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NEW BUSINESS MODEL DESIGN AND MARKETING APPROACHES FOR A CIRCULAR ECONOMY

Key points

- Origins of circular economy - from linear to circular
- Principles and implementation of circular economy
- Circular economy at micro level
- Circular economy at meso level
- Circular economy at macro level
- Decoupling economic growth from environmental impacts
- New business model design and marketing approaches for a circular economy
- Marketing – green marketing – social marketing?
- Design for sustainable behaviour
- Consumer factors for a circular economy
- Communication strategies can address consumer concerns in a circular economy

ORIGINS OF CIRCULAR ECONOMY

Some authors considers CE as an “alternative growth discourse” and not an “alternative to growth discourse”

In particular, makes reference to the degrowth concept as proposed as:

- “a socially sustainable and equitable reduction (and stabilization) in a society's throughput where throughput denotes the materials and energy a society extracts, processes, transports and distributes, to consume and return back to the environment as waste”,

- “the one that undergoes neither growth nor recession, resulting in a constant rate of throughput”.

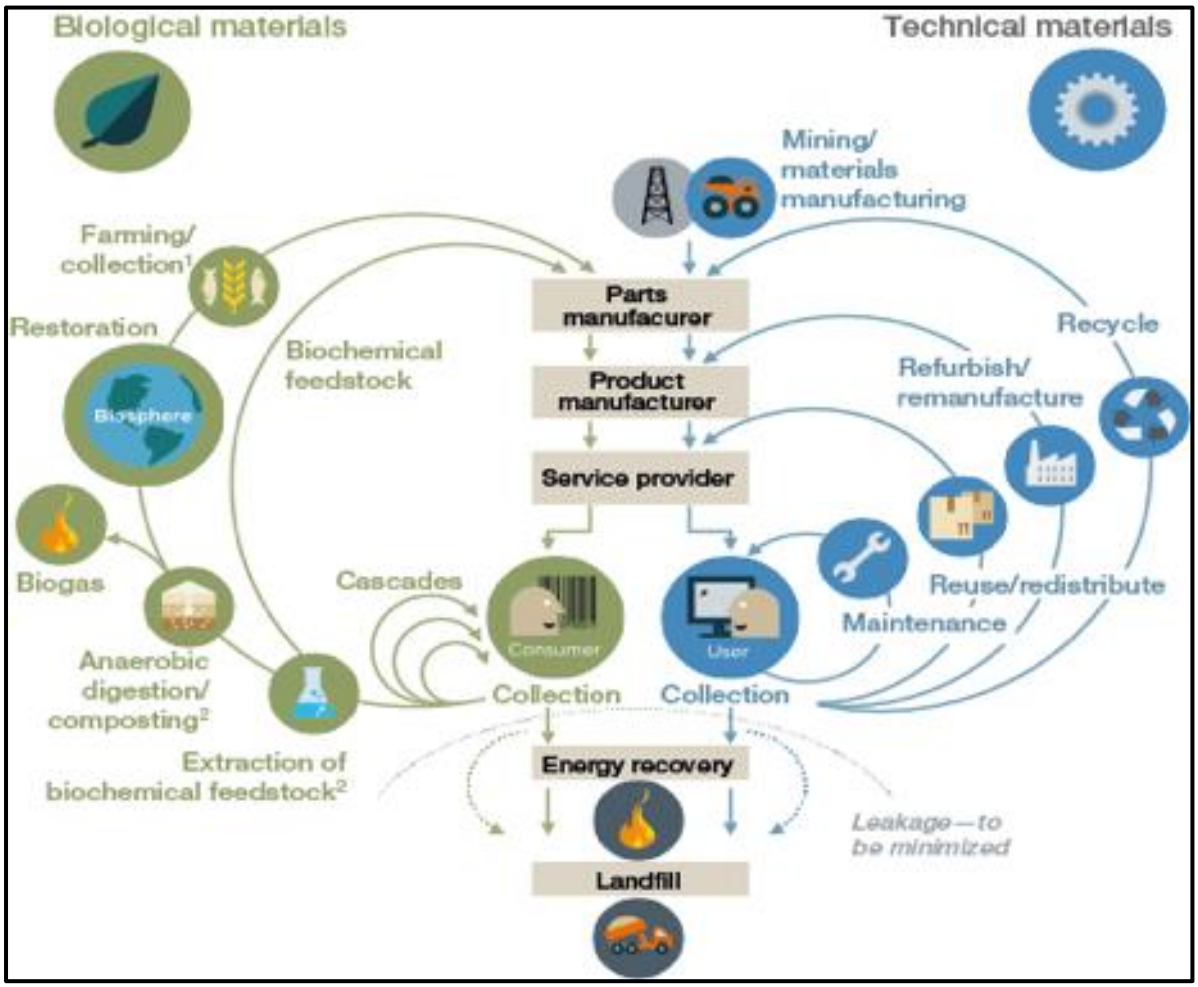
- “steady-state economy represents the balance between two systems: material wealth system and human system, which cannot keep self-constant. Only when these two systems are kept at a low flow rate, a sustainable steady state may be achieved. As for the population system, a low flow rate means a low rate of birth and death, i.e. high life expectancy; as for wealth system, it means better commodity durability and less time spent on production as well as more leisure time”.

The circular economy*, beyond the present model of production and consumption, helps optimize natural resource use through efficiency increase towards a transition from open to closed cycles of materials and energy and to less wasteful industrial processes.*

CE prevents the loss of valuable materials and supports the concepts put forward of waste as a potential resource rejects the concept itself of waste. For this to happen, *their use at the end of life cycle should be planned in the design phase evidence that this latter stage acquires and plays a central role in CE reinforcing its benefits (mainly focused on resource use) as eco-design aims to reduce all environmental impacts in the life cycle of a product.*

The adoption of a cradle to cradle perspective embedded in CE while preventing the loss of valuable materials allows a reduction of the costs for the companies and municipalities, due to a reduction of the problem of waste management as well as to a reduction of the externalities for the

society (lower pollution), new jobs opportunities and increased welfare for low income households.



PRINCIPLES AND IMPLEMENTATION OF CIRCULAR ECONOMY WORLDWIDE

Main limits and challenges of transition to Circular Economy.

Principles of CE	Limits or challenges
Design	Optimal product life scenario. Design for disassembly, reuse, recycling. Design for durable products. Design for new business model of consumption.
Reduction	Overcome rebound effect of eco-efficiency and eco-sufficiency strategies.
Reuse	Technical maximum reusability of materials. Increase of consumer demand towards reuse of products and materials. Development of take-back mechanisms from the companies. Ensuring repair and secondary use of products after their original use. Taxation based on non-renewable energy rather than labor and renewable energies
Recycle	Reinforcement of local markets of recycled materials. Risks of global trade of materials. Plastic waste: unfeasibility due to the mixing of contaminants. Cellulose: feasible until 4–6 times. Rare metals (lack of economies of scale). Food Waste: further transformations before being used requires high costs in research and development. Appropriate LCA modelling for reuse and recycling.
Reclassification of materials into: Technical Nutrients	Reuse after the first cycle Safe return to the Biosphere or in a cascade of subsequent uses (biorefinery).
Renewable Energy	Increase their share compared to the share of fossil fuels.

The vertical approach implies the shift of CE from the low level of analysis – **micro level** - (company or single consumer level) to the higher hierarchical levels – **meso level** - (e.g. eco-industrial parks) and **macro level** (cities, provinces and regions) while the horizontal dimension implies a link between “industries, urban infrastructures, cultural environment, and the social consumption system”

Circular economy at micro level

CE implementation in production sectors: *the emergence of eco-design and cleaner production*

The adoption of a circular economy program entails that a company carries out different strategies to improve *the circularity of its production system* and also cooperates with other companies over the supply chain for the achievement of a more *effective circular pattern*.

Both DFE and eco-design “blend environmental aspects into product design and development at product conception to enhance environmental performance throughout its lifecycle”.

CE in the consumption sector: consumers' responsibility and green public procurement

The *promotion of consumers responsibility* is crucial for enhancing the purchase and use of more sustainable products and services.
Functional instruments for green consumers are *specific information and labelling systems covering food, non-food products as well as services.* The labelling systems are sharply developing across all continents.

CE in waste management: recovery of resources and environmental impact prevention

- Waste management has been considered in the past simply a way to get rid of the waste materials by landfilling or incinerating. This is still the dominant disposal pattern worldwide, in so generating a huge loss of valuable resources and very heavy environmental impacts.
- Recently, a new way to look at waste is emerging, that recognizes waste management as a recovery of resources and environmental impact prevention.
- In so doing, waste management becomes an important sub-sector of circular economy, with the emergence of new typologies of operators and processes, among which the so-called “scavengers” and “decomposers”, *referring to companies capable to extract resources out of waste by applying innovative recovery technologies.*
- We keep in mind the different development stages and country-specific constraints, European Union Japan and USA, etc. (post-industrialization stage) and China, etc. (mid-industrialization stage). China is facing a phase of industrial development that has no precedents in the history of the former countries. Its primary aims within CE is the adoption of a new business model that integrates cleaner production and the development of eco-industrial parks, considered as the more critical sectors to address.
- The large industrialization, rapid urbanization, change of consumption patterns and population growth lead to a rapid increase

of the amount of waste leading China from 2004 to be the largest Municipal Solid Waste generator.

- World Bank Group report estimates that at present almost 1.3 billion tonnes of MSW are generated globally every year, or 1.2 kg/capita/day. The actual per capita rates, however, are highly variable, as there are considerable differences in waste generation rates across countries, between cities, and even within cities.

Circular economy at meso level

- The CE actions within this level only refer to the production side involving the development of eco-industrial parks, industrial symbiosis districts, and networks, as well as other related productive networks denominations.
- In these industrial systems, industries that traditionally work as separate entities, become engaged in complex interplays of resource exchange (material, water, energy, and by-products), so-called "industrial symbiosis", with the purpose of achieving economic and environmental benefits.
- "The essence of industrial symbiosis is taking full advantage of by-product utilization while reducing residual products or treating them effectively. The term is usually applied to a network of independent companies that exchange by-products and possibly share other common resources"
- Lower material and energy resources consumption and lower water, air and soil pollution and economic advantages (e.g. lower costs for raw materials substitution and lower treatment costs).

Circular economy at macro level

Circular economy development in cities, provinces or regions involves the integration and the redesign of four systems:

- the industrial system (e.g. changing the size of companies from small to large or the phase-out of the heavy polluting enterprises in favour of light economic activities as related to high-tech industries, tourism or culture)
- the infrastructure system delivering services (transportation and communication systems, water-recycling systems, clean energy and electrical power lines, etc.),
- the cultural framework and
- the social system.

Eco-cities

In that way, both zero-emissions goals (a concept that virtually emphasizes the full use of waste flows in the economic system) and economic benefits have been achieved given the challenges of shortage of landfills and the need of revitalizing local industry texture.

Collaborative consumption models

- Collaborative consumption models are recognized as one of the best available options on consumer side to shift from the present business-as-usual model to CE.
- Collaborative models (e.g. sharing, bartering, lending, trading, renting, gifting) are based on shared ownership among multiple consumers. For example, when renting the consumer has no ownership of the product but has only the right to use it by paying a charge. *As ownership is at the core of our present consumption model, the loss of ownership is one of the strongest potential barriers that could limit the development of such systems.*
- Besides renting, other solutions are lending, bartering, and gifting.
- Because of the various approaches of these activities, their *goal can range from profit, non-profit or both.*
- Presently, collaborative consumption is adopted in car-sharing, in website-based networks sharing different products (music, textbooks, fashion, and art, among others). Consumer's lifestyle keeps changing, by reducing the environmental impacts associated with consumption activities and promotes social cohesion. Rather than a marketing trend, it is instead a crucial factor towards sustainable development and circular economy (??????).
- However, consumers need to be located within a certain community or location (e.g. big cities) or should be part of a larger network for easy access to such schemes. These consumption models are the basis for improved performance of the circular economy, as theorized by.
- In several studies the authors evidenced the advantages in terms of higher employment and resource-efficiency of a business model mainly based on selling services instead of selling products as the present business model.
- REMARK: As consequence governments, in western economies should *accelerate their taxation policies* towards taxing more strongly the use of non-renewable resources instead of taxing renewable resources as labour. Obviously, this fact creates an indirect strong barrier to the development of the circular economy as

CE is perfectly aligned with the development of the bio-economy and the transition towards bio-based rather than fossil-based products.

Innovative waste management and zero-waste programmes

Waste production and management issues increase when a society further develops. The problem is also worsened by globalization. In urban centres, municipal solid waste is mainly disposed of in landfills, recycled or recovered. Due to increasing environmental problems and landfill constraints, the prevention of waste is gaining more attention in particular in populous cities and countries such as Japan with limited landfill and natural resource capacity.

DECOUPLING ECONOMIC GROWTH FROM ENVIRONMENTAL IMPACTS

- Europe seems to strive towards absolute decoupling; there is the risk that only relative decoupling can be achieved due to the so-called “rebound effect”, that is the risk for eco-efficiency strategies at micro level that improvements *in productivity of resources do not translate into a reduction of resource use, but rather into an increase of them.*
- However, some cases of absolute decoupling seem to confirm the hypothesis by that rebound effects are not a certainty in all sectors, although they frequently occur. These experts also found that eco-sufficiency strategies (consisting in reducing what is produced or consumed in absolute terms) are not *neutral to rebound effects*. If both of these strategies are unable to reduce resource use, the final result would unavoidably be an overall reduction of economic activity.

Finally,

1. the circular economy also requires producers and consumers to become more active participants in the recycling or reuse of products, forgetting about the passive “throwaway” culture of the linear economy.
2. It should not be disregarded that given the limits in recycling it is unlikely that CE could continue to maintain quantitative economic growth forever. According to: “not only growth but also a zero-growth state, even a declining state which does not converge toward annihilation, cannot exist forever in a finite environment”.
3. Nevertheless, CE should be seen as a transition to a new and different business model, where wellbeing is decoupled by resource consumption. CE could help the transition to a de-growth path (less resource use with increasing wellbeing) that seems inevitable in particular in industrialized economies having surpassed ecological limits.
4. In this perspective, CE can be seen as an advantage by degrowth supporters and a disadvantage by the ones advocating continuous quantitative economic growth.
5. On the other hand, so far environmental and social dimensions of sustainability have attracted less interest compared to the economic sphere and need the right recognition. A shift is then needed, in particular in developed countries, towards a more qualitative development model, as could be the CE, where people live equitable within the planet's carrying capacity.

Limits of the CE Concept

Six limits and challenges for the circular economy concept.

Thermodynamic limits

- Cyclical systems consume resources and create wastes and emissions

System boundary limits

- Spatial: problems are shifted along the product life cycle
- Temporal: short term non-renewables use can build long-term renewable infrastructure

Limits posed by the physical scale of the economy

- the Rebound effect, Jevon's paradox*, a boomerang effect

Limits posed by path-dependency and lock-in

- First technologies retain their market position despite of in-efficiency

Limits of governance and management

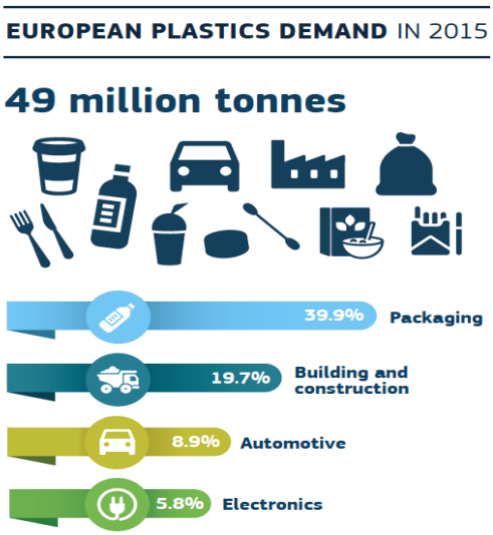
- Intra-organizational and intra-sectoral management of inter-organizational and inter-sectoral physical flows of materials and energy (level of SCM)

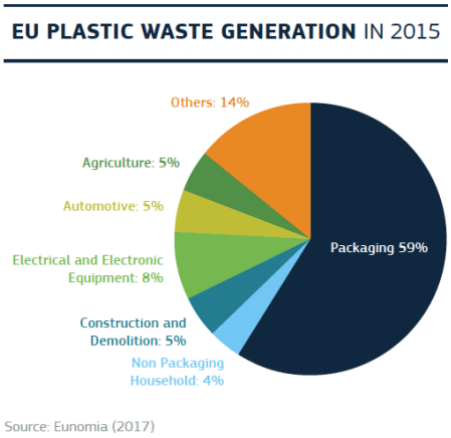
Limits of social and cultural definitions

- The concept of waste has a strong influence on its handling, management, and utilization
- The concept is culturally and socially constructed
- The concept of waste is always constructed in a certain cultural, social and temporal context and this context is dynamic and changing

- When technological progress or government policy increases the efficiency with which a resource is used (reducing the amount necessary for any one use), but the rate of consumption of that resource rises due to increasing demand.

EU Plastics agenda

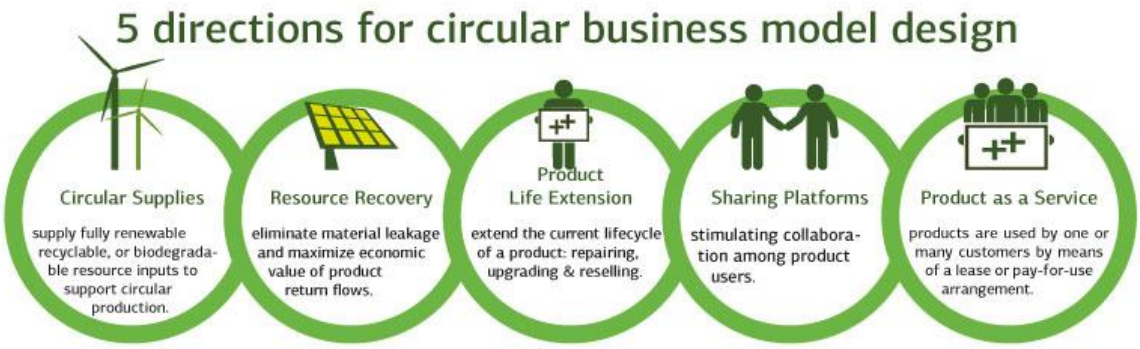




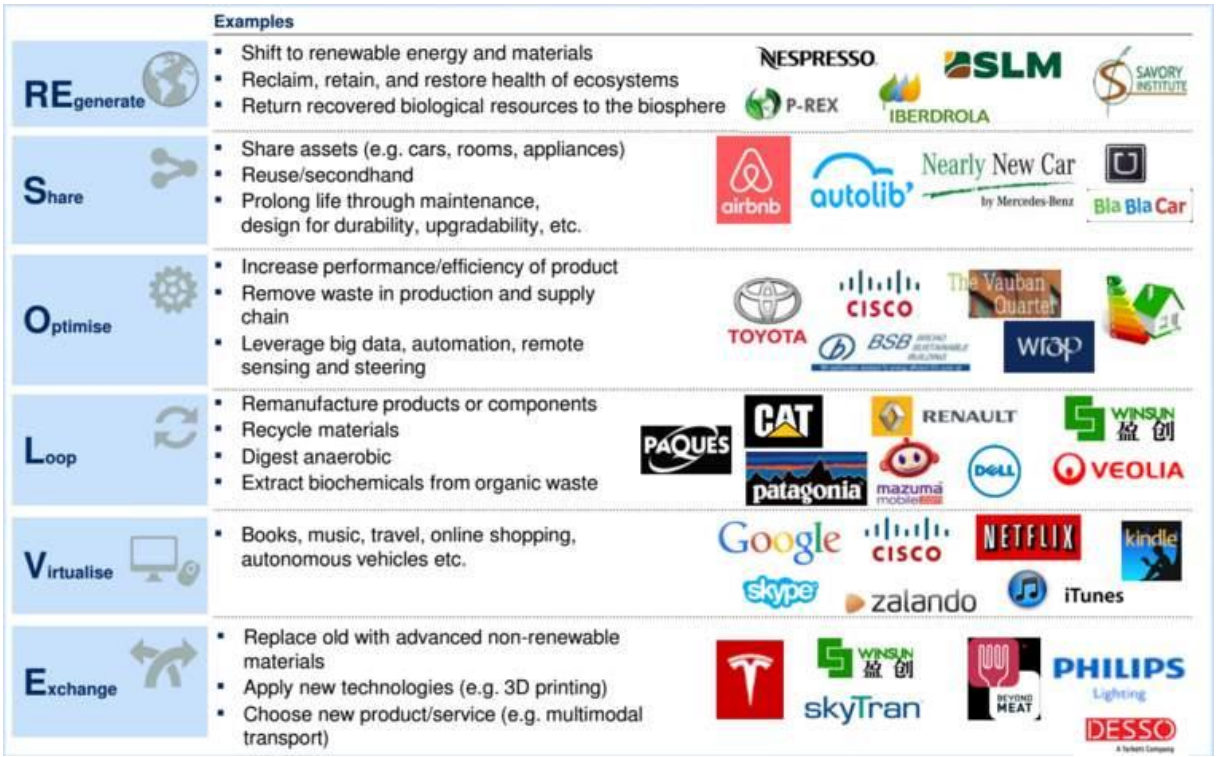
90% of plastic polluting our oceans comes from just 10 rivers

Eight of them are in Asia: the Yangtze; Indus; Yellow; Hai He; Ganges; Pearl; Amur; Mekong;
And two in Africa – the Nile and the Niger.

New business model design and marketing approaches for a circular economy



Examples



CONTEMPORARY MARKETING (B2C)

- Marketing may be seen as both a reflection of and influence on human culture, through the active creation of markets by companies using the traditional marketing mix of price, place, promotion and product (the '4Ps') to stimulate attention, interest, desire and action.
- Marketing is the communication of one to many (as distinct from sales, which is one to one), and a market-oriented firm is one which prioritizes market intelligence and a strong customer focus.
- Brands and advertising are central to the field of marketing, and brands represent powerful conduits of meaning that contribute to customers' concepts of self. Perception, reputation and image are the essences of a brand, and it has been shown that advertising that taps into emotive concerns is more successful than purely factual forms – especially where the brand's image is of especial importance to the consumer (e.g., with clothing).
- Advertising is designed to both inform and persuade, and successful advertising can manipulate people's desires and intentions in such a way as to create needs for goods with which they were previously unfamiliar or not interested in purchasing.
- With the growth of the world wide web, a company's marketing capacity and identity as perceived by its consumers is largely cultivated via its website, with factors such as visual appeal, ease of use, interactivity, trust and playfulness becoming essential in converting repeat customers online.
- The challenges of competitor differentiation and lack of personal contact or influence over customer location are more difficult in online scenarios, and yet the internet has been defined as a powerful tool for retailers: search engines select required information, websites can be frequently updated and accessed from a number of devices in many locations and time zones, and Web 2.0 has enabled new levels of user interaction and collaboration.
- The main characteristics of contemporary marketing (in general)
    - from needs, wishes to the value creation, production, communication, and delivery,
    - from a passive role to the pro-active role (sometimes aggressive).
    - globalization, global products, global marketing,
    - IT technologies,
    - extension of marketing into non-profit areas,
    - ethics and social responsibility in marketing (no comment???).

Green Marketing (kind of criticism)

- The theory and practice of green marketing have developed over more than 30 years, and the field provides valuable insight into the development of new markets for products and services with lower environmental impacts or higher sustainability credentials, in particular through companies' communication with consumers.
- In practical terms, green marketing has evolved from reassuring customers with end-of-pipe solutions that mitigate pollution and address moral issues, to creating new markets and competitive advantage for business through desirable green products and services; more recently it has attempted the 'normalization' and integration of sustainability by introducing longer term perspectives and addressing business models such as localization or product service systems which could also be seen as facilitating a circular economy.
- Moreover studies suggest that green marketers need to emphasize both tangible and intangible value (e.g., reduced costs as well as moral satisfaction), and align environmental benefits with consumer self-interest in order to increase sales and consumption – as although those with higher environmental involvement can be influenced by environmental information, both those with higher and lower environmental concerns are likely to be affected by how the purchase will make them feel.
- However, it has received criticism for taking an overly cognitive and behavioural approach that focuses on the psychology of the individual whilst tending to ignore social and cultural contexts. Research studies can be contradictory or even inconclusive. The rebound effect and values-action (or attitude behavior) gap are well known phenomena that can scupper the benefits of efficiency savings through green consumption (rebound effect) and show that consumers do not always follow up their green attitudes and intentions with sustainable consumption behaviors (values-action gap).
- Environmental labelling has likewise not brought the hoped-for upturn in green consumption, and such tools have even been condemned for the plethora of programs, costs, and lack of consumer focus.
- In general, people are positive about supporting environmental issues but unwilling to change their lifestyles, and 'green' products may also be viewed as unpleasant, inconvenient or weird – possibly because industry has previously focused on creating green products, rather than products that consumers actually want.

Social Marketing

- The concept of social marketing was born in the 1970s and has developed as an approach that utilizes conventions of traditional marketing and behavioral science, such as the 4Ps, norms, prompts and social diffusion, to bring about behavioral change for the benefit of a community or society (e.g., in the field of healthcare – to encourage the cessation of smoking).
- Unlike commercial marketers, which compete with other brands selling similar goods and services to consumers for purposes of financial gain, social marketers usually work on behalf of governments or non-profit organizations, competing with peoples' current behaviors in order to sell them more beneficial behaviors for purposes of societal (and sometimes also commercial) gain and removing the barriers whilst simultaneously stimulating the motivators for action.
- In terms of behavior change for sustainability, it has been argued that people rarely shift their conduct as a result of information provided and that many green marketing approaches take an overly rational approach – neglecting consumers' cultural and symbolic context and emotional responses. Whereas green marketing tends to ignore the non-purchase elements of consumption (e.g., use and disposal) and focuses largely on products, social marketing takes a more customer-oriented or user-focused perspective towards changing and maintaining new behaviors such as recycling, building relationships, and using emotion and humour as tools of communication.
- However, accusations of social engineering have sometimes been targeted at the social marketing field, and its usual focus on curbing unhelpful behaviors has also proved difficult to reconcile with principles of sustainable consumption, which tend to implicitly accept the norms of growth and unlimited consumer choice.
- Some experts argue that social marketing does, in fact, provide a suitable model for so-called 'anti-consumption', and in doing so suggest several modifications to the marketing mix which could also fit with a circular economy. For instance, shifting from products to propositions, from place to accessibility (e.g., access over ownership), from price to costs of involvement (e.g., time and effort), and from promotion to social communication (e.g., relationship building instead of one-way promotion).

DESIGN FOR SUSTAINABLE BEHAVIOUR

- In recent years the growth of user-centered and service design has see the field of design become more fundamentally concerned with a customer or user-centric approach.
- Design for Sustainability and in particular Design for Sustainable Behavior (DfSB) have emerged as areas of design research that explore how to influence the environmental impact of consumers' activities, mostly during the use rather than purchase phase.
- As with green marketing, DfSB focuses on individual behaviour change and incorporates psychological, sociological and economic perspectives, and also uses some work to describe how behaviors are 'scripted' into the design of our objects and surroundings.
- According to such psychological approaches, new behaviors may be triggered as a result of extrinsic or intrinsic, hedonic or eudaimonic motivations and deliberate or automated decision making, and changes to consumer behaviour will have the greatest impact when they address several motivating factors simultaneously.
- However, although Design for Sustainability more broadly has addressed issues such as the repairability, disassembly and remanufacturability of products. Design is fundamentally concerned with creating change and making innovation 'acceptable to users' through interfaces and experiences and is a means of configuring communicative resources as well as social interaction.
- As has already been alluded to, conventional marketing techniques encourage consumers merely to switch brands, whereas a circular economy will likely require consumers to adopt new behaviors such as product return, rental, or reuse.
- There are several tools and strategies that might lend themselves to an analysis of current approaches that businesses are taking in order to influence consumers in the adoption of certain circular economy behaviors.
- We note two of these frameworks to show their relevance in exploring and analyzing the marketing communications strategies used by such businesses on their customer-facing websites. One is 9 Dimensions of Behavior Change (see table below), which describes different types of behavioral influencers. A key concept here is the strategies of control in any given activity, from 'user in control' to 'product/system in control'. This continuum moves from informing, through persuading, to determining user actions.
- In terms of online communications, it is suggested that some dimensions may be more relevant than others, for instance, it may

be difficult to exert absolute control over a user through a website alone, whereas it may be easier to convey meaning or empathy.

The 9 Dimensions of Behavior Change

Control	To what extent is the user or the product in control of the behavior?
Obtrusiveness	How much attention does the design demand from the user? On a scale from obtrusive to unobtrusive.
Encouragement	To what extent does the design encourage desired behavior or discourage undesired behavior?
Meaning	How does the design motivate the desired behavior, on a scale from emotional to rational)
Direction	Is the desired behavior in line with, or opposing the wishes of the user?
Empathy	Is the design focusing on the user or on others/what others think?
Importance	How important or unimportant does the user consider the behavior/consequence?
Timing	Does the user encounter the design before, during or after the behavior?
Exposure	How frequently or rarely does the user encounter the design?

CONSUMER FACTORS FOR A CIRCULAR ECONOMY

- Academic literature and expert opinions on the circular economy is still nascent, particularly when it comes to the consumer perspective. There are, however, a number of studies that deal with consumer reactions to activities that form part of a circular economy, such as reuse, remanufacturing, and product-service-systems.
- The most prevalent factors were found to recur throughout the different sources, and these were identified and grouped into ten similar themes or factors (see below).
- The grouping is based on the contextual understanding of how different authors approach the various themes. Different authors and

experts use different terminology to describe similar factors, and some might focus on motivators rather than barriers (or vice versa).

- For instance, some experts refer to the barrier of ‘disgust’ or ‘contagion’ that people feel in using remanufactured or access-based products that have previously been touched by others.
- Next ones call this same issue of the previous usage a concern for ‘newness’. Whilst for other experts one of the problems of refurbishment is ‘lack of the thrill of newness’.
- Contamination and disgust are feelings evoked by a lack of newness, and thus all represent different facets of the same factor. Some experts deploy ‘convenience’ as a more general term, where others are more specific by explicitly pointing out availability as a crucial factor.
- Convenience and availability may be considered as an element of quality and performance, but we chose to distinguish the latter as a separate consumer factor because it bears more relation to the product or service in use.

A summary of consumer factors for a circular economy, on product service systems, remanufacturing and reuse:

Consumer Factor
Contamination/disgust/newness
Convenience/availability
Ownership
Cost/financial incentive/tangible value
Environmental impact
Brand image/design/intangible value
Quality/performance
Customer service/supportive relationships
Warranty
Peer testimonials/reviews

COMMUNICATION STRATEGIES CAN ADDRESS CONSUMER CONCERNS IN A CIRCULAR ECONOMY

Suggestion of which communication strategies can address which consumer concerns in a circular economy

Consumer Factor	**Communication Design Strategies**
Contamination/disgust/newness	Importance, playfulness, rephrasing and renaming, emotional engagement, empathy, personality, framing, choice editing
Convenience/availability	Encouragement, direction, simplicity, assuaging guilt, worry resolution
Ownership	Meaning, anchoring
Cost/financial incentive/tangible value	Encouragement, rewards, importance, first one free, scarcity, framing
Environmental impact	Transparency, simplicity, empathy, obtrusiveness, meaning, framing, emotional engagement, importance, assuaging guilt, direction
Brand image/design/intangible value	Meaning, storytelling, empathy, mood, colour associations, importance, emotional engagement, scarcity, prominence, obtrusiveness, expert choice, social proof.
Quality/performance	Provoke empathy, meaning, storytelling, personality, importance, scarcity, expert choice, direction, emotional engagement, worry resolution
Customer service/supportive relationships	Encouragement, tailoring, transparency, emotional engagement, metaphors, provoke empathy, assuage guilt, reciprocation, importance
Warranty	reciprocation, assuaging guilt, worry resolution, obtrusiveness, metaphor, importance
Peer testimonials/reviews	social proof, storytelling, provoke empathy, expert choice, importance, worry resolution

Future research options

- The perspectives of CE are huge and appealing. The most important aspect, i.e. the one that still seems to need improvement, is the knowledge and awareness of European producers and consumers, because of the important role devoted to producers and consumers responsibility in European policies.
- At a micro level, the research on design needs to be oriented to understand the effects of CE business and consumption models implying the selling of a service (instead of a product) or its leasing, refurbishment and remanufacturing To this purpose research on motivation of consumer's purchases and replacement of still functioning products with new ones is also needed, to help designers to better match consumers choices and needs.
- The role of scavengers and decomposers also requires a better investigation at all levels. Diverse types of scavengers and decomposers companies are well established in Europe where recycling activities are highly developed and recycled materials markets are actively operative (especially for paper, glass, steel, among others). The meso level is critical for the adoption of industrial symbiosis. The role of the public sector is of paramount importance in promoting the adoption of new symbiosis initiatives as well as CE advancing over time.
- Continuity, i.e. stability of normative framework and market opportunities, the company relies on the need to maintain economic profitability of their activities and investments. In this regard, appropriate instruments rewarding positive externalities need to be tailored to provide tools to policymakers.
- Finally, at the macro level, it would be extremely important to evaluate the evolution of projects, legislation, and awareness in cities, regions and over all nations. This would provide feedback information to policymakers about the soundness of the policies adopted by far.