using smart energy recovery, energy-efficient production equipment and lighter materials. But efficient, high-grade recycling at the end of the life cycle is also crucial in order to guarantee the availability of (critical) raw materials. As a result, the materials cycle will more often be organised locally, which creates opportunities for regional players. The dependence on specific countries for raw materials will decrease as well.

Circular inputs

Manufacturing is introducing many innovations involving products made from renewable raw materials. cardboard from roadside grass, film from sewage sludge, rubber from dandelions and plastics based on sugar beet: the technical possibilities are endless. And yet, the production capacity for bio-based and biodegradable plastics still amounts to just one percent of worldwide plastics production. But the availability of renewable raw materials is growing, quality is becoming more stable and there are specific material benefits that generate material and costs savings during use. One example is the PEF bottle, which is made from sugar beet or maize. This is stronger and lets through less light, water and carbon than a PET bottle, which preserves its contents better. These types of benefits often still have to be priced in, however. The global share of bioplastics is expected to more than double, to 2.5 percent in 2020.

Life extension

The largest circular gain can be achieved in extending the life of products and equipment. Product design and software play an important role in this regard. A product with a modular design or design for disassembly simplifies the upgrading, reuse and eventual recycling of products. This also creates opportunities for a closer relationship with the customer. The car industry is playing a pioneering role here. Sensors, electronics and smart software offer proactive support for car operators, leading to less wear and tear. Upgrades can in future be carried out via the internet, without having to visit a garage. Predictive maintenance and big data analysis will extend the service life of many products and reduce environmental pollution.

Product-service systems

The ultimate method for closing the chain: no longer selling products, but offering them as a service. In this way, the manufacturer continues to be the owner and knows for certain that their products and raw materials will be returned. Consumers, but business customers as well, are increasingly looking for a worry-free solution. This is how services such as maintenance, repairs, calibration, overhauls and training are becoming an integral part of the product. Manufacturers of aircraft engines offer ‘power by the hour’; train manufacturer Alstom is being paid by Virgin Trains on a per-passenger basis, and Vanderlande is looking at payment per suitcase for its baggage system. This ‘servitisation’ of manufacturing is more relevant than ever: services often have a higher profit margin and offer more stable revenues, while the required sensors, electronics and computing power are becoming ever cheaper.

Utilities: from fossil to renewable

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The earth is gradually devouring trees and plants. This is how coal and oil were created over the course of millions of years. So, with a little imagination, it could be argued that yesterday's living organisms are proving their economic value today – a fine example of circularity. But unfortunately, that is not how it works; fossil fuels have no right to that label. The process takes much too long for that. What is more, once they have been burnt, oil and coal cannot be used again. They also produce more carbon emissions. Sun, wind and water are renewable sources, which is why they do fit in with the circular economy.

Electricity companies under high voltage

When we think of utilities, it is electricity companies that spring to mind. Over the past few years, they have faced major changes and this trend towards change is expected to grow stronger still in the years ahead. Not only is their business model coming under pressure due to decentralisation and the emergence of new market players, but returns are also falling sharply due to the fact that investments in coal and gas-fired plants, for example, are subject to accelerated depreciation.

In addition, electricity will have to be generated using new methods. This will again lead to major expenditures, for instance on large-scale data analyses and the construction of solar and wind farms. The business model is changing: from supplying energy only to offering a mix of energy and services. Not every energy company appears ready to make this transition, and some will therefore be unable to survive. But we also see opportunities, particularly if a company is well-positioned and can capitalise on these developments.

Waste processing: low oil price curbs circular potential

At waste processors, we see that circularity initially offers opportunities. For example, the heat released in waste incineration can be used as an input in district heating. That said, there are threats too. The amount of qualified waste is not always sufficient, for instance. And in the recycling of plastics, the consequences of the low oil price are evident; new plastic production is sometimes cheaper than recycling.

Water companies are also playing their part

Finally, we are seeing developments at the ten Dutch water companies, each with their own supply area. They too are concerned with the circular economy, for example by trying to extract lime from drinking water for reuse or by undertaking infiltration projects, the reason being that the groundwater level may fall when water is extracted. By absorbing surface water and returning it to the soil, this effect is compensated. A fair number of measures are also being taken with regard to consumers. These include low-flush toilets and low-water taps, heat recovery from shower water and separate drainage of rainwater.

Circular business models in the Utilities sector

Circular inputs

As part of the National Energy Agreement, the Dutch government has decided to close at least five of the country's ten coal-fired power plants. A subsequent government will decide on the fate of two further plants. These coal-fired plants can be closed because additional generating capacity has come on stream. This extra capacity mainly comprises onshore and offshore wind energy. Wind power capacity is set to increase substantially in the years ahead, but the quantity of generated solar energy is also growing fast. Moreover, the costs (and required subsidies) are falling fast due to increased scale. The three remaining coal-fired plants could be converted into biomass incineration plants, possibly with some co-firing of coal. The coal/biomass plants simultaneously provide a substantial volume of residual heat. The only risk in this scenario involves the creation of a 'lock-in'. By making the heat infrastructure co-dependent on coal/biomass plants, plants may continue producing carbon emissions for longer than necessary. That also reduces the incentive for further innovation.

Value recovery

Where utilities are concerned, value recovery principally means using residual heat. This may come from coal/biomass plants, but from waste processors as well. The problem of solar and wind energy is that it is not yet possible to store it on a large scale: generated electricity must be used immediately. Homeowners with solar panels are often seen to generate too little power at times of peak demand, while they have a surplus during the rest of the day. Thanks to net metering, the surplus can now be 'fed back' into the grid at an attractive price, so that the generated power retains its value for the producer/homeowner.

Sharing platforms

Another strategy could be to share ownership of solar and wind farms. Such sharing platforms, or participation options, boost support for these forms of energy. Many of these projects are now still being held back by the NIMBY (not in my back yard) effect. We are already seeing scale, greater efficiency and hence lower costs. But if citizens become more involved, the share of renewable energy can increase further.

Smarter use of data

There are plenty of opportunities to invest in renewable energy. Businesses can also do this relatively safely, partly because the Dutch government creates the legal framework and encourages these investments through subsidies. Thanks to European and national targets, we also know the growth potential for this sector in the years ahead, both for onshore and offshore projects. In addition, there are some promising alternatives, for example if energy companies were to process and use their data better. With that knowledge:

- energy companies can make smarter use of electricity
- consumers can become more efficient users
- users can get better insulation advice

TMT: key supplier to the circular economy

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The Technology, Media & Telecom (TMT) sector has long been in a state of flux due to the impact of digitalisation on the business model. Now that our society is increasingly becoming a fundamentally digital environment, the overlaps between TMT and other sectors are growing. Digitalisation, and hence the TMT sector, play an important role in the transition to the circular economy as well.

TMT leading the way in change

For the TMT sector, the circular approach entails two fundamental changes. First, the sector is an essential force behind the entire circular revolution, i.e. as an enabler of change in all sectors. Circular production chains are much more complex than traditional, linear production columns. Software, internet applications and other forms of new technology make this complexity manageable and can accelerate the emergence of the circular economy as a whole.

Second, the TMT sector can contribute to the circular economy by adapting its own products and services. This is mainly concentrated in two areas: the production of hardware and traditional media. In both sectors, a considerable reduction in raw materials and energy use can be achieved.

Opportunities for TMT as an enabler

Relationships in a circular production chain are very intensive: among suppliers themselves, but particularly between customers and the suppliers. As a result, working methods have to change in order to be able to supply new products and services. The ability of equipment and electrical devices to communicate with each other is an essential precondition for circular production. The new industrial design and production methods that are required call for innovative industrial software and internet connections. The nature of communication between producers and consumers is also changing, increasing the need for new CRM solutions. These developments make the TMT sector a key supplier to the emerging circular economy.

TMT as a contributor: less waste and paper

Obsolete equipment accounts for a large part of the electronic waste (e-waste) worldwide. Since this type of waste is difficult to recycle – it often costs too much to recover the raw materials – a great deal of value is lost in this production chain, not to mention the substantial problems that come with e-waste in terms of the environment and the health of workers processing it. The life of electronics can often be extended by replacing components.

There are large savings to be had in the newspaper and publishing business as well. Although print circulations have been falling for years, an average of 35 percent of a newspaper publisher's costs are still spent on the production and distribution of paper editions. In 2015, 936 million paper newspapers were distributed in the Netherlands, using around 150,000 tons of paper. Production also requires ink and energy. By digitalising all news media, the use of all these raw materials plus the required equipment could in theory be phased out entirely.

Circular business models in Technology, Media & Telecom

Sharing platforms and product-service systems are the most promising new business models for the TMT sector, as software and internet applications play a crucial role in them. The sector can contribute directly to the concepts of circular inputs, life extension and value recovery through the ICT Hardware and Media sectors.

Sharing platforms

Sharing platforms are furthest in their development and they are very much part of our daily lives. These represent a new category of businesses, made possible by the internet and smartphones. Well-known large sharing platforms are Airbnb and Dutch-based Snappcar (car sharing). Other sharing platforms focus on such items as tools (Peerby), clothing (Rewear) and books (Bksy). In 2016, there were more than 150 sharing platforms operating in the Netherlands.

Product-service systems

In addition to sharing platforms, product-service systems offer potentially large new markets for the TMT sector. Offering a product as a service is effectively an extension of circular production. Its major advantage is that fierce price competition and fluctuating sales are replaced by stable income from high-added-value services. The shift to product-service systems offers opportunities for the TMT sector on two levels: companies can introduce new concepts themselves or they can use software solutions to contribute to other players' concepts. Businesses in other sectors that introduce product-service systems face major changes. There will, for instance, be a significant shift in income flows (from sales to service). Their relationship with customers will change as well; it will become closer and focus more on the long term. For this reason, producers will have to expand their service capacity substantially and software is indispensable in doing so.

Life extension

A transition to the fully modular production of such products as computers, IT equipment and electronics would be a logical step towards a more sustainable hardware sector. The life of smartphones and tablets, for example, can often easily be extended by replacing parts. Refurbishment is far from being a new phenomenon nowadays.

Incubator for start-ups

When established businesses fail to change or embark on change too late, new businesses will grasp the opportunities that come with the circular economy. A well-known modular concept such as the Fairphone can in principle be applied to any (electronic) device. Since internet technology is crucial in customer relations (interactive service), start-ups often have the chance to do things better than established businesses. The circular revolution therefore gives rise to a new generation of start-ups.

Professional services: knowledge for the circular economy

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Professional services account for a major share of the Dutch economy. In 2015, this person-intensive sector contributed 13.2 percent of GDP. Over 1.4 million people now work in the professional services sector; most of them have high professional qualifications.

Sector considers fundamental questions

The sector can broadly be subdivided into three segments:

- HR services (temporary employment, secondment and payrolling)
- Professional practitioners (accountants, consultants and lawyers)
- Facilities management (cleaning, security)

The central challenge for all these segments is the question: 'How do I get the best from my people?' Fundamental questions also play a role, such as: 'What is the right organisational structure?'; this is a relevant question as the dominance of hierarchies recedes. And: 'What is our purpose on earth?' In short, how do we add value to society and/or resolve our social problems. Circularity is playing an increasingly important role when it comes to social problems in particular.

Influence of technology is palpable

We are also seeing that technology is increasingly gaining traction in the sector's business models. In fact, technology is already disruptive in the standard operations of a number of subsectors, such as the notarial profession, temporary employment and accounting. These professions come with the highest margin pressure and the lowest added value. The opposite is true for customisation and advisory services, where there is some scalability and where margin pressures are relatively low. Here, professional services serve as a type of testing ground where businesses experiment (out of sheer necessity) with new organisational structures and socially relevant business models.

Large firms scaling back, self-employment on the rise

As a knowledge-intensive sector, professional services are a key contributor to the unique selling points of the Dutch national economy. Within the sector, we are seeing a general contraction among large firms. Growth is due primarily to smaller businesses and self-employed persons. Most self-employed persons are active in specialist professional services, so this is where the transition to a network economy is most visible. The sector is also a favourite among young people, with most start-ups being recorded in professional services. As a result, within the sector, (circular) innovation is found in the networks of small businesses and independent professionals.

People make the difference

Professional services play an important role as an enabler in the circular economy, as human brainpower is a crucial factor in the restructuring of the economic system. The main added value in the sector lies in the fact that it supports businesses that introduce new working methods, such as reverse logistics, predictive maintenance and sharing platforms. These innovations also result in new types of jobs, for which the right people must be recruited *and* trained.

As a result, there is a role to play for knowledge: in the process changes required to build the circular economy and in amendments and applications of legislation to the circular economy. That calls for innovation, new ways of thinking and different uses of labour.

Circular business models in Professional Services

Since professional services so clearly have an enabling function, this sector overlaps with many – if not all – business models in the circular economy. Knowledge of the various business models and the foundations or processes underlying them is crucial for professional services providers. The challenge lies primarily in the fact that, although theoretical knowledge is available, there is still a lack of practical experience. That is needed to assist SMEs further in the application of circular business models, and to advise governments or train staff to instantly fulfil new roles in the circular economy.

Product-service systems

The development of product-service systems does not mean, of course, that the product and the services have to be provided by the same company. A shift from production to services has been under way in the manufacturing industry for some time. We expect this to continue in the future. As a result, some manufacturing companies will develop into service providers and new service companies are being created to service the industrial sector. IBM and Xerox, for example, have distanced themselves so much from the physical product that they now actually focus only on business services. Their service offering has been greatly expanded to encompass not only maintenance but also consultancy, financing and insurance. Such a move requires a huge cultural shift in the organisation, as well as large investments in the knowledge of employees and a broad service offering.

Circular inputs

In addition to the enabling role, the professional services sector is also a key customer of the real estate sector. Housing is a very different kind of focal point for the circular economy. With the increasing need for sustainable work environments, professional services are a hotbed for circular housing requirements, such as a carbon-neutral office that collects rainwater and has solar panels on the roof. This can make a difference, not just for the environment but also for the image of a professional services provider. The same goes for company cars driven by professionals in the sector, where the objective of lower carbon emissions can also be pursued.

The Edge

The head office of Deloitte/AKD in Amsterdam's Zuidas district is known as 'The Edge'. On completion, the building was awarded a certificate as the most sustainable office building in the world. An important sustainable feature is that the building is entirely energy-neutral, partly thanks to the use of solar panels that cover the entire southern façade. The Edge has not only won praise for its sustainability, the focus that was placed on creating a pleasant working climate has also paid off.

Transport & Logistics: efficiency is the way to go

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The Logistics sector is already highly relevant to the Dutch economy, but could further strengthen its position. The circular economy aims to reuse as many materials as possible with a view to closing chains completely. This requires a complete overhaul of production chains on the basis of total cost of ownership. This affects the chain role of logistics companies.

Circular success factor: more chain collaboration

A successful transition to the circular economy calls for an accommodating adjustment of product and transport flows, which in turn requires intensive chain collaboration between shippers and carriers. The agriculture and food (raw materials) and construction sectors are important pioneers in the circular approach. These sectors also serve as the engine that drives a large share of the Dutch transport movements.

Pushing goods back into the chain

The main activity of logistics companies is moving goods. The focus has traditionally been on maximum efficiency at minimal cost, but now the sector is under social pressure to reduce the high level of carbon emissions it produces. And because the circular economy needs reusable materials, new goods flows will be created in the future. Return logistics is one example where goods are not moves forward, but pushed back into the chain.

Logistics companies play seize a leading role here and become important enablers for the circular economy. It is important that they do not wait, however, but start contributing ideas now on new, ingenious transport processes. That will require an innovative mindset and new forms of collaboration.

Reducing carbon emissions and easing the pressure on cities

Together with road and rail transport, inland and maritime shipping and aviation produced 29 billion kilograms of carbon emissions in 2015, which corresponds to 17 percent of total carbon emissions in the Netherlands. As a result, the sector is increasingly having to contend with environmental rules and regulations. These include environmental zones and regulations on cleaner engines.

Specific problems relating to city distirbution also play a role. The Netherlands is classified as having a 90 percent urban population density and this percentage is expected to rise. This is putting increasing pressure on cities, and hence on urban logistics. Shippers and logistic service providers in areas such as hotel and catering, retail and construction need to collaborate with each other on a structural basis in order to keep cities liveable.

This is already happening as a result of information and capacity being shared on platforms, but that is only the start. Retail and Construction each account for 25 percent of the total carbon emissions in the logistics sector, followed by Hotel and Catering with 12 percent. Many gains are still to be had. Another example is the delivery of online orders. High percentages of return shipments are a headache for retailers and impact negatively on people's living environment. Efficient return logistics may be the perfect solution.

If logistics companies succeed in translating their customers' circular product design into practical transport solutions, they can add value to the chain. That will open the door to horizontal and vertical forms of collaboration focusing on specific clusters or product flows.

Circular business models in Transport & Logistics

Value recovery and sharing platforms are promising new business models for Transport & Logistics. Closed loop supply chains can be created only by an approach that focuses on the end of the chain. For this reason, companies must shift their attention to the 'first mile reverse logistics' of reusable products. The digital transformation opens up new possibilities in terms of sharing platforms, enabling existing capacity to be used more effectively and for multiple sectors at the same time.

Value recovery

Logistics companies have a strong relationship with their shippers based on their original transport mission. The opportunities offered by the circular economy to manufacturing clients will affect their logistics requirements. Supply chains need to be adapted, so that some products can be returned to the chain. This is subject to the condition that logistics companies will gain a better understanding of their customers' changing production processes. In contrast to the familiar concept of 'last mile logistics', this is about 'first mile reverse logistics'.

Sharing platforms

The transport sector is a major consumer of fossil fuels, so this sector plays an important role in the transition to alternative energy sources. Optimisation of loading capacity is another challenge to which sharing platforms offer a solution, as they enable existing logistics networks to be interconnected, making them ideal for designing circular chains. Various initiatives have already been launched, driven by digital innovations. There are two types of initiatives:

1. Occasional initiatives
   Operators with an urgent need for transport capacity are connected to providers of loading capacity in a virtual marketplace.
2. Structural initiatives
   Cargo flows of a number of collaborating companies are connected on a structural basis.

Companies that are prepared to share information can collaborate more intelligently and thus build up strategic partnerships. With technological innovations coming on stream at increasing speed, the dotcoms of the transport world are set to transform the sector.

12Return and Rhenus: software and logistics in one

Logistics services providers must be able to streamline their customers' return shipments. To this end, returns management software company 12Return has joined forces with Rhenus Contract Logistics. Together, they offer customers a comprehensive solution for return logistics based on a transparent partnership that integrates software and logistics.

Sharing platform 2.0 is here

Quicargo is a start-up that aims to modernise the transport sector with innovative technology. Quicargo offers unused loading capacity via an app. With its end-to-end solution, the platform takes things a step further than existing sharing platforms: Quicargo also arranges for the financial settlement and monitors payments and insurance. The next step will be to stimulate long-term structural partnerships, for example to exchange freight between different shipping companies.

Government & Education: sharing knowledge

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The Government & Education sector plays a special role in the mission to transition to a circular economy. The government is uniquely placed to act as a catalyst for the new economy by eliminating obstacles or promoting innovation, as well as by increasing awareness among citizens through education and leading by example. The sector is also an important client for a multitude of companies: by making the right demands to promote circularity, the sector can play a meaningful role in the new economy in that regard as well.

Progress through policy

From linear, fossil and carbon-based to energy-neutral, climate-proof and running on green raw materials: the Dutch government has taken on various important roles to accelerate the transition to a circular economy. The policy that must be pursued in these areas will be reflected in the new coalition agreement. The market will undertake many of these implementation plans. As in other transitions, the approach here too is: 'government where necessary, market where possible'. But also: 'centralised where necessary, decentralised where possible'.

Sustainable investment agenda

Decentralised authorities – provincial and local authorities and water boards – have recently presented an extremely robust sustainable investment agenda. This shows how, each on the basis of their own roles, they will be taking ownership in the drastic yet promising mission to change the sector. The agenda is also an invitation to central government, businesses and other social partners to strengthen their combined efforts.

Local, regional and national

An important principle of this agenda is that the right scale is required to tackle the transition to circularity effectively. Most measures need to be taken at local or regional level. In addition, innovations have to be integrated intelligently and connected to other objectives, such as business climate, urban renewal, landscape and mobility. Decentralised authorities are well placed to do this. As enablers and drivers of the circular economy they are developing a number of initiatives:

1. For each of the five chosen sectors/chains, the government is forming transition teams responsible for the transition agenda.
2. They drive innovation, for instance by acting as a launching customer themselves in circular solutions.
3. They connect players that recover raw materials from water and wastewater and market it, creating new jobs (e.g. with raw material hubs and factories). They give a boost to businesses with (revolving) innovation funds and regional development companies.
4. They identify the obstacles to the transition to a circular economy and adjust them where necessary.
5. Decentralised authorities (or centralised, see above) encourage behavioural change among citizens. And finally they lead by example. From 2018 onwards, decentralised authorities will assess their own expenditures and investments (€28 billion per year) on the basis of climate-proof and circular criteria.

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Circularity in the curriculum

Education has a specific mission in the circular economy: preparing children and young people for a sustainable world. In this process, young people learn to create a liveable, fair and sustainable world within ecological boundaries. The new economy will be given priority in the curriculum. The *7dagencirculair* teaching materials are an example of this. In addition, the number of creative hotbeds are on the rise; here, businesses and knowledge institutions team up to develop innovative applications for the new economy.

Circular business models in the Government & Education sector

Because the Government & Education sector has such an all-encompassing role in the circular economy, it is difficult to identify which business models will be impacted most. Looking at the role of the government as a launching customer for new business models, we believe that the impact is greatest when it comes to social real estate, such as townhalls, schools, sports facilities and swimming pools.

Life extension

Social real estate is perfectly suited to circularity. Facilities are also much more pleasant to use as a result (Happy Buildings). To illustrate: a modest number of social facilities of circular design were completed for the first time last year: a temporary court in Amsterdam and city hall in Venlo. In both developments, the temporary nature of the buildings was introduced in making the business case. On the scheduled decommissioning date, the buildings will be dismantled and rebuilt elsewhere or the used materials will be reused as high-grade materials in other buildings.

Organisations in the Government & Education sector own a lot of old real estate that has now been written off and often does not meet modern-day requirements. That is why some of these buildings are vacant. Renovation and life extension allow a substantial improvement in the building and energy facilities of the earmarked core stock, i.e. those facilities whose function must be preserved in the long term. Here too, some aspects can be given a circular twist. The real estate that does not belong to the core stock qualifies for retrofit or demolition/harvesting of materials.

Value recovery

The government also plays a role in waste prevention and the use of valuable raw materials. It does so by developing return systems and upcycling centres. This autumn, the first upcycling centre is due to open in the Netherlands (Almere Haven). This waste processing centre was built using waste from demolished local buildings. All materials have been recycled, refreshed, repaired and made suitable for reuse. The centre also offers opportunities to people who are in the process of returning to the labour market.

Retail: from second-hand shopping mall to subscription jeans

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Our current production model is linear. And that has adverse consequences, such as a growing waste mountain and a shortage of raw materials. The only logical solution would seem to be a transition to modular and circular production in areas such as clothing, electronics, DIY products and furniture. Retailers can play an important role here, for example by increasing the useful life of products, renting them out or offering them as a service.

Our current model: making throw-away products

Every year, Dutch consumers spend more than €100 billion buying items. Many of these items have a short life and end up in dustbins or landfill sites. At present, our economy is based largely on the principle of obsolescence, meaning that products are designed to become obsolete quickly so they need to be replaced sooner. The intentional shortening of life cycles and poor (or unprofitable) reparability cause consumers to throw away many of their possessions, leading to a systematic waste of materials and products.

To illustrate: in the Netherlands, the drive to consume results in the destruction of 1.2 million new items of clothing every year[2]. Of all discarded and worn clothing, 15 percent ends up in the clothing bank. The vast majority (135 million kilograms annually[3]) is incinerated or thrown out, while cotton production requires enormous amounts of water. Just to give you an idea: it takes 2,700 litres of water to produce one cotton T-shirt and no less than 8,000 litres to produce a pair of jeans[4].

The waste mountain is also growing. At the current rates of consumption and production, the weight of waste plastic in the oceans will be higher than that of living fish by 2050. In addition to the threat of raw material shortages, this is having an enormous impact on our living environment. An interesting development is that Adidas and G-Star, among other clothing producers, are now making products using waste plastic from the oceans.

Boycotts, buycotts and sustainable living

Preventing waste is a key aspect of more sustainable consumption and hence of the transition to circular production. When consumers take account of ethical, political or environmental considerations, they qualify as conscious consumers. They are deliberately buying (buycotting) or not buying (boycotting) a product or adjusting their lifestyle.

The Dutch consumer population has three distinct types of sustainable consumers:

1. 'Red' consumers (25-55 percent) are not committed to sustainability.
2. 'Light green' consumers (40-70 percent) understand the consequences of their consumption but do not want to make too many sacrifices to sustainability. Their behaviour is often fragmented: for example, they do buy energy-saving bulbs, but they take long showers. They could make the switch to genuine green consumption.
3. 'Dark green' consumers (approximately 5 percent) are the most sustainable and consistent in terms of awareness and behaviour.

2 awearness-fashion.nl
3 voordewereldvanmorgen.nl
4 oneworld.nl

According to the Netherlands Institute for Social Research, consumers are buycotting more, they are participating in the sharing economy and they increasingly learn about sustainable initiatives. In other words, consumers are becoming increasingly socially aware. According to a recent investigation by market researcher GfK (October 2016), an average of 49 percent of Dutch consumers now consider sustainability when buying a product.

Circular business models in Retail

ABN AMRO expects the consumption of sustainable products to increase further. Consumers want to contribute to sustainability and engage with this theme. This is consistent with a trend that consumers are connecting more with the brands and products they buy. This goes beyond the mere need for a product. It is easy to choose between a brand that just fulfils your needs and a brand you feel connected with at a higher level. Transparency about the production process is becoming a basic requirement for retailers.

That said, the circular movement also poses a threat to retail. Fewer new items are sold as a result of sustainable approaches such as:

- consuming less
- refurbishing
- sharing platforms
- acquisitions

This is all the more reason for retailers to embrace circularity.

Business models: life extension, sharing platforms and product-service systems

ABN AMRO believes the following strategies will have the greatest impact on Retail:

- **Life extension** of products, as facilitated by Marktplaats and Leapp. Smartphones and tablets, for example, can remain in use for longer if components are replaced.
- **Sharing platforms**, on which items can be borrowed for a short period of time. Examples are Peerby, Lena (the clothing library) and various car platforms such as SnappCar and MyWheels.
- **Product-service systems**, in which a subscription-based product can be used over the long term without the user becoming its owner. Quality, service and collection of the raw material are guaranteed, both for the customer and for the supplier.

Promising business models for circular retailers

How do you extend the life of products? Various providers have made this their business model, from the local cobbler and clothing repair shop to brands such as United Wardrobe and Fairphone. In Sweden, the first fully second-hand shopping centre is now open. With this strategy, products can be offered to price-conscious consumers at an attractive price. It is important to research the extent to which a product lends itself to rental rather than direct sale. Construction equipment has been available for short-term renting for some time. MediaMarkt and Dixons have begun hiring out electronics. Given that they retain the ownership of the products, they have an interest in a long service life. It may also be worth taking a different look at the concept of ‘ownership’. Do your products lend themselves to a subscription service or a leasing model? Copier, coffee and software providers have been doing this for many years. Washing machines, refrigerators and even made-to-measure suits (Dutch Spirit), jeans (Mud Jeans) and mattresses (Auping) can now be leased. Rather than entering into a short-term relationship based on a sale, you engage in a more valuable long-term customer relationship. And by keeping control of raw materials, the ‘price’ factor can be positively influenced here as well.

Leisure: experience economy offers circular opportunities

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In the fast-growing Leisure sector, businesses are capitalising on the circular economy as best they can. And they have to, because investors and lenders are prepared to go the extra mile for circular business models. That means more money for less. On the other hand, customers are increasingly regarding sustainability as a firm requirement. No Green Key label? No event!

Consumer is a sustainability driver

The Leisure sector is a melting pot of a diverse group of segments, ranging from holiday parks to airlines and from caterers to festival organisers. How and to what extent the circular economy applies to them differs from segment to segment. But they do have one thing in common: they are consumer-oriented businesses. And consumers are becoming increasingly critical of wasting of raw materials.

Leisure as a circular testing ground

As a result of its unique position (close to the consumer), Leisure is well- placed to lead consumers into the circular economy. Festivals, for example, are perfect mini-biotopes in which to experiment with circularity. The audience can be introduced to the practical aspects of circularity through entertainment. ICEK is a good example. This festival scale-up keeps beer really cool, but consumes just half the normal energy and produces no less than 82 percent fewer carbon emissions.

Wind in its sails

The sector has the wind in its sails. Consumers are increasingly looking for valuable experiences and are less interested in owning things. The 'experience aspect' affects the circular economy in two ways. On the one hand, it leads to increased focus on shared ownership among consumers. This is reflected, for instance, in more use of public transport and sharing platforms, such as Airbnb. On the other hand, consumers' quest for innovative and interesting experiences means that companies in the sector are continuously having to look for innovative concepts. As a result, companies will be wanting to refurnish their interiors more often, for example. These shorter production life cycles are at odds with the principles of the circular economy.

Climate-neutral travel

The Dutch Railways (NS) have been worked to make train travel climate-neutral for some time. Since 2005, electricity use per passenger kilometre has declined by 30 percent. In addition, all the power used by NS now comes from renewable sources. And from 2018 onwards, NS will operate entirely climate-neutral trains. For eight out of ten travellers, these are important reasons for travelling by train rather than driving.

Clean holidays?

The Dutch Association of Travel Agents an Tour Operators (ANVR) received a coveted United Nations award in January 2017: the UNWTO Award for Innovation in Research and Technology. It was awarded top marks for an online calculator with which travel companies can accurately measure the carbon footprint of their holidays they offer. The calculator is linked to a database containing nearly one million accommodations worldwide, including transfers and local excursions. Both travel companies and travellers can now put together their trip – from flight-only to package holiday – in a way that puts as little pressure on the climate as possible.

Circular business models in Leisure

Circular inputs

Particularly when we travel, by air or by road, we burn large volumes of fossil fuels. The sector is aware of this and is working to reduce its carbon footprint. New aircraft, for example, consume 70 percent less fuel than aircraft built in the 1970s. Research by ABN AMRO shows that clear and reliable information on energy consumption forms the basis for greater efficiency because this allows targets to be set from which the bar can be raised further. This leads to all kinds of added value: innovation, image improvement, loyalty, new customers and higher revenues. What applies to airlines applies to other leisure sectors too: capitalising actively on the circular economy will yield at least an 18 percent improvement in returns.

Product-service systems

Hotels and holiday parks in particular are continually expected to capitalise on changing consumer trends and requirements. Nobody wants to sleep in an 'old' bed. But when such a bed is replaced, most of the time it is far from being at the end of its technical life. The same goes for other furniture, carpeting and lighting. If the manufacturer remains the owner and adopts the circular approach in its production where possible, the sector can produce less raw materials waste. In addition, product-service systems give businesses an opportunity to capitalise all the time on demand for innovative and high-quality experiences without continually having to make major investments.

A good night's sleep as a service

Auping is a good example of a business that offers a successful product-service system. Since December 2016, this Dutch bed manufacturer has partnered up with Landal holiday parks by offering 'A Good Night's Sleep-as-a-Service'. Landal rents its beds from Auping. That means that guests always sleep in a new bed and Landal does not have to invest in new beds all the time. In turn, Auping remains the owner of valuable raw materials and can thus tap into an entirely new market, in which demanding guests continuously give relevant and reliable feedback to improve the product, in a sector that has seen the number of German and Belgian holidaymakers rise by tens of percentage points over the past few years. There are no doubt many among them who – once they get home – still have dreams about sleeping in a Dutch bed

Healthcare: less waste, more sharing, tailored nutrition

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Healthcare organisations quintessentially have a social foundation, which is why proper care for people and the environment forms a natural combination. Various overarching initiatives are already in place to minimise the environmental impact of the sector.

Energy consumption and waste mountain must be reduced

Healthcare produces two types of raw material waste: real estate and refuse. A large share of the total of 54 million square metres of healthcare real estate was built between 1970 and 1990, a period in which the use of energy-efficient raw materials was not much of an issue. On average, real estate accounts for around 50 to 55 percent of the total environmental impact of healthcare institutions. New construction can substantially reduce this percentage. In consultation with builders and engineering firms, new buildings are constructed to be as energy-efficient as possible. The Tergooi hospital in Hilversum, for instance, which has yet to be built, is designed to become as energy-neutral as possible.

The healthcare sector also produces waste consisting mostly of paper, packaging materials and medical applications: an average of 1.3 kilograms per hospital patient, and 1,000 kilograms per bed in long-term care. The Environmental Platform for the Healthcare Industry and the Carefree Waste Initiative have committed themselves to reducing the size of the healthcare waste mountain. By increasing its focus on this issue, healthcare managers could reduce it by 30 percent.

Healthcare is more of an end-user than a producer. It is worth noting that nearly all items used in healthcare are made of primary raw materials and intended for one-off use. This increasingly begs the question of whether this is desirable or necessary in all cases.

The conscious healthcare consumer

The healthcare waste hotline of the Dutch Ministry of Health, Welfare and Sport received no fewer than 22,500 reports over the period 2013-2016. These mostly concerned the provision of unnecessary care and wastage of medicines and food. Medicine wastage can be addressed by prescribing smaller quantities and by asking patients to use medicines from home when they are in hospital. Radboud UMC university medical centre has good experience with patients taking their medicines with them to the hospital. Other hospitals will probably be recommended to do the same.

The Diverzio foundation was established to combat food waste. In healthcare institutions, an average of 40 percent of food is thrown out. It would seem quite feasible to cut this percentage in half, for example by presenting the food better – on ordinary crockery instead of on plastic plates – and taking more account of the preferences of patients and residents. A significant impact can already be achieved when residents can decide for themselves when they want to eat.

Circular business models in Healthcare

Circular inputs

Disregarding energy consumption from buildings, circular inputs have the most impact.
Chain partners will have to adapt their products and services, for example by:

- using recycled materials. At this time, nearly everything is made of primary raw materials, but that is due more to force of habit than to legal requirements. Protective clothing, needle containers and gloves can be made from recycled materials, for example.
- collecting different types of used plastics separately. This requires clear agreements and closer collaboration with healthcare institutions. The OLVG hospital in Amsterdam is running a pilot on the collection of clean plastic in operating rooms.
- using biodegradable materials. Examples are biological rubbish bags and biodegradable hard plastics. Pharmafilter, for example, produces biodegradable disposable urinals and bedpans, which can be turned into energy in an installation.

Sharing platforms

A lot of expensive equipment in healthcare institutions is only used sparingly due to the fact that overcapacity is often a conscious choice to ensure that peak loads can be accommodated. Part-time use is then much more efficient. Another advantage of sharing is that equipment is written off more quickly, so the sector as a whole will always have the latest technologies at its disposal.

Product-service systems

A supplier can also make a contribution by taking back products after they have been replaced and sending them to a different hospital. This often happens in the case of imaging equipment produced by major manufacturers such as Philips and Siemens. Normal products such as lighting, beds, doors and taps can also be reused, for example through the FLOOW2 sharing platform.

Food: a double-edged sword

With regard to food waste, the main strategy is to focus on economical and sensible use. This is a double-edges sword: providing high-quality food is good for people's health, but it also helps to reduce the waste mountain since patients and residents will actually eat it. Both the quality and the presentation of the food are important aspects. The Gelderse Vallei hospital is probably the most advanced healthcare institution when it comes to the right nutrition. It has created the Nutrition in Healthcare Alliance with Wageningen University for this purpose. FoodforCare is one of the organisations that aims to raise the quality of nutrition in long-term care facilities as well.

Using products of recycled or recyclable material

As an end-user of products, the sector can exert influence on producers. Where possible from a hygiene and safety perspective, products made from recycled materials can be purchased. After their use, smart collection methods and separation of plastics in particular will result in sufficient volumes to make the waste suitable for reuse.

Financing the circular economy: a different way of looking at value

The concept of 'value' is changing. At this time, we still assume that a product has the highest value when it is sold to the end customer, after which its value falls quickly. Just look at cars: once they leave the showroom, they are considered used, which makes them worth less. In the circular economy, things work differently. Here, companies want to keep the added value of a product as high as possible for as long as possible.

With this in mind, we have to recalibrate economic and technical life cycles. After all, in the circular economy, products are designed for the long term and for future reuse. Where value is concerned, we will therefore have to find different ways of depreciating both products and raw materials. In addition, the circular economy offers businesses plenty of opportunities, for example when it comes to developing new business models. That in turn requires a different, new way of looking at finance.

Changing business models

The new business models in the circular economy differ from the current models. Both the role and economic share of services and IT are growing exponentially, while those of tangible assets are slowly declining. This combination of physical assets and growing services (including IT) also triggers a shift from 'ownership' to 'use'. Revenues from product sales are expected to decline and this offers scope for other sources of revenues and cash flows, such as:

- lease arrangements
- pay-for-use
- output
- aftersales services

Post-sale contacts intensify the relationship with the customer, providing greater security. They also enable manufacturers to see how products are used and how they are maintained. These insights mean that they can be used better and last longer. The 'ownership' of products and the underlying raw materials may shift as product-service systems are applied. This also calls for a different way of looking at business models and financing structures.

Financing the circular economy

Our current financing system is broadly based on three pillars:

1. Financial performance
2. Guarantees and collateral
3. Contractual agreements

ABN AMRO expects the second pillar in particular to pose challenges in the financing of the circular economy. The answers to questions such as 'Who is the owner of this product?' and 'What is a product worth at a given time?' will become increasingly complex.

Financing in the circular economy calls for customised solutions. At present, we often finance individual companies. In a circular economy, finance is provided in the chain in which, for example, the producer and the user stay connected to each other. All three pillars require extra attention or call for different types of questions. Financial performance, for instance, will become dependent on the tenant/user rather than on 'one-off' sales transactions. For this reason, we will have to devote extra attention to the financial performance of all key players in a chain. In the case of guarantees and collateral, questions such as 'Who is the owner of this product?' and 'What is a product worth at a given time?' will arise. Contractual agreements between parties in the chain will become more important to understanding where the risks lie. Any additional agreements will have to be formalised in a contract, so that everyone continues to engage in dialogue – even when things are not going all that well.

Our current system is set up in such a way that settlement takes place with the individual company, in both a legal and tax sense. Traditional financing methods are geared to this system. But ultimately it is about the teamwork between multiple parties that are all part of the chain that we want to finance.

This calls for customised solutions, for which lenders need a better understanding of companies' business models as well as of the financial performance of the entire chain: from raw materials supplier to end user. That is why ABN AMRO invests in the sector knowledge of its employees. And we are looking to develop new services and legal structures that tie in with the ideas behind the circular economy. The following adjectives best describe us:

1. Innovative and meticulous. We are open to new ideas, technologies and business models and take time to analyse them thoroughly. We first seek to understand the entire chain and then look for the strongest financial links that can help support eligibility for financing.

2. Connecting and persevering. Our role is a connecting one. Sometimes, we cannot be the (only) source of financing. To ensure that a business can continue developing anyway, we actively seek to connect with other investors or lenders.

3. Open and informative. In our relationship with business owners, we seek to achieve maximum transparency. Only then do we get to know the business and the person behind it as well as possible. By the same token, we always include business owners in our decision-making process and the rationale behind it.

Financing the circular economy will mainly come down to customisation, i.e. case-by-case in-depth analyses of businesses and their financing requirements. Sitting down together, sharing ideas and making a valuable contribution to the transition to a circular economy.

Do you have circular ambitions?

Please do not hesitate to contact us if you see business opportunities in the circular economy or if you want to invest in more sustainable business processes and you require financing.

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Colophon

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About Circle Economy
Circle Economy is a social enterprise that works with frontrunner companies, cities and partners to accelerate the transition to the circular economy by means of practical and scalable solutions.

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Pioneering with CIRCL

The circular economy: a topic that is much- discussed in ABN AMRO conference rooms. We want to accelerate the transition to a more sustainable society and are taking ownership by getting offices ready for the future. That is why we are building an entirely circular pavilion, which we are calling CIRCL. CIRCL is sustainable, from its foundations to its roof and from the design phase to how it will be operated. ABN AMRO is exploring every option.

The bank plays a pioneering role

Circular construction is clearly on the rise worldwide. The Netherlands is leading the way, with ABN AMRO as its ambassador. We are endorsing our role by building the pavilion. Circular construction is still relatively new and we cannot fly solo. Partnerships are essential. That is why we have teamed up with architects, advisers, the Delft University of Technology and suppliers to devise a new set of sustainable solutions. The pavilion at Gustav Mahlerplein will be the ultimate example of our efforts to promote sustainability.

Support for sustainability

We are not only building the CIRCL meeting place entirely in accordance with circular principles, but CIRCL will also become *the* meeting place for the movers and shakers of sustainability. People with varying educational qualifications and backgrounds will engage in a dialogue on how to create a more sustainable economy. We see the circular, green, healthy and innovative environment as a perfect test case for piloting circular production chains and sustainable financing options. CIRCL is scheduled to open in September 2017.

The circular economy belongs to everyone

The pavilion, which was designed by Architekten Cie, is the first circular building design in the Netherlands. Its park-like environment and the open structure with lots of glass gives the building an inviting appearance. The roof garden offers butterflies, bees and birds all the space they need. With this exceptional building, we are challenging society and the market to join us in our mission to make the world a more circular place. Everyone is welcome to visit and be inspired, whether they are a client, a local resident, a passer-by or an innovator.

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