

# Business Model Innovation in a Circular Economy Reasons for Non-Acceptance of Circular Business Models

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## Abstract:

**Purpose** - The overall aim of this paper is to develop a new conceptual framework for business model innovation in a circular economy and to explore the reasons for consumer non-adoption of business models in this context.

**Design/methodology/approach** – The study is based on existing work in mostly professional or for-business publications and develops a conceptual model by clustering and abstraction. For developing hypotheses on motives for consumer non-adoption the author refers to existing empirical research in various related fields.

**Findings** – The first part of the paper demonstrates that, despite wording differences, a predominant agreement on a basic structure for new business models in a circular economy has emerged in the field. The second part provides evidence that the adoption of circular economy business models will depend upon changing consumer habits and routines by leveraging the impact of non-functional motives, as well as subjective and moral norms.

**Practical implications** – For practitioners working on new innovative business models in the realm of the circular economy this paper provides a basic framework for clustering their concepts. By learning about consumer motives leading to non-adoption, this paper also provides support for designing better and more successful business models.

**Originality/value** – This paper develops a new holistic framework for the emerging topic of circular economy business models.

## Keywords:

Business Model Development; Circular Economy; Business Innovation; Business Model Acceptance

## 1. INTRODUCTION

By 2050, there will be approximately 9 billion people living on earth and enjoying increasing wealth [1]. This will lead to a global economy requiring about three times the resources we currently use. In our current, linear economy, approximately 80 % of what we use is directly discarded after usage [2]. Other research even concludes that over 99% of the total material flow generated in order to produce consumer goods ends up in waste disposal within 6 months ([3], p.81). Even though there is ongoing discussion about the exact numbers, the fundamental need for an alternative

to the current make-use-throw away-model, has led to the emerging discussion about a more circular economy.

While the idea of a circular economy is around for decades the current situation seems now more favorable than ever to take action. In a recent report to the World Economic Forum the Ellen MacArthur Foundation and McKinsey & Company concluded that the transition to a circular economy would create an opportunity in excess of 1 trillion USD for the global economy ([4], p.5). These calculations created a huge awareness for the topic as many corporations seized their chance to get a part of this potential revenue opportunity.

But why has the perception of circular economy ideas among corporate managers changed so dramatically in the past years? It can be constituted that three major changes led to this development. First, increasingly volatile commodity prices have fueled the need to safeguard the resource supply for manufacturing corporations. One of the key principles of a circular economy is that “the goods of today are the resources of tomorrow at yesterday’s prices” ([5], p.55). Since commodity prices dropped from 1900-2000 with an average 1.2% per annum ([6], p.11), having yesterday’s prices for raw material did not seem quite interesting in the past century. Since then, however, raw material prices are on a constant rise and become increasing volatile, which makes it now more attractive than ever to recover raw materials from users at the end-of-life stage. Second, Information technology enables new business models which weren’t thinkable a few years ago. While car sharing was around for decades, for instance, only smart phone apps have brought a wide spread success of this new form of shared commodity usage. Moreover, the development of reverse networks for resources only has become efficient when materials are traced via RFID or other identification technologies. Third, and maybe most fundamental, we are in the beginning of a pervasive shift in consumer behavior which increasingly leads to a performance over ownership mentality ([4], p.44).

Generally, the transition to a circular economy entails four fundamental building blocks

- (1) materials and product design
- (2) new business models
- (3) global reverse networks
- (4) enabling conditions .

The aim of this paper is to focus on the second building block and answer the question which new business models could enable a transition to a more circular economy. As Osterwalder and Pigneur ([7], p.5) put it, “business model innovation is about creating value, for companies, for customers, and society”. Creating new business models in the realm of the circular economy could achieve exactly this, a positive contribution to society as well as to the economy.

## 2. LITERATURE REVIEW

### 2.1 Business Modell Innovation

While used in a growing number of scientific publications, the term “business model innovation” appears to still lack a commonly accepted and generally valid definition [8, 9]. At root, business model innovation can be defined as a novel way of how to create and capture value, which is achieved through “a change of one or multiple components in the business model” ([10], p.253). While this definition leaves it open how *novel* is defined, Björkdahl and Holmén (2013) remark that “a business model innovation is the implementation of a business model that is *new to the firm*. [...]”. At the same time one could certainly argue that a business model innovation must be also perceived as *new to the customers*. This raises the question how the term *innovation* in business model *innovation* could be defined. Even though the scientific discussion is still far from reaching a common agreement to describe the term *innovation*,

it is widely believed that the term was introduced to the world of economics by Peter Schumpeter in 1939. He defined Innovation as "The introduction of new goods (...), new methods of production (...), the opening of new markets (...), the conquest of new sources of supply (...) and the carrying out of a new organization of any industry" [11]. This original definition is still valid to a large extent and especially the latter part can be seen as description of what today is called business model innovation. More recent definitions include a "significant positive change" [12], making it clear that what is new should lead to an improved state compared to the status quo. In this regard developing new business models in the realm of the circular economy can be seen as an almost classical case of business model innovation.

## 2.2 Business Model Innovation in a Circular Economy

While the basic ideas of a circular economy trace back to the 1980s (see the original work of Stahel and Reday-Mulvey [13] and McDonough and Braungart [14]), there is limited scientific work on how the proclaimed shift of the economy will translate into new business models on a micro-economic level. Establishing a new economic order with a clear focus on the recovery of material flows instead of generating excessive amounts waste will, however, require a fundamental change in consumer behavior. Next to altered purchasing behavior, this development will also require consumer acceptance of reverse business models and new forms of re-manufacturing and upgrading.

By reviewing existing work, it becomes apparent that so far there are no clear cut, generally valid, categories of business models aimed towards the transition to a circular economy. Yet, by reviewing practitioner-oriented publications on business model innovation in a circular economy certain clusters of categories can be revealed. Generally, most authors agree on hierarchical order of business model categories. The starting point is more efficient and longer use of current products, which is at the core of the transition progress. Based on this, reverse networks come into place to recover either the product itself or its components and materials. Energy recovery, finally, is the last option to prevent products to become landfill. **Table 1** gives an overview on different definitions of business model categories in a circular economy.

## 2.3 Structuring New Business Models in a Circular Economy

The development of a circular economy will require a pervasive shift in consumer behavior. While ownership of products is still of utmost importance to consumers in developing countries, research shows that in most saturated markets consumers tend to realize the downside of ownership [17]. It might not be a wise choice, for instance, to store a power drill for years while it will be used only for a few minutes during its lifetime [18], or paying insurance and motor vehicle tax for a car that on average stands still more than 22 hours of the day [19]. New, collaborative, business models now allow for access instead of ownership, which increases the capacity utilization and thus the efficiency of the deployed resources. This, however, can only be a first step towards performance-oriented business models. These business models presume that consumers don't want access but rather want to have a certain performance, *e.g.* having a hole in the wall to fix their shelf, for which access to a drilling machine is only one possible solution – maybe not even the most efficient one. Finally also these business models can only be seen as an intermediate step towards result-oriented business models, which are targeted at the desired outcome, *e.g.* fixing a shelf on the wall. From a customer perspective, new business models aimed towards more efficient use of resources can thus be categorized into four main categories, see **Table 2**.

These business models, however, only describe the inner circle of a circular economy, which is aimed at longer and more efficient use of resources as outline before. In a broader perspective, however, developing a truly circular

Table 1. Overview on business model categories in a circular economy.

1.Product Life extension via re-use, re-manufacturing, maintenance 2.Recycling -reusing materials on a molecular level	1.Product as a Service 2.Design, Manufacture and Distribute 3.Usage 4.Maintain/ Repair 5.Reuse/ Redistribute 6.Refurbish/ Remanufacture 7.Product Recycling	1.Products as services 2.Next life sales 3.Product transformation 4.Recycling 2.0 5.Collaborative consumption	1.The classic long-life model 2.The hybrid model (combine durable product with short-lived consumables) 3.The gap-exploiter model (components of products that last longer than the rest) 4.The access model (customer pays for access to product) 5.The performance model (customer pays for performance instead of product)	1.Maintenance 2.Repair 3.Reuse 4.Re-furbishment 5.Re-manufacturing 6.Recycling 7.Energy recovery	1.Maintenance 2.Repair 3.Redistribution (or reuse without treatments) 4.Upgrading 5.Re-manufacturing 6.Recycling 7.Energy recovery 8.Disposal	1.Product Service System 2.De-materialised services 3.Hire & leasing 4.Collaborative consumption 5.Incentivised return & re-use 6.Asset management 7.Collection of used products 8.Long life
Stahel and Reday-Mulvey, 1981	Circular Economy Toolkit ( University of Cambridge, Institute for Manufacturing, 2013)	Lacy <i>et al.</i> [15]	Bakke and Hollander [16]	Damen, 2012	Mentink, 2014	<a href="http://www.wrap.org.uk/content/innovative-business-model-map">http://www.wrap.org.uk/content/innovative-business-model-map</a>

Table 2. Structuring new business models from the customer perspective.

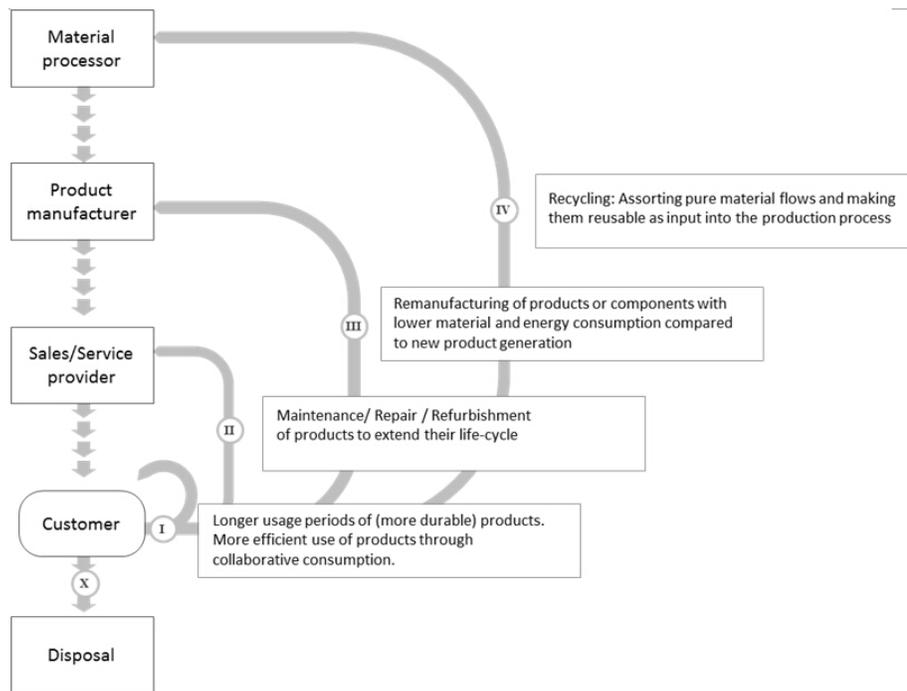
Business model category	Short explanation	Example	Source
Ownership-based business models	Customer purchases a product and owns it right away	Purchasing a washing machine	-
Access- or Usage-based business models	Customer purchases a certain usage period or access period to a certain good	Leasing a washing machine for 12 Months	Sempels, 2014
Performance-based business models	Customer purchases a defined performance, normally not bound to a defined product	Leasing a washing machine for 1000 washing cycles	Cinquini, Di Minin and Varaldo, 2013
Result-based business models	Customer purchases a defined end result	Providing a pick-up and delivery washing service	Sempels, 2014

economy requires ideas for the recovery of pure material flows as well as energy recovery in an increasing international supply chain and for ever-faster product life-cycles. This creates the need for new business models in a more complex system of actors, such as suppliers at various levels, recycling and returning facilitators, local authorities and many others. There have been several attempts to develop a generally valid conceptual model for this new system of business models. By reviewing literature on the circular economy it becomes obvious that there is no common agreement on how to design such a system. Yet, a certain widely agreed structure can be derived, which constitutes the basic roadmap towards business model innovation in a circular economy.

This circular, hierarchical system of business models was first developed by Stahel and Reday-Mulvey in 1981

and since then developed further by multiple authors. In this model the inner circle constitutes the customer and the main drivers of change are the more efficient use of resources, for instance by collaborative consumption, as well as the product lifetime expansion, for instance by developing more durable goods. In the next wider circle product life-cycle expansion is achieved by refurbishment and maintenance, as well as by redistribution and next-life sales, for instance by selling used products to more price-sensitive markets. New business models which include the physical transformation of products, for instance by remanufacturing or upgrading, build the next stationary orbit of a circular economy. Winning back pure material flows, finally, is the last and most energy consuming option to bring back resources from end-of-life products into the circular economy. This new form of recycling requires products which are built with clearly identified pure materials (as opposed to the products, which are hybrids of different, inseparably materials).

**Figure 1** shows a general outline of this model and the associated business models on each level.



**Figure 1.** Source: Own drawing based on Ellen McArthur Foundation, 2014. Originally developed by Stahel and Reday-Mulvey, 1981.

**Table 3** gives a more detailed overview of the individual categories and provides examples of current applications of the respective business model categories.

While it has to be acknowledged that every attempt to define mutually exclusive categories brings along certain tradeoffs, this categorization can be seen as a basic framework for developing new business models in a circular economy. This framework introduces a clear hierarchical order: (I) as the closest circle and thus the most efficient one in terms of energy needed to bring the resources back into use and (IV) as the widest circle and thus the least efficient one. This hierarchical order is also based on the fact that closer circle business models act as catalyzers for downstream business models along the next loops. When ownership of products is replaced with access-based business models (I), for instance, this allows for a more efficient establishment of return networks since using time is limited and return of the product is part of the contract. This in turn enables refurbishment (II) and re-manufacturing (III) business models in the next step in order to bring back the resources into use. The shift from ownership to other forms of temporary usage is consequently at the core of a transformation towards a circular economy and the basis

Table 3. Structuring new business models along the circular flows.

Cycle	Business model category	Short explanation	Example	Source
IV	Product Recycling/ Recycling 2.0	Recycling wins back base materials from used products, but loses much of the added (or embodied) value (energy, labor and use of capital).	PET bottles, (only 20-30% of PET can be reused as new bottles)	Ellen MacArthur Foundation (2013) Vol.3, Mentink B. [20]
III	Product transformation	Product transformation uses certain components of products, which carry a high value, to be put together to form new products.	H&M collected clothes which fibres are used for damping components in the auto industry	Peter Lacy, David Rosenberg, Quentin Drewell, and Jakob Rutqvist [15]
III	Upgrading	Upgrading replaces outdated modules or components with technologically superior ones	Modular phone (e.g. Google Ara Project)	Parlikad, A. K., et. Al. (2003)
III	Remanufacturing Next-Life sales	Remanufacturing is the process of restoring the product or part functionality to "as-new" quality.	Bosch remanufactured car parts	CircularEconomy Toolkit (University of Cambridge, Institute for Manufacturing, 2013)
III	Hybrid model / Gap-exploiter model	The hybrid model is a combination of a durable product and short-lived consumables. Companies profit from the gap in life-time of components.	Refilled printer ink cartridges	Bakker, & Hollander, D. [16]. Products that Last.
II	Reuse/ refurbish/ maintain/ redistribute/ Next-Life Sales	Direct Secondary Re-usage or resale extends the product life so that the company can put the same products into the market to earn a second or third income.	Apple Certified Refurbished	CircularEconomy Toolkit (University of Cambridge, Institute for Manufacturing, 2013)
II	Performance model/ Products as Services / Result-based models	Company delivers product performance or certain defined results rather than the product itself.	Hours of thrust in a Rolls- Royce, 'Power-by-the-Hour' jet engine	Bakker, & Hollander, D. [16]
I	Access model / Collaborative Consumption	Company provides product access rather than ownership	Carsharing, e.g. car2go, apartment sharing e.g. airbnb	Bakker, & Hollander, D. [16]
X	Energy recovery	Winning back energy through energy-from-waste (EfW) process	Waste incineration plants	<a href="http://www.edie.net/news/5/Circular-economy-failing-to-place-value-on-energy-recovery/">http://www.edie.net/news/5/Circular-economy-failing-to-place-value-on-energy-recovery/</a>

for establishing effective reverse networks on various levels.

## 2.4 Reasons for Non-acceptance of Circular Business Models

If the benefits of a circular economy are so obvious and the basic concepts are available for more than three decades, then why have circular economy business models not yet made the world a better place? The reasons are manifold and partly rooted in conceptual flaws of our world economic order as well as in the inherent irrationality of consumer behavior. From an economic point of view, misaligned profit-share along the supply chain is one of the main causes for imperfect product design. If the profits from a better design would only occur at the end-of-use phase, *e.g.* when a product is returned for re-manufacturing or recycling, than this leads to a situation where the optimization of product design is mostly based on cost and production efficiency. This explains why most consumer products today are not made with repair and re-manufacturing in mind, even if this might be more economical than product replacement from a lifecycle point of view. At the same time consumers tend to foster this development by only evaluating the transaction cost at the point of sale (purchase price) even if the net present value of upgrading to a more expensive but more durable product would be more economical. **Table 4** shows the summary of reasons for non-acceptance of circular economy business models.

**Table 4.** Reasons for “non-acceptance” of circular business models. Source: Based on Ellen McArthur Foundation, 2014, pp.46–48.

Reason for non-acceptance	Short explanation	Origin
Customer irrationality	Customers only evaluate the transaction cost at the point of sale (purchase price) even if the net present value of upgrading to a more expensive but more durable product would be more economical. Consumers prefer ownership of a product, even if temporary usage is more economical.	Consumer behavior
Conflict of interest within companies	Higher capital or cash required to change an existing product design or to move from a sales-based to a usage-based revenue model	Short-term oriented corporate management
Misaligned profit-share along supply chain	Imperfect design at the beginning of the supply chain if the profits from a better design would only occur at the end-of-use phase	Lack of consistent legislation regarding end-of life phase of products
Geographic dispersion	Since the value chain of today’s product is spreading over multiple countries, national initiatives often lose their potential impact	Transnational authorities and lack of national collaboration

## 2.5 The Role of Consumer Behavior in the Acceptance Process of Circular Economy Business Models

Consumer behavior will play an important, if not the most important, role in the shift towards a circular economy. Classical economic theory argues for consumers being “*homo oeconomicus*”, purely motivated by rational monetary considerations. Such customers would be easy to convince to buy a more expensive but more durable product if this would result in reduced overall lifetime costs. At the same time, such customers would be willingly sending back articles after use if this would be rewarded with a small monetary incentive. It has become well known, however, that consumers are not always rational, objective and utility-maximizing. Instead, they tend to base their decisions on other, more subjective, beliefs about the product or service in question [21]. Different areas of technological and service advancements have shown that reasonable innovations take longer than expected to reach wide-spread acceptance, despite their proven usefulness [22, 23]. This paradox is generally explained by consumer resistance to change learned purchasing behavior.

### 2.5.1 The Role of Habits and Routines

By using products repeatedly over a long period of time, consumers form habits and routines. In general, they aim to preserve these habits and strive for consistency and status quo rather than to continuously search for and embrace new behaviours [24]. This leads to a form of passive resistance, which is mainly caused by satisfaction with the status quo. Based on an empirical study, Bamberg *et al.* [25] conclude that habits are the strongest predictors of behaviour in some behavioural categories (the study investigated the choice of transport options). Other studies have reinforced these findings in different areas of consumer behaviour (see [26, 27]). Generally, strong attitudes toward existing objects usually increase the resistance to change and may prevent consumers from being open to innovations. In this case, further processing of information about an innovation may require a new openness to change or even a change in one's attitudes toward the habitual target. Consequently, pure information about the ecologic and economic rationality of switching to a circular economy business model will not be sufficient to change the long-learned habits of consumers. As Rogers put it 'changing people's customs is an even more delicate responsibility than surgery in many cases' (2003 p.436). In order to be able to change consumer behaviour, one needs to understand that the behaviour is often led by unconscious, deeply-rooted motives, which are not directly observable.

### 2.5.2 The Role of Non-functional Motives

Innovations generally have an effect on non-functional motives, which are often overseen by technology-oriented change agents. Acceptance studies in the field of online shopping behaviour consistently report that the shopping task provides more to the customer than the simple purchase and replacement of goods [28]. Various social and personal motives, such as self-gratification and sensory stimulation, are involved in the shopping process in addition to the acquiring of a good or service. This explains why consumers might not be willing to change their shopping habits, even if there is an economic reason to do so. In general, non-functional motives, like enjoyment and entertainment, have been found to be more influential than the pure utility function [28]. Based on an empirical study, Chtourou *et al.* (2010) have reported, consistent with other work, that enjoyment mediates the effect of usefulness on the attitude towards an innovation. In other words, if the usefulness of a product does not generate amusement for the consumer, then even a high utility will have only a limited impact on the decision to adopt a new product or service. As an example, a useful new business model that is very time-consuming to learn to use might fail in satisfying the user not because it is use-less but because it is irritating and annoying. Consequently, when designing new business models in the realm of the circular economy, one need to closely evaluate the obvious, rational but also the invisible, potentially unconscious motives that underlie consumer behaviour. Next to product-related motives, social motives also need to be considered.

### 2.5.3 The Role of Subjective Norms

Subjective Norms represent the perceived social pressure to perform or not to perform a given behavior. This social pressure is generally associated with two normative components: Injunctive norms, which represent the perceptions concerning what should be done, and descriptive norms, which represent the perceptions that others are or are not performing the behavior in question [21]. When an individual forms an injunctive norm, the normative prescriptions of various individuals and groups are taken into account. However, only salient or readily accessible referents will influence the person's injunctive norm at any given moment ([29], p.396). In general, humans base their decisions as to whether or not to adopt a new behavior on the perceived number of relevant others who are

or are not already performing the specific behavior ([21], p.130). Especially in the field of consumer innovation, the perceived customer base was found to have a relevant impact on the acceptance decision ([30], p.304). While for highly visible innovations, perceived market share may be almost equal to, or sometimes even exceeding, the real market share, for nonvisible innovations, in contrast, the perceived installed base of customers might be much smaller than it actually is. Consequently, it will be a challenge to circular economy change agents to ensure that early adopters of new business models are visible as such and thus influence their peer network in order to adopt as well. It is a common misconception that social pressure is best generated using virtual social networks. While there might be an effect of someone communicating through social media that he or she has used a certain new business model, recent research demonstrated that this effect is extremely weak compared to real peer-to-peer networks. As Alex Pentland has put it: ‘Digital media don’t convey social signals as well as face-to-face interactions, making it harder for people to read each other, and so digital media are less useful in generating the trust needed for behavior change’ (Pentland, 2014 pp.172–173). In general, subjective norms will play a key role in transforming consumer behavior towards a more circular economy and can be a catalyst for change if employed in the right way. While social pressure is generally imposed on subjects by the peer group of an individual, there are also societal norms, which are imposed by the society as a whole. The most important form of such an influence in the context of the circular economy is the perceived moral obligation to perform a certain behavior.

#### 2.5.4 The Role of Perceived Moral Norms

Generally, moral norms are defined as personal norms regarding what is right and what is wrong [31]. As opposed to laws and regulations, moral obligations are completely subjective and solely based on the subjective impression of what ought to be done or not done. Empirical research has proved that moral concerns are a potential motive for innovation acceptance [31]. According to Sparks and Shepherd (2002), this is congruent with positions in other disciplines that would argue for the importance of morals in social and personal actions. Additionally, the rising tide of ethical consumerism means that moral issues are likely to be increasingly present in many instances of consumer behaviour [32]. Perceived moral obligations are thus expected to be an important determinant of innovation acceptance in the circular economy context. Generally, social norms are imposed by the society over time and thus cannot be altered on a short term. Once there is a societal consent on a certain acceptable or non-acceptable behaviour, however, it can be expected that the impact of perceived social pressure on individual behaviour is very strong. It is important to notice, however, that moral norms cannot be prescribed from authorities, but must come from the society itself. A regulation to enforce the recycling of old batteries, for instance, will not create a moral obligation to do so. Consequently, influencing moral norms to shift a whole society towards the use of more sustainable business models will be a long-term task and can only be achieved by fostering the cooperation and the idea-flow within the society.

### 3. CONCLUSION

Without doubt, the described circular business models provide huge opportunities for companies, customers and the environment. These benefits alone, however, will not translate into widespread acceptance of the idea of circular economy business models. When selling a certain performance, rather than the goods itself, the primary competitor remains the traditional approach of buying tangible goods. Giving up one’s car and make use of mobility solutions that are composed of different modes of transportation, for instance, cannot be taken for granted for a vast majority of car owners, even if it is more economical ([2], p.147). Consequently, the key lever for change will be to optimize the value proposition of circular economy business models by not only regarding rational but also *non-rational motives* of consumer behavior. This includes regarding the habits and routines of individuals. As Alex Pentland has

put it: ‘Designing an optimal system is useless unless it fits our human natures, because otherwise people won’t cooperate, either ignoring or misusing the system’ (2014, p.208). The success of certain business models, such as bottle recycling or carsharing, give a glimpse at the opportunities for new business models in different industries. This might only be the starting point for changing the entire economy. More research in the realm of the circular economy will be a necessary contributor for meeting the expectations described earlier. In particular, empirical research focusing on consumer behavior in the acceptance process will be highly beneficial for those designing new circular economy business models. For developing a convincing value proposition a profound knowledge of the latent motives and norms underlying consumer reasoning is a prerequisite.

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