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The Role of the Consumer and Systemic Policy Mixes for Circular Business Models in the EU

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Abstract

Recent decades have shown an unprecedented growth in demand for resources, with a trend that is projected to accelerate in the future. Policymakers around the world have started to recognise that transitioning to a more resource-efficient and circular economy (CE) is key to addressing this challenge. Two important enablers for the transition to a CE are circular business models (CBMs) and consumers. The two are interlinked, as demand shifts among consumers can foster the development and supply of new business models, which in turn require the uptake by consumers to be successful. To promote the development and increase the uptake of new CBMs, policymakers need to provide the respective regulatory frameworks and incentives. Doing so requires systemic policy mixes that go beyond encouraging technological innovations and include targeting the demand side as well. This paper zooms in on the role of the consumer for CBMs, discusses potential consumer barriers to CBM demand, and outlines how policy-making can address these barriers by applying systemic mixes of instruments to tackle the macro-, meso-, and micro-level factors that influence consumer demand simultaneously. While the macro-level describes the economic context of consumers' decision-making, that is, the availability and supply, infrastructure and price of CBMs in the market, the meso-level characterises the social environment, including social norms and social status, whereas the micro-level focuses on individual characteristics such as consumption habits, security and quality concerns, and environmental knowledge or concern. This paper illustrates how the different consumer barriers are closely interlinked, and that, ideally, policymakers should target all three levels jointly to encourage CBM demand most effectively. In doing so, policymakers should consider the principles of the waste hierarchy in order to maximise the environmental benefits of CE policy mixes. The paper mostly takes a European perspective on the topic, especially when discussing relevant policy frameworks, and reflects on potential differences to other regions, particularly in the Global South, when appropriate.

Keywords: Circular economy, circular business models, consumers, policy mixes

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Abbreviations

B2B	business-to-business
B2C	business-to-consumer
C2C	consumer-to-consumer
CBM	circular business model
CE	circular economy
CEAP	Circular Economy Action Plan
ECLAC	Economic Commission for Latin America and the Caribbean
EEA	European Environment Agency
EPR	extended producer responsibility
EU	European Union
EV	electric vehicle
ICT	information and communication technology
LCA	Life Cycle Assessment
OECD	Organisation for Economic Co-operation and Development
R&D	research and development
SDGs	Sustainable Development Goals
SRU	Sachverständigenrat für Umweltfragen
VAT	value added tax

1 Introduction

Recent decades have shown an unprecedented growth in demand for resources, with a trend that is projected to accelerate in the future. Rapid industrialisation of emerging economies and continued high levels of consumption in developed countries have inflated the amount of materials consumed worldwide, which has more than doubled since 1980 and increased even ten-fold since 1900 (OECD [Organisation for Economic Co-operation and Development], 2019). In 2019, over 96 billion tons of natural resources were used by production and consumption systems globally. Looking ahead, global demand for virgin materials is expected to at least double again by 2050 (World Bank, 2022). These developments have severe consequences for our environment, with half of total greenhouse gas emissions and more than 90 per cent of biodiversity loss and water stress stemming from resource extraction and processing (European Commission, 2020). Moreover, waste is a major cause of public health issues and has high social and economic costs (World Bank, 2022).

Policymakers around the world have started to recognise that transitioning to a more resource-efficient and circular economy (CE) is key to addressing these challenges (OECD, 2019; World Bank, 2022). In order to achieve the environmental goals of the 2030 Agenda for Sustainable Development and to reach countries' climate targets formulated in the 2015 Paris Agreement, moving away from the current linear "take-make-dispose" economic model is inevitable (Schröder, 2020). Essentially, achieving circularity will be crucial to meet the objectives of numerous international environmental agreements, and for preventing the crossing of key planetary boundaries (World Bank, 2022). In the European Union (EU), the Circular Economy Action Plan (CEAP) – first introduced in 2015 and revised in 2020 – represents a major pillar to achieving the objective formulated in the European Green Deal of becoming the first climate-neutral continent by 2050 (European Commission, 2020).

Despite the pressing need, increasing interest in and support for the CE however, global production systems remain largely linear, and the CE transition is only developing slowly (Hartley et al., 2020; Hartley et al., 2023; World Bank, 2022). Reasons can be traced back to a number of different barriers, from cultural over market and technical to regulatory barriers. At the global scale, circularity in production systems has even declined over the last years (Hartley et al., 2023). In the EU, even though substantial progress in the CE transition has been made, 87 per cent of resource consumption still stems from primary materials, while overall EU waste generation keeps increasing (World Bank, 2022). In sum, it is clear that the CE transition needs additional support, for which public policy plays a key role.

Two important enablers for the transition to a CE are circular business models (CBMs) and consumers (Kirchherr et al., 2017). The two are interlinked, as demand shifts among consumers can foster the development and supply of new business models, which in turn require the uptake by consumers to be successful. This paper discusses the role of the consumer for the transition to a CE and for CBM development in particular, and outlines how policy-making can address potential consumer barriers to CBM demand through systemic policy mixes. It draws on existing literature on the topic and derives concrete options for policymakers to increase CBM demand. In doing so, the paper mostly takes a European perspective on the topic, especially when discussing relevant policy frameworks, while reflecting on potential differences to other regions, particularly in the Global South, when appropriate.

Circular modes of production and the underlying business models represent the key activities needed to transition to a more resource-efficient and circular economy and involve fundamentally different ways of consuming goods and services (OECD, 2019). CBMs help to slow resource flows and close resource loops (Guldmann & Huulgaard, 2020). Over the last years, CBMs have become of major interest to both CE research and practice (Acatech, 2021). Along with technological innovations as well as tighter environmental standards and regulations,

changes in consumer preferences and an increased willingness to pay for green products have been main drivers for the development of new CBMs (Ellen MacArthur Foundation, 2013; OECD, 2019). However, due to a number of different barriers, companies often struggle in scaling up and accelerating the deployment of CBMs (World Bank, 2022). One important factor is that, without consumers being able and willing to engage in circular practices – such as sharing models, the return of packaging or repair schemes – the transition to a CE will not be possible (Clarasys, 2022; Wilts, 2016).

To foster the development and increase the uptake of new CBMs, policymakers need to provide the respective regulatory frameworks and incentives. The transition to a more circular economy will be unlikely if CBMs continue to hold only a small market share and to occupy only small economic niches (OECD, 2019). To increase the competitiveness of CBMs, policymakers need to ensure that market prices reflect the full environmental costs of production and consumption activities and that the regulatory frameworks promote the development of new sustainable business models rather than the preserving of an existing status quo (OECD, 2019). Both "supply push" and "demand pull" policy measures are important in this regard. "Supply push" measures aim to promote the supply of circular products, for example, through eco-design standards, extended producer responsibility (EPR) schemes, or the provision of targeted research and development (R&D) funding. "Demand pull" measures aim to increase the demand for circular products, for instance, through differentiated value added tax (VAT) rates, product labelling standards, awareness-raising via educational and information campaigns, or behavioural nudges (Acatech, 2021; OECD, 2019). Through various different measures, policymakers can thus influence both the supply *and* the demand side of circular business models, which need to be targeted jointly given their strong interdependencies – targeting either side in isolation is unlikely to be effective.

To successfully transition to a CE, it therefore needs systemic policy mixes that go beyond encouraging technological innovations on the supply side but that include targeting the demand side as well (Acatech, 2021). Efficiency improvements on the supply side alone will not be sufficient to outweigh the environmental consequences if global consumption and production levels continue to increase due to the combined effects of population and economic growth. Moreover, many changes on the supply side will only result in environmental benefits in conjunction with certain behavioural changes on the demand side – for example, eco-design requirements for more durable and repairable products still require consumers to actually use appliances longer and make use of repair services, and thus to buy new appliances less often, in order to realise their environmental potential (SRU [Sachverständigenrat für Umweltfragen], 2023). Consequently, next to more circular and efficient production systems, fundamental changes in lifestyles and consumption patterns will be crucial as well (Bengtsson et al., 2018; EEA [European Environment Agency], 2023; Lorek et al., 2021; SRU, 2023). In fact, while scholarly studies often blame technological barriers as the main reason for the slow CE transition and CBM development, and addressing technological barriers has long been the main focus of EU policy-making, a large-N-study on circular economy barriers in the EU found that a lack of consumer interest and awareness is considered *the* most important barrier by stakeholders from businesses and policy-making (>200 survey respondents) as well as a number of CE experts (>45 expert interviews) (Kirchherr et al., 2018).

Despite the great importance of the demand side, however, the role of the consumer for CBM development is often disregarded and to date heavily under researched in the CE literature (see, for instance, Circular Innovation Lab, 2022; Elzinga et al., 2020; Kirchherr et al., 2017; Mostaghel & Chirumalla, 2021). Based on an extensive literature review, Camacho-Otero et al. (2018) found that only around 10 per cent of peer-reviewed articles in the context of the CE focused on "consumption", "customers" or "users" in their research (Camacho-Otero et al., 2018; Clarasys, 2022). Moreover, based on a review of the literature on CE barriers in particular, De Jesus & Mendonca (2018) found that cultural barriers (of which consumer barriers are part in their classification) was the least-mentioned category of all, with only around 20 per cent of the

studies examined including this barrier. This gap is driven by the fact that the development of new business models is often only looked at from a corporate perspective, treating the consumer rather as a passive agent, which is highly problematic given that without understanding the demand side, new CBMs will unlikely become successful (Elzinga et al., 2020). Thus, there is a critical research gap on the role of consumers' demand for and their willingness to participate in CBMs that this paper aims to address.

This paper zooms in on the role of the consumer for CBMs in the EU and discusses how policymakers can address potential consumer barriers through systemic policy mixes to increase demand for CBMs. The general relevance of consumer demand for CBMs is illustrated and different examples for consumer barriers at different levels are presented. Moreover, concrete policy recommendations for how to address these barriers are provided. Concretely, demand-side barriers and policy options are organised on the basis of three levels: the macro-, meso- and micro-level. While the macro-level describes the economic context of consumers' decision-making, that is, the availability and supply, infrastructure and price of CBMs in the market, the meso-level characterises the social environment, including social norms and social status, and the micro-level focuses on individual characteristics such as consumption habits, security and quality concerns, and environmental knowledge or concern.

The paper illustrates how the different consumer barriers are closely interlinked, and that, ideally, policymakers should target all three levels jointly to encourage demand for CBMs most effectively. It further outlines how the different consumer barriers can be very context- and sector-specific, and that targeted policy mixes are required that need to be adjusted to the specific context and business model, which may affect the required sequencing and prioritisation of policy measures. In regions or sectors where the availability and infrastructure of CBMs is not yet in place, focusing on those macro-level factors first will be key, whereas targeting social norms and individual-level factors such as consumption habits or environmental knowledge should get priority where CBM uptake is lacking despite the necessary infrastructure being in place. Given their strong interdependencies, this paper argues that targeted policy mixes that address consumer barriers at all three levels simultaneously will be most successful.

Moreover, this paper outlines how policymakers should consider the principles of the waste hierarchy when designing measures for CBM demand to maximise the environmental impact. This means, a priority should be on promoting CBMs that have the potential to completely prevent, or otherwise reduce, the purchase of new products and new waste being generated, for instance, through sharing products or extending products' lives, compared to CBMs that focus on lower levels of the hierarchy such as recycling. In this regard, it is however also important to note that there may be unintended consequences of changes in consumption patterns, such as overall increases in consumption through cost savings, that may undermine the environmental benefits of CE policies and thus need to be considered as well. Furthermore, it is illustrated how changes in consumer demand and public awareness can lead to positive spillover effects that may exert positive pressure on both policymakers and businesses and thereby help boost a virtuous circle towards more circularity.

The paper proceeds as follows: Section 2 provides the conceptual background, including definitions of the circular economy and circular business model, an illustration of the different types of CBMs and different barriers than can affect CBM development, as well as the environmental impact of different CBMs. Section 3 outlines the role of the consumer for CBM demand and presents the various different consumer barriers at the macro-, meso- and micro-level. Section 4 discusses the role of policy-making for CBM demand, outlines how policymakers can address the various consumer barriers at the different levels, and presents a collection of selected CE policies with particular relevance to circular consumption in the EU. The paper ends with a discussion and conclusion in Section 5.

2 Conceptual background of circular economy and circular business models

2.1 Definition of circular economy and circular business model

Circular economy

There are various different definitions of the concept of the circular economy. The topic has received increasing attention in the literature with a number of reviews being published on it, resulting in a range of different definitions (see, for example, Geissendorfer et al., 2020, for an overview of reviews).

The Ellen MacArthur Foundation has recently defined CE as:

> A systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution. It is based on three principles, driven by design: eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature. It is underpinned by a transition to renewable energy and materials. Transitioning to a circular economy entails decoupling economic activity from the consumption of finite resources. This represents a systemic shift that builds long-term resilience, generates business and economic opportunities, and provides environmental and societal benefits. (Ellen MacArthur Foundation, 2022)

Based on a comprehensive analysis of 114 definitions, Kirchherr et al. (2017) point out that many CE definitions fail to acknowledge the crucial role of circular business models (mentioned by 11 per cent of all reviewed studies) as well as consumers (mentioned by 19 per cent of all reviewed studies). Their definition of CE is:

> A circular economy describes an 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, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), 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. (Kirchherr et al., 2017, pp. 224-225)

The authors further point out that only 30 per cent of all CE definitions take into account a waste hierarchy concept (Kirchherr et al., 2017) such as, for example, Song et al. (2015) who write that "If reuse or repairs are not possible, they can be recycled or recovered from the waste stream and used as inputs, substituting the demand for the extraction of natural resources" (Song et al., 2015, p. 200). Moreover, the authors find that the concept of CE is only rarely linked to sustainable development, with its impact on social equity and future generations being barely mentioned (Kirchherr et al., 2017). In general, the CE literature has long focused on industrialised countries, while the concept has only recently received more attention in discourses on developing countries and development cooperation as well (see To, 2023, for an overview). This paper thus addresses several important dimensions of the circular economy debate that have so far often been neglected.

Circular business model

As with the concept of the circular economy, there is no single accepted definition of what a circular business model is (OECD, 2019). Geissendorfer et al. (2020) point out that, despite the importance of CBMs and the increasing attention the concept has received in the literature over the last years, there is still considerable lack of clarity about its theoretical conceptualisation. As with business models in general, at the core of CBMs is the ability of organisations to create, deliver (or transfer), and capture value (Acatech, 2021). In contrast to traditional business models, one key aspect of CBMs is their relatively sparing use of natural resource inputs. Moreover, the underlying sales strategy tends to place less emphasis on maximising sales volumes of low-margin and short-lived products, but rather on selling higher quality products or marketing access to, rather than ownership of, products. Furthermore, the business case often leverages the value contained in already existing materials, components and products, and it often involves greater levels of collaboration between different actors in the supply chain (OECD, 2019). Many CBMs rely on the potential of digital technologies to significantly transform circular value creation, transfer and capture (Acatech, 2021). By extending product utilisation periods or intensifying product usage, CBMs can slow resource flows and, through recycling post-use materials and reintegrating them into the production system, they can close resource loops (Guldmann & Huulgaard, 2020). Based on an extensive analysis of CBM definitions in the existing literature, Geissendorfer et al. (2020) define CBMs as:

> Business models that are cycling, extending, intensifying, and/or dematerialising material and energy loops to reduce the resource inputs into and the waste and emission leakage out of an organisational system. This comprises recycling measures (cycling), use phase extensions (extending), a more intense use phase (intensifying), and the substitution of products by service and software solutions (dematerialising). (Geissendorfer et al., 2020, p. 12)

The definition already highlights that there are different types of CBMs that focus on different strategies to reduce their use of natural resource inputs, which will be outlined more in detail in the following subsection.

2.2 Circular business model typology

There are different typologies of CBMs in the literature. Differentiating between different types of CBMs is important as the role of the consumer for CBM development can vary depending on the business model. This paper follows the typology used by the OECD (2019), which distinguishes between five types of CBMs: i) circular supply models, ii) resource recovery models, iii) product life extension models, iv) sharing models, and v) product service system models. Table 1 provides an overview of the different CBM types, their respective sub-models, main characteristics, and the main sectors they are currently applied in. The OECD (2019) describes the various different CBM types as follows:

- **Circular supply models:** Replace traditional material inputs derived from virgin resources with bio-based, renewable, or recovered materials, which reduces demand for virgin resource extraction in the long run.
- **Resource recovery models:** Recycle waste into secondary raw materials, thereby diverting waste from final disposal while also displacing the extraction and processing of virgin natural resources.
- **Product life extension models:** Extend the use period of existing products, slow the flow of constituent materials through the economy, and reduce the rate of resource extraction and waste generation.

- **Sharing models:** Facilitate the sharing of underutilised products, and can therefore reduce demand for new products and their embedded raw materials.
- **Product service system models**: Market services rather than products, improve incentives for green product design and more efficient product use, and thereby promote a more sparing use of natural resources.

A key distinction to be made is between CBMs that are applied in a business-to-business (B2B) and those that are applied in a business-to-consumer (B2C) setting. The focus of this paper is on CBMs in a B2C context given that it concentrates on the role of consumer demand for CBM development. In this sense, consumers in this paper are defined as individuals (as opposed to businesses or public entities that buy or use circular products or services). So far, CBMs in B2B settings seem to be more successful in practice and have been discussed more extensively in the literature. To successfully increase the diffusion and market share of CBMs, however, advancing CBMs in B2C settings as well is crucial (Acatech, 2021).[1]

Table 1: Circular business model typology

CBM type	Sub-model	Characteristics	Current main sectors
Circular supply	▪ Cradle to cradle	▪ Replace traditional material inputs with renewable, bio-based, recovered ones ▪ →Close material loops	▪ Diverse consumer product sectors
Resource recovery	▪ Industrial symbiosis ▪ Recycling ▪ Upcycling ▪ Downcycling	▪ Produce secondary raw materials from waste ▪ →Close material loops	▪ Metals ▪ Paper and pulp ▪ Plastics
Product life extension	▪ Classic long life ▪ Direct reuse ▪ Repair ▪ Refurbishment ▪ Remanufacture	▪ Extend product lives ▪ →Slow material loops	▪ Automotive ▪ Heavy machinery ▪ Electronics
Sharing	▪ Co-ownership ▪ Co-access	▪ Increase utilisation of existing products and assets ▪ →Narrow resource flows	▪ Short-term lodging ▪ Transport ▪ Machinery ▪ Consumer products
Product service system	▪ Product-oriented ▪ User-oriented ▪ Result-oriented	▪ Provision of services rather than products. Product ownership remains with supplier ▪ →Narrow resource flows	▪ Transport ▪ Chemicals ▪ Energy

Source: Author's representation, based on OECD (2019)

Examples of *circular supply models* in a B2C context relate to various consumer goods for which traditional material inputs have been replaced with bio-based, renewable, or recovered equivalents. This already takes place in a variety of sectors, such as clothing, electronics, furniture, and many more. This way, firms can market their products as "green" and thereby

1 For comprehensive overviews of CBM examples in both B2B and B2C settings see, for example, Acatech (2021), Nordic Innovation (2022) and OECD (2019).

differentiate them from others to target environmentally conscious consumers who may be willing to pay a higher price knowing that their consumption decisions have a smaller environmental footprint. Essentially, circular supply models can be seen as a form of resource recovery models, however, here the material recovery is considered at a much earlier stage of the product lifecycle (OECD, 2019).

Resource recovery models seem to be less common in B2C settings so far although some examples exist, such as the company Freitag, a German apparel manufacturer, that produces bags directly from recovered materials such as old truck tarpaulins or safety belts. Consumers play an important role for resource recovery models as the waste collected from households is a main source of recovered materials for businesses (OECD, 2019).

Product life extension models in B2C settings can, for example, involve second-hand shops or online platforms where products can be sold for direct reuse, and providers include a small margin on the reselling price as profit. Other examples relate to consumer goods in various sectors where producers extend the lifetime of a product by offering higher quality products with longer durability, which can then be sold at higher prices (for instance, Patagonia). Other examples are businesses that offer maintenance, repair, refurbishment or remanufacturing services, either directly through the manufacturer itself (such as Fairphone) or through third party firms (such as Mister Minit) (OECD, 2019).

Sharing models in a B2C context can include both co-ownership of and co-access to products and are especially prominent in the transport and housing sector to date. Underutilised assets or products such as rooms, vehicles, clothing or tools can be leveraged rather than sitting idle. Prominent examples include car sharing platforms like Blablacar or housing platforms like Airbnb.[2] Most of today's sharing practices are facilitated by online platforms where underutilised assets or products can be offered for usage by someone else, and platform owners can generate a small margin on each related transaction. Technically, these transactions in sharing models take place in a consumer-to-consumer (C2C) rather than a B2C setting. In most B2C sharing models, they would be considered product service system models instead (OECD, 2019).

Examples for *product service system models* in B2C settings have become increasingly common regarding digital services, such as e-books, music and film streaming services (for example, Spotify or Netflix), or digital newspaper subscriptions. Digitalisation has enabled suppliers to avoid the material input and costs associated with producing physical products and to offer digital service solutions instead (OECD, 2019). Moreover, prominent examples of product service system models in a B2C context refer to the leasing or renting of different products, such as services for the leasing of cars or smartphones, or online clothes rental services (Ramboll, 2022). Urban car or bike sharing schemes – where customers either pay a monthly fee or only pay when using the vehicle (e.g., Nextbike or Share Now) – refer to product service system models as well and are perhaps among the most successful examples to date. In contrast to car sharing services in sharing models, ownership of products in these business models lies with the providing company (OECD, 2019).

It should also be noted that the distinction between the different CBM types is often less clear in practice, and that many businesses adopt a combination of different circular strategies rather than one in isolation (OECD, 2019). For example, firms offering product service system models

2 It should be noted that there are also social concerns regarding the growth of certain sharing and other platform-based business models such as Airbnb or Uber. Concerns exist, for example, regarding the effects on jobs in traditional service activities, increasing housing prices and rents, consumer protection, fair competition, as well as appropriate regulation and taxation (OECD, 2019). While discussing these potential concerns in detail goes beyond the scope of this paper, it is important to be aware of them when designing relevant policy measures. OECD (2019) provides a more detailed discussion of the topic.

may as well invest in product life extension given that the ownership of the product remains with the providing company (OECD, 2019). Moreover, there are companies that combine traditional linear business model components and circular business model components, for example, by offering both one-time sales as well as take-back and leasing options (Guldmann & Huulgaard, 2020).

2.3 Different barriers to circular business model development

There are several different factors and actor groups that are important for the development and diffusion of CBMs. Understanding these various potential barriers is important in order to derive suitable systemic policy mixes that address both the supply and the demand side, even if the focus of this paper is on the consumer, that is, on the demand side in particular. Figure 1 provides an overview of the various different barriers that can impede CBM development following the framework of Acatech (2021). The framework distinguishes between six different types of barriers, of which four are directly linked to the key actors involved in the development of CBMs:

i) **Regulatory barriers** relate to the respective policy-making and governmental institutions;

ii) **financial** and iii) **organisational barriers** relate to the corporate actors/companies involved; and

iii) **consumer barriers** to the consumer/end users of the circular product or service.

iv) In addition, there are two cross-cutting barriers:

v) **Value chain barriers** that relate to all market and network-related factors along the value chain; and

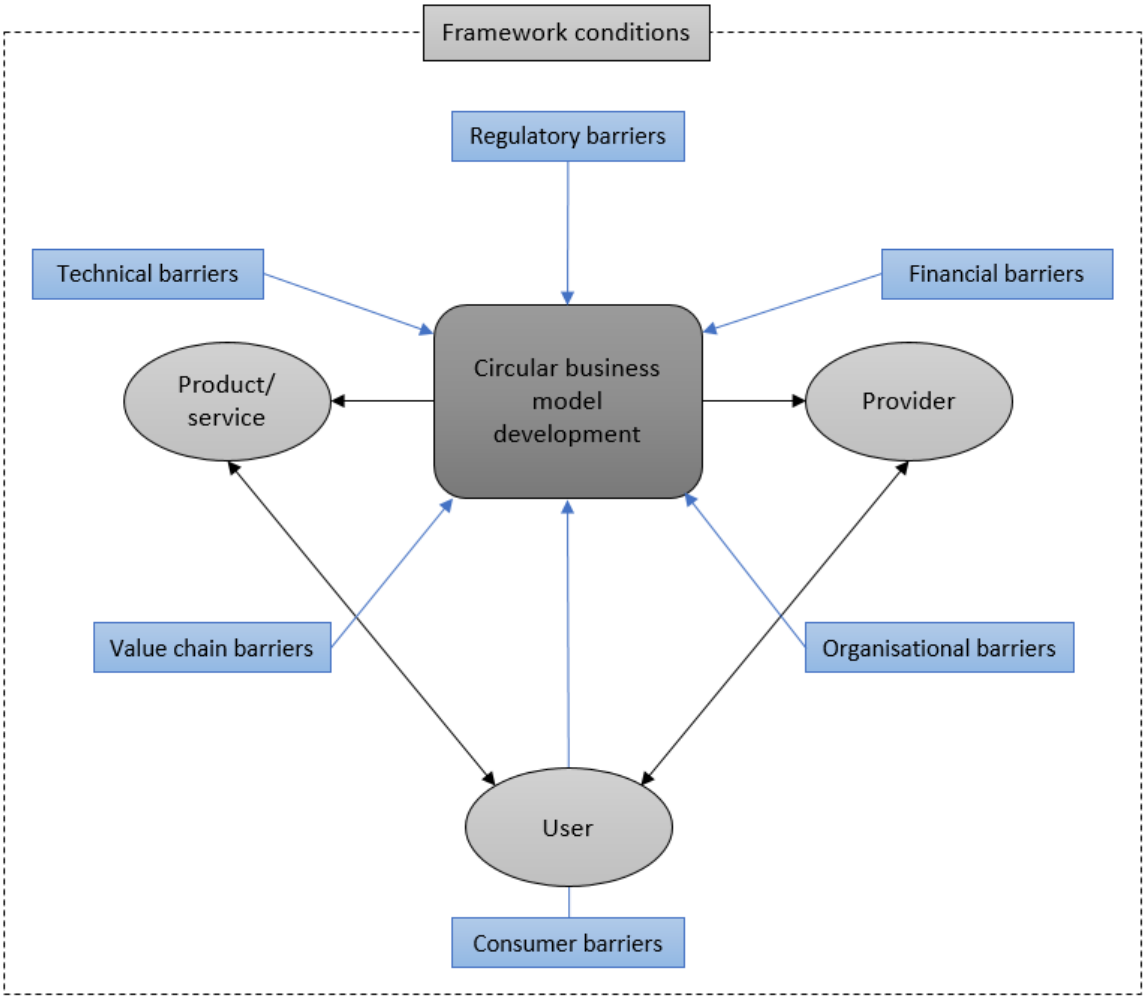
vi) **technical barriers** relating to all technical factors that can impede CBM development.

This paper focuses on the role of consumers as final users of circular products or services (consumer barriers) for the development of CBMs in B2C settings. As illustrated in Figure 1, consumer barriers are one of several important factors that can impact CBM development and thus need to be addressed.

Kirchherr et al. (2018) outline the importance of fundamental systemic changes at all barrier levels for the transition to a CE, based on the example of a bottle deposit return scheme. The authors highlight that, first, novel technologies will be needed, for instance, regarding the inspection and cleaning of returned bottles (technological barriers). Second, various players in the market along the value chain need to adjust their activities and interactions, for example, using reverse logistics for the returned bottles (value chain barriers). Third, policies need to be developed for the respective regulation, for instance, regarding mandatory return schemes or minimum return quota, or the cleaning of returned bottles (regulatory barriers). Fourth, consumers need to adjust their behaviour and learn to return bottles after usage instead of throwing them away (consumer barriers). All this, of course, depends on the providing company being able to develop and provide the return scheme in the first place (financial and organisational barriers). In sum, consumer barriers are only one piece of the bigger puzzle needed for the successful development of new CBMs, while at the same time, without this important piece of the puzzle being in place, the whole transition to a CE cannot function. According to Kirchherr et al. (2018), this is not just any piece of the puzzle, but consumer barriers were identified as *the* most important barrier for the transition to a CE based on over 200 surveys with stakeholders from businesses and policy-making and almost 50 CE expert interviews. This stands in contrast to technological barriers, which are often perceived as the most important,

but in their research did not turn out to be of highest priority (Kirchherr et al., 2018). This paper thus addresses a crucial element for the CE transition that may often be underestimated.

Figure 1: Barriers to circular business model development



Source: Author's representation, based on Acatech (2021)

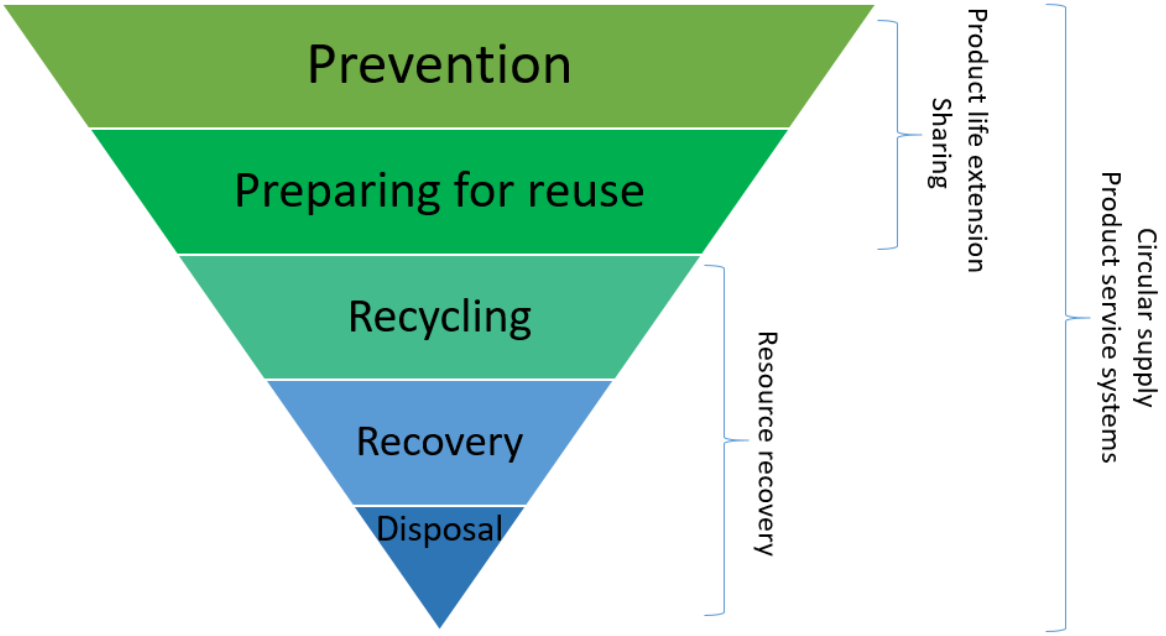
2.4 Environmental impact of circular business models

Different types of CBMs can have different environmental impact. Understanding the diverse environmental benefits of CBMs is important to inform the environmental prioritisation of policy mixes for CBM demand. There are various methods that can be used to assess the environmental impact of CBMs. A common approach is to rank CBMs according to their position in the waste hierarchy, which is usually illustrated as an inverted pyramid (see, for example, Kirchherr et al., 2017; OECD, 2019; Dijkstra et al., 2020). While various versions of the waste hierarchy exist, this paper follows the definition of the EU Waste Framework Directive, which ranks waste management accordingly (see Figure 2): i) prevention, ii) pre-paring for reuse, iii) recycling, iv) recovery, and v) disposal (European Commission, 2008). The waste hierarchy lays down some basic waste management principles to protect the environment and human health, as well as to reduce the overall impacts of resource use and improve the efficiency of such use, which is crucial for the transitions to a CE. Based on the waste hierarchy, preventing the generation of waste should thus be the first priority and, after that, to reuse, recycle and recover what is generated, and finally only to dispose of what remains as the least-preferred option (OECD, 2019).

Different concepts with differing levels of specificity exist in the literature to rank the hierarchy of the various waste management options. Concepts range from 3-R frameworks (R0 reduce, R1 reuse, R2 recycle – see, for example, Ranta et al., 2018) to 10-R frameworks (R0 refuse, R1 reduce, R2 reuse/resell, R3 repair, R4 refurbish, R5 remanufacture, R6 re-purpose, R7 recycle (materials), R8 recover (energy), R9 re-mine – see, for instance, Reike et al., 2018, and Calisto Friant et al., 2021, or similar approaches by Kirchherr et al., 2017, Prakash et al., 2022, or World Bank, 2022). The waste hierarchy as it is defined in the EU Waste Framework Directive thus takes a 4-R approach (R0 prevent, that is, refuse, R1 reuse, R2 recycle, R3 recover) and adds the final disposal as the least-preferred option, which is usually not included in the R-rankings.

Figure 2 illustrates how the various CBMs address different levels of the waste hierarchy. Based on this waste hierarchy ranking, product life extension and sharing models are environmentally preferable to resource recovery business models. While the former two CBMs have the potential to reduce the amount of new waste being generated, the latter mainly focuses on recovering and recycling already existing waste. Circular supply and product service systems models can have an impact throughout the entire waste hierarchy, depending on their specific business case. This circularity ladder ranking approach can be seen as a useful "first pass" assessment of the relative environmental desirability of different CBMs (OECD, 2019). Other concepts for ranking CBMs' environmental impact exist, such as Life Cycle Assessment (LCA); however, discussing these alternative approaches goes beyond the scope of this paper (see OECD, 2019, for an overview and a discussion of different concepts).

Figure 2: The waste hierarchy and circular business models



Source: Author's representation, based on De Groene Zaak & Ethica (2015), European Commission (2023a) and OECD (2019)

3 The role of the consumer for circular business models

3.1 Why consumers matter for CBMs

Consumers play a major role for the transition to a CE and the development and scalability of CBMs. Efficiency gains and circularity in production alone will not be enough, but to achieve the CE it needs fundamental changes in consumption patterns as well (EEA, 2023). In their famous "butterfly diagram" of the CE, the Ellen MacArthur Foundation places the user/consumer as *the* central element around which resource flows and circular practices emerge (Ellen MacArthur Foundation, 2019).[3] Thus, the consumer is much more than just a passive agent in the CE, but rather represents a central figure that deserves much more active integration into scientific CE debates as well as policy-making (Hobson et al., 2021).

Research has shown that consumers are of central importance for a company's decision to engage in circular business models. Based on their large-N-study on circular economy barriers within the EU with 208 survey respondents from businesses and policy-making and 47 interviews with CE experts, Kirchherr et al. (2018) find that "lacking consumer interest and awareness" appears as the most important CE barrier identified by their respondents. For example, it was mentioned that "consumers changing their minds too quickly" could undermine a firm's business model that is based on the production of especially durable products – that is, products that last longer than the current fashion trend. Moreover, "hesitant company culture" was identified as the second most important CE barrier, and it was implied that it may be largely driven by the lack of consumer interest and awareness, as companies are conditioned to respond to consumers. Furthermore, "unclear market demand" has been identified by other researchers as one of the main barriers for companies to engage in CBMs (Guldmann & Huulgaard, 2020). In sum, it is indisputable that consumers are key for CBM development.

The role of the consumer in the CE differs fundamentally to that in the linear economy. In many CBMs, the traditional concept of the consumer is replaced by that of a user as – unlike in the traditional "buy-and-consume" economy – products are often leased, rented, shared, or returned after purchase and usage, which can create new relationships between businesses and their customers (Ellen MacArthur Foundation, 2013). Therefore, in contrast to the linear economy, customer journeys in CBMs often involve continuous loops of engagement and interaction with companies (Clarasys, 2022). The various new circular business models that are needed for achieving circularity will only be able to become successful if consumers are willing to change their consumption habits and appreciate the benefits of those new consumption options, such as sharing and using, rather than owning products (Wilts, 2016, 2017). Moreover, several CBMs require circular work or knowledge from consumers, such as the proper recycling or repairing of materials, or the acquisition of knowledge to identify circular products based on certain characteristics at the point of sale (Hobson et al., 2021).

Even though the market share held by CBMs is usually still small, there are a number of new circular business models that have appeared more recently and are scaling up rapidly, which can be mainly attributed to an increased consumer interest in and willingness to participate in circular practices and to pay for green products (OECD, 2019). As already illustrated in subsection 2.2, several examples of CBMs in B2C settings already exist. For example, increasing consumer trust in sharing models has led to continued growth of housing sharing platforms such as Airbnb as well as several successful car sharing platforms such as Blablacar or the German Mitfahrgelegenheit. Urban car and bike sharing services such as Zipcar and

3 Since its creation in 2010, the Ellen MacArthur Foundation has emerged as the global thought leader on the topic of circular economy (World Economic Forum, 2023).

Share Now, or LimeBike and Next Bike have been popping up in almost every larger city – between 2006 and 2014, the global fleet of shared vehicles grew from slightly over 10,000 to more than 100,000 vehicles, with memberships growing from 350,000 to 4,800,000 people, and projections indicating strong continued growth for the future (OECD, 2019). Increased environmental awareness combined with a higher willingness to pay for green products have been main drivers of the development of new circular supply models (OECD, 2019). Moreover, new creative business models for consumers to repair products are being developed, such as so-called "repair cafes" (Golsteijn, 2021; Repair Café, 2023). Furthermore, new reusable packaging business models that are usually based on the refilling or returning of packaging have emerged and become widely adopted, such as deposit-return-systems for reusable plastic cups (Bocken et al., 2022; Cottafava et al., 2019; Ellen MacArthur Foundation, 2023; To, 2023). In the fashion industry, circular business models such as clothing rental services have become more popular and are expected to strongly increase in the future, particularly in emerging economies, as is the global second-hand clothing market, which studies predict could be twice the size of fast fashion by 2030 (Van der Ven, 2022).

Increased consumer demand and awareness for circular products and services cannot only, on the one hand, foster the innovation of new businesses but also, on the other hand, pose new sources of reputational risk for already established firms and thus foster sustainable innovations and more circular modes of production within already existing companies (OECD, 2019). Studies have shown that more than 80 per cent of customers feel strongly that companies should help improve the environment, and more than 90 per cent of business leaders believe that customers will hold their businesses accountable for their environmental impact – more than investors and shareholders, employees, or government regulators (Environmental Defense Fund, 2019). In 2018, Unilever's Sustainable Living Brands grew 69 per cent faster than the rest of the business, and Unilever's CEO, Alan Jope, said that "two-thirds of consumers around the world say they choose brands because of their stand on social issues, and over 90% of millennials say they would switch brands for one which champions a cause" (Unilever, 2019). As a result, more and more leading companies have started to use sustainability in their marketing strategies to improve their reputation and respond to the growing demand by consumers for more corporate social and environmental responsibility (Forbes, 2020). Several major companies have started to experiment with circular business models in their portfolios, such as H&M (such as clothing rental service or recyclable packaging) or IKEA (for instance, buy-back programmes or furniture as a service) (Bocken & Konietzko, 2022). In addition, several major companies have announced ambitious climate pledges, environmental goals, and other social and environmental responsibility initiatives, such as Amazon's Climate Pledge to become net carbon zero by 2040 or Apple's commitment to being 100 per cent carbon neutral in their entire business by 2030 (Forbes, 2020). Moreover, various pledges have been made by leading consumer goods firms such as Coca Cola, Unilever or L'Oreal to use 100 per cent reusable, recyclable or compostable packaging by 2025 (OECD, 2019).[4]

4 It should be noted that making pledges alone does not necessarily mean that companies will also follow through with their announced ambitions. Thus, while ambitious sustainability pledges are an important first step, companies should further be subject to intense scrutiny regarding the credibility of their pledges and be held accountable in case credibility does not hold. Regulators and standard-setting initiatives need to find ways to distinguish honest climate action from greenwashing to ensure that ambitious corporate actors will be rewarded and not economically disadvantaged compared to their less ambitious peers (New Climate Institute, 2022).

3.2 Potential consumer barriers to CBM demand

Despite these promising developments in consumers' environmental awareness, their increased interest in and willingness to pay for green products and the growing demand for more corporate social and environmental responsibility, several potential barriers to the adoption of CBMs exist. Changing consumption patterns in general is difficult. Consumer behaviour is influenced by several different factors that are often highly context-specific and shaped by a variety of variables such as the political system, geographic region, religion, norms, education, access to products and services, and many more. All those factors determine why we consume what we consume, and why consumption trends may differ fundamentally between different societies (EEA, 2023). Also regarding the demand for CBMs, it is therefore important to recognise that consumer barriers cannot be generalised, but that it requires context-specific analyses of why certain CBMs may be developing and scaling up rapidly in certain regions while others may not. In general, though, market penetration of most CBMs seems to have been greatest in developed countries so far and less so in developing countries, for example, regarding sharing, product service system or circular supply models, while some exceptions in the Global South exist (OECD, 2019).

Besides the regional and context-specific variables that can influence the demand for CBMs, consumer barriers can also differ depending on the specific types of CBMs. For example, in the case of sharing models or product service system models, a main barrier can be that consumers may be reluctant to give away ownership and control over certain products or services. In the case of circular supply or product life extension models, the central barrier can be that consumers may not be willing or able to pay a higher price for more sustainable or durable products if they are more expensive than conventional alternatives (Acatech, 2021; OECD, 2019). These potential barriers to certain CBM types can again be very context- and sector-specific, so that, for example, security concerns and availability may be of greater relevance for the demand for car sharing services in many countries in the Global South, while they may be less important for consumers in most countries in the Global North. Notably, while Asia, Africa and Latin America comprise over 78 per cent of the world's population, they only account for 20 per cent of the global car sharing market, which is so far mainly concentrated in Europe and North America (OECD, 2019). Regarding circular supply or product life extension models, consumers may be more willing and able to pay for more expensive "green" and high-quality products in wealthier countries than in developing countries (OECD, 2019). In sum, both context and CBM type are important when it comes to consumer barriers to CBM adoption and need to be taken into account when designing policy measures to address those barriers.

In line with the European Environment Agency (EEA, 2023), this paper divides potential consumer barriers into three categories (although using a different categorisation approach): i) macro-, ii) meso- and iii) micro-level barriers. *Macro-level barriers* describe the economic context of consumers' decision-making, including the availability and supply of CBMs in the market, the infrastructure and access to CBMs, and the price. *Meso-level barriers* characterise the social environment in which consumers make their consumption choices, such as social norms and social status. *Micro-level barriers* focus on the individual characteristics of consumers, including individual consumption habits, desire for ownership, security or quality concerns regarding CBMs, information and familiarity with CBMs, environmental knowledge and education, as well as environmental awareness and concern.

Table 2 summarises potential consumer barriers to CBM adoption according to the three categories and gives examples of different sectors. The selection of potential barriers is based on the most important consumer barriers to CBM demand identified in the CE literature (Acatech, 2021; Bocken et al., 2022; Calisto Friant et al., 2021; Camacho-Otero et al., 2018; CE Center, 2021; EEA, 2023; Elzinga et al., 2020; Fuhrmann-Riebel et al., 2021; Hartley et al., 2023; Hartley et al., 2020; Hobson et al., 2021; Kirchherr et al., 2018; Mostaghel & Chirumalla,

2021; Musova et al., 2021; OECD, 2019; Prakatsch et al., 2020; Soler et al., 2020; SRU, 2023; To, 2023; Van der Ven, 2022; World Bank, 2022; Zibell et al., 2021). As outlined above, the potential barriers presented in the table may be more or less relevant for consumption choices regarding CBMs depending on various different context-specific factors. They thus present rather a general collection of potential barriers and do not intend to provide a generalisable (or exhaustive) list to be applied to all situations where CBM demand shall be encouraged. Besides outlining potential consumer barriers to CBM demand and providing examples of different sectors thereof, the table further includes options for policy-making on how to address those barriers. The subsequent section discusses the role of policy-making for encouraging CBM demand in more detail.

Table 2: Potential consumer barriers to CBM adoption, examples of different sectors, and options for policy-making at the macro-, meso- and micro-level

Consumer barriers	Description	Examples for different sectors	Options for policy-making
Macro-level: Economic context			
Supply & availability	The supply and availability of CBMs in the market is the first necessary prerequisite for consumers to be able to make use of circular products or services. Lack of CBM supply is thus a fundamental barrier for consumers to engage in CBMs (Zibell et al., 2021).	Transport: Lack of availability of car or bike sharing services or public transport options. Plastics: Lack of availability of reusable plastics alternatives (e.g., cups or bags) or deposit- and take-back-systems. Fashion: Lack of availability of sustainably produced clothes or clothing rental services (Van der Ven, 2022). Electronics: Lack of availability of maintenance or repair services for old electronic gadgets.	Develop a regulatory framework that favours CBM supply (Acatech, 2021). Develop Eco-design guidelines, impose standards and norms for circular product design (EEA, 2023; Hartley et al., 2020). Offer financial support for CBM development, invest in circular start-ups (Hartley et al., 2023; Kirchherr et al., 2018).
Access & infra-structure	Having (easy) access to CBMs in the market is crucial for consumers to make use of them. Especially if CBMs are still in the process of scaling up, however, the necessary infrastructure may not be available everywhere or accessible to everyone (Soler et al., 2020).	Transport: Missing infrastruc-ture for car or bike sharing services, e.g., including safe bike lanes or parking lots for shared vehicles; also a lack of special parking lots and charging options for electric vehicles (EVs) (Hartley et al., 2023) Plastics: Infrastructure for plastics return- or deposit-systems, e.g., for reusable cups or plastic bottles (Ellen MacArthur, 2019)	Make sure the necessary infrastructure for CBMs is in place, e.g., through take-back obligations for producers and sellers (Zibell et al., 2021) Invest in infrastructure that favours circular products and services as opposed to unsustainable alternatives (SRU, 2023).
Price	CBMs can be more expen-sive than conventional alternatives, e.g., in the case of various consumer goods, if using recycled material input is more ex-pensive for businesses than virgin material input (e.g., for circular supply models), or if economies of scale are not yet in place.	Fashion: Higher prices for sustainably produced clothes than for fast fashion (Zibell et al., 2021). Plastics: Higher prices for sustainable/reusable plastics products than for disposable ones. Transport: Higher prices for EVs than for combustion engine cars.	Ensure that market prices reflect the full environ-mental costs of a product, e.g., through demand-side subsidies or tax exemptions (OECD, 2019). Design taxes that favour CBMs and make un-sustainable alternatives less attractive (Hartley et al., 2023).

Consumer barriers	Description	Examples for different sectors	Options for policy-making
	This can impede CBM demand if consumers are either not willing or not able to pay higher prices (World Bank, 2022; Zibell et al., 2021).	Electronics: High repair costs that outweigh cheap prices for new gadgets.	
Meso-level: Social environment			
Social norms	Consumer behaviour is deeply rooted in social norms. People tend to follow what other people around them are doing or approve of doing. This can make it difficult for new CBMs to be taken up by a critical mass of consumers and thus become successful and profitable. Social norms can impede CBM adoption if conventional products or services are (still) preferred by the majority in society (CE Center, 2021; Zibell et al., 2021). Also, sharing platforms need a critical mass of users to become attractive (OECD, 2019).	Fashion: Consumers can be less willing to purchase second-hand clothes or sustainable fashion brands if they are not (yet) popular to date (Zibell et al., 2021). Transport: People may be reluctant to make use of car or bike sharing services if they are rarely used by other people. Plastics: Consumers can be less likely to choose reusable plastic cups or bottles, and to return products after usage, if only few other people around them are doing so.	Help promote CBMs to become the norm (SRU, 2023). Communicate positive trends in behaviour (i.e., dynamic norms) in information campaigns if more and more people start to make use of circular products or services. Highlight injunctive norms, i.e., social approval for CBMs, if it is already high. Correct potential misperceptions regarding corresponding norms in CBM demand.
Social status	Social norms are closely linked to social status. Products can be status symbols; what status symbols are, is usually determined by the society around us. Social status can impede CBM demand if unsustainable alternatives are important for people to maintain and signal a certain status in society (Zibell et al., 2021). If, for example, the ownership of certain products is linked to social status, people may be reluctant to give them up. Social status can be an important barrier regarding the demand for product service system models such as reuse or repair as consumers may prefer the “latest” products instead (OECD, 2019).	Transport: Big cars can be status symbols, which can hinder people from purchasing smaller, more sustainable /electric cars, or from making use of car sharing services or public transport (OECD, 2019). Fashion: Social status linked to new clothes can reduce people’s willingness to repair old ones or to purchase second-hand clothes instead (Zibell et al., 2021). Electronics: The social status of certain electronic devices such as mobile phones or tablets may lower people’s willingness to repair old gadgets instead of purchasing new ones.	Try to make sustainable purchase decisions and engagement in CBMs fashionable. Influence status symbols towards circular solutions, e.g., by working together with celebrities or influencers in (social) media campaigns and regulating media advertisement (Zibell et al., 2021).

Consumer barriers	Description	Examples for different sectors	Options for policy-making
Micro-level: Individual characteristics			
Habits & convenience	Changing habits of existing consumption patterns is difficult, which can impede or slow down CBM demand if people are reluctant to change old behaviours or first need time to get used to choosing new products or services. This phenomenon is linked to the so-called “status quo bias”, which describes that people often face difficulties to let go of old routines and habits (EEA, 2023). Moreover, such change can be associated with a lack of convenience, which can further reduce people’s willingness to adapt to new products or services (Elzinga et al., 2020).	Plastics: Not being accustomed to return products after usage instead of throwing them away, such as plastic bottles or cups, can inhibit people from making use of return and recycling services (Bocken et al., 2022). Transport: People may be used to the convenience of the constant availability of owning and driving their own car, and therefore less willing to change their habits to utilise car sharing options instead (OECD, 2019).	Make choosing circular products or services as easy and convenient as possible (SRU, 2023). Make use of behavioural nudges and choice architecture to facilitate behaviour change. Change defaults to circular options (e.g., to reusable cups or bags in stores).
Desire for ownership	Consumers often have a strong desire for product ownership in itself. This can be a main barrier against people making use of CBMs, particularly sharing or product service system models, where ownership is substituted by sharing goods or using services instead (OECD, 2019).	Transport: Many individuals attach a high value to vehicle ownership in itself, which can lower their willingness to make use of car sharing services instead (OECD, 2019). Fashion: The desire to own certain clothes even if only worn very rarely can be a reason why people refuse to utilise clothing rental services.	Disincentivise ownership of certain products, e.g., through high charges for car parking lots. Invest in the sharing economy to make sharing services more accessible and attractive.
Security or quality concerns & trust	If CBMs are still new to customers, people may have concerns about the security and/or quality of new products or services, e.g., regarding the durability (e.g., of recycled or repaired products) or contractual conditions (e.g., of car sharing services) (Acatech, 2021; CE Center, 2021; EEA, 2023; Zibell et al., 2021). Trust in new platforms is moreover a key issue for people to engage in sharing or product service system models (OECD, 2019).	Fashion: People may have hygienic or quality concerns regarding second-hand clothes. Electronics: People may not trust the quality of repaired electronic gadgets when purchasing new ones or not be willing to recycle their old phones or laptops due to data concerns (Hobson et al., 2021). Transport: Low trust in car sharing platforms can hinder people from making use of them, both as users and providers of cars.	Apply mandatory product labelling and certification to increase transparency for consumers and ensure quality standards of repaired or remanufactured products (Acatech, 2021; World Bank, 2022). Potentially offer a test phase for sharing models, if possible, to increase consumer trust in the sharing economy (CE Center, 2021).

Consumer barriers	Description	Examples for different sectors	Options for policy-making
Lack of information or familiarity	Lack of information about new circular products or familiarity with using new business models such as sharing platforms can lower people's willingness to purchase or commit to them. Also, consumers need to be able to identify sustainable products easily at the point of sale. Moreover, a lack of information about proper product maintenance or repair can be a reason why consumers do not make use of maintenance or repair services (Acatech, 2021).	Transport: Consumers can be reluctant to make use of car or bike sharing services when they are not familiar with such sharing models. Plastics: Consumers may not be able to easily identify circular products in stores, e.g., products made from recycled material such as plastic bottles. Fashion: Consumers may not be able to identify sustainably produced clothes if they are not familiar with certain brands or labels (Zibell et al., 2021).	Invest in public information campaigns to inform about new CBMs. Make use of mandatory product labelling and certification, e.g., regarding the efficiency or repairability, to remove information asymmetries (Hartley et al., 2023; World Bank, 2022). Increase transparency about the circularity of products, e.g., through digital product passports (Acatech, 2021).
Environmental knowledge & education	Not all consumers are familiar with the environmental consequences of their consumption choices and with the environmental benefits of choosing circular products or services (World Bank, 2022; Zibell et al., 2021). Low levels of environmental knowledge can therefore reduce sustainable consumption (Fuhrmann-Riebel et al., 2021). For example, it can impact CBM demand regarding product life extension models or sharing models, if consumers do not understand the positive consequences of reusing, repairing or sharing products.	Transport: If the environmental benefits of car or bike sharing services are not clear to consumers, they may be less willing to make use of them or offer own vehicles for sharing. Electronics: People may not be willing to make use of repair services for old electronic gadgets if they do not understand the environmental benefits compared to the purchase of new products.	Increase environmental knowledge through public education and information campaigns, e.g., using (social) media (CE Center, 2021). Integrate education regarding the CE already in schools (Hartley et al., 2023). Increase environmental knowledge through easily understandable product labelling (World Bank, 2022).
Environmental awareness & concern	The potential positive environmental impact is a main reason for consumers to participate in CBMs (Bocken et al., 2022). Lacking environmental awareness and concern can therefore be a barrier for consumers to behave pro-environmentally (Fuhrmann-Riebel et al., 2021). Moreover, not all consumers can be expected to be (primarily) interested in the environmental benefits of a product or service (CE Center, 2021).	Plastics: People may not be willing to make use of deposit-return-systems, e.g., for plastic bottles or cups, instead of throwing products away after usage if they do not care about the environmental consequences. Electronics: The incentive for consumers to make use of repair services for electronic gadgets can be low if environmental awareness is lacking.	Increase environmental awareness for engaging in CBMs through education and information campaigns, e.g., using (social) media (Hartley et al., 2023). Design information campaigns in a way that other benefits of CBMs such as quality, ease of use, financial savings, health benefits or reduced risks are highlighted as well (CE Center, 2021).

Consumer barriers	Description	Examples for different sectors	Options for policy-making
Following through with behaviour intentions	Even the most environmentally knowledgeable and concerned consumers sometimes fail to follow through with their sustainable behavioural intentions (SRU, 2023). This so-called "intention-action-gap" (or "attitude-behaviour-gap") can be a barrier to CBM adoption if consumers intend to engage in CBMs yet fail to do so, e.g., due to problems of limited attention, old habits or inertia (Zibell et al., 2021).	Plastics: People may plan to choose reusable cups instead of disposable ones, and to return products after usage, but then forget to do so in the moment of choice. Electronics: People may plan to make use of repair services for broken gadgets but then end up buying new ones instead, as they may forget about it or as it is simply more convenient for them.	Make engaging in CBMs as easy as possible for consumers (SRU, 2023). Make use of behavioural insights and choice architecture, such as changing defaults, to facilitate circular consumption choices. Make use of reminders to overcome the problem of limited attention.

Source: Author's representation, partly based on Acatech (2021), Bocken et al. (2022), Calisto Friant et al. (2021), Camacho-Otero et al. (2018), CE Center (2021), EEA (2023), Elzinga et al. (2020), Fuhrmann-Riebel et al. (2021), Hartley et al. (2023), Hartley et al. (2020), Hobson et al. (2021), Kirchherr et al. (2018), Mostaghel & Chirumalla (2021), Musova et al. (2021), OECD (2019), Prakatsch et al. (2020), Soler et al. (2020), SRU (2023), To (2023), Van der Ven (2022), World Bank (2022) and Zibell et al. (2021)

4 The role of policy-making for circular business model demand

4.1 Policy measures to address consumer demand for CBMs

With different measures and strategies, policymakers can have great influence in encouraging consumer demand for CBMs. Consumers are more than just passive agents in the CE and need to be integrated more actively into policy-making (Hobson et al., 2021). As already argued, to successfully promote the CE transition and support CBM development, systemic and holistic policy mixes are needed that address both the production *and* the consumption side of CBMs simultaneously (Acatech, 2021; Bengtsson et al., 2018; EEA, 2023).

At the *macro-level*, policymakers can support the adequate provision and supply of CBMs in the market and make sure the necessary infrastructure is in place. This can be done through economic instruments such as fiscal instruments aimed at true-cost environmental pricing and "the polluter pays" principle (for instance, tax changes, removal of harmful subsidies) or targeted funding for CE practices (Acatech, 2021). Policymakers can help to ensure that the full environmental costs of production and consumption activities are reflected in market prices and thereby increase the competitive advantage of CBMs compared to traditional businesses in the market (OECD, 2019). The current low prices for virgin materials need to be addressed so that circular products can become more profitable and affordable (Kirchherr et al., 2018). Tax relief on renewable resources and higher taxes on non-renewable resources can be applied (Hartley et al., 2023). Promoting price competitiveness of CBMs will be key (World Bank, 2022). Other policy options include reduced VAT rates for repair services to make repair more attractive (Kirchherr et al., 2018). Furthermore, regulatory instruments such as eco-design or circular product design standards, waste laws, product bans, or strengthened EPR schemes such as take-back obligations or repair requirements for producers can be applied (Acatech, 2021;

OECD, 2019; Zibell et al., 2021). Digitalisation must be advanced as it constitutes the basis for many CBMs. In the end, it is the policymakers' responsibility to ensure that the contextual conditions favour environmentally friendly consumption choices and that engaging in CBMs is possible, attractive, and easy for the consumer (SRU, 2023).

On the *meso-level*, policymakers can try to influence social norms and status symbols regarding CBMs. For example, policymakers can work together with celebrities or influencers in public information campaigns, such as using various (social) media channels, to change consumers' attitudes and values towards sustainable products or services that are not yet popular in society. This can be further supported by regulating media advertising, for instance, by putting restrictions on the advertising of harmful goods (as has been done, for instance, in the case of tobacco or alcohol) (Zibell et al., 2021). Moreover, policymakers can inform consumers about corresponding social norms and, for example, exploit positive trends (that is, dynamic norms) in market shares of CBMs by highlighting that more and more people are making use of circular products or services, which can motivate others to follow suit. Similarly, social approval for CBMs (that is, injunctive norms) can be highlighted when the general support from the public for circular solutions is already high. What is more, informing consumers about social norms can correct potential misperceptions regarding positive trends in the demand or social approval for CBMs, which can be a barrier to sustainable consumption if people underestimate such positive developments (Fuhrmann-Riebel et al., 2022).

At the *micro-level*, policymakers can redesign and improve existing educational and information programmes to provide individuals with a better understanding of the unintended consequences of their consumption choices and raise environmental awareness (OECD, 2019; World Bank, 2022). Public campaigns using various channels of (social) media can be used to raise environmental awareness among the public (Hartley et al., 2020). Moreover, information provision, such as through digital product passports, can be used to increase transparency for consumers (Acatech, 2021). Increasing consumer knowledge and literacy regarding the CE can already start through education in schools by including circularity in educational and academic curricula (Hartley et al., 2023). This can go beyond informing about the environmental impacts of sustainable consumption, but also include concrete training, for instance, in appliance care or the repairing of products (SRU, 2023). Product labelling can be key to provide transparent and easily accessible information for consumers (World Bank, 2022). Behavioural insights can help inform the design of product labelling to make labels (such as those regarding the recycled content of products) most appealing and informative to consumers. In general, information should be communicated in a clear and simple way – as well as being of personal relevance to the respective target group. Including additional benefits of sustainable consumption, for example, health benefits or improved wellbeing, in information strategies can be particularly effective (SRU, 2023). Moreover, behavioural insights and pro-environmental nudges such as changing the default to sustainable consumption choices or making use of reminders can facilitate behavioural change among consumers and help to break existing unsustainable consumption habits or inertia in changing behaviour as well as to overcome potential intention-action-gaps.

To encourage the demand for CBMs, a mix of policies that addresses various consumer barriers jointly will be needed. The different factors that can determine consumer demand are closely interlinked and often influence each other. For example, our social environment – that is, social norms – influence what is seen as a status symbol in our society. This again can influence our consumption habits as we orient ourselves on the consumer behaviour of others around us and may develop a stronger desire for owning certain products of which social status is high. Individual characteristics such as security or quality concerns are closely linked to the personal level of information or familiarity with the usage of new business models. Higher levels of environmental knowledge or education can influence our concern for the environment. Finally, better availability of and access to new CBMs in the market as well as lower prices can impact our consumption patterns and influence both social norms and status regarding the usage of

new CBMs as well as individual characteristics such as consumption habits, information or quality concerns. Moreover, most policy measures are rarely effective in isolation, for example, eco-design guidelines for more durable products (that is, the macro-level) can only have positive environmental effects if consumers actually use appliances longer and thus avoid the purchase of new ones (that is, accompanying micro-level policies regarding environmental knowledge and awareness are required) (SRU, 2023). Thus, policy mixes that acknowledge these different influencing factors and their strong interdependencies, and therefore try to target consumer demand at different levels simultaneously by combining several policy instruments together will likely be most successful to encourage CBM uptake (Acatech, 2021; OECD, 2019; SRU, 2023; World Bank, 2022). In this sense, policymakers should also take into account which other measures are already in place to make sure that new and existing policy measures are adjusted and harmonised (SRU, 2023).

Moreover, policy-making should acknowledge that demographic factors such as age or gender can influence the respective relevance of different consumer barriers (CE Center, 2021; Musova et al., 2021; SRU, 2023). For example, younger people may be more familiar with the sharing economy and thus more likely to make use of sharing CBMs. This can be aggravated by the fact that sharing and product service system models are usually organised via digital platforms, which may be easier to use for the younger generation. On the other hand, the older generation may be more used to and thus more open to the repairing or reusing of products, or less prone to buy fast fashion. Environmental awareness, technology affinity, or security and quality concerns can differ between male and female consumers and age groups as well, as can social norms and status symbols in consumption choices. In sum, taking into account such demographic differences when designing policy measures for CBM demand can be worthwhile in order to address consumer barriers most effectively.

Finally, it is important to recognise that the different consumer barriers are very context-specific and can vary strongly depending on the region, economic context, sector and type of business model, which has implications for the prioritisation and sequencing of policy measures to increase demand for CBMs. For example, car sharing services are already fairly popular in many developed countries, while they are less common in developing countries to date (OECD, 2019). Consequently, focusing on the infrastructure and availability of car sharing services (that is, the macro-level) should have first priority in regions where such services are not yet accessible to everyone, while targeting social norms and status regarding car usage (that is, the meso-level) as well as mobility habits or desire for ownership of cars (that is, the micro-level) should get priority in regions where consumer uptake is lacking despite the necessary infrastructure being in place. Other examples would be deposit systems or repair schemes, for instance, for plastics or electronics. Here as well, investment in infrastructure and access to such services (that is, the macro-level) should have priority in regions where it is not yet in place, while targeting social norms regarding the returning or repairing of products (that is, the meso-level) as well as environmental knowledge and awareness for the environmental benefits of returning and repairing (that is, the micro-level) should be addressed where the infrastructure is already available. Thus, there is no “one size fits all” approach to encourage consumer demand for CBMs; rather, it requires targeted policies to address consumer barriers that need to be tailored to the specific context and business model (OECD, 2019).

Essentially, policymakers can target consumer demand for CBMs at three stages where decision-making takes place: i) the purchase, ii) the use, and iii) the end of use (EEA, 2023; Zibell et al., 2021). All of these stages are important and need to be addressed. Regarding the purchase decision, a reduction in overall consumption levels should be the aim. Both consuming less and consumption shifts are important in this regard (EEA, 2023). This can be achieved, for example, when consumers engage in sharing or product service system models where product purchases are substituted by the sharing, renting or leasing of products. Also, through the purchase of more durable products with longer lives, or the repairing of older gadgets, frequent purchases can be avoided. Regarding the use stage, proper product usage and maintenance

as well as reusing and repairing should be encouraged. This can, for example, be achieved through improved environmental knowledge and awareness as well as through better availability of repair services. Regarding the end of use stage, encouraging consumers to recycle rather than to throw away items that they do not use anymore should be addressed. This can, for example, be achieved when consumers make use of return or deposit systems, such as for the recycling of plastic cups or bottles. Given that consumers usually use several products or services at once in their daily lives so that all three decision-making stages may be relevant at the same time depending on the specific product or service, this again calls for effective policy mixes that address all three stages of consumer decision-making simultaneously through different measures.

The choice of the policy package for influencing consumer demand for CBMs should be combined with an environmental prioritisation in line with the waste hierarchy, as will be outlined in the following subsection.

4.2 Environmental prioritisation of policy measures for CBM demand

As illustrated before, different CBMs can have different environmental impacts based on the waste hierarchy framework (see subsection 2.4). In general, policymakers should consider the principles of the waste hierarchy when designing policy measures to increase consumer demand for CBMs. This means, a priority should be on encouraging CBMs that have the potential to completely prevent or otherwise reduce the purchase of new products, that is, CBMs that reduce the amount of new waste being generated. In this sense, concepts should be preferred where consumers use, instead of own, products (Acatech, 2021). Examples are product service system or sharing models, where consumers' purchases can be substituted by the renting, leasing, or sharing of products. Other examples include product life extension models that offer maintenance or repair services so that new purchases and waste generation can be avoided. Based on the waste hierarchy, policy measures aimed at those higher levels of the inverted pyramid should be preferred to those that focus on CBMs for less impactful practices such as the recycling of products and materials. Again, the importance of systemic policy mixes that address both the supply and the demand side becomes apparent. Taking the example from above, policies for stricter eco-design guidelines for more durable and repairable products – which technically have the potential to prevent or reduce the purchase of new products, that is, addressing the highest level in the waste hierarchy – will only be able to realise their intended environmental potential if consumers actually use appliances longer, treat them carefully, and make use of repair services. Consequently, to ensure that the environmental benefits of policies can properly unfold, targeted policy mixes that address production and consumption patterns simultaneously are key.

Given the environmental prioritisation prescribed by the waste hierarchy, it stands out that many EU CE policy interventions and business models to date have focused on recycling and end-of-pipe waste management solutions (Acatech, 2021; Öko-Institut, 2021; World Bank, 2022). Calisto Friant et al. (2021) provide a comprehensive summary of CE policies in the EU up to December 2019 (2014-2019) and find that most measures and almost all targets are aimed at improving the recycling of different types of waste, which the authors call a clear policy focus on resource efficiency and technological change as an avenue for circularity. This is in line with the observations of Kirchherr et al. (2018) who state that most governmental CE intervention strategies have focused on removing technological barriers. This is further supported by the findings of Dijkstra et al. (2020) who find that the majority of sustainable business models in the plastics sector (at global level) focus on recycling (55 per cent), with only a small proportion focusing on the prevention (11 per cent) or reusing (9 per cent) of plastic materials, which may be – at least partly – a result of the corresponding policy frameworks. Policy measures in the

EU that aim at higher levels of the waste hierarchy are in the minority. Only a limited number of technological products are affected by governmental regulations on repairing, and only a limited number of plastics products are targeted through regulations on refusing (with some single-use plastic bans) and reducing (via awareness-raising campaigns) (Calisto Friant et al., 2021). Thus, a more holistic CE policy framework that addresses all relevant circular strategies for CBM development and puts more emphasis on higher levels of the waste hierarchy such as refusing, reducing, repairing and reusing is urgently needed (Acatech, 2021; Wilts et al., 2016; World Bank, 2022).

However, it should be noted that prioritising the environmental impact of policy-making for CBM demand based on the waste hierarchy alone may be too simple. First, as already mentioned earlier, the waste hierarchy is only one possible (yet commonly applied) concept for assessing the environmental impact of CBMs, and there are different alternative approaches that each have their pros and cons (see OECD, 2019, for a discussion). Second, there might be unintended consequences of certain consumption shifts to CBMs that may undermine their initial environmental benefits according to the waste hierarchy, which will be discussed more in detail in the following subsection. Thus, while policymakers should orient themselves on the principles of the waste hierarchy when designing measures for CBM demand, taking a more nuanced look at potential side-effects will be important as well.

4.3 Potential unintended environmental consequences of policies for CBM demand

Besides the general importance and environmental benefits of applying policies for CBM demand, there are some potential unintended environmental consequences that can occur when consumer demand changes that policy makers need to bear in mind. One prominent concern is that there can be negative rebound effects of changes in consumption (EEA, 2023; OECD, 2019; SRU, 2023). The rebound effect describes increases in absolute consumption levels due to price reductions. For example, if governmental regulations for circular products and services lead to lower costs for consumers, there is a risk that consumption increases as a result (SRU, 2023). This can happen regarding higher consumption levels of the same (now cheaper) consumption item (direct rebound), or the money saved through price reductions of a particular item can be invested in other goods and services (indirect rebound) (EEA, 2023). Both can lower the environmental benefits of policies targeting CBM supply at the macro-level. Examples can be cost reductions in the case of circular supply models or cost savings through the leasing, sharing or repairing rather than the purchasing of products in the case of sharing or product service system models (OECD, 2019; SRU, 2023). Especially in such situations, combining policy measures at different levels, that is, the macro- with the meso- and micro-level, is essential to effectively mitigate potential rebound effects.

Moreover, in the case of product service system models, consumers may tend to treat products less carefully and invest less in proper maintenance if they are not owned but merely leased or rented, which would result in shorter product lives (Acatech, 2021; OECD, 2019). From a company perspective, insecurity about the quality of returned products from customers can be a main barrier to engaging in CBM innovation such as product service system models (Guldmann & Huulgaard, 2020). Thus, again it is important to combine different policies and to address consumers' environmental knowledge and concern regarding proper product usage and maintenance simultaneously to make sure the environmental benefits of leasing or renting instead of purchasing products are not lost.

Furthermore, the environmental impact of sharing or product service system models is based on the assumption that it can replace product ownership, for example, in the case of car sharing services, which is true for many consumers yet may not always be the case (OECD, 2019). For

example, some people may make use of car sharing services when it is conventient to them, while still owning their own vehicle. Moreover, besides having the potential to replace car ownership, car sharing services may also substitute the use of public transport among people who would otherwise not have access to car usage at all, which would be undesirable from an environmental perspective (OECD, 2019). Consequently, accompanying policies that reduce potential negative use patterns are needed.

In sum, while implementing policies for CBM demand should be high on policymakers' agendas, considering the potential unintended side-effects of changes in consumption patterns when designing policy measures is crucial. With their consumption and usage behaviour, consumers cannot only influence CBM demand, but also impact the environmental benefits that CBMs can bring. Combining macro- with meso- and micro-level policies such as educational and awareness-raising campaigns, influencing social norms and status symbols, and addressing consumption habits is advisable to counteract potential negative consequences. Behavioural insights can help in understanding consumers' motivation behind potential rebound effects or product/service use patterns and to design measures to prevent such potential unintended side-effects most effectively. If designed properly, changes in consumer demand for CBMs can have positive spillover effects, as will be outlined in the following subsection.

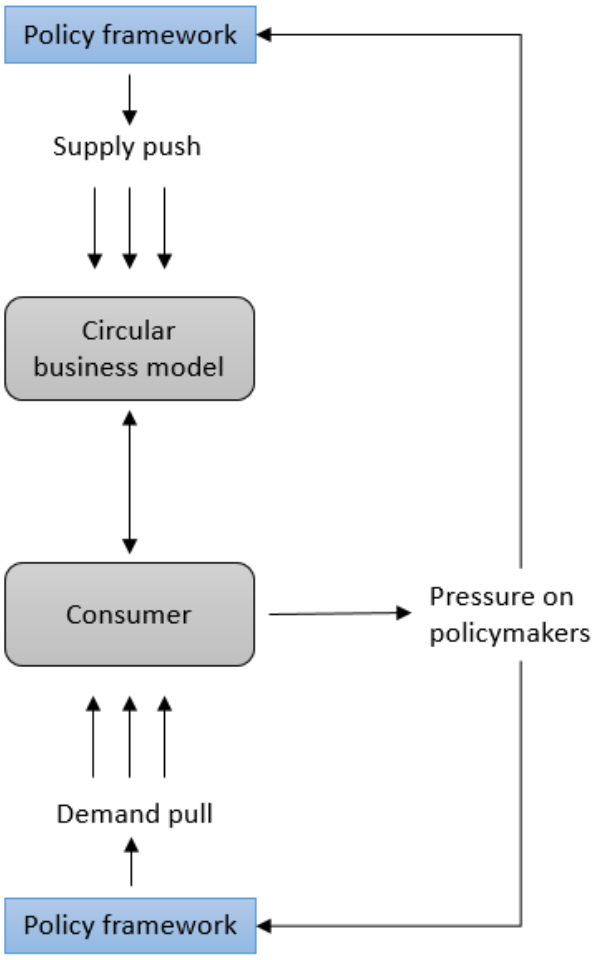
4.4 Positive spillover effects of increasing consumer demand for CBMs

Increasing consumer demand for CBMs can have positive effects beyond the direct consumption itself, which presents an additional benefit of focusing more actively on the consumer in CE policy-making. The argument is linked to the conceptual framework of Kirchherr et al. (2018), which argues that the different barriers to CBM development are nested, and that there are interactions between them that can lead to possible chain reactions. As already highlighted above, the supply and demand side for CBMs are closely interlinked and influence each other. With both supply push and demand pull policy measures, policymakers can increase the development and uptake of CBMs from both sides. Subsection 4.1 illustrated that, when focusing on the demand for CBMs, policymakers have the potential to influence consumption patterns at different levels – by improving the availability of and access to new CBMs in the market, lowering CBM prices, encouraging new social norms and status symbols of CBMs, addressing people's individual values and preferences and increasing environmental knowledge or concern. All this can lead to societal and cultural change in lifestyles and consumption patterns and fundamentally change the mind-set of consumers.

Once a change in consumers' demand preferences has taken place, positive chain reactions can follow. As outlined before, changes in consumer preferences have been main drivers for the development of new CBMs and more sustainable practices of already established companies over the last years. Moreover, cultural changes in consumption patterns and demand preferences can encourage consumers to exert new pressure on policymakers for more circular regulatory frameworks, which can in turn influence both the supply and the demand for CBMs (see Kirchherr et al., 2018, for a similar line of argumentation). There is compelling evidence that public opinion can influence policy-making (Burstein, 2003). Policymakers are reluctant to implement policies if public acceptance for those measures is low. In contrast, a change in public opinion can lead topics from being a niche issue to becoming one of central concern, which has been demonstrated over the last years regarding climate change, with the Fridays for Future movement being probably the most prominent example (Schaffer et al., 2022). In this sense, consumers can be seen as both a starting point and a policy target group in a virtuous cycle that ideally creates a positive dynamic towards more circularity (Never, 2023). Figure 3 visualises the described dynamics graphically. Therefore, the positive effects of raising public awareness

for the CE and increasing consumer demand for CBMs may well be underestimated, given the positive spillover effects it can have on policy-making and businesses.

Figure 3: Positive spillover effects of increasing consumer demand for CBMs



Source: Author

4.5 Selected examples of recent EU policy initiatives related to circular consumption

Even though EU policy-making for the transition to a CE has focused for a long time primarily on addressing technological barriers (Kirchherr et al., 2018), with the introduction of the new EU Circular Economy Action Plan (CEAP) in 2020, the role of the consumer started to receive more attention, with empowering consumers being one of its key objectives (World Bank, 2022; Zibell et al., 2021). This subsection briefly summarises some of the most important recent policy initiatives within the EU with particular relevance to circular consumption. It is mainly based on the collection provided by the European Environment Agency (EEA, 2023). The aim is not to provide a comprehensive overview of EU policy-making with regard to the CE in general, but to highlight selected initiatives that are of special importance for sustainable consumption.

- **European Green Deal 2019 & 8th Environment Action Programme**

In 2019, the European Commission adopted the *European Green Deal*, which includes ambitious objectives to protect the environment and mitigate climate change (EEA, 2023).

These objectives include the achievement of becoming the first climate-neutral continent by 2050, the improvement of biodiversity, and a shift to a resource-efficient and competitive CE (European Commission, 2019a). Building on the European Green Deal, in May 2022, the *8th Environment Action Programme (8EAP)* entered into force, as the EU's legally agreed common agenda for environmental policy until 2030 (European Commission, 2023b; EU [European Union], 2022). Its aim is to align European environmental policy-making with the Green Deal's ambitions and the Sustainable Development Goals (SDGs), and to reiterate the EU's 2050 vision of "living well, within the planetary boundaries", recognising that human wellbeing and prosperity depend on healthy ecosystems. Significantly decreasing the EU's material and consumption footprints is one of its key objectives (European Commission, 2023b; EEA, 2023).

- **Circular Economy Action Plan (CEAP) 2015, revised 2020**

In March 2020, the second *EU Circular Economy Action Plan (CEAP)* was adopted, following the first CEAP in 2015 (European Commission, 2020). It is one of the main building blocks of the European Green Deal and highlights the potential of a circular economy to contribute to reducing the EU's consumption footprint. The revised EU CEAP aims to establish a strong and coherent policy framework that will make sustainable products, services and business models the norm, to empower consumers and public buyers, and to make circularity work for people, regions and cities. Key product sectors being addressed are food, water and nutrients, electronics and information and communication technology (ICT), textiles, batteries and vehicles, packaging, plastics, construction and buildings (EEA, 2023; European Commission, 2020). With the revised EU CEAP, the role of the consumer in enabling the CE transition has become more prominent in EU policy-making (Zibell et al., 2021).

As a result of the EU CEAP, several product-specific initiatives have been launched.

- **European Strategy for Plastics in a CE 2018 & Single-Use Plastics Directive**

In 2018, A *European Strategy for Plastics in a Circular Economy* was published (European Commission, 2018), which addresses the way plastic products are designed, produced, used, and recycled in the EU (EEA, 2023). It is part of the EU CEAP and aims, among other goals, to achieve a CE for plastic packaging by 2030, so that all plastic packaging on the EU market will be either reusable or recyclable (EEA, 2023). One particular goal is to increase demand for recycled plastic content, and to support more sustainable and safer consumption and production patterns for plastics (European Commission, 2023c). In addition, the *Single-Use Plastics Directive* aims to promote the transition to a CE by reducing the use and environmental impact of certain types of plastic products (EEA, 2023). Concrete measures to do so are, among others, reducing consumption through awareness-raising campaigns, the introduction of design and labelling requirements, as well as market bans and waste management obligations (EEA, 2023; European Commission, 2023d; European Commission, 2019b).

- **EU Strategy on Sustainable and Circular Textiles 2022**

In March 2022, the *EU Strategy on Sustainable and Circular Textiles* was published (European Commission, 2022a). The strategy includes an ambitious vision of circular textiles by 2030, as well as many initiatives to make textiles more circular and sustainable (EEA, 2023). These include, among others, design requirements to make textiles last longer as well as easier to repair and recycle, mandatory and harmonised EPR schemes, the support of CBMs for profitable reuse and repair services, empowering consumers and raising awareness about sustainable fashion, clearer information provision in the form of digital product passports as well as tackling greenwashing (EEA, 2023; European Commission, 2023e).

- **Regulation on Ecodesign for Sustainable Products (ESPR) 2022, extends EU Ecodesign Directive**

In March 2022, the European Commission proposed a *Regulation on Ecodesign for Sustainable Products (ESPR)* (European Commission, 2022b). The proposal extends the existing *EU Ecodesign Directive* beyond the scope of energy-related products only and builds the cornerstone of the Commission's strategy to more sustainable and circular products (European Commission, 2023f). The ESPR establishes a framework for ecodesign requirements for almost all categories of physical goods placed on the EU market to ensure that all products are designed on the basis of sustainability objectives, including resource efficiency, energy performance, carbon neutrality, and circularity. Moreover, it sets legal requirements for the provision of information to consumers and the transparency about products' environmental sustainability. This includes the introduction of digital product passports, for instance, regarding the recycled content and reparability of products, to facilitate the informed purchasing decisions of consumers, as well as repairs and recycling. (EEA, 2023; European Commission, 2023f). In this regard, the ESPR also presents an important step in CE policy-making in the EU as it shifts the focus upstream in the waste hierarchy, and addresses the entire range of circular activities (World Bank, 2022).

- **Right to Repair Directive**

In March 2023, The European Commission adopted a new proposal on common rules promoting the repair of goods, called *Right to Repair*, to support the objectives of the European Green Deal by reducing waste (European Commission, 2023g). The proposal will make it easier and more cost-effective for consumers to repair goods instead of replacing them. Moreover, more demand for repair services is expected to result in a boost to the repair sector while incentivising producers and sellers to develop more sustainable business models. The proposal aims to ensure that more products are repaired within the legal guarantee, and that consumers have easier and cheaper options to repair products when the legal guarantee has expired. Within the legal guarantee, sellers will be required to offer repair except when it is more expensive than replacement. Beyond the legal guarantee, a new set of rights and tools will be available to consumers to make repair an easy and accessible option, such as producers' obligation to inform consumers about the products that they are obliged to repair themselves, or an online matchmaking repair platform to connect consumers with repairers and sellers of refurbished goods in their area (European Commission, 2023h).

5 Discussion & conclusion

This paper discussed the role of the consumer in the transition to a CE in the EU and for CBM development in particular, and outlined how policy-making can address potential consumer barriers to increase CBM demand. Consumers play a major role in the CE transition and the development and scalability of new CBMs. In contrast to the linear "take-make-dispose" economic model, the consumer in the CE differs fundamentally and often becomes a user as, in many CBMs, products are leased, rented, shared, or returned after purchase and usage, which creates new relationships and strong interdependencies between businesses and their customers. Consumers' willingness to engage in and appreciate those new consumption options will be key for a successful CE transition and a boost in CBM development. At the same time, resistance and hesitancy from consumers to do so can be of central importance for a company's decision to engage in CBMs, and thus severely hamper the transition to a CE. Accordingly, addressing potential consumer barriers to CBM demand is key and should be high on policymakers' agendas.

A rich list of potential consumer barriers to CBM demand was provided, together with selected examples of different sectors thereof. The paper organised consumer barriers and respective policy options based on three categories: the macro-, meso- and micro-level. The macro-level takes into account the economic context of consumers' decision-making, while the meso-level characterises consumers' social environment, and the micro-level refers to consumers' individual-level characteristics. The paper thus acknowledged that consumers cannot be treated as isolated individuals, but that each consumption choice is influenced strongly by a variety of factors such as people's regional context, social norms, personal level of information, and many more.

Based on the relevant literature, the following consumer barriers were identified to be of particular importance for CBM demand:

Macro-level

- Availability and supply of CBMs in the market
- Access and infrastructure
- Price

Meso-level

- Social norms
- Social status

Micro-level

- Habits and convenience
- Desire for ownership
- Security or quality concerns
- Lack of information or familiarity
- Environmental knowledge and education
- Environmental awareness and concern
- Following through with behaviour intentions

The paper outlined how policy-making can address consumer barriers at the different levels. At the macro-level, policies promoting the supply and infrastructure of CBMs can be applied, for example, through eco-design guidelines or strengthened EPR schemes, as well as policies targeting CBMs' price competitiveness, such as tax changes or the removal of harmful subsidies. At the meso-level, social norms and status symbols in CBM demand can be promoted, for example, through information provision via (social) media campaigns or restrictions on media advertising. At the micro-level, policies including information campaigns promoting environmental knowledge and awareness, education reforms, mandatory product labelling, quality standards and certification, or behavioural nudges such as changing defaults can be applied.

It was illustrated how the different consumer barriers are closely interlinked, and that systemic policy mixes that address barriers at all three levels will be simultaneously needed to successfully increase CBM demand. Moreover, the paper discussed how the different consumer barriers can be very context- and sector-specific, which has implications for the required sequencing and prioritisation of policy measures. In regions where the supply and infrastructure of CBMs is already in place (that is, the macro-level), targeting meso- and micro-level barriers such as norms and consumption habits is advisable, whereas focusing on the adequate provision of CBMs in the market first is needed in regions where it is not yet assured. In this regard, structural differences between developed and developing countries can occur, as well

as between differing sectors. In sum, there is no “one size fits all” approach, but policy mixes for CBM demand need to be adjusted to the specific context and business model.

When designing policy mixes for CBM demand, policymakers should consider the principles of the waste hierarchy to maximise the environmental impact. This means, a priority should be on promoting CBMs that have the potential to completely prevent, or otherwise reduce, the purchase of new products, compared to CBMs that focus on lower levels of the hierarchy such as recycling. Prominent examples of the former could be sharing or product service system models, where the purchase is substituted by the sharing, leasing or repairing of goods. However, it was illustrated how changes in consumption patterns towards CBMs can also have unintended environmental consequences, for instance, in the form of rebound effects, when cost savings through sharing, leasing or repairing are spent on other products instead, so that absolute consumption levels increase, or when products are treated less carefully when they are merely rented instead of owned. The waste hierarchy may thus not be the only orientation for policymakers in terms of the environmental prioritisation of CBMs, but potential negative side-effects need to be taken into account as well. It further shows that consumers are not only important for CBM demand, but also for the environmental benefits that CBMs can bring depending on their consumption and usage behaviour. Combining macro-level policies (for example, regarding the price of circular products or access to sharing models) with meso- and micro-level policies, such as promoting social norms for circular consumption and raising environmental awareness, can be particularly important in this regard to counteract the potential unintended side-effects of consumption changes. Behavioural insights can further help to understand consumers’ motivation behind certain consumption patterns, including potential rebound effects, and to design policy mixes most effectively.

While this paper has focused on consumer barriers, which has a somewhat negative connotation, it should be noted that all of those barriers can become drivers for CBMs as well. As argued, the different consumer barriers to CBM demand are closely interlinked, and positive developments on one level can lead to positive snowballing effects on other levels. For example, if social norms and status symbols in CBM demand change, consumption habits or security or quality concerns regarding CBM demand can change as well. Moreover, there can be positive spillover effects through the chain reactions of cultural changes in consumption patterns that may exert new pressure on policy-making and businesses to further promote CBM development in the market. Thus, actively targeting consumers in CE policy-making may be even more worthwile, given the positive chain reactions that can follow.

It stands out that technological constraints are often blamed as the main reason for slow CBM progress (Word Bank, 2022), and that many of the governmental regulations regarding the CE in the EU have long focused on overcoming technological barriers for CBM development, while consumer barriers have received less political attention (Kirchherr et al., 2018). Thus, novel governmental intervention strategies are needed that go beyond addressing technological progress and put more emphasis on other barriers, such as consumer barriers, as well. As illustrated, with the introduction of the new EU CEAP in 2020, the role of the consumer has already started to become more prominent in CE policy-making in the EU, and several initiatives related to circular consumption have been introduced since. While these developments are promising, there is still considerable room for improvement, and extending policies that take a more holistic approach and include targeting the demand side for the CE transition as well will be key. As outlined in this paper, the possible policy toolkit to do so is rich, and the need to do so is urgent.

It is important to emphasise that, while this paper has focused on the role of the consumer as one important driver for the development of CBMs and the transition to a CE, changing consumption patterns alone will not be enough: a simultaneous transition of production systems will also be essential (World Bank, 2022). As outlined in this paper, the supply and demand side for CBMs are closely interlinked and influence each other, and policymakers need to target both

with a systemic mix of policies that acknowledges their respective importance. Without the availability of and access to circular supply in the market, consumers cannot make use of CBMs. Without consumers being willing to adopt CBMs and to adjust their consumption patterns to new options such as using or sharing, rather than owning products, CBMs will not be able to scale up and become successful. Removing consumer barriers is therefore one important piece in the puzzle to drive the CE transition. While increasing consumer demand for CBMs cannot solve the CE challenge alone, without it being addressed, the circularity transformation cannot take place either.

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