
Article

Transition from linear to circular business models with service design methodology to drive innovation and growth

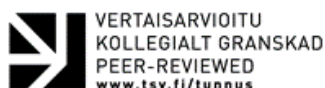
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Abstract: Estimates of the economic value of transitioning to circular economy models vary but it has been estimated to unleash \$1 trillion worth of new business into the global economy. In Europe alone, estimates claim that adopting circular-economy principles could not only have environmental and social benefits but also generate a net economic benefit of €1.8 trillion by 2030. Proponents of a circular economy argue that it offers a major opportunity to increase resource productivity, decrease resource dependence and waste, and increase employment and growth. A circular system could improve competitiveness and unleash innovation. Yet, most companies are not capturing these opportunities and thus the even abundant circular opportunities remain uncaptured even though they would seem inherently profitable.

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Our hypothesis is that in addition to linear models still being easier to adopt and often with lower threshold costs, companies lack an understanding of how circular models can be adopted into their business and how customers will be willing and ready to adopt the new circular business models. In our research, we use robust service design methodology combined with business model innovation techniques to develop circular economy solutions with three case study companies. The aim of the process is to not only develop the service-product bundles and portfolio, but to demonstrate the willingness to adopt circular solutions exists in the customer base. In addition to service design, we employ business model innovation methods to develop, test and validate the new circular business models further.

The results clearly indicate that amongst the customer groups there are specific customer personas that are willing to adopt and in fact are expecting the companies to take a leading role in the transition towards a circular economy. At the same time, there is a group of indifferents, to whom the idea of circularity provides no added value. In addition, the case studies clearly show what changes adoption of circular economy principles brings to the existing business model and how they can be integrated.

Keywords: Circular economy, business model innovation, service design, value creation, circular economy business models, innovation, growth

1 Introduction

By now it is probably safe to say that the circular economy as a concept has moved from a weak signal to a megatrend. Academic literature on the topic has increased dramatically (Geissdorfer et al., 2017) and along with the literature, businesses have realized they need to adapt their way of generating social, environmental and economic value when faced with the urgent resource scarcity and climate challenges (Epstein, 2018). However, the majority of the rhetoric thus far has focused on creating circular economies on a systems level or societal level (European Commission, 2015; MacArthur et al. 2015; EEA 2016 and others) whereas less work has been done on highlighting the business benefits of circular economy models from the perspective of the individual company.

There is a significant body of academic and practitioner work done on estimating and quantifying the environmental benefits or environmental value propositions of individual circular economy business models (Manninen et al., 2018; Mont & Dalhammer, 2005; Mont, 2002; Tukker, 2015). However, as for-profit businesses are primarily driven by the economic imperative, there is a clear gap in the literature for demonstrating the business or customer experience benefits of circular economy business models. This study, in response, explores 'business experimentation for sustainability' as an approach to accelerate sustainability transitions in business. This specific study aims to bring forth one such experimentation to shed light on the possibilities for evaluating customer experience and business impacts.

2 Theoretical background

2.1 The Circular Economy

Estimates of the economic impact of the transition to the circular economy vary, but according to some estimates, they mean about \$ 1 trillion worth of new business globally. In Europe, the environmental benefits and social benefits brought by the circular economy have been estimated to reach EUR 1.8 trillion by 2030 (MacArthur et al., 2015). In Finland, The Finnish Innovation Fund Sitra has recognized that increasing resource recovery and recycling offers the Finnish economy an annual growth potential of EUR 1.5-2.5 billion by 2030 (SITRA, 2014.). The figures are daunting and present some of the biggest untapped business potential in the current era.

The circular economy advocates often promote that the circular economy is the best and easiest way to make more efficient use of resources, and to reduce resource dependence and waste generation. At the same time, the circular economy will create a path for improved employment and healthy economic growth. At best, its models also improve competitiveness and promote innovation. Despite all the benefits of the circular economy, most companies have not yet seized its potential. For this reason, even the widespread and profitable benefits of the circular economy will only remain academic training and political rhetoric.

Why, despite the clear benefits of moving from a linear economic model to a circular economy, is it often so painfully slow? How can it be facilitated / facilitated?

One of the reasons for the low utilization of the circular economy model may be that traditional linear business models are often still more advantageous for companies because the full cost of using resources is not yet included in the final cost. In addition, they are no longer associated with switching thresholds,

either in terms of skills, investments or emotions. For example, there may be a lack of information about circular economy solutions or prejudices about the quality or durability of recycled materials. While many companies prefer traditional business models because of lower costs, it would seem that most companies do not know how to integrate circular economy models into existing business models. This may be due to the fact that business model innovation is not yet commonplace. In addition, companies are largely unsure of the potential reactions of customers or consumers to moving towards resource-efficient circular economy models.

2.2 Business model innovation

A business model represents an organization's way to create, deliver and capture value (Osterwalder & Pigneur, 2010). A business model is essentially a concise representation of how the business is organized in terms of meeting customer and market needs, organizing the internal functions and how specific activities are carried out to create value for the customer and for the company. The aim is to give a holistic perspective on how business is conducted and to highlight the importance of value creation for all actors in the businesses' value framework.

Amit and Zott (2010) highlight business model innovation as a way for managers to create new value and to re-invent the business or parts of it, especially in times of economic, societal and customer attitude change. The core idea is to move beyond product or service improvements, or innovations, towards re-inventing the whole business model; i.e. the entire way the business is driven. Innovating the way the business is done can yield far better and more solid competitive advantage compared to individual product or service innovation alone. Toivola (2018) is not alone in claiming that "the business model has become an important competitive advantage for any company. Gaining sustainable advantage and creating added value for customers happens through business model innovations, not with new products and service offerings."

Nidumolu et al. (2009) have studied the necessary transformation for a company to become environmentally, economically and socially a sustainable business. They claim that it is precisely the development of a new business model; or a new *modus operandi*, that is a key element in the transformation. The authors emphasize the necessity to find novel ways of delivering and capturing value incorporating the sustainability element, which will eventually change the basis of competition.

According to Amit and Zott (2010) the key questions in innovating the business model relate to firstly determining the objectives and perceived needs to be satisfied and potential new activities that are necessary. This needs to be combined with a value creation framework for each participant and partner in the business model. The business also needs to decide how activities are linked in new ways (for example channels and segments; segments and revenue models; partners and key activities). Importantly a clear and potentially new division of the performing of individual tasks and activities amongst the business model constituents needs to be set.

The business model has been of significant interest both in academic literature and in the practitioner field for more than two decades. Initially it was equated closely to the revenue model or earning logic of companies. Recently, the business model has taken on a broader meaning, including all the elements that

are inherent in the business and the creation of value as well as all the interactions between the value chain actors and partners (Magretta, 2002; Zott & Amit, 2007). Toivola (2018) has listed various definitions of business models in Table 1 below.

Authors	Definition
Amit and Zott (2001, 2007)	A business model depicts the content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities. A business model elucidates how an organization is linked to external stakeholders and how it engages in economic exchanges with them to create value for all exchange partners.
Chesbrough and Rosenbloom (2002)	Business model is a construct that mediates the value creation process.
Osterwalder et al. (2010)	A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a firm.
Chesbrough (2007)	The business model performs two important functions: value creation and value capture.
Mason and Spring (2011)	Three key elements of a business model are technology, market offering (incl. revenue model), and network architecture.
Shafer, Smith, and Linder (2005)	Business model components are: strategic choices, value network, creating value, and capturing value.
Teece (2010)	A business model defines the way the company generates value (value creation) and how it captures some of this value as profit (value capture).

Table 1. Definitions of business models (Toivola 2018).

The centrality of the concept of customer value creation is one key common element and similarity in the different definitions of a business model (Nenonen & Storbacka, 2010; Zott et al., 2011). Another notion, or finding, is that a successful business model can create a unique position in the market that is difficult to imitate and as such provides a sustainable competitive advantage. Often products, services or even value propositions can be copied but a winning and customer-centric business model is possibly non-duplicable (Matzler et al., 2013).

Companies are currently inventing new ways of integrating consumers into their value creation processes for example through different sharing economy initiatives. These attempts are mainly directed to enhance the success and adoption of new products and services (Harmaala, 2016). At the same time, consumers are creating new and novel ways of satisfying their needs, which often include collaboration with fellow consumers (Blättel-Mink, 2014).

2.3 Business models for the circular economy

Many businesses have realized that the time for the profit maximizing imperative has passed. The single-minded focus on shareholder value often over stakeholder value has proven less and less of an option. Most companies have been forced to or are rethinking their products, product-service bundles

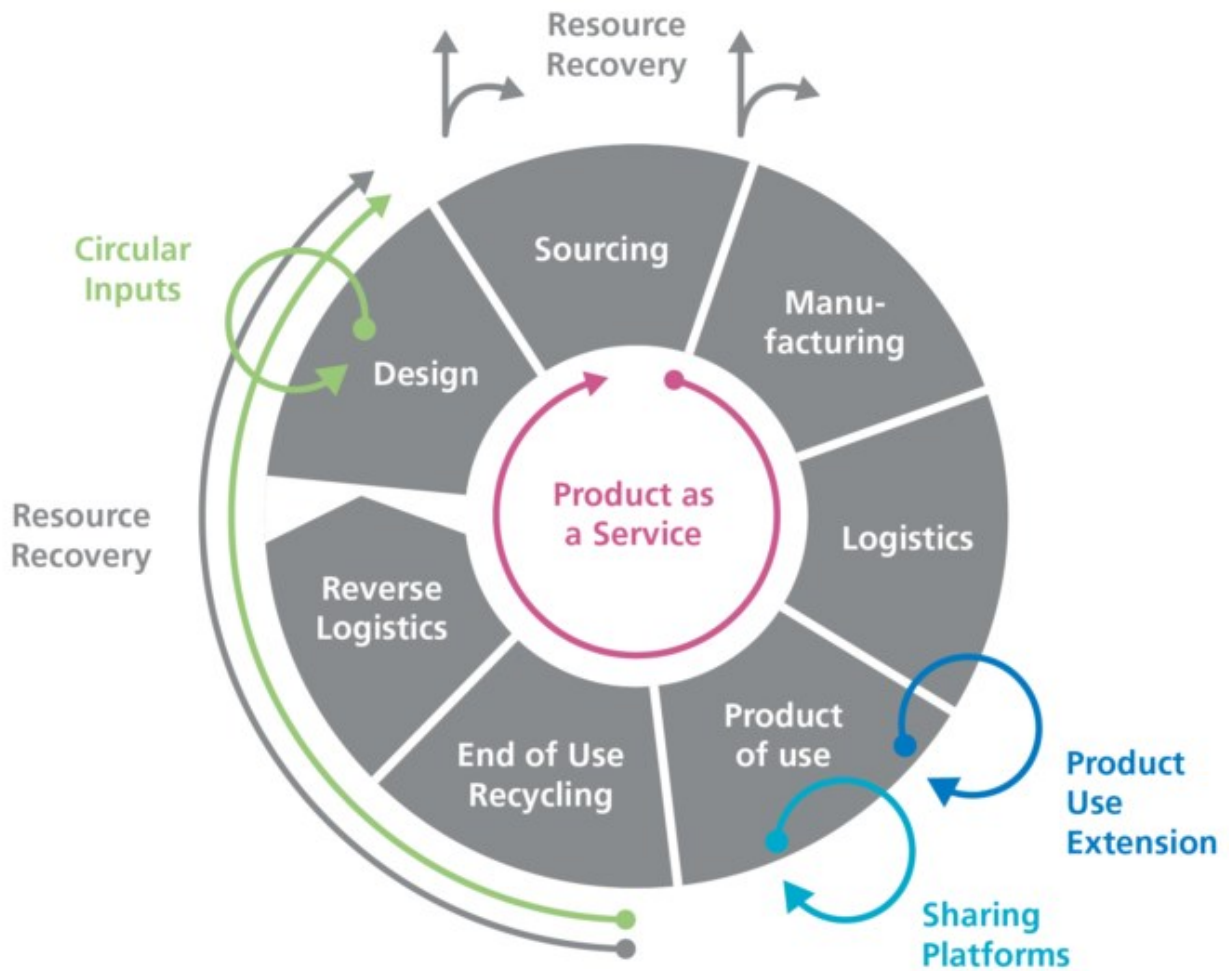
and the entire value networks in their strive for competitiveness and customer acceptance.

Evident resource constraints have also forced some companies to find new ways of value creation; for example the difficulties related to the mining of metals and minerals necessary for battery production has opened up a profitable business for car battery recycling. Companies and consumers alike are urged and guided towards more sustainable and circular approaches in the face of technology development, diminishing resources, stricter environmental and social regulations as well as megatrends such as urbanization and climate change (Lacy & Rutqvist, 2015). By definition, business models for sustainability consider a wider group of stakeholders and provide measurable ecological or social value alongside with economic value (Schaltegger et al., 2016; Boons et al., 2013; Stubbs & Cocklin, 2008).

It is argued, that companies could potentially achieve competitive advantage by using circular economy strategies, especially in terms of efficient material circulation and through transition to service based models (Seppälä et al., 2015). The circular business model differs from the linear business model in attempting to close the loop by creating value for a broader range of stakeholders and taking into consideration also the benefits from societal and environmental perspectives (Antikainen & Valkokari, 2016). The ambition of a circular business model is to reduce resource consumption and resource dependency, to keep resources in circulation for as long as possible and to create as little waste throughput as possible. The circular economy business models demand companies to be involved in the product life cycle for a longer period of time than in the linear model; especially since companies need to plan and design not only the product use phase but also disposal and recovery. (Antikainen & Valkokari, 2016.)

Companies need to be ready to innovate or reinvent their business models to make them incorporate the notion of the circular economy. These changes may include new value propositions, potentially new segments, new channels, novel products and services and different revenue models for example (Mentink, 2014, p. 4).

Alternative models to characterizing circular economy business models have been introduced for example by Ellen Mac Arthur Foundation (MacArthur et al., 2015), EEA (2016), Antikainen and Valkokari (2016) and Lewandowski (2016). Finnish SITRA (SITRA, 2018) has identified five different main categories of circular economy business models to reduce inefficiencies in the value chain. These are grouped into (1) circular supply chains, (2) sharing platforms, (3) product as a service, (4) product life extension and (5) recovery and recycling. These are replicated in figure 1.



TYPICAL VALUE CHAIN



CIRCULAR INPUTS
Use of renewable energy, bio-based or potentially completely recyclable materials



PRODUCT USE EXTENSION
Prolongation of product use through repair, reprocessing, upgrading and resale



SHARING PLATFORMS
Increased usage rates through collaborative models for usage, access, or ownership



RESOURCE RECOVERY
Recovery of usable resources of energy from waste or by-products



PRODUCT AS A SERVICE
Offer of product use with retention of the product at the producer to increase resource productivity

Figure 1: Circular economy business models (SITRA, 2018)

A business model aligned with the principles of the circular economy can be attained either through innovations in the supply chain, product life extension, recovery and recycling or through sharing platforms or offering of the product as a service; or a combination of these approaches.

A product service system (PSS) is an integrated combination of products and services for optimal consumption. PSSs aim to achieve maximum efficiency by selling as many services as possible and support sustainable consumption as utility is maximized through services replacing products. (Centenera & Maruf, 2014). PSS is defined as a “System of products, services, supporting networks and infrastructure that is designed to be competitive, satisfy customer needs and have a lower environmental impact than traditional business models” (Mont cited in Baines et al., 2007).

In PSS, value is created while in use as suggested in the service -dominant theory. Thus value is co-created with the customer as they use the product in their personal way. (Lusch, 2011.) PSS is also often referred to as a concept of dematerialization, as it breaks the linkage between the physical materials needed to create and the user value (Baines et al., 2007). PSS moreover encourages information to be shared between the customer and the service - provider in each stage of the service. Thus making the service more responsive to wants and needs because of early involvement of users (Baines et al., 2007).

The theory of PSS also suggests that the value creation of a product does not require ownership of a product. The overall advantage to the customer is that they get to enjoy the product in the form that they need it and can forget all administrative obligations to a network of companies (Baines et al., 2007).

3 Methodology

The aim of this study is to present a business experimentation for sustainability (BES) to demonstrate some ways in which such an experimentation can be done. As mentioned by earlier authors, the number of cases and best practices for BES to date are limited (e.g. Weissbrod & Bocken, 2017; Antikainen et al., 2018; Bocken et al., 2018). Business experimentation can be used to test new value propositions and it can support a corporate innovation process, either in the innovation of products, services or in the entire business model (Weissbrod & Bocken, 2017). Coupled with continuous and collective learning with stakeholders, BES has been positioned as a potential way for large business to accelerate business model innovation for sustainability (Antikainen et al., 2018; Bocken et al., 2018).

This study has a qualitative approach and the case study method was used to gather the data. Case study is relevant when the study requires an extensive and in-depth description of the phenomenon (Yin, 2014). The exploratory case study was chosen as a method, because it attempts to understand what happens within a case by looking beyond descriptive features and studying the surrounding context. Since the case study method is useful for the study of new phenomena, it lends itself well to the BES study here.

Within our cases, we employ service design. The purpose of service design methodologies is to establish best practices for designing services according to

both the needs of customers and the competencies and capabilities of service providers. Service design is a user or customer centric methods for product, service or business model innovation. If a successful method of service design is employed, the service will be user-friendly and relevant to the customers, while being sustainable and competitive for the service provider. Earlier studies into circular economy business models have not used service design methodologies.

Service design combines methods and tools from various research fields, such as design, management, marketing and process optimization to create suitable concepts based on the expressed experiences, values and habits of the user or customer. Service design is built on five central principles that are (1) user-centricity (2) co-creation, (3) sequentiality, (4) evidencing and (5) holisticity (Stickdorn and Schneider, 2012).

This study applied the service design method and qualitative research method in analyzing the selected case companies by simulating the requirements of various consumers, conducting participant observation and interviews with the relevant target groups and recording their true feelings on the case companies, their offering and their bundling of products and services.

The study followed the double-diamond model of service design. In the initial discovery phase, we used interviews, observations and shadowing in addition to and in parallel with customer journey mapping, empathy mapping and the service safari. These were then refined into user personas and design briefs in the discover –phase. For the develop phase we used prototyping and business model canvas innovation. For the delivery phase we refined the tested prototypes and handed them over to the case companies as final concepts ready to be implemented.

The Business Model Canvas template was used in this study in association and to aid with business model innovation. The BMC includes nine building blocks (Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, Cost Structure). The template is an easy tool to explain and use in order to have a common ground for describing, visualizing, developing, assessing, and sharing business models (Osterwalder & Pigneur, 2010).

3.1 Case descriptions and selection

This study uses three different case studies from companies that were all eager to explore and further develop the circular economy elements in their respective business models. Our case selection is based on convenience sampling. Convenience sampling is based on non-probability and literally means that the sample being drawn from that part of the population that is close to hand, i.e. convenient for the researcher. Convenience sampling is most useful for pilot testing and exploratory research such as that done here in the BES study (Saunders et al., 2012). The results may include bias, results can only be concluded within the sample and as such warrant further studies (Bornstein et al., 2017).

Restaurant LOOP operates along circular economy principles in producing lunch, brunch and catering services through sourcing waste and leftover food (mainly vegetables and fruit) from supermarkets. Its main challenge was to expand operations and thus expand the usage and acceptance of left-over food. Helsieni offers consumers a home-kit for growing mushrooms utilizing left-over coffee filter waste and in addition it provides restaurants with mushrooms

grown with the help of waste products. Both companies operate in the circular supply chains as well as resource recovery categories of the circular economy business models in figure 1. Alko is the Finnish retail monopoly of alcoholic beverages. Their challenge was to introduce a possibly deposit based reusable and returnable carrier bag as an option in their stores. This idea has elements of circular supply chains, recovery and recycling as well as product as a service business models. Table 2 summarises the cases.

Case	Description	Challenge	Circular business model category
Case 1. Restaurant LOOP	Lunch, brunch and catering services sourcing with supermarket's leftover food	Increase awareness; increase sales; increase utilization of "waste"	circular supply chains; recovery and recycling
Case 2. Helsieni	Cultivating mushrooms on used coffee grounds, agro-industrial byproducts, or other un-utilized nutrient streams	Increase awareness of home growkits; increase awareness of mushroom home cultivation	circular supply chains; recovery and recycling
Case 3. Alko	Retail sale of beverages containing more than 5.5 percent alcohol by volume	Launch reusable and returnable shopping bag concept	circular supply chains; recovery and recycling; product as a service

Table 2: Summary of studied cases

All case companies participated in drafting the initial design brief; in identifying relevant stakeholders in a common workshop; in verifying user personas and initial prototypes and in the final stage of delivering the developed concepts.

4 Results of the case studies

4.1 Awareness & personas

One key finding from the exploration was that the circular economy is not yet widely known by consumers or when known is equated with recycling or taking care of trash. The notion of companies utilizing circular economy as a central element in their strategy was unheard of. However, the general values of the studied consumers are well in-line with sustainability and despite the lack of awareness, do lay a foundation for circular economy business models.

Despite each case having a different focus we realized that the customer personas follow similar lines; especially since we are concentrating on the value of the circular economy elements in the business. The four key types of personas found were the Practical Pete, Suspicious Sam, Potential Petra and Conscious Clare. Each persona had specific habits, values and attitudes

pertaining to the case companies but the key shared elements are summarized in table 3.

Persona	Characterization	Willingness to participate	Willingness to pay
Practical Pete	Appreciated value for money and is very practical in his approach; is a little concerned about sustainability and the environment	Can participate if it means no additional burden or inconvenience; sustainability is not a decision criteria	Willing to pay if the solution otherwise makes sense; not extra for the sustainability aspect
Suspicious Sam	Appreciates familiarity; is suspicious of individual efforts in promoting sustainability (“small things don’t make a difference”); very suspicious of using waste or recycled raw materials; doesn’t believe individual actions will contribute to sustainability	Not willing; utilizing waste sounds suspicious	Not willing to pay extra for sustainable products, rather looking for a discount since the products might be recycled etc.
Potential Petra	Cares about sustainability but does not know much about it; not so concerned about the origin of products; likes the idea of being able to make a positive impact	Willing to take part if the effort is not too big and there is no compromise for quality or convenience	Is willing to pay for quality and a good experience; and will pay extra of that comes through sustainability, otherwise not
Conscious Clare	Is environmentally aware; is concerned about the origin of raw materials; often vegetarian; appreciates health and quality; often in her 20’s-30’s	Want to do her share to promote sustainability	Is willing to pay a little more for environmentally conscious options if there is a demonstrated impact

Table 3. Summary of personas identified through study.

4.2 Willingness to participate

The majority of consumers are willing to participate in sustainability as long as it is not a compromise for quality, price or convenience. A small share of consumers are willing to participate even with a decrease in convenience. In the case of Loop, this means willingness to eat at the restaurant if the food quality and taste are as good as a traditional restaurant or in the case of Alko, choosing the bag if it does not incur additional costs. In some cases, consumers would pay extra for the reusable bag if it provided additional benefits in terms of style

and acceptability (“if it would not look like an Alko bag and I can go and pick up my child from daycare with it”).

The results clearly indicate that amongst the customer groups there are specific customer personas that are willing to adopt and in fact are expecting the companies to take a leading role in the transition towards a circular economy. At the same time, there is a group of indifferents, to whom the idea of circularity provides no added value.

4.3 Business model implications

Most circular economy models do not work if not all stakeholders are involved. For example, even the best and most sophisticated electronics recycling systems do not work if consumers fail to bring back their old phones. As a result, a crucial element of circular economy aligned business models is the inclusion of the consumer or customer in the value creation process.

The study clearly shows that with circular economy business models, much more attention needs to be paid to company external factors and stakeholders in the value creation process. The business model innovation process must include the customers as a central element in bringing about business success. Only this ensures that the business model is aligned with the values and expectations of the customer.

The majority of changes to the business model relate to the value proposition and the value capture process of the company as well as the customer relationship the company has. A circular economy business model inevitably means a closer relationship between the company and the customer; and in the case of product service systems, a profoundly two-way and continuous relationship between the two. Important ripple effects concern the key competencies and activities the company needs, such as strategic sustainable sourcing and in the revenue models that might need to be altered to accommodate circularity.

Our study shows that service design can be a powerful tool in promoting the co-creation of service delivery. Consumers or customers are willing to participate in the development of the circularity aspect of the business model even when they are not willing to go to great lengths in changing their own habits or sacrificing their convenience. This co-creation will make the resulting business model more viable and acceptable by the stakeholders once launched in full.

The key implications for necessary changes in the business model vary according to which persona the company wishes most to address as well as which circular economy business model is being considered. The most relevant impacts for the business model building blocks vis-a-vis the different circular economy models under study here are summarized in table 4.

BMC aspect	Circular supply chains	Product as a service	Recovery & recycling
Value proposition	Does the VP change? Environmental benefit; less harmful/toxic	Access over ownership; ease of use; flexibility; price advantage;	Ease of disposal; cheaper disposal; “guilt-free”; easy access to waste management

	materials; impact change; promote the circular economy	communality; the trendy option	
Customer segments	No necessary changes; but CAN appeal to the environmentally conscious segment	Young, urban millennials, sharing economy advocates; customers wanting to own less	No necessary changes; but CAN appeal to the environmentally conscious segment
Channels	No evident changes required	Channels need to facilitate more frequent and diverse exchange of goods, communication and payment, potentially also peer-to-peer exchange	Reverse channel needs to be considered and built; physical space requirement changes
Customer relationship	No evident changes required; potentially to educate the user of the benefits of using recycled materials	Ongoing; customer & service platform needed; customer-to-customer interaction must be facilitated	Need to take into consideration how to motivate and encourage the use to return product at end-of-life and to educate about the benefits of recovery
Revenue streams	No evident changes.	Subscription fees instead of sales; usage fees	Do we need to accommodate a deposit; is there a reward for product returns (discount, vouchers); does the company receive income from material sales
Key resources	Sourcing needs new knowledge and skills	Communication is emphasized	New resources are needed to organize and manage recovery & recycling or coordination thereof.
Key activities	Sourcing function is transformed; communication needs to be enhanced	Need to build and nurture trust in the platform; need to get basic platform economics to work (supply and	Is there a need for a collection point; is there a need for an information system (for example as with

		demand); need to create awareness and educate	deposits) to handle recovery
Partnerships	Need to reorganize supply chains and find new suppliers and partners	Potentially new partnerships needed to realize platform thinking	Recovery operators and recyclers
Cost structure	Are circular supplies cheaper or more expensive; do circular raw materials differ in terms of quality, durability, or other characteristics	New costs from maintenance of "leased" products; need for more durable raw-materials; etc.	Costs from recovery; cost from potential deposit

Table 4. Key considerations in the different business model building blocks with the studied circular economy business models.

4.4 Use of service design in circular business model innovation

The study shows that specifically in the case of innovating business models for circular economy, service design can be a very powerful tool. It can provide such insights that are difficult to obtain otherwise and can be used in building winning value propositions that incorporate circular economy in them.

5 Discussion

A circular economy approach ensures that attention is paid to the origin of raw materials and that any materials used are not wasted but rather kept in productive use for as long as possible. Circularity focuses on reshaping businesses and the consumption systems so that waste would no longer be an element of those systems.

Circular economy business models can offer new business opportunities and generate new revenue through success with the new opportunities. New business opportunity recognition can also lead to business growth. Incorporating circularity in the business model has the potential to transform a business’s relationship with its customers, especially considering the new more environmentally and social conscious consumer segments. On a broader level, circular economy business models can be our best protection on a societal level against environmental crises, resource scarcity and resource price hikes.

5.1 Consumer rewarding behavior

Not all customers are equally keen on adapting circular economy principles or in supporting companies with circular economy business models. Figure 2 shows the potential economic return from the effort put into transformation into a circular business model.

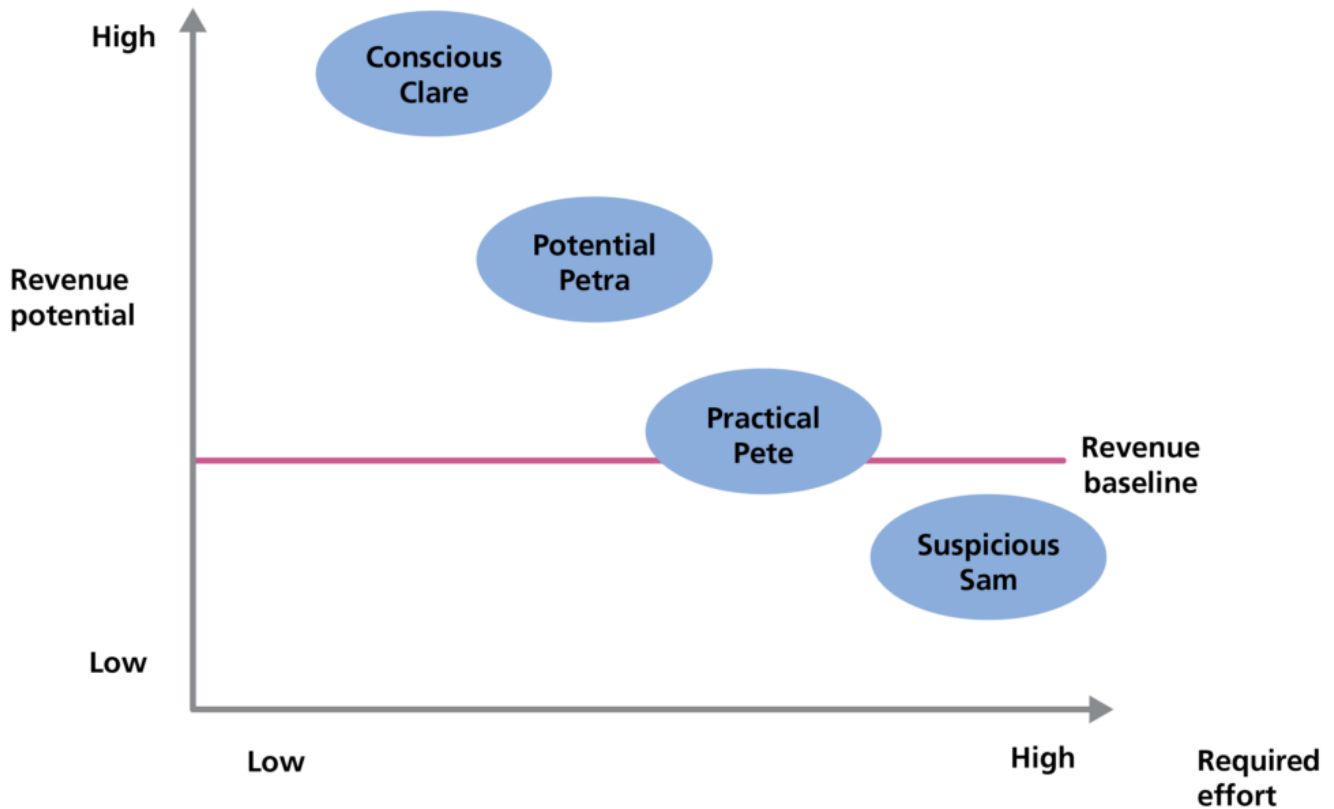


Figure 2. Revenue potential of different customer personas from transition to circular economy business models and the required effort from the company's side to keep them as customers.

The Conscious Clare is the customer segment with the most willingness to support, pay and engage in circular business models. When the transformation is done correctly and the resulting business model truly advances the circular economy, this customer type will be an important advocate for the company. The Conscious Clare is willing to change her consumption habits and bring essentially more revenue for the circular company. The Potential Petra needs a little more nudging along in adopting circular models. She has a somewhat higher revenue potential as her values are not as deep-set green as Clares and thus is not for example opposed to shopping as strongly. The Potential Petra needs more effort through communication and through making the circular choice easy, but her revenue potential is substantial.

In the circular transformation, the company needs to be careful not to lose the Practical Pete's and the Suspicious Sams. The Practical Pete is willing to adapt the circular model as long as the benefits and convenience are at an equal level and the transformation does not require changes on his behavior. He will continue as a customer as long as things stay as close to normal as possible. This requires extra effort on the company's side to make the transformation to the circular business model as invisible as possible. However, the Practical Pete will even increase his purchases if the service-product bundle improves in terms of convenience and quality for example. For the Practical Petes, most likely product-as-a-service models are not the first steps, until they reach mainstream. The Suspicious Sams are the customer group that the company may lose revenue with in the transformation. Each company needs to then carefully

consider how large this segment is compared to the Clares, Petras and Petes. In order to increase revenue from the Suspicious Sams with the circular economy business model, the company needs to place substantial effort on convincing about the performance, quality and convenience of the circular solution; otherwise the Suspicious Sam will turn to other, probably more traditional service providers with the similar price level. Another option is to make the transformation completely invisible so that the Suspicious Sam does not even realise there is circularity and thus his notions of quality and convenience are not compromised.

5.2 Competitive advantage

Michael Porter (1985) defined the two types of competitive advantage an organization can achieve relative to its rivals: lower cost or differentiation. A competitive advantage exists when the firm is able to deliver the same benefits as competitors but at a lower cost (cost advantage), or deliver benefits that exceed those of competing products (differentiation advantage). The advantages are a result of organizational skills and attributes that outperform those of the competition especially in the eyes of the customer. According to Porter, the building and sustaining of a competitive advantage should be the focus of strategic management.

"A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential player" (Barney, 1991). Such a company will be outperforming other players in the market and thus will witness superior performance along any relevant metric. Business has started to talk about so-called unfair competitive advantage referring to a competitive advantage so strong and difficult to copy by other players that it seems almost unfair. Jon Baer (Baer, undated) argues that it is not patents and other such "old" protection mechanisms but rather attributes such as profound customer insight, an innovative and agile business model, extraordinary speed that create current competitive advantage. Our argument through demonstration in this study is, that a genuine engagement with customers through involvement in the circular economy can and will yield established companies such difficult to copy unfair competitive advantage.

6 Conclusions

The main goal of this research was to provide new information on the circular economy to existing businesses to enable them to create new business models or modify existing ones in response to new consumer demand and consumer behavior as well as to reap the environmental and economic benefits of operating in a circular model. With the results of the research, companies can create sustainable competitive advantage that helps them beat their competitors and enable growth and long term viability and success of the business.

We clearly demonstrate that combining service design methodology to circular economy business model innovation brings clear benefits and will yield a more practical and customer oriented model as an end result. Although we have worked on a case basis with a convenience sample, we believe that the results can be considered and to some extent duplicated in other cases. Nonetheless, they bring valuable insight into the use of service design methodology in circular economy business modeling.

This study enables a deeper understanding on the organizational manifestations and sustainability management dimensions business model innovations for the circular economy. In addition, we provided insights into the role of the consumer and transformation of consumer behaviors through new business approaches.

With the framework provided in this exploration, companies can plan and design their own circular economy transformations taking into account the different personas and the necessary changes to the business model. We also warmly welcome new studies in this area to provide additional insights into our themes.

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