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CONSUMER STUDIES IN THE CIRCULAR ECONOMY CONTEXT: HOW TO MOVE FORWARD WITH THE FIELD? A THEORETICAL ESSAY

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1 INTRODUCTION

Environmental problems, such as biodiversity loss, water crisis, air and soil pollution, resource depletion, and excessive land use are increasingly harming earth's life-support systems (Geissdoerfer *et al*., 2017; Meadows *et al.,* 2004; Rockstrom *et al.*, 2009). Economic challenges, such as supply risk, problematic ownership structures, deregulated markets, and flawed incentive structures lead to increasingly frequent financial and economic instabilities for individual companies and entire economies (Sachs, 2015). These are some of the many problems that result from the Linear Economy (take-make-dispose), system that got instituted with the industrialization. Its fundamental characteristic is the linearity of resource consumption (Murray, Skene & Haynes, 2015; Sauvé, Bernard & Sloan, 2016). Despite that, there've been a growing concern about resource overconsumption, environmental degradation, and social inequity, that have resulted in a pressing need for a transition toward a more sustainable society, economy and sociotechnical systems (Adams *et al*., 2016; Markard *et al*., 2012; Meadows *et al*., 2004; Seiffert & Loch, 2005; WBCSD, 2010).

Some authors infer that this shift requires a new economic model. The classic approach of the Linear Economy (LE), with the principles of "take-use-dispose", was successful until acknowledgement that the resources are limited, and now it needs to be replaced by a different approach (Ellen MacArthur Foundation, 2013; Ghisellini, Cialani & Ulgiati, 2016; Gregson *et al*., 2015; Kumar *et al*., 2019). It is necessary a system that contributes to the attaining the sustainable development - development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCDE, 1987). Many scholars point the Circular Economy (CE) model as an alternative that has the potential to pave the way for eliminating environmental waste in manufacturing and regaining used materials into the material flow by encouraging the use of renewable energy sources and new manufacturing methods to achieve sustainability (Ciani, Gambardella & Pociovalisteanu, 2016; Kumar *et al.*, 2019; Yuan, Bi, & Moriguichi, 2006). For that reason, some authors even discuss the CE as being a new paradigm that may lead to an effective sustainable development (Geissdoerfer *et al*., 2017; Prieto-Sandoval *et al.*, 2018).

The concept, that emerged in the 1990s, was named Circular Economy (CE) by the economists Pearce and Turner and disposes that the matter and energy can only be preserved in a circular system. In this context, CE is a closed-loop system which contains the circular flow of materials and energy (Kumar *et al*., 2019; Su *et al*., 2103). Shifting to a CE logic requires eco-innovations to close products lifecycle, get valuable products to others from waste and solve the needs of environmental resilience despite the tendency toward economic growth (Prieto-Sandoval *et al*., 2018; Scheel, 2016).

Despite these general conceptualization of CE, the understanding that we are adopting in this theoretical study is the one that, as CE is the manifestation of a paradigm shift (Geissdoerfer *et al.*, 2017; Prieto-Sandoval *et al.*, 2018;), it requires changes in the way that society produces and consumes innovations, while also using nature as inspiration for responding to societal and environmental needs (Cohen-Rosenthal, 2000; Hofstra & Huisingh, 2014; Prieto-Sandoval *et al.,* 2018). In this way, CE implementation requires eco-innovations to legislation, production and consumption to achieve a sustainable development (Hofstra & Huisingh, 2014; Huesemann, 2004; Lozano, 2008; Prieto-Sandoval *et al.*, 2018; Scheel, 2016). To summarize, we understand that the paradigm shift towards sustainable development can be visible through eco-innovations, which are tangible results of the CE paradigm (Prieto-Sandoval *et al.,* 2018).

Prieto-Sandoval *et al*. (2018) developed conceptual guidelines for classifying and proposing a framework of eight kinds of eco-innovation, based on other models (Keeley *et al.*, 2013; OECD, 2005): Business model innovations; Network innovations; Organizational structure innovations; Process innovations; Service innovations; Market innovations; Consumer. Based on these eight kinds of eco-innovation, the present essay will focus on consumer engagement. We argue that in the context of CE, consumers have a major role, and the paradigm shift depends on their participation and acceptance. However, their willingness to participate in this change is one of the biggest gaps on CE studies (Borrello *et al.,* 2016, 2017; Ghisellini, Cialani & Ulgiati, 2016; Kirchherr, Reike & Hekkert, 2017; Lieder & Rashid, 2016; Merli, Preziosi & Acampora, 2018; Yuan *et al.*, 2006). Kirchherr *et al.* (2017) reviewed 114 definitions of CE and found that only 19% of all definitions examined included the consumption phase. Contrary to that, many scholars have been highlighting that the consumer is the central enabler of CE and that CE entails rethinking consumption (Borrello *et al.*, 2017; Ghisellini *et al.*, 2016; Moreau *et al.,* 2017).

Camacho-Otero, Boks and Pettersen (2018) carried out a systematic review of the literature regarding consumption in the context of CE and results showed that studies investigating these two topics appeared for the first time in 2015. Until now, such studies have been developed through different approaches, but the majority of studies of consumption in the context of circular economy uses an utilitarian approach, more specifically through the Theory of Planned Behavior (TPB). Not only in the context of CE, TPB is a very important theory to consumer behavior studies in general. However, some scholars are demonstrating that, historically many efforts and investments have fuelled information-based policies based on such theory (TPB) that, although successful in creating awareness, have modestly influenced individuals' behavioral changes (Capacci, *et al.*, 2012; Liu, Wisdom, Roberto, Liu, & Ubel, 2014; McGill, *et al.,* 2015; Traill, Mazzocchi, Niedźwiedzka, Shankar & Wills, 2013; Vecchio & Cavallo, 2019). Because of that, this theoretical essay aims **to contribute to the gap regarding consumer studies in the Circular Economy context by recommending a theoretical way that could be further explored in order to advance in the knowledge of the field**.

3 THEORETICAL BACKGROUND

3.1 Paradigm Shift Towards a Circular Economy

The Linear Economy (LE) model (take, make, dispose) began during the industrial revolution, in the 17th century, with the exploitative scientific and technological innovations which didn't considered the limits of the environmental and the long-term damage they were causing (Geissdoerfer *et al*., 2017; Prieto-Sandoval *et al*., 2018). Societal issues such as high unemployment, poor working conditions, social vulnerability, inter and intragenerational equity, and widening inequalities (Banerjee & Duflo, 2011; Prahalad, 2004), are some of the consequences of this model. Many scholars and practitioners (Kirchherr *et al*., 2017) have been defending that Circular Economy (CE) is an alternative that has the potential to pave the way for eliminating environmental waste in manufacturing and regaining used materials into the material flow by encouraging the use of renewable energy sources and new manufacturing methods to achieve sustainability (Ciani, Gambardella & Pociovalisteanu, 2016; Kumar *et al.*, 2019; Yuan, Bi & Moriguichi, 2006). In fact, such popularity among scholars and practitioners is because CE has been viewed as an actual solution, something that can be operationalized to the much-discussed concept of sustainable development (Ghisellini *et al.,* 2016; Kirchherr *et al.,* 2017; Murray *et al.,* 2015). According to Kirchherr *et al.* (2017, p.221) in the last few years "more than 100 articles were published on the topic in 2016, compared to

only about 30 articles in 2014 [...] and many consultancy reports have been published on the topic recently (with consultancies attempting to signal expertise on trending topics to clients via such reports".

In this way, studies have been trying to better understand CE. Definitions have been referring to circular business models (Bocken *et al*., 2014; Lewandowski, 2016), to the reduce, reuse and recycle (3Rs) taxonomy, and to value creation throughout the supply chain (Schenkel *et al*., 2015). Recently, a significant number of studies have focused on explaining the CE as a paradigm, due to its relationship with sustainable development (Geissdoerfer *et al.*, 2017) and the large number of concepts that define it.Despite their divergent approaches, these studies share a similar purpose, which is the understanding of CE as a cycle of the extraction and transformation of resources and the distribution, use and recovery of goods and materials. Generally, the cycle starts with the companies taking resources from the environment to use as primary material to transform them into products and services. Then, they distribute the products or services to consumers at sale points or to other companies, and the products/services are used by consumers in the market (Priesto-Sandoval *et al*., 2019).

Also, CE has some principles that support it, which are composed in the R framework – that has been viewed as the 'how-to' of CE and, because of that, as a core principle of it (King *et al*., 2006; Ghisellini et al., 2016; Kirchherr et al., 2017). Scholars have been proponing various R frameworks, such as the 3R – Reduce, Reuse, Recycle (King et al., 2006; Ghisellini et al.; PRC, 2008), the 4R – Reduce, Reuse, Recycle, Recover (European Commission, 2008), the 6Rs – Reuse, Recycle, Redesign, Remanufacture, Reduce, Recover (Winans, Kendall & Deng, 2017) or the 9Rs – Refuse, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover (van Buren et al., 2016; Potting et al., 2017).

In line with Prieto-Sandoval *et al.* (2018, p.10-11), we believe that, despite the different approaches used by the scholars to conceptualize CE, or the different principles that support such concept, four relevant components can be highlighted through the definitions: "1) the recirculation of resources and energy, the minimization of resources demand, and the recovery of value from waste, 2) a multi-level approach, 3) its importance as a path to achieve sustainable development, 4) its close relationship with the way society innovates".

It is also relevant to understand that CE is discussed in three levels: micro, meso and macro (Ghisellini *et al.*, 2016; Kirchherr *et al.*, 2017; Prieto-Sandoval *et al.,* 2018; Yuan *et al.,* 2006). The first level (micro) refers to companies and consumers. At this level, companies "are focused on their own improvement processes and eco-innovation development. In addition, there is a positive relationship between a company's environmental management maturity level and its willingness to implement CE" (Prieto-Sandoval *et al*., 2018, p.08) mainly due to the positive impact it has on its prestige among consumers and the associated reductions in cost (Ormazabal *et al*., 2016).At the meso level, the discussion enlights eco-industrial parks and focuses on the production side of activities. It includes companies that belong to a network or an industrial symbiosis that will benefit not only the regional economy but also the natural environment (Geng *et al*., 2012). Finally, at the macro level, nations, regions, provinces and cities are focused on. It involves the integration and redesign of four systems: the industrial, the infrastructure, the cultural and the social systems (Prieto-Sandoval *et al*., 2018; Yuan *et al.,* 2006).

This essay focuses on the micro level – specifically in consumers' behavior towards CE solutions. Also, among all the definitions of CE, in this essay, we adopt the vision of CE as a paradigm to achieve sustainable development (EU Commission, 2014; Ghiselini *et al.*, 2016; Nasir *et al.,* 2017; Prieto-Sandoval *et al*., 2018). In this vision, CE does not go against economic growth, but proposes an intensive use of the resources: the propose is to close the loop through the recovery of goods, transforming them in to new products and services instead of disposing or simply wasting them (Jaca *et al*., 2018; Prieto-Sandoval *et al.*, 2017).

In this last stage, specially, innovation is required (Park *et al.,* 2010; Jaca *et al.,* 2018; Prieto-Sandoval *et al.,* 2018; Stahel, 2016; Ülkü & Hsuan, 2017), to close the loop of the products life cycle, get valuable products to others from waste and solve the needs of environmental resilience despite the tendency toward economic growth (Scheel, 2016). Consequently, eco-innovative products are developed.

Eco-innovations can be further classified based on their level of performance to move forward with CE: Business model innovations; Network innovations; Organizational structure innovations; Process innovations; Service innovations; Market innovations; and Consumer innovations (Prieto-Sandoval *et al.,* 2018).The present essay focuses on the consumer side, since, as argued consumers have a major role, and the paradigm shift depends on their participation and acceptance (Borello *et al*., 2017; Ghisellini *et al.,* 2016; Moreau *et al.,* 2017). Such issue is further in the next section, which explores previous studies on CE and consumers, highlighting the theoretical lenses applied.

3.2 Consumption in the Context of Circular Economy

As already contextualized, the major literature on the circular economy seems to focus on the production side, and very little attention has been given to the consumption. According to Camacho-Otero *et al.* (2018), 10% of the research in the context of CE addresses consumption, despite having started in the mid-1990s, it has been on the rise ever since. Many scholars have been highlighting that consumers have a key role in the context of CE (Camacho-Otero *et al.,* 2018; Jaca *et al.*, 2018), though. That is because consumers can have an active role for environmental change, adopting social practices to consume in different ways and, thus, contributing to the achievement of a sustainable system (Jaca *et al*., 2018). Consumer and user acceptance, therefore, have been highlighted as a significant factor hindering the diffusion of CE business models and their products, since their lack of interest and awareness on the subject have been seen as main impediment regarding a transition towards CE (Kirchherr *et al.,* 2017).

Camacho-Otero *et al.,* (2018) reviewed the literature on CE and consumption, and found that these studies addressed consumption in three main problematizations: the understanding of what drives and barrs the consumption of circular solutions; the nature, meaning, and dynamics of consumption in the circular economy; and how the consumer has been included in the design process of circular solutions - in this case, the consumer being viewed as user.

The majority of the studies focused on the first issue, understanding consumption drivers of circular solutions, consumer perceptions, consumer awareness, consumer types and strategies and incentives to improve acceptance. In such studies, the main circular solutions focused were the sharing economy and collaborative consumption, remanufactured products, and product service system - PSS (Armstrong *et al.,* 2015, 2016; Decrop *et al.,*2018; Etzioni, 2017; Huber, 2017; Mugge, Jockin and Bocken, 2017; Wang *et al.*, 2018).

The factors identified as drivers and barriers of consumption were summarized in seven areas: personal characteristics, product and service offering, knowledge and understanding, experience and social aspects, risks and uncertainty, benefits, and other psychological factors (Camacho-Otero *et al.,* 2018). The main aspects found on each one of the factors of influence (drivers and barriers) highlighted were crossed with the main theoretical approaches and presented on Table 1. The majority of the studies that focused on the first issue identified used an utilitarian approach, mainly through TPB and related theories.

Table 1
Main drivers and barriers of consumption of CE solutions

Drivers and Barriers	Main Aspects	Theoretical approach	Authors
PERSONAL CHARACTERISTICS	Materialism; Need for uniqueness; Desire for change; Involvement; Control; Status; Community	Utilitarian approaches (Theory of Planned Behavior and related theories, economic theories and other psychological theories)	Armstrong et al., 2016; Baxter and Childs, 2017; Kohr and Hazen, 2017; Lee and Kim, 2018; Möhlmann, 2015; SLawson et al., 2016.
PRODUCT AND SERVICE OFFERING	Product quality; Product-need fit; Product longevity; Technology that supports value deliverability; Design; Brand	Utilitarian approaches (Theory of Planned Behavior and related theories, economic theories and other psychological theories)	Abbey, Meloy and Guide, 2015; Agrawal, 2015; Borin, Lindsey-Mullikin and Krishnan, 2013; Edbring, Lehrner and Mont, 2016; Schrader, 1999.
KNOWLEDGE AND UNDERSTANDING	Understanding of the offering; Sufficient knowledge; Information about services	TPB and related theories	Edbring, Lehrner and Mont, 2016; Guo *et al.*, 2016; Harms and Linton, 2016.
EXPERIENCE AND SOCIAL ASPECTS	User experience; Impact on everyday life; Enjoyment;Facility to use; Convenience; Privacy; Interaction	TPB and related theories	Decrop *et al*., 2018; Guttentag *et al*., 2018; Johnson, Mun and Chae, 2016; Joo, 2017; Van Weelden, Mugge and Bakker, 2016.
RISKS AND UNCERTAINTY	Trust; Other risks; Disgust; Newness	TPB and related theories	Abbey, Meloy and Guide, 2015; Barnes and Mattson, 2017; Lutz *et al.*, 2017.
BENEFITS	Economic; Environmental; Social	Economic Theories	Tussyadiah, 2016; Van Weelden, Mugge and Bakker, 2016; Yang *et al.,* 2017.
OTHER PSYCHOLOGICAL FACTORS	Attitudes;Norms Perceived behavioral control; Habits; Values	TPB and related theories Design Theories	Armstrong et al., 2015; Decrop, del Chiappa, Mallargé and Zidda, 2018; Matsumoto, Chinen and Endo, 2017.

Source: developed by the authors based on Camacho-Otero *et al.* (2018)

The two other issues received significant less attention in the literature. The second issue addressed the meanings of consumption in CE context, analyzing the nature, dynamics of consumption, exploring some specific solutions, questioned socio-political aspects of such consumption, the understanding (shared and individual) and acceptance of specific circular solutions offered (Bardhi & Eckhardt, 2012; Park & Armstrong, 2017; Philip, Ozanne & Ballantine, 2015).

This subject's development is important once, the shift towards circular economy requires new ways of consumption, probably changing the terms of what consumption means for consumers and how they perceive it. The aspects identified as meanings of such consumption are: anonymity, connected consumption, multiplicity of values, political consumerism and uncertainty (Camacho-Otero *et al.,* 2018). Each one of the aspect were explained and crossed with the main theoretical approaches, as presented on Table 2. These studies were mostly developed under the lens of consumer culture theories as well as through institutional, socio-technical and socio-material theories.

Table 2
Main drivers and barriers of consumption of CE solutions

Meanings	Aspects	Main theoretical approach	Authors
ANONIMITY	Consumption becomes anonymous. The property of the goods is less important than its usage. Since people don't care about owning such goods, their identity potential offered by goods dissolves; people might not be able to define themselves by the products they have anymore.	Consumer culture	Park and Armstrong, 2017; Bardhi andEckhardt, 2012; Philip, Ozanne and Ballantine, 2015.
CONNECTED CONSUMPTION	New relationships being established between consumers and companies through networks and sharing activities.	Consumer culture; Practice Theory	Bardhi andEckhardt, 2012; Huber, 2017; Mylan, 2015; Petersen and Riisberg, 2017
MULTIPLICITY OF VALUES	As in LE, in CE solutions cannot only rely on their utility value, and need to create symbolic value.	Consumer culture; Practice Theory	Mylan, 2015; Petersen and Riisberg, 2017; Catulli, Cook and Potter, 2017; Binninger, 2015; Santamaria, Escobar-Tello and Ross, 2016.
POLITICAL CONSUMERISM	Consumption of CE solutions being perceived as a manifest against mainstream consumption.	Consumer culture	Park and Armstrong, 2017; Bardhi and Eckhardt, 2012.
UNCERTAINTY	In CE, as products only move temporarily from producers to consumers and then return to continue their journey with other consumers, issues of trust, risk, and control arise.	Consumer culture	Bardhi and Eckhardt, 2012; Catulli, Cook and Potter, 2017.

Source: developed by the authors based on Camacho-Otero *et al.* (2018)

The last issue addressed the consumer as user, and very few studies are enlightening by this side. Studies in the context of the design process of circular solutions are indicating and defending that solutions cannot be thought of only in terms of the product, but must consider a role system of provision and how the consumer fits within such an ecosystem (Dewberry *et al.*, 2013; Knot & Luiten, 2006, Stacey & Tether, 2015). An important aspect highlighted in such studies is the integration of CE solutions in people's everyday life (Know & Luiten, 2006). "Daily practices make up everyday lives, i.e., the routines that people perform in their day-to-day contexts can affect how they react to new solutions" (Camacho-Otero *et al*., 2018, p.15). Mainly, the studies developed under this perception used Design Theories, such as User Design (Knot & Luiten, 2016; Gargiulo, Giannantonio, Guercio, Borean & Zenezini, 2015).

The studies developed until now on the subject addresses it through three major issues, as described before. The main theories used in such studies were TPB and related theories. Table 3 summarizes the issues and main theories used.

Table 3
Issues and Theories summary

Issues	**Description**	**Main theories**
Consumption drivers and barriers	Factors (barriers, drivers, motivators), consumers perceptions, consumer typology and incentives for adoptance	TPB and related theories.
Nature, meanings and dynamics of consumption	Changes in the process of consumption in the context of CE and understandings of such consumption	Consumer culture theories; Institutional, socio-technical and socio-material theories.
User perspectives in the design process	Investigations of how the consumer or user was integrated into the design process of circular solutions and theoretical inquiries providing frameworks to introduce the consumer perspective in the design process.	Design theories.

Source: developed by the authors

The scholars that have been studying consumption in the context of CE highlighted some literature gaps, as more insights of consumers' profile and consumers characteristics that can affect their acceptance and adoption of circular solutions (Atlason, Giacalone & Parajuly, 2017; Edbring, Lehner & Mont, 2016; Paundra, Rook, van Dalen & Ketter , 2017). The role of the brand in influencing behavior is, as well, mentioned as a path for research. Camacho-Otero *et al.* (2018, p.16) additioned that "further investigating the intention–behavior gap in the context of circular solutions by focusing on data collection on observed rather than reported behavior".

Thus, further understanding behavior remains as a gap in the literature. As well, studying the phenomenon under other perspectives than the rational decision making process is also a path to be underlined, once the majority of the literature works with TPB, as mentioned before. Ghisellini *et al.* (2016) found that the existing literature on CE considers consumers to be passive and rational recipients and who will follow labels and other production-side signals when making decisions. Still, it's been proved that individuals have several non-rational processes that contribute and, sometimes, even determinate the decision making process.

Studying consumer and shaping consumer's attitudes seems to be critical to the CE development (Hazen, Mollenkopf & Wang, 2017). Recently, scholars have been pointing out the necessary of other interventions in order to incentivate consumers to have behavioral changes towards the CE and among the theories that have been commented, the Nudge Theory may be a way to advance in the knowleadge of the field (Cohen, Lynch, & Robertson, 2016; Sousa Lourenco, Ciriolo, Almeida, & Troussard, 2016; Sunstein, 2016; Vecchio & Cavallo, 2019).

4 DISCUSSION

Studying planned behavior is important, however, we should take under consideration that the rational process of the decision making is limited. Simon (1959) was one of the first scholars to enlight that. Some aspects that can contribute to such limited rationality are the speed of mental processes and information that one has access to at the time of the decision, personal values and motivation. Combining with limited rationality, other scholars points that individuals make choices inconsistent with standard models. Individuals have several

non-rational processes that contribute and, sometimes, even determinate the decision making process.

Psychological biases (Tversky & Kahneman, 1979; Vecchio & Cavallo, 2019) are an important part of the non-rational process, and were first developed to facilitate the decision-making process daily, but end up guiding to bad decisions. Choice experiments have been carried out and showed that statistically better choices are left aside due to choice heuristics induction, which have the aim to facilitate the decision making process, but generally lead us to biases and blunders (Thaler & Sustein, 2008; Tversky & Kahneman, 1979).

In recent years, many stakeholders have hopefully embraced alternative approaches based on behavioral economic principles that alter choice environments to improve selections. A recognized alternative is the use of nudges (Cohen, Lynch & Robertson, 2016; Sousa Lourenco, Ciriolo, Almeida & Troussard, 2016; Sunstein, 2016; Vecchio and Cavallo, 2019). Mont, Lehrner and Heiskanen (2014, p.07) defined that "a relatively new way to influence behavior in a sustainable direction without changing values of people is nudging. Nudging can be used to help people make choices that are better for the environment or their health".

Therefore, to nudge means to carefully guide people's behavior in a desirable direction without restricting their choices. It's about arranging the choice situation in a way that makes desirable outcomes the easiest or the most attractive option. Knowledge about nudging opens up the possibility to suggest new types of policy tools and measures that can contribute to sustainable consumption (Jung & Mellers, 2016; Mont, Lehrner & Heiskanen, 2014; Sustein, 2016; Thaler & Sustein, 2008).

As argued before, the majority of studies of consumption in the context of CE are being developed under TPB. Therefore, it seems a good opportunity to complement these works by searching for understanding on the other side of the decision-making process: the non-conscient part, as individuals are not totally rational in their decision-making (Kahneman, 2002; Simon, 1979).

Behavioral economics is a strand of economy that searches for understanding mostly consumers behavior, and consists in a precise and fruitful alternative to traditional economic theories, which are based on optimization. Behavioral economics is especially useful when decisions are complex and optimality is difficult to achieve. It is based on utilitarianism and gets together two important areas in order to better understand behavior: psychology and economics (Camerer, 2014).

In 1979, Amos Tversky and Daniel Kahneman published one of the first papers about heuristics and choice biases, creating the Prospect Theory. Their work was focused on the process of decision making, and argued that individuals take decisions much based on heuristics of judgement, enlightening that individuals are not totally rational in their decision-making. They explain triggers such as **representativity, availability and anchorage**. Thaler and Sustein (2008) denominate such heuristics and bias as rules of thumb, and discuss also framing effects, optimism and overconfidence, gains and losses and the status quo bias.

The trigger **representativity** can be understood as the similarity heuristic. The idea is that when asked to judge how likely it is that A belongs to category B, people answer by asking themselves how similar A is to their image or stereotype of B (trying to understand how “representative” A is of B). It means that we search for characteristics and data to help us to do relations and associations, but the error consists in not considering that the complexity of things cannot be resumed in some characteristics. The **availability** heuristic helps to explain much risk-related behavior, including both public and private decisions to take precautions. The bias in this case is related to evaluate the risk taking as parameter your early experiences, instead of real probability. With **anchorage**, you start from an information

you know and adjust in the direction you think is appropriate. The bias occurs because the adjustments are typically insufficient (Thaler & Sustein, 2008; Tversky & Kahneman, 1979).

Other aspect that Tversky and Kahneman (1979) saliented as important to explore the psychology of intuitive beliefs and choices is the framing effect and the risk aspect, which brings that the way facts are presented also interfere our choices. The **framing effect** is related to the context and the way that situations are presented. It happens when people have a situation that requires a decision making, but may be influenced by the way the situation is presented to them. To illustrate such bias, Thaler and Sustein (2008) provided an example: if a person is sick and needs to decide whether or not to get operated, his or her decision making can be influenced by the way the doctor presents the odds of success. If the doctor says that, out of one hundred patients that have had the operation 90% are well and alive, people are likely to accept to do the surgery. However, if the doctor says that, out of one hundred patients who have had the operation 10% haven't had success, people are more likely to don't have the operation. The information is the same, but people react different due to the framing effect.

Thaler and Sustein (2008) explain the heuristics of **optimism and overconfidence**, which is basically an unrealistic optimism. It happens when people overestimate their personal immunity from harm and, as a consequence, they may fail to take sensible preventive steps. As well, there is the **gains and losses** heuristics. People tend to have aversion to lose. Studies demonstrated that, "when they have to give something up, they are hurt more than they are pleased if they acquire the very same thing. (...) Loss aversion helps produce inertia, meaning a strong desire to stick with your current holdings" (Thaler and Stein, 2008, p.34). Which leads us to the **status quo bias** (Samuelson & Zeckhauser, 1988), that is mainly the idea of inertia.

Thaler and Sustein (2008) argue that one of the causes of status quo bias is a lack of attention, since people tend to adopt what they call as "yeah, whatever" heuristic. For example, when watching television, people are more likely to stay in the channel in which they started the evening than to switch it, even though the actual switching channel costs are literally one thumb press. "But when one show ends and the next one comes on, a surprisingly high number of viewers (implicitly) say, "yeah, whatever" and keep watching" (Thaler & Sustein, 2008, p.35).

Along the evolution of behavioral economics, theories that search better explanations for the argument that heuristics and cognitive failures have a great influence on the decision making process. The understatement that the human brain functions through two different systems was considered one great advance on the behavioral economics field, and has allowed others to discover systematic biases in the way we think (Thaler & Sustein, 2008; Satanovich & West, 2000; Shepard, 1990). Actually, the heuristics and biases pointed out by Tversky and Kahnemann (1979) have been understanded by psychologists as emerging from the interplay between these two systems (Thaler & Sustein, 2008).

"The two systems correspond to two kinds of thinking of the human cognition, one that is intuitive and automatic (known as Automatic System or System 1), and another that is reflective and rational (known as Reflective System or System 2)" (Thaler & Sustein, 2008, p.30).

Thaler and Sustein (2008) further explain the two systems with different examples that helps to elucidate: for writing this essay, we are using our Reflective System. But in moments in which we are doing other activities and the (rare) times while we are not thinking at all about the essay and ideas pop up in our minds – that is the Authomatic System in action.

The heuristics mentioned above are triggers to automatize some decisions so that the brain does not get overwhelmed. It is a way for System 1 to assume functions based on shortcuts, without needing deep knowledge in various subjects, to assist System 2 in decision making. However, since System 1 is not deductive, analytical, but automatic, this

functionalism results in many cases in pretty bad decisions—decisions they would not have made if they had paid full attention and possessed complete information, unlimited cognitive abilities, and complete self-control (Thaler & Sustein, 2008).

Choice experiments have been carried out and showing that statistically better choices are left aside due to choice heuristics induction, which have the aim to facilitate the decision making process, but generally lead us to biases and blunders (Thaler & Sustein, 2008; Tversky & Kahneman, 1979). Studies such as these have been growing and gaining space in the litterature. That because, historically, many efforts have been made in the field of understanding the rational side of the decision making process, which have fuelled information-based policies that, although successful in creating awareness, cannot, *per se,* actually influence individuals' behavioral changes (Capacci, *et al.,* 2012; Liu, Wisdom, Roberto, Liu & Ubel, 2014; McGill *et al.*, 2015; Traill, Mazzocchi, Niedźwiedzka, Shankar & Wills, 2013).

Thus, there's a growing interest on alternative approaches based on behavioral principles that alter choice environments by organizing the context in which people make decisions in order to improve selections (Cohen, Lynch & Robertson, 2016; Sousa Lourenco, Ciriolo, Almeida & Troussard, 2016; Sunstein, 2016; Vecchio & Cavallo, 2019). That is what have been called as **choice architecture.** These interventions are also supported by consumers across many countries (Junghans *et al.*, 2015; Reisch & Sunstein, 2016; Reisch, Sunstein, & Gwozdz, 2017), as most individuals want to lead towards better choices. From the behavioural economics perspective, every situation represents some kind of choice architecture, even if it is not explicitly designed for a particular effect (Kahneman, 2013).

An important concept is brought by Thaler and Sustein (2008) for conceiving choice architecture: the **libertarian paternalism**. The libertarian aspect aims to assure that people should be free to do what they like. The paternalistic aspect lies in the notion of trying to influence choices in a way that will make choosers better off through nudges.

A **nudge** is any aspect of the choice architecture aims to change people's behavior in a "predictable way without forbidding any options or significantly changing their incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not" (Thaler & Sustein, 2008, p.06).

Thus, nudges refer to "purposeful changes in the choice architecture that influence peoples' behaviour by making changes in the environment that guide and enable individuals to make choices", however without trying to "change one's value system or increase information provision; instead they focus on enabling behaviours and private decisions that are beneficial for society and usually in the individual's long-term interests, as well" (Lehrner *et al.,* 2015). Nudges are made possible because of cognitive biases in individual and social decision-making. In line with that, nudges work because they correct for biases and errors in human behaviour, which occur when the situation does not support the use of cognitive effort (Thaler & Sustein, 2008).

It is important to understand that there are kinds of nudges and, when designing a research through it, describe which tools is being used. The term shouldn't be used as a 'catch-all term', otherwise it is not clear what type of interventions fall under this definition (Vecchio & Cavallo, 2019). Thus, nudging can be considered as a role methods of changing individuals' behaviour by modifying the cues in the physical and/or social context (Marchiori, Adriaanse & De Ridder, 2017), through nudge tools (Lehrner *et al*., 2015).

The simplification and framing of information is much based on the bias of framing effect. Since not only the accessibility of information matter but also how this information is presented, framing is important. Is the conscious phrasing of information in a way that activates certain values and attitudes of individuals (Lehrer *et al*., 2015). Also, making

information direct and straight is relevant. The changes to the physical environment are long known for their impact on decision making. “For example, one way to nudge people into buying certain products is by careful product placement on shelves e most sold products are situated at the eye level. Also products that are situated closest to cashier are the ones that are often sold” (Lehrer *et al.,* 2015, p.168). Such nudge tool have been used in diverse studies: the reduction of the plate size or reduction portion size can reduce food waste (Freedman & Brochado, 2010).

The changes to the default policy tool aims to fight the status quo bias, since people are greatly influenced by defaults e standard choices - that determine the result in case people take no action. For that reason, transforming the default option into the better one can be a nudge (Johnson & Goldstein, 2003; Lehrer *et al.*, 2015). Finally, the use of social norms is a nudge that uses the social argument to change individual behavior. Since humans are social beings, they tend to follow what others are doing. Goldstein *et al.* (2008) found that in hotels the most efficient message to avoid guests from switching the towels daily was that the majority of guests reuse their towels, rather than information focused on environmental protection. The following Table 4 summarizes the tools.

Table 4
Types of nudges

Nudge tools	**Description**
Simplification and framing of information	Information made straightforward and carelull phrasing
Changes to the physical environment	Facilitating or dificultating peoples access to something
Changes to the default policy	Turning the default option the better choice
Social norms	Social argument to change individual behavior

Source: based on Thaler and Sustein (2008) and Szaszi *et al.* (2018)

Some scholars, that are already working with Nudges, report that there is still a lack of evidence to estimate the magnitude of effect of nudge interventions (Marteau, Hollands & Kelly, 2015), since the analysis of the effectiveness of the results of nudging initiatives is not always easy (Arno & Thomas, 2016). An important consideration to be made is that not all nudging studies refer to Nudging Theory (Skov, Lourenço, Hansen, Mikkelsen, & Schofield, 2012).

Thaler and Sunstein (2008) suggest that nudges are appropriate when choices have delayed effects, when they are complex or infrequent and thus learning is not possible, when feedback is not available, or when the relation between choice and outcome is ambiguous. According to Ölander and Thøgersen (2014, p.04) “most environmentally relevant choice situations share several of these characteristics. (...). Hence, there seems to be good reason to consider nudges as a means to promote pro-environmental behaviour”. Consumption in the context of the circular economy can be considered a form of sustainable consumption, and, therefore, a pro-environmental behaviour (Kirchherr *et al*., 2017). Camacho-Otero *et al.* (2018, p.04) also agree that nudging can help promoting such pro-environmental behavior, since they argue that "researchers have been investigating what makes consumption sustainable, and also offered insights about elements that can drive change, such as nudging".

5 FINAL REMARKS

In this theoretical essay, we argued that Nudge Theory is an appropriate lens for studying consumer behavior of eco-innovative products in the Circular Economy (CE) context. To defend our main argument, we have first contextualized the Circular Economy

model, the different concepts and approaches with which authors have been working and we highlighted the idea of CE as a new paradigm that could lead toward sustainable development. We defended, as well, the concept of eco-innovation as being a way to materialize the CE system. Next, we discussed consumption in the context of CE, presenting important ideas. Thus, we introduced the Nudge Theory and some of its key aspects, highlighting the reason why this is an appropriate and valuable theoretical basis for future studies in the proposed context.

We conclude that both CE and the Nudge Theory are relevant to the present moment and have several possibilities of development. The exploration of consumption of eco-innovative products in the context of CE through the Nudge Theory lens can help to fill practical and theoretical gaps, resulting in valuable outcomes that encourage and find possible ways to transitioning to a more sustainable system. Some future studies opportunities that can lead to such outcomes are: to better understand consumers non-rational insights towards CE's products; to deliberate strategies to nudge the consumers participation in the CE context; and to enlighten which context can best be targeted to promote behavioral changes toward CE.

In terms of practical implications, this essay offers some insights of ways to improve consumer's decision making processes and the reasons why such strategies should be adopted. Different stakeholders can benefit from the proposed ideas, once having the sustainable development as guideline. Finally, regarding theoretical perspectives, this essay contributes to the understanding of the non-rational side of the decision making process as an important aspect to implement the Circular Economy paradigm, through the support of one of the main stakeholders for such change: the consumer.

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