

## **Breaking the Barriers to the Circular Economy**

Julian Kirchherr, Marko Hekkert, Ruben Bour, Anne  
Huijbrechtse-Truijens, Erica Kostense-Smit, Jennifer Muller  
October 2017



# Contents

---

|                                  |    |
|----------------------------------|----|
| Executive summary                | 3  |
| The Circular Economy             | 4  |
| Barriers to the Circular Economy | 6  |
| The way forward                  | 10 |
| Contacts                         | 12 |
| Endnotes                         | 13 |

---

# Executive summary

The Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands and Deloitte have jointly carried out research on barriers to the Circular Economy (CE) in the European Union. For this research, a survey with 153 businesses, 55 government officials and expert interviews with forty-seven thought leaders on the circular economy from businesses, governments, academia and NGOs have been carried out. Two types of barriers emerged as main barriers.

Firstly, there are the cultural barriers of lacking consumer interest and awareness as well as a hesitant company culture. This finding is at odds with claims that the circular economy concept is hyped; rather, the concept may be a niche discussion among sustainable development professionals.

Secondly, market barriers emerged as a core category of barriers, particularly low virgin material prices and high upfront investments costs for circular business models.

Government intervention might be needed to overcome the market barriers which then may also help to overcome cultural barriers. Cultural barriers do also need to be overcome by circular start-ups. And, even though there is still no circular start-up that has made global headlines, this may change soon.

## Research Program

The Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands and Deloitte have jointly carried out research on barriers to the circular economy in the European Union. For this research, we have conducted a survey with 153 businesses and 55 government officials. These are from all over the EU, e.g. countries such as Portugal, Sweden, the Netherlands, Belgium, the United Kingdom and Germany. Our survey respondents are CE experts with 82% of them working on CE in their daily jobs. The survey was complemented by forty-seven expert interviews with CE thought leaders from businesses, governments, academia and NGOs. Examples of players interviewed are: Fairphone, Zero Waste Scotland, Springloop and the German Council for Sustainable Development. These expert interviews could take up to one hour or longer. Barrier sub-categories depicted in Figure 3 of this white paper were derived from these interviews and a literature review. Data collection for this white paper was undertaken from May 2017 to September 2017. As far as we know, our research has resulted in the largest dataset collected on CE barriers.

The intention of this white paper, lead authored by Julian Kirchherr (j.kirchherr@uu.nl), is to ensure the rapid dissemination of recent research results. This paper will be followed by a more in-depth working paper which will undergo peer-review. The lead author of this paper may be contacted for additional information on this.

# The Circular Economy

The CE concept is said to be hyped by policy-makers and businesses in the European Union (EU)<sup>1</sup>. For instance, the European Commission (EC) has adopted legislation to accelerate the transition towards CE, the Circular Economy Package, in 2015<sup>2</sup>. Meanwhile, several EU governments, e. g. the Dutch and the Scottish one, have embraced CE with dedicated initiatives<sup>3,4</sup>. Prominent firms such as Google, Renault, Nike and Unilever have also announced to integrate the CE concept in their business models<sup>5</sup>.

Much of the momentum CE has gathered is driven by promises of CE's impact with many arguing that CE can reinvigorate the EU's stagnating economy. CE is supposed to create a net economic benefit of EUR 1.8 trillion until 2030 in the EU, according to one estimate<sup>6</sup>. This would entail an average increase in household income by EUR 3,000 as well as a halving of carbon dioxide emissions, compared to current levels<sup>6</sup>. CE is also supposed to massively boost the profit margins of those companies adopting it<sup>7</sup>.

Some of CE's critics find these promises outlandish. For instance, one of our interviewees for this white paper told us that "CE sounds too good to be true". These critics further point out that limited progress has been realized so far in reaching these potentials. Academic studies confirm this<sup>5,8</sup>. Indeed, CE is far from being implemented at scale in the EU yet. Even those who claim to implement CE, are frequently accused of not doing so. One of our interviewees noted on this: "Every large corporation in the EU today has implemented some CE policy. But, if you look at this policy, it is often only a thin layer of ice". The regular 'take, make, dispose'

model would be underneath this thin layer, the interviewee claimed. Conceptual confusion regarding CE provides some ground for this kind of controversy. Indeed, CE can mean many different things to different people. While some players equate CE with a complete overhaul of the current economic system, others merely equate it with additional recycling efforts<sup>1</sup>.

Those adopting the former definition then quickly accuse those with the latter definition of greenwashing, existing business models via the CE concept if only recycling efforts are undertaken. A commonly used definition for CE, outlines it as a regenerative economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/ distribution and consumption processes. This with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations<sup>1</sup>.

Our interviewees largely agree with this definition, as can be seen in Figure 1. The only marked difference in understanding between business and governments that we identified relates to 'Reduce'. While 80% of government interviewees believe that this is part of CE, only 57% of businesses agree. This is surprising since 'Reduce' is the most cost-efficient step in transitioning to CE. After all, producing a product with less materials reduces material costs and thus boosts profit without increasing transaction costs that are related to reusing or recycling materials. Any business would be well-advised to consider the potential of 'Reduce' for its business model.

Our research aims to contribute towards the transition to CE in the EU. It rests on the assumption that various barriers currently impede the implementation of CE. If the implementation of CE is supposed to progress, these barriers must be understood as a first step to overcome them. Our focus is on barriers that are seen by businesses and governments, since these two stakeholder businesses and governments, since these two stakeholder groups are usually considered to be the most essential players for the transition towards CE<sup>9</sup>.

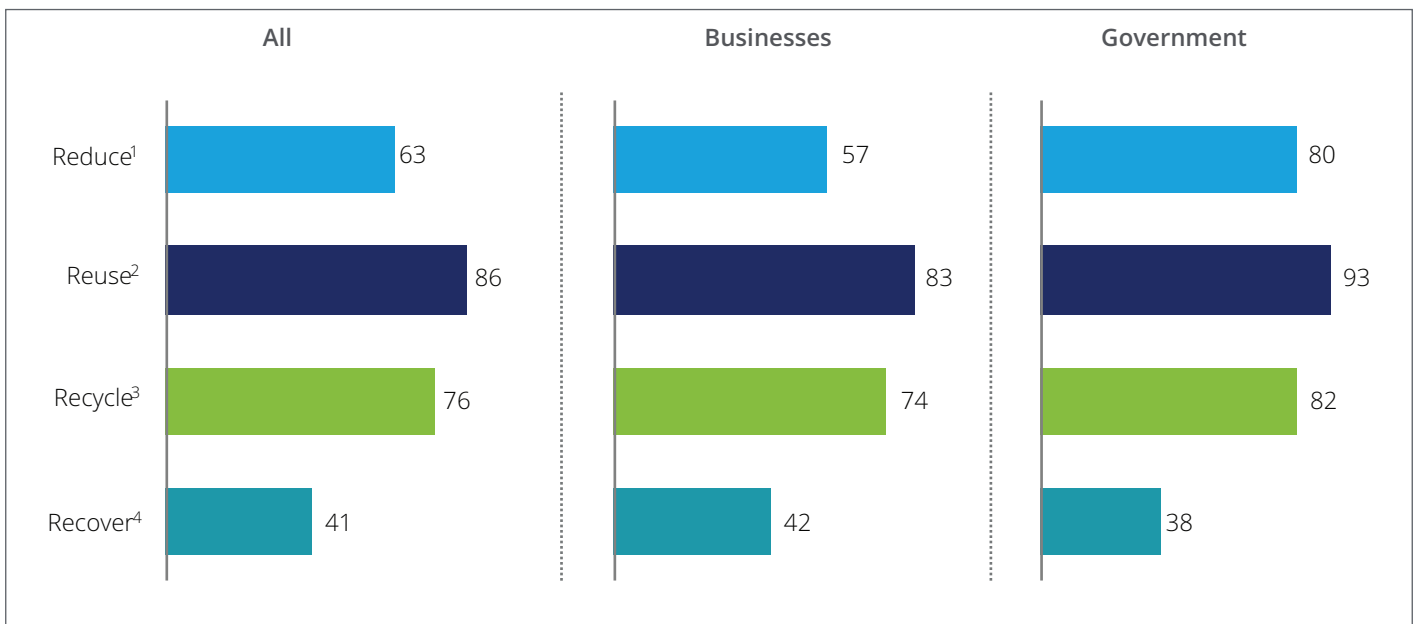
**Figure 1. Conceptualizations of the Circular Economy**

1 = Rethinking, redesigning (including prolonging the lifespan of products), minimization, reduction, prevention of resource use and/or preserving of natural capital

2 = Reusing (excluding waste), closing the loop, cycling, repairing and/or refurbishing of resources

3 = Remanufacturing, recycling, and/or reuse of waste

4 = Incineration of materials with energy recovery



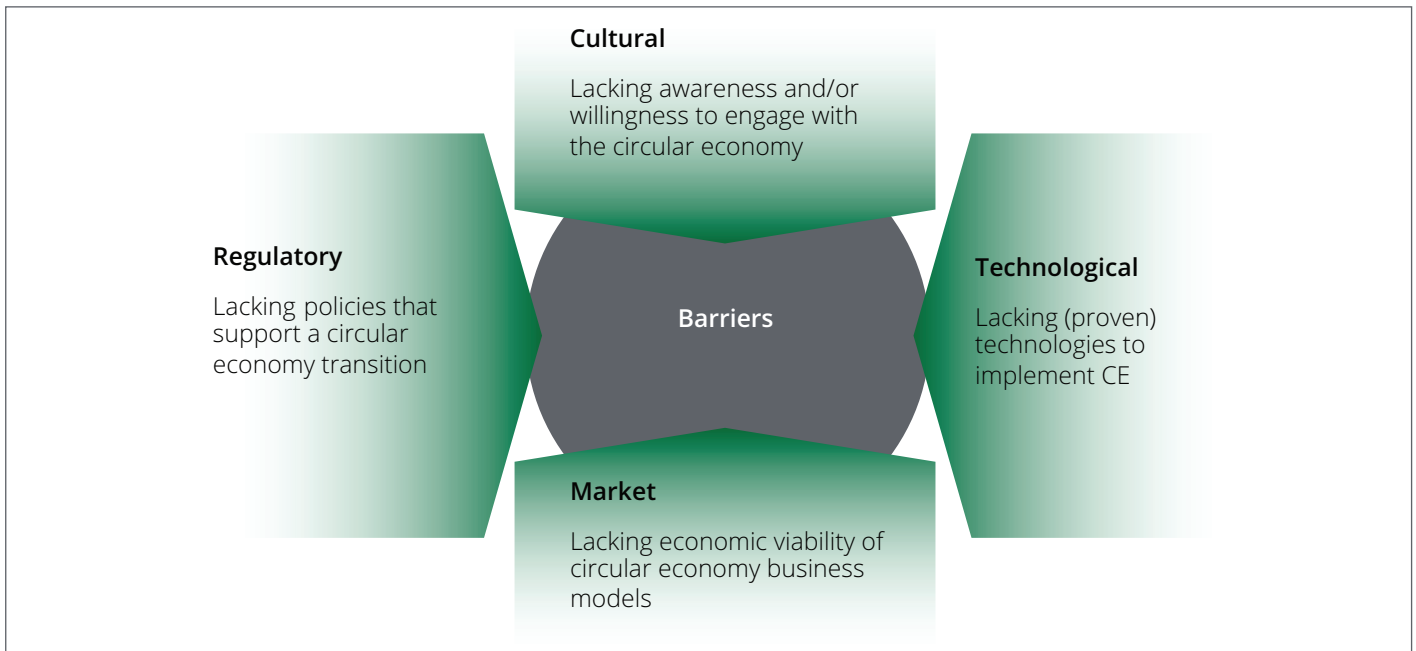
# Barriers to the Circular Economy

We distinguish four categories of barriers throughout this white paper: cultural, technological, market and regulatory (Figure 2)<sup>10,11</sup>. These barriers are interrelated. For instance, a business with a company culture hesitant towards CE will not develop circular designs. Hence, consumers will lack awareness and interest regarding circular designs since none of these are offered in the market. This means that cultural barriers can induce technological barriers which induce further cultural barriers.

Another example regarding interrelatedness are regulatory and market barriers. For instance, limited circular procurement can result in limited funding for circular business models since circular firms may not be able to demonstrate convincingly that there is a market for their products in the absence of such procurement. This, in turn, may further undermine the development of a global consensus among policy-makers regarding transitioning towards CE since convincing use cases are missing. Hence, regulatory barriers can induce market barriers which induce further regulatory barriers.

The interrelatedness of the four categories of CE barriers can result in a chain reaction towards CE failure, with the economy then remaining in its current business-as-usual. However, examining the four categories of CE barriers and their different sub-categories in detail can reveal insights regarding the root causes of failure regarding a transition towards a CE. Once these root causes are identified, targeted interventions can be undertaken to break the chain reaction towards CE failure and replace it with one that is geared towards CE transition.

Figure 2. Categories of Circular Economy Barriers



Cultural barriers emerge as the main impediment regarding a transition towards CE with three out of the five most pressing barriers identified being cultural ones. These are *lacking consumer interest and awareness*, mentioned by 47% of our respondents, company culture, mentioned by 46% of our respondents and *operating within a linear system*, mentioned by 44% of respondents.

Those interviewees raising the barrier *lacking consumer interest and awareness* complained that current mainstream consumer habits would impede CE. For instance, one interviewee said that “consumers change their mind too quickly”. This would undermine the business model of his firm which would rest upon producing particularly durable products -“products which last much longer than a fashion trend”. Interviewees agreed that consumer demand could be a major driver towards CE, “but there is currently little such demand”, another interviewee noted.

Those interviewees raising *company culture* as an issue frequently outlined that many businesses would remain stuck in their current business models even if some CE actions had already been undertaken. “This is very much a mindset issue”, an interviewee noted.

Discussions on CE are frequently restricted to the CSR/environmental departments of a firm with more influential departments in a firm, e. g. operations or finance, taking limited interest in it. Circular Economy thus remains a niche discussion in many companies.

Companies that could overcome *company culture* as a barrier then face *operating in a linear system* as a subsequent barrier. A firm can only deliver a circular product if its entire supply chain is circular. However, it is difficult for many firms to find companies that are also keen to embrace CE. One interviewee noted: “Our supply chain is very conservative. If you talk about CE, these players only glance at you with a question mark in their eyes”.

The second category of prominent barriers that emerged from our research are *market barriers with low virgin material prices* mentioned by 45% of interviewees and *high upfront investment costs* mentioned by 40% of interviewees. Those raising low virgin material prices complained that these low prices would result in circular companies producing products more expensive than those by traditional players.

For instance, one of our interviewees shared with us that “fossil-fuel based plastics are much less expensive than our bio-based plastics”.

Players indicating *high upfront investment costs* noted that market readiness of many circular products has not been realized yet. “There is still a need for several learning curves”, one interviewee noted. Furthermore, the interviewee stated that “the first one that will invest in learning will probably lose money and only the second mover will earn a fortune. Hence, many people are now waiting for each other”. However, interviewees largely agreed that the technological barriers are not the main barriers to CE. Indeed, none of these rank among the five most frequently mentioned barriers, as indicated by Figure 3. This is a promising finding for those keen on a transition towards CE. If technological barriers dominated, much time would be needed for the CE transition since technological development is slow. Meanwhile, the limited prominence of this barrier suggests that intervention strategies may be able to achieve results in the short- and medium-term.

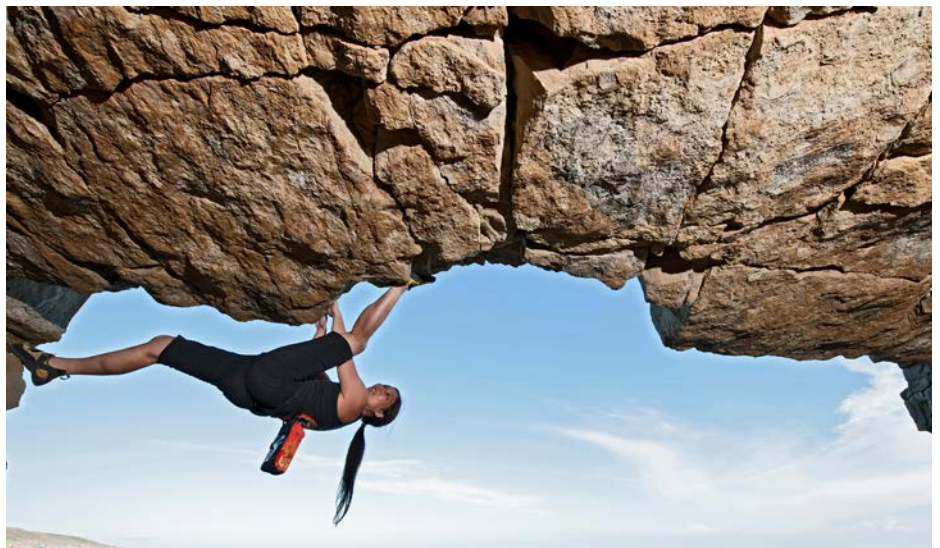
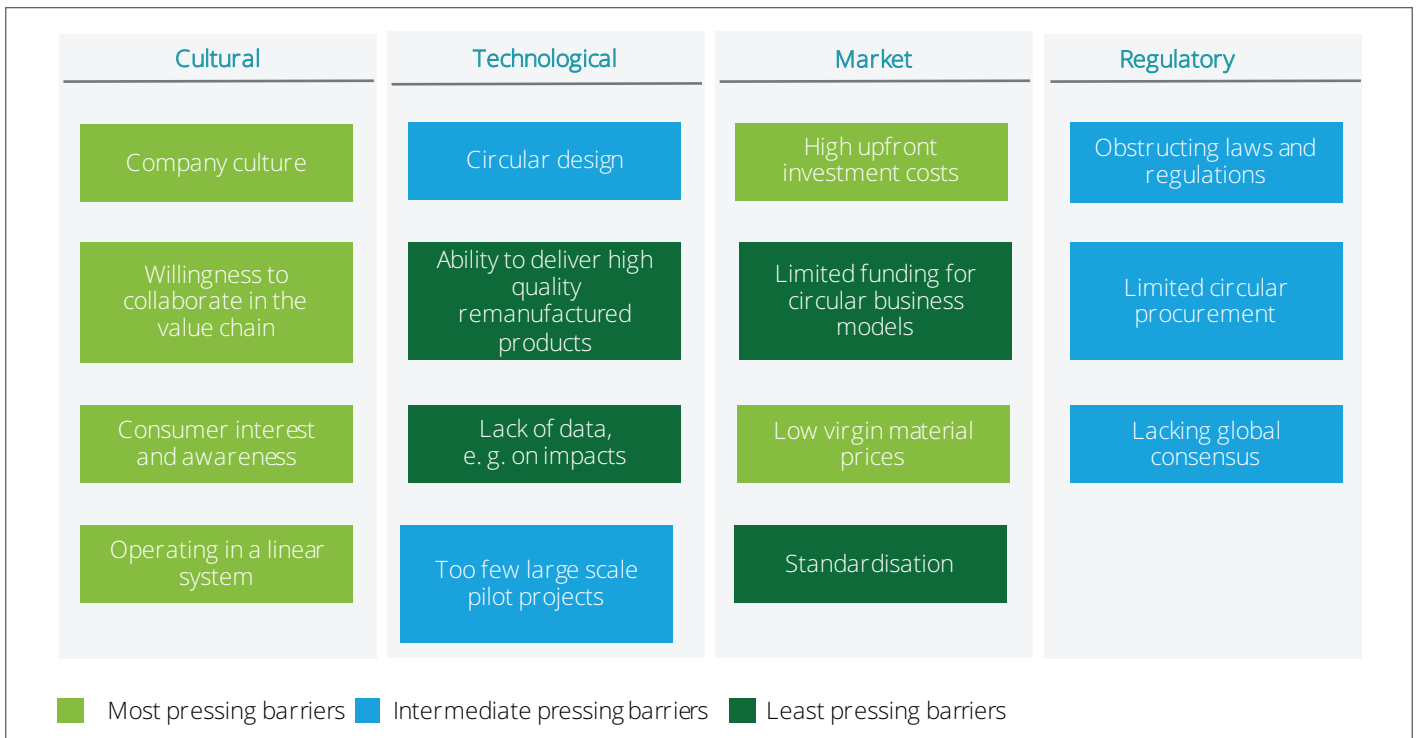




Figure 3. Heatmap of Circular Economy Barriers



The most pressing regulatory barrier identified was *obstructing laws and regulations*. Yet, this barrier does not appear among the five most pressing barriers when examining survey responses from all interviews. However, it appears as the fifth most pressing barrier when examining main barriers named by businesses and government separately (Figure 4). While this result generally suggests that policy-makers are not a major barrier to CE, this also indicates that regulatory work for policy-makers keen on CE remains.

Our interviewees provided numerous examples regarding regulatory CE barriers. For instance, one interviewee whose firm is constructing roads shared that “in our asphalt we can’t use recycled materials

in our top layers because it is regulated (...) that this is not allowed”. Another interviewee pointed out restrictions regarding cross-country waste trading. “We want to recycle our bakelite that is waste, and we found a company in Belgium that can do this, but we are not allowed to transport this bakelite across the border”.

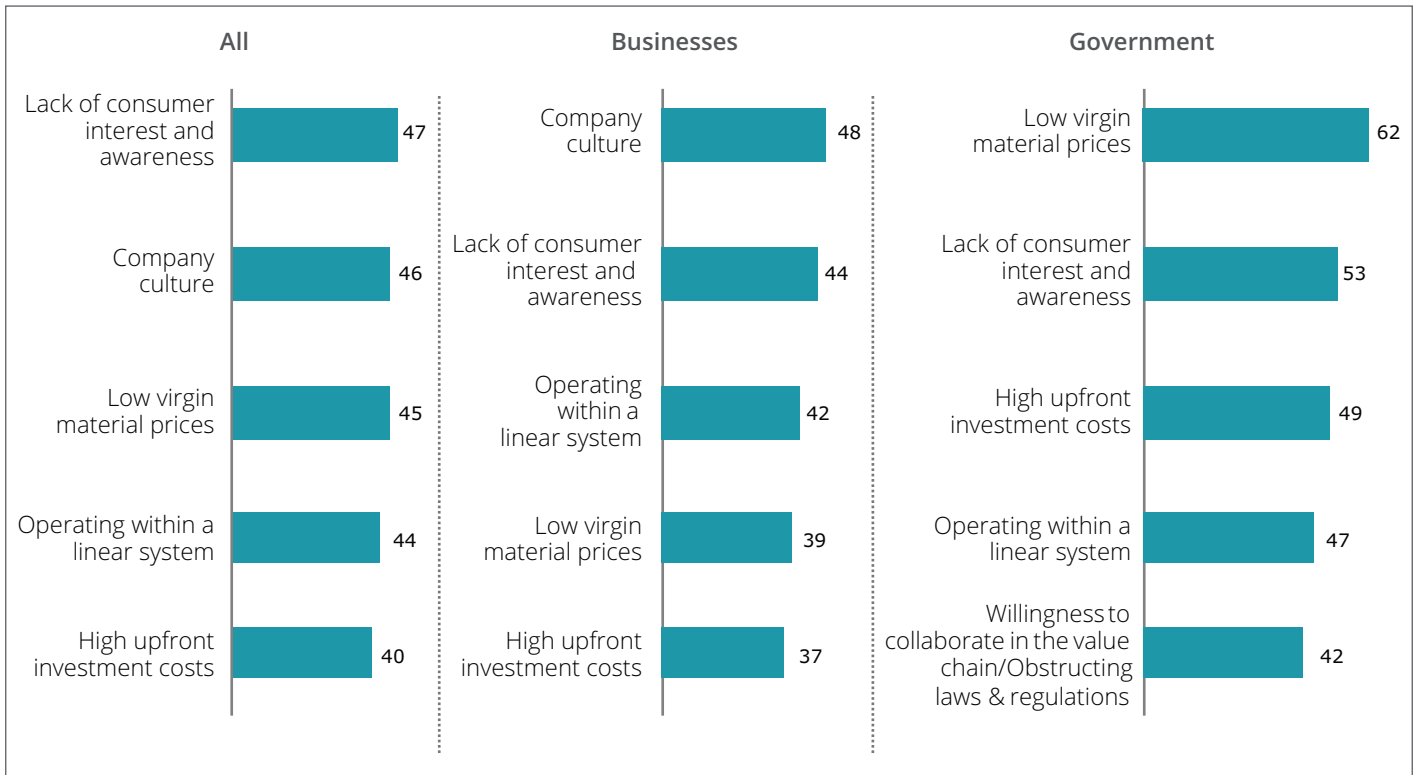
When comparing the main barriers according to the views of businesses and governments much agreement is to be found (Figure 4).

The main difference relates to the barrier company culture. While businesses name this as their top barrier, it is only ranked as the 7th most pressing barrier by government officials, mentioned by 40% of

those participating in our survey. However, government officials mention willingness to collaborate in the value chain among the five most pressing barriers. This barrier is only ranked 6th by companies, mentioned by 36% of them.

This indicates that firms consider their own organization already as a skeptic of CE, whereas government players seem to believe that there are already many firms that have committed to the CE concept, but these in sum still lack the critical mass to start creating circular value chains. The view by governments may be driven by only discussing with those in firms that are already firmly committed to the CE concept which are those in CSR/ environmental departments.

Figure 4. Barriers to the Circular Economy from a Stakeholder Perspective



# The way forward

Many barriers regarding CE were raised by our work. However, interviewees from businesses and government remain enthusiastic regarding the concept. More than half of all interviewees believe that CE will be implemented at scale in ten years. One-third of interviewees think that the CE concept will still be much-discussed and that many CE solutions will be detailed, but that not much of it will be implemented (Figure 5). As one interviewee noted: “The question in ten years will not be how to get to CE, but when to get there”.

Bursts of enthusiasm oftentimes (if not always) spur experimentation. The enthusiasm on CE may thus help to overcome barriers identified in our work since it may result in more experimentation with CE implementation, which, in turn, may yield compelling CE success cases. However, these success cases may also not emerge fast enough for the concept

to maintain its momentum. After all, a player aiming for circularity needs to overturn entire value chains which is time consuming.

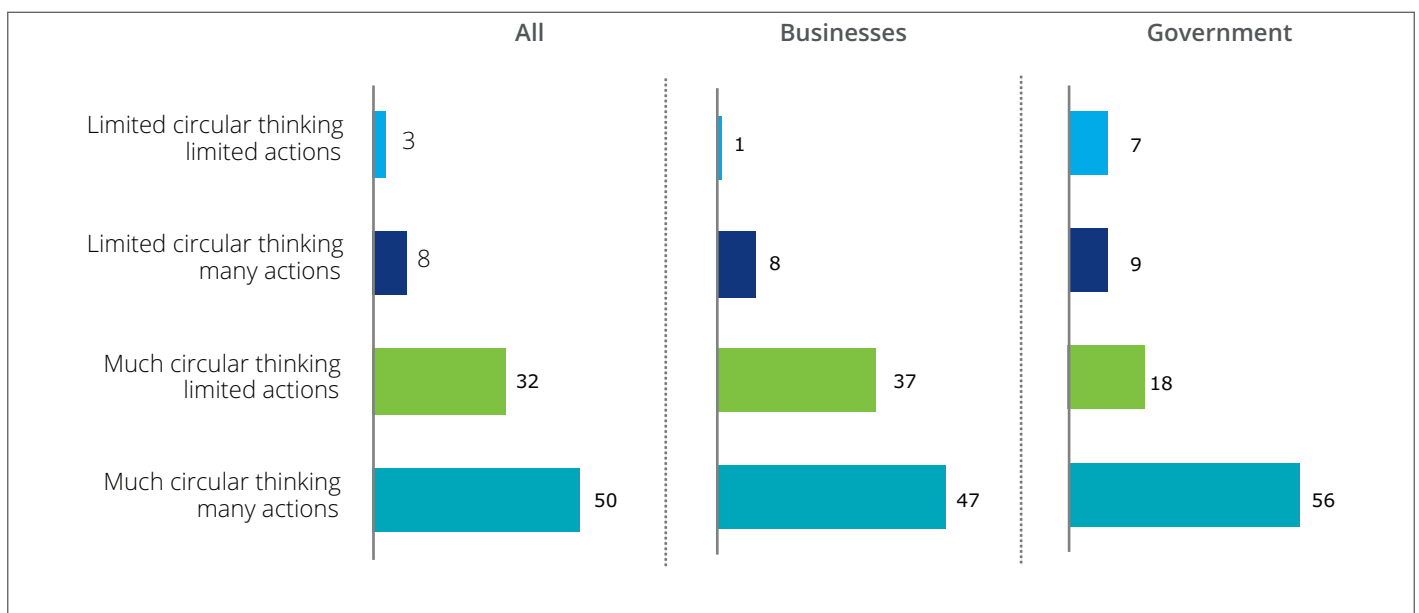
Hence, those claiming that adopting CE will instantly result in phenomenal profitability increases are likely contributing to the fading of the concept’s momentum. If CE was phenomenally profitable, cultural barriers such as company culture, lacking interest and awareness of consumers would not have emerged as core barriers from our work; rather, many more companies would have embraced the CE concept already.

The lacking interest and awareness of consumers, a cultural barrier, appeared as the main barrier in our research. Creating consumer interest and awareness is difficult since most consumers are traditionalists. For instance, most

consumers repeatedly buy the same 150 items which fulfill more than 85% of their needs<sup>12</sup>.

A key player that may accelerate the CE transition is the government. It may become an enabler of CE breaking the current chain reaction towards CE failure. The government has a high interest in CE as it solves many problems at once: solving emerging resource problems, lowering carbon emissions as the production of materials and products is highly carbon intensive and in some countries also waste management problems. Indeed, the main market barriers identified in our research – low virgin material prices and high upfront investment costs – can be addressed by governmental interventions. First, many virgin material prices are artificially low since energy for producing these materials is frequently provided at subsidized rates. This can be changed.

Figure 5. Barriers to the Circular Economy from a Stakeholder Perspective



Second, public capital can be provided to cover the high upfront investment costs of circular business models – which may be necessary since many private investors do not seem to see a market for CE business models yet. If the identified market barriers are addressed by governmental interventions, change may happen quickly. With more and more affordable circular products following which increase consumer interest and awareness, breaking the cultural barriers identified as the main impediments for CE. First mover firms may benefit from these dynamics.

First mover firms are the second potential driver of the CE transition. True entrepreneurs do not wait for the government to create a market, but create a market themselves. While interviewees pointed out that many with an interest in CE would be waiting for first movers to get a bloody nose, an increasing number of first movers is out there. Apart from the well-known leading firms embracing CE principles, also dozens of circular start-ups have emerged in recent years in start-up hubs such as London, Berlin or Amsterdam. Examples are: the London-based start-up Design by Sol which helps consumers to determine the edibility of their food beyond the best-to-use-date, the Berlin-based start-up Tiffin Projekt that delivers food in reusable stainless-steel boxes and the Amsterdam-based start-up Fairphone that creates long-lasting phones that are particularly recyclable.

Admittedly, the circular start-up that has made global headlines is still missing. However, virgin material prices keep rising, while private investments in start-ups in the EU are at an all-time high. The main market barriers impeding the transition to CE may thus be overcome soon which, in turn, may then also break cultural barriers. While some of our interviewees believe that these first movers may not be able to capitalize on early actions then, this remains to be seen. The power of being first has oftentimes been underestimated. As one interviewee noted: "If you, as a large firm, do not make the shift from a linear to a circular business model now, you will be swept away". With many circular start-ups keen to scale, large firms adopting a wait-and-see approach may be choosing a risky strategy.

# Contacts

## **Julian Kirchherr**

### **Assistant Professor**

Copernicus Institute of Sustainable  
Development  
Utrecht University  
[j.kirchherr@uu.nl](mailto:j.kirchherr@uu.nl)

## **Marko Hekkert**

### **Director**

Copernicus Institute of Sustainable  
Development  
Utrecht University  
[m.hekkert@uu.nl](mailto:m.hekkert@uu.nl)

## **Ruben Bour**

### **Master student**

Sustainable Business and Innovation  
Deloitte Touche Tohmatsu Limited  
[rubour@deloitte.nl](mailto:rubour@deloitte.nl)

## **Anne Huijbrechtse-Truijens**

### **Director**

Risk Advisory  
Deloitte Touche Tohmatsu Limited  
[AHuibrechtse@deloitte.nl](mailto:AHuibrechtse@deloitte.nl)

## **Erica Kostense-Smit**

### **Manager**

Risk Advisory  
Deloitte Touche Tohmatsu Limited  
[EKostenseSmit@deloitte.nl](mailto:EKostenseSmit@deloitte.nl)

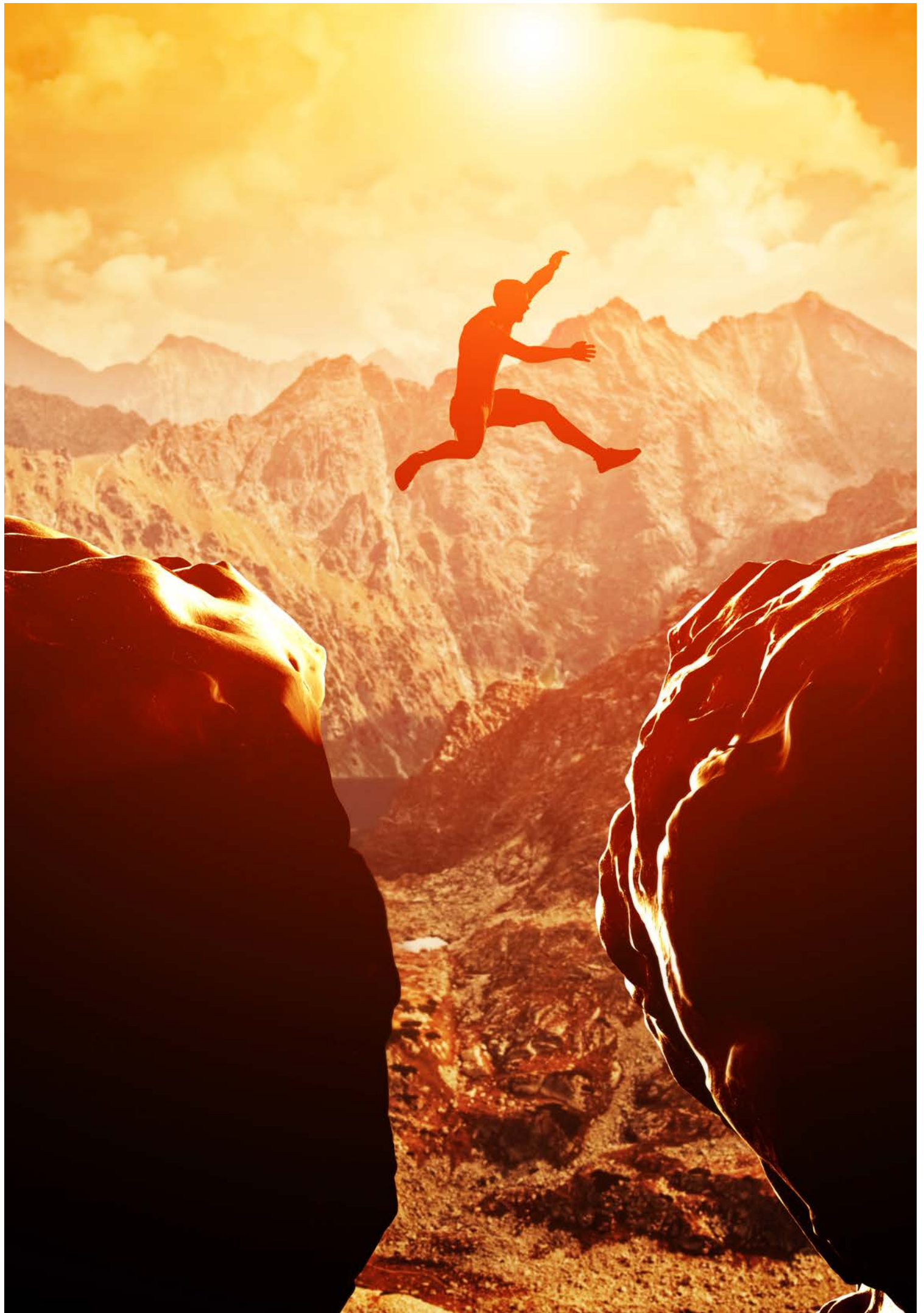
## **Jennifer Muller**

### **Consultant**

Risk Advisory  
Deloitte Touche Tohmatsu Limited  
[JeMuller@deloitte.nl](mailto:JeMuller@deloitte.nl)

# Endnotes

1. Kirchherr, J., Reike, D. & Hekkert, M. Conceptualizing the circular economy: An analysis of 114 definitions. *Resour. Conserv. Recycl.* **127**, 221–232 (2017).
2. EC. Circular economy. (2015). Available at: [https://ec.europa.eu/growth/industry/sustainability/circular-economy\\_en](https://ec.europa.eu/growth/industry/sustainability/circular-economy_en).
3. GotN. *A Circular Economy in the Netherlands by 2050*. (2016).
4. WG. Welsh Government Circulars. (2014). Available at: <http://gov.wales/topics/planning/policy/circulars/welshgovcirculars/?lang=en>.
5. Bocken, N. M. P., Ritala, P. & Huotari, P. The Circular Economy: Exploring the Introduction of the Concept Among S&P 500 Firms. *J. Ind. Ecol.* **21**, 487–490 (2017).
6. Ellen MacArthur Foundation. *Growth Within: A Circular Economy Vision for a Competitive Europe*. (2015).
7. Zils, M. Towards a Circular Economy: Rethinking value chains to boost resource productivity. (2015). Available at: [http://www.environnement.brussels/sites/default/files/user\\_files/2.\\_zils\\_v03.pdf](http://www.environnement.brussels/sites/default/files/user_files/2._zils_v03.pdf).
8. Ghisellini, P., Cialani, C. & Ulgiati, S. A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *J. Clean. Prod.* **114**, 11–32 (2016).
9. Geissdoerfer, M., Savaget, P., Bocken, N. M. P. & Hultink, E. J. The Circular Economy – A new sustainability paradigm? *J. Clean. Prod.* **143**, 757–768 (2017).
10. van Eijk, F. *Barriers & Drivers towards a Circular Economy*. (2015).
11. de Jesus, A. & Mendonça, S. Lost in Transition? Drivers and Barriers in the Eco-innovation Road to the Circular Economy. *Ecol. Econ.* **145**, 75–89 (2018).
12. Schneider, J. & Hall, J. Why Most Product Launches Fail. *Harvard Business Review* (2011). Available at: <https://hbr.org/2011/04/why-most-product-launches-fail>.
13. Suder, K., Haenecke, H. & Kirchherr, J. Strengthening ‘startup ecosystems’ is one potential option for boosting job creation in European cities. LSE EUROPP (2013). Available at: <http://blogs.lse.ac.uk/europpblog/2013/10/08/strengthening-startup-ecosystems-is-one-potential-option-for-boosting-job-creation-in-european-cities-2/>.



# Deloitte.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as "Deloitte Global") does not provide services to clients. Please see [www.deloitte.nl/about](http://www.deloitte.nl/about) for a more detailed description of DTTL and its member firms.

Deloitte provides audit, tax, consulting, and financial advisory services to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 150 countries and territories, Deloitte brings world-class capabilities and high-quality service to clients, delivering the insights they need to address their most complex business challenges. Deloitte's more than 200,000 professionals are committed to becoming the standard of excellence.

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively, the "Deloitte network") is, by means of this communication, rendering professional advice or services. No entity in the Deloitte network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.