




RESEARCH ARTICLE

# Identifying entrepreneurial opportunities in the circular economy

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## Abstract

The circular economy (CE) has gained increasing attention as a means towards sustainable development. Entrepreneurs and small and medium enterprises are regarded as key custodians in the transition to a CE. Opportunity identification is the cornerstone of entrepreneurship and has been extensively studied in traditional venturing; however, research on circular opportunity identification is limited. This paper addresses this gap by exploring (1) how entrepreneurs identify opportunities in the CE, underpinned by an adaptation of a sustainable opportunity identification conceptual model and (2) how CE principles are reflected in the identified opportunities, through the lens of the ReSOLVE CE framework. Nine in-depth interviews were conducted with circular entrepreneurs from three European Union member states with high, medium, and low Resource Efficiency Scoreboard rankings. The findings shed light into the black box of circular opportunity identification and indicate that the ReSOLVE levers constitute a useful framework to advance knowledge on circular entrepreneurship.

**Keywords:** circular entrepreneurship; circular economy; opportunity identification; ReSOLVE framework; sustainable entrepreneurship

## Introduction

Over the last few years, the circular economy (CE) has received growing global attention as a means to overcome the environmental damage instigated by human activities in their quest to satisfy their needs and demands. In the traditional economic model, resources are extracted from the earth's ecosystems, manufactured into products, and disposed of at the end of their lifetime. This is referred to as the 'take, make, waste' linear model, as most natural resources cannot be recovered after the product's disposal, leading to depletion and extraction of further resources from the ecosystem (Ellen MacArthur Foundation, 2012).

In response to widespread concerns and campaigns to curb this unsustainable practice, researchers, policymakers, and businesses are studying, promoting, and enacting the CE as a prominent alternative to the linear economy. The CE aims to convert linear processes of production, usage, and disposal to circular ones that replace the latter with recovery and regeneration, thereby maximising the utility of products, components, and materials and reducing or eliminating waste. The CE is 'restorative or regenerative by intention and design' (Ellen MacArthur Foundation, 2013, p. 7) and is considered a major paradigm shift towards sustainability (Geissdoerfer, Savaget, Bocken, & Hultink, 2017; Ranta, Aarikka-Stenroos, Ritala, & Mäkinen, 2018; Re, Magnani, & Zucchella, 2021) as it encapsulates various sustainability trends such as carbon neutrality, resource efficiency, and industrial ecology (Ranta, Keränen, & Aarikka-Stenroos, 2020).

Start-ups and small and medium enterprises (SMEs) (defined by the European Commission's criteria as enterprises with a headcount of less than 250 employees and either an annual turnover of up to €50 million or a balance sheet total of up to €43 million: [https://ec.europa.eu/growth/smes/sme-definition\\_en](https://ec.europa.eu/growth/smes/sme-definition_en)) are considered to be the backbone of the economy as they constitute the vast majority of enterprises in the European Union (EU) and are a major source of innovation, job creation, and economic growth (European Commission [EC], 2020b). Therefore, the entrepreneurs who establish and run them are potentially vital catalysts in transitioning towards greater sustainability and circularity (Pizzi, Corbo, & Caputo, 2021), including by closing the loop on dwindling resources. While the literature on entrepreneurship and SMEs in the CE is underdeveloped (Suchek, Ferreira, & Fernandes, 2022), both in comparison to that on large organisations in the CE and on SMEs in the linear economy, a small but growing number of researchers have started to turn their attention to smaller, younger businesses in the context of the CE. Notably, the term 'circular entrepreneurship' has very recently appeared in the academic literature. This is defined as the 'processes of exploration and exploitation of opportunities in the circular economy domain' (Zucchella & Urban, 2019, p. vii) and has already been studied in relation to various concepts, including its antecedents and consequences in emerging markets (Dantas, Ilyas, Martins, & Rita, 2022), circular business models (Cullen & De Angelis, 2021; Henry, Bauwens, Hekkert, & Kirchherr, 2020; Zucchella & Previtati, 2019), motivation and identity (Henry, Hoogenstrijd, & Kirchherr, 2021, 2023), and value co-creation (Re & Magnani, 2022, 2023). However, one of the cornerstones of entrepreneurship – the identification of opportunities – has largely been neglected by CE researchers.

Opportunity identification is fundamental in entrepreneurship (Shane & Venkataraman, 2000), and a considerable amount of literature has been published on opportunity identification in traditional business venturing (see Gaglio, 2018, for a review). However, although the CE could lead entrepreneurs to countless creative value propositions (Zucchella & Urban, 2019), the limited research that sheds some light on opportunity identification in the CE does not focus on this phenomenon but only includes it as an element of their research on the business models of circular enterprises (Cullen & De Angelis, 2021; Rok & Kulik, 2020), leaving a gap in the literature that is worth addressing.

The main aim of this study is to address this gap in the literature by exploring opportunity identification among entrepreneurs in the CE. In order to address this broad aim, the following two research questions are posed: (1) *How do circular entrepreneurs identify opportunities in the CE?* and (2) *How are CE principles reflected in the opportunities identified by circular entrepreneurs?* For the purpose of this study, circular entrepreneurs are defined as founders and/or owner-managers of start-ups and SMEs who have identified entrepreneurial opportunities which employ a circular aspect and act in accordance with CE principles (Dantas, Ilyas, Martins, & Rita, 2022). In line with Zucchella and Urban's (2019) definition introduced above, circular entrepreneurship is defined in this study as entrepreneurial activity that is aligned with CE principles. This includes the identification, exploration, and exploitation of circular opportunities, which are defined as profitable opportunities that aim to drive growth decoupled from the use of scarce natural resources. The research questions are addressed by means of a qualitative approach, employing semi-structured interviews with nine circular entrepreneurs from three EU member states with high (Netherlands), middle (Ireland), and low (Malta) Resource Efficiency Scoreboard rankings (EC, 2015b).

This study contributes to the literature by being the first to focus on the crucial yet underexplored phenomenon of circular opportunity identification. Given the novelty of this concept and the paucity of literature on circular entrepreneurship, this research aims to develop theoretical foundations in this domain by building on and extending transferrable theory from the neighbouring fields of sustainable entrepreneurship and the CE. Specifically, it proposes a conceptual model that integrates theoretical underpinnings of sustainable opportunity identification (Patzelt & Shepherd, 2011) and CE principles (Ellen MacArthur Foundation, 2015) and explores it empirically to assess its suitability for circular opportunity identification.

In addition to these theoretical contributions, this paper responds to calls for research that has ‘real-world’ societal outcomes and implications (Chapman, Cully, Kosiol, Macht, Chapman, Fitzgerald, & Gertsen, 2020; Macht, Chapman, & Fitzgerald, 2020). It sheds light on factors that facilitate circular opportunity identification, with a view to accelerating the transition to a CE. This in turn bears practical relevance, as the CE represents significant economic, social, and environmental opportunities for business, as highlighted in a study by the Ellen MacArthur Foundation (2015). This study estimated that, by 2030, the CE could generate €1.8 trillion for the economy in Europe, net material cost savings of more than US\$ 700 billion in global consumer goods companies, significantly reduce greenhouse gas emissions, and create more than 100,000 new jobs, leading to positive environmental and social impact.

## Theoretical background

### *The circular economy*

The CE has gained traction in recent years within the global business and academic communities, primarily as it has been championed by the Ellen MacArthur Foundation think tank whose mission is to spread the widest possible use of the CE (Sauvé, Bernard, & Sloan, 2015). The Ellen MacArthur Foundation (2015) identified three principles upon which the CE is built, namely:

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows ... Optimise resource yields by circulating products, components and materials in use at the highest utility at all times ... Foster system effectiveness by revealing and designing out negative externalities (p. 23).

Grounded upon these three principles, the Ellen MacArthur Foundation (2015) proposed the ReSOLVE framework, which consists of six ‘levers’ or action areas that organisations may utilise in order to engage with the CE. The first lever is ‘Regenerate’, which refers to a shift towards renewable energy and materials, return of biological resources to the biosphere, and restoration of ecosystems. The second lever is ‘Share’, whereby entrepreneurs maximise utilisation of assets through practices such as peer-to-peer sharing and prolonging the life of products through maintenance, repair, and design. The third lever is ‘Optimise’, which enhances the efficiency of products by removing waste in the production process or inefficiencies in the supply chain. The fourth lever is ‘Loop’, which keeps all materials in the economy in closed loops through practices such as re-manufacturing and recycling. ‘Virtualise’ is the fifth lever, which delivers utilities virtually rather than materially. Finally, ‘Exchange’ is the sixth lever, which replaces old and inefficient materials with advanced renewable ones and/or new technologies and generates value through perpetuating resources. This framework provides a starting point for translating the CE principles into entrepreneurial opportunities (Lewandowski, 2016). Through this model and its guiding principles, entrepreneurs may identify opportunities that generate value from products, components, and materials that were previously considered as waste (Ellen MacArthur Foundation, 2015).

Despite being a contemporary movement, the CE is founded upon long-standing concepts in sustainable development (SD) practices. SD is defined by the World Commission of Environment Development (WCED, 1987) as development which is ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’ (para. 1). In a world where ‘the climate crisis and sustainable development are critical elements in humanity’s fate’ (Sheppard & Young, 2020, p. 929), SD implies that economic growth should integrate the protection of the environment and societal needs. This equal consideration of financial, social, and environmental aspects in business performance is widely known as the ‘triple bottom line’, or the ‘3Ps’ for ‘Profit’, ‘People’, and ‘Planet’ (Elkington, 1997).

Sauvé, Bernard, and Sloan (2015) identify a number of sustainable schools of thought on which the CE is based, including the ‘cradle-to-cradle’ approach, where waste is considered a perpetuating

source of value (McDonough & Braungart, 2002), the service or functional economy, where services are sold instead of products (Stahel, 1997), and industrial ecology, which focuses on the material and energy flows through industrial ecosystems (Graedel & Allenby, 1995). Rooted in these SD concepts, the CE paradigm introduces a new perspective to view the economy, where economic growth is independent from the consumption of finite resources as end-of-life materials and products are perceived as resources rather than waste (Sauvé, Bernard, & Sloan, 2015). This reduces the demand for virgin raw materials and their subsequent waste disposal through the closing of material cycles.

Some academics argue that due to these underlying concepts, the CE favourably contributes to all the elements of the triple bottom line and may be used as a tool in reaching sustainability (Birat, 2015; Ghisellini, Cialani, & Ulgiati, 2016; Sauvé, Bernard, & Sloan, 2015). Whilst SD promotes a balanced and simultaneous consideration of the economic, environmental, and social elements of an economy, advocates of the CE argue that it contributes to reconcile those aspects and promotes a more suitable and comprehensive use of resources aimed at implementing a greener economy (Ellen MacArthur Foundation, 2015; Ghisellini, Cialani, & Ulgiati, 2016; Sauvé, Bernard, & Sloan, 2015). Through a CE approach, entrepreneurs and businesses seek to achieve profitability whilst also achieving a positive societal and ecological impact. In this light, transitioning towards a CE is seen as a way towards sustainability, which goes further than just improving existing production processes as in other sustainable practices (WEF, 2014). This belief is held strongly by the EU, which earmarked the transition to a CE as a prerequisite in reaching many of the 17 SD goals that were embraced in 2015 (Ellen MacArthur Foundation, 2017) and adopted a Circular Economy Action Plan in 2020 as one of the key building blocks of the European Green Deal (EC, 2020a).

### *Circular entrepreneurship*

As noted above, circular entrepreneurship is a novel concept that appeared in the academic literature only recently, but it is steadily attracting increasing attention from researchers. To elaborate on Zucchella and Urban's (2019) definition provided in the Introduction, circular entrepreneurship may be defined as 'a process of opportunity recognition, product development, and opportunity exploitation within CE' (Dantas, Ilyas, Martins, & Rita, 2022) or as 'independent and innovative entrepreneurial activity that is embedded in a CBM', where CBMs (Circular Business Models) refer to 'circular operations on the micro-level that aim at closing material loops or increasing resource efficiency' (Henry, Hoogenstrijd, & Kirchherr, 2023, p. 1124).

Circular entrepreneurship is distinguished from traditional entrepreneurship, which is capitalistic by nature and defined as 'the discovery and exploitation of profitable opportunities' (Shane & Venkataraman, 2000, p. 217). Although they share the core similarity of opportunity identification and exploitation, circular principles such as the recovery of resources fall outside the scope of traditional entrepreneurship where the entrepreneur's primary objective is to make financial gains. Therefore, traditional entrepreneurs generally operate within a linear economic model or in alignment with linear principles.

Circular entrepreneurship may also be distinguished from sustainable entrepreneurship, although this distinction is less stark. Sustainable entrepreneurship is defined as 'the discovery, creation and exploitation of opportunities to create future goods and services that sustain the natural and/or communal environment and provide development gain for others' (Patzelt & Shepherd, 2011, p. 632), thereby broadening its focus from the sole emphasis on profitability that characterises traditional entrepreneurship, to also encompass social and environmental aspects.

Although there are similarities between the goals of circular and sustainable entrepreneurship, the concepts are not synonymous. The principles of the CE are sustainable by nature, as the CE is built on the notion that all resources should be sustained indefinitely, thereby covering the entire realm of sustainability in terms of resources, energy, and labour (Ellen MacArthur Foundation, 2012). This means that, in essence, circular entrepreneurs are always sustainable entrepreneurs, but the inverse is

not necessarily true, as sustainable entrepreneurs may operate within a linear economy whilst looking to minimise externalities and have a positive impact on society and the environment. While the social aspect may not always be as evident as the environmental element in circular entrepreneurship (Henry, Hoogenstrijd, & Kirchherr, 2023), safeguarding and improving the natural environment has far-reaching benefits including on society. For example, combatting climate change, which is one of the UN's SDGs, is often referred to as a 'wicked problem par excellence' as it is closely interlinked with all the other SDGs that incorporate various social issues (Wohlgezogen, McCabe, Osegowitsch, & Mol, 2020). In contrast, the environmental aspect appears to dominate in circular entrepreneurship (Henry, Hoogenstrijd, & Kirchherr, 2023), yet the latter differs from environmental entrepreneurship, which is defined as 'the process of discovering, evaluating, and exploiting economic opportunities that are present in environmentally relevant market failures' (Dean & McMullen, 2007, p. 58). As this definition implies, environmental entrepreneurship focuses only on environmental causes and operates within a linear economy.

To a certain extent, sustainable entrepreneurship could be understood as an umbrella term for different types of entrepreneurship, including circular entrepreneurship. However, Rok and Kulik (2020) posit that the term 'circular' is more meaningful in practice than 'sustainable' because it describes a means to achieve a certain level of sustainability, whereas the concept of SD often concentrates on creating economic, environmental, and social value, while failing to identify specific ways to achieve it. This key distinction between sustainable and circular entrepreneurship was also identified by Henry, Hoogenstrijd, and Kirchherr (2023), as follows:

Even if potentially related, circular entrepreneurs conceptually differ from sustainable entrepreneurs because they apply a common 'how' (i.e., circular principles) in their business models in addition to the relatively vague 'what' that is common among sustainable entrepreneurs (i.e., environmentally or socially beneficial innovations). This level of alignment on the 'how' is unprecedented and makes grassroots circular entrepreneurs one of the few distinct groups in the context of sustainable entrepreneurship research (p. 1123).

In other words, sustainable (as well as social and environmental) entrepreneurship addresses the 'what', while circular entrepreneurship is concerned with the 'how'. Moreover, circular entrepreneurship provides a very specific framing through the three above-mentioned principles, which sustainable entrepreneurship arguably fails to do. Circular entrepreneurship has a laser sharp focus in terms of aiming to decouple economic activity from the extraction of the world's finite resources and, through this framing, entrepreneurs can explore alternative business models and opportunities (e.g., access instead of ownership), as outlined next.

### *Circular opportunity identification*

As mentioned earlier, the identification of opportunities is at the heart of entrepreneurship, and an extensive body of literature has been developed on the topic. Opportunity identification is a core element of widely cited definitions of entrepreneurship, such as 'the discovery and exploitation of profitable opportunities' (Shane & Venkataraman, 2000, p. 217), and is the subject of a philosophical debate regarding whether opportunities are objectively 'out there' to be discovered (positivist view) or if they are created or enacted (social constructionist view) by entrepreneurs (Vaghley & Julien, 2010). Without getting into the merits of the debate, opportunity identification – which may be understood to encompass both possibilities – has been the focus of numerous studies (e.g., Baron, 2006; Baldacchino, Ucbasaran, & Cabantous, 2023; Grégoire, Barr, & Shepherd, 2010; Gruber, MacMillan, & Thompson, 2008, 2012, 2013; Shepherd & DeTienne, 2005) that have sought to address the key question of why certain people discover entrepreneurial opportunities whilst others do not (Shane & Venkataraman, 2000).

Some research has been conducted on opportunity identification within the neighbouring fields of sustainable and environmental entrepreneurship (Choongo, Van Burg, Paas, & Masurel, 2016;

Cohen & Winn, 2007; Dean & McMullen, 2007; Hanohov & Baldacchino, 2018; Muñoz & Dimov, 2017; Patzelt & Shepherd, 2011), but it is largely absent in the domain of circular entrepreneurship. According to Dean and McMullen (2007), environmental market failures represent opportunities for achieving profitability while also reducing environmentally degrading behaviours. Similarly, Cohen and Winn (2007) maintain that environmental degradation is caused by market imperfections and that these represent business opportunities for entrepreneurs. The underpinning notion is that the decline of the natural environment, which constitutes market failures, functions as a driver for opportunities which entrepreneurs can identify and capitalise upon. Yet, although the CE may inspire entrepreneurs to generate numerous creative value propositions (Zucchella & Urban, 2019), including to address linear model market failures, very limited research has shed light on opportunity identification in the CE. Worthy of note are studies by Cullen and De Angelis (2021) and Rok and Kulik (2020), both of which found that prior knowledge of an environmental problem in the entrepreneurs' personal lives led to the identification of circular entrepreneurial opportunities. They also found that the entrepreneurs' personal motivations, purpose-led attitudes, and altruistic motivations to solve ecological challenges helped drive them to seek and identify circular solutions.

### *Conceptual model*

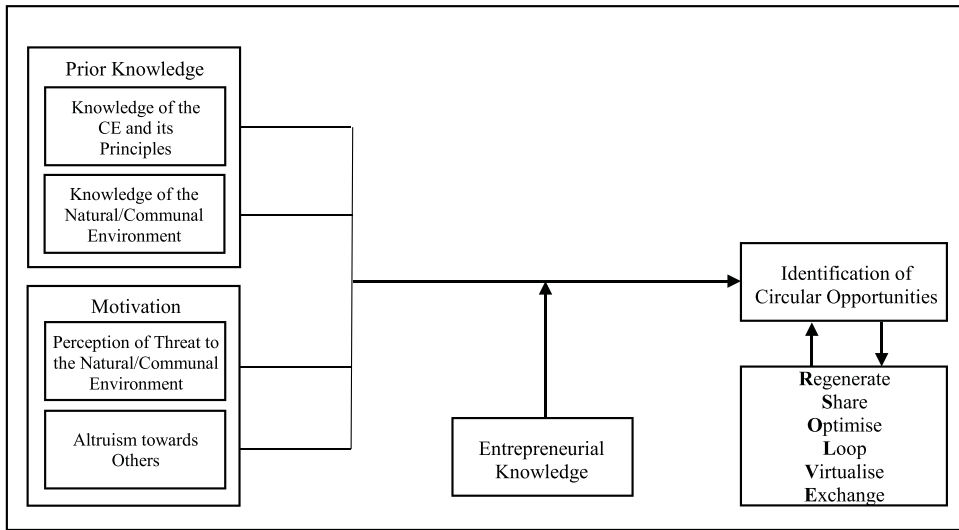
As a result of the paucity of research on circular opportunity identification, there are currently no published conceptual frameworks dedicated to this phenomenon. However, as circular entrepreneurship is sustainable by nature (Birat, 2015; Ghisellini, Cialani, & Ulgiati, 2016; Sauvé, Bernard, & Sloan, 2015), opportunity identification in circular entrepreneurship may be similar to that in sustainable entrepreneurship. The sustainable entrepreneurship literature may therefore be used as a relevant basis to study circular entrepreneurship (Henry, Hoogenstrijd, & Kirchherr, 2023). In view of this, Patzelt and Shepherd's (2011) model of sustainable opportunity recognition was deemed a suitable starting point to explore circular opportunity identification. This model proposes that sustainable opportunity identification is an outcome of (i) prior knowledge of the surrounding communal and natural environments; (ii) motivation for one's own gains; (iii) motivation for others' gains (altruism); and (iv) entrepreneurial knowledge.

However, as sustainable and circular entrepreneurship are not synonymous (Kristensen & Mosgaard, 2020), relying exclusively on a sustainable entrepreneurship model may not be sufficient to capture 'the particularities, intricacies and the variables that foster circular entrepreneurship' (Henry, Hoogenstrijd, & Kirchherr, 2023, p. 1123). Patzelt and Shepherd's (2011) model was therefore adapted to address the research questions and offer actionable suggestions for entrepreneurs looking to develop circular enterprises by (1) including prior knowledge of the CE and its principles as an enabler of opportunity identification in this context and (2) integrating the ReSOLVE framework (Ellen MacArthur Foundation, 2015) to illustrate the circular nature of the identified opportunities. The adapted model is depicted in [Figure 1](#) and outlined below.

### *Prior knowledge*

The first component of the conceptual model is prior knowledge, which comprises knowledge of the CE and its principles, and knowledge of natural and communal environments.

Prior knowledge of the CE and its principles was added to Patzelt and Shepherd's framework as an enabler of opportunity identification in this context, as this type of prior knowledge may direct entrepreneurs' attention towards CE practices and facilitate circular opportunity identification. This is consistent with the mainstream entrepreneurship literature (Shane, 2000), in that entrepreneurs identify opportunities related to the information that they possess. It is also aligned with the sustainable entrepreneurship framework of Patzelt and Shepherd (2011), who give the example of marine biologists who would be more likely to focus their attention on opportunities to develop sustainable fish farms that reduce overfishing, if they are attuned to the notions of sustainability and sustainable entrepreneurship. Extending this into the circular entrepreneurship domain, it may be argued that



**Figure 1.** The circular opportunity identification model (adapted from Ellen MacArthur Foundation, 2015; Patzelt & Shepherd, 2011).

marine biologists may be more likely to identify an opportunity to develop fish farms that are circular by design, if they have prior knowledge about the CE and its principles.

Prior knowledge of problems in the natural and communal environment as enablers of circular opportunity identification is derived from Patzelt and Shepherd's (2011) framework, which suggests that the identification of sustainable opportunities is facilitated when individuals focus their attention on opportunities related to their own stock of prior knowledge for a given aspect of their environment. This was supported by Hanohov and Baldacchino (2018) who identified spending time abroad and socialisation as contributors to knowledge of natural and communal environments. Prior knowledge of environmental problems is also relevant for circular opportunity identification, as illustrated by Cullen and De Angelis (2021) and Rok and Kulik (2020). The CE is a response across all levels to knowledge of the current economic system's failure to sustain the natural and communal environments. Individuals pay attention to those areas of the environment in which they possess prior knowledge and are increasingly likely to identify opportunities for circular entrepreneurship in those areas.

### Motivation

The second component of the conceptual model refers to motivation as a key enabler of circular opportunity identification and proposes two motivational elements that play an important role in this regard, namely motivation for personal gains (perception of threat) and motivation to develop gains for others (altruism). This also reflects Patzelt and Shepherd's (2011) model, which identifies these motivators as important elements of sustainable opportunity identification. They argue that individuals are more likely to identify sustainable opportunities when they perceive that their own physical and psychological well-being is threatened, and if they possess a high level of altruism towards others. This was supported by Hanohov and Baldacchino's (2018) research regarding sustainable opportunity identification, which found that perception of threat to the environment increases the likelihood of recognising a sustainable opportunity and that all participants in their study possessed altruistic motivation with 'selfish aspects' (p. 26).

It may be argued that this also holds true for circular opportunity identification, as this could be a reaction to a threat or a desire to alleviate harmful effects of unsustainable development on others. This was supported by Rok and Kulik (2020), who identified an ulterior form of personal gain in

the context of circular entrepreneurship: The founders in their study were indeed driven to solve environmental problems, but they were also motivated by others' perception of their solutions as unique, innovative, and pioneering.

Recent research on the motivations of circular entrepreneurs (Henry, Hoogenstrijd, & Kirchherr, 2021, 2023) made a similar distinction between personal gains and altruism but related the former to self-realisation, profit, or income security and split the latter into altruism towards others (social altruism) and towards non-human species and the natural environment (biospheric altruism). They found self-realisation and biospheric altruism to be the dominant drivers towards circular entrepreneurship.

### *Entrepreneurial knowledge*

The third component of the model represents knowledge of markets and customer problems that is acquired through involvement in entrepreneurial activities. This is in line both with the literature on traditional entrepreneurship (e.g., Baron, 2006; Baldacchino, Ucbasaran, & Cabantous, 2023; Grégoire, Barr, & Shepherd, 2010; Gruber, MacMillan, & Thompson, 2008, 2012, 2013; Shane, 2000; Shepherd & DeTienne, 2005) and with Patzelt and Shepherd's (2011) sustainable entrepreneurship model. The latter propose that entrepreneurial knowledge plays a moderating role between the above-mentioned factors and sustainable opportunity identification, which requires individuals to associate their stocks of knowledge of the environment with their prior entrepreneurial knowledge. Hanohov and Baldacchino (2018) found that prior jobs and projects lead to entrepreneurial knowledge, while Muñoz and Dimov (2017) found that prior knowledge facilitates the process when moral intensity (the extent to which one feels the need to act due to moral standards and values) is high. As the model is adapted in this study to include the element of prior knowledge of the CE and its principles as an antecedent, a similar relationship may be expected with entrepreneurial knowledge to enable circular opportunity identification. Entrepreneurial knowledge also strengthens the effect of motivation, both for personal gain and altruism, and plays a role in directing an individual's attention towards sustainable opportunities (Patzelt & Shepherd, 2011). In this study's adapted model, it is proposed that the same relationship holds true for the recognition of circular opportunities. However, the moderating role of entrepreneurial knowledge cannot be validated in this qualitative study as this would require statistical analysis.

### *The ReSOLVE framework for circular opportunity identification*

The final element in the model integrates the Ellen MacArthur Foundation's ReSOLVE framework which, as outlined above, provides six 'levers' or action areas that organisations may implement to engage in the CE, namely Regenerate, Share, Optimise, Loop, Virtualise, and Exchange. The ReSOLVE levers are not opportunities in themselves, but enacting them may enable entrepreneurs to identify and exploit circular opportunities by addressing market inefficiencies and externalities (Dean & McMullen, 2007) in a linear economy, primarily in terms of ineffective use of resources. Moreover, the ReSOLVE actions are likely to be reflected, at least to some extent, in the circular opportunities that are identified by entrepreneurs.

Previous research has indicated that SMEs may be discouraged to engage with sustainability frameworks and practices if they are perceived as too demanding; therefore, easier tools are needed to assist SMEs to transition towards sustainability (Dalton, 2020). To the extent that circular entrepreneurship is sustainable by nature (Birat, 2015; Ghisellini, Cialani, & Ulgiati, 2016; Sauv e, Bernard, & Sloan, 2015), this argument may be extended to state that the relative simplicity and practicality of the ReSOLVE framework may add value to entrepreneurs' efforts to engage with the CE. Moreover, although the ReSOLVE framework was initially practitioner-oriented (unlike Patzelt & Shepherd's, 2011 theoretical model), it has since been applied in various scholarly studies (e.g., Jabbour, de Sousa Jabbour, Sarkis, & Godinho Filho, 2019; Lewandowski, 2016; Manninen, Koskela, Antikainen, Bocken, Dahlbo, & Aminoff, 2018; Pizzi, Corbo, & Caputo, 2021; Re, Magnani, & Zucchella, 2021; Seles, Mascarenhas, Lopes de Sousa Jabbour, & Trevisan, 2022; Tedesco, Simioni, Sehnem, Soares, & Junior, 2022), which indicates its growing acceptance in the academic community.



In view of the above, it was considered appropriate to integrate the ReSOLVE framework into the present study's conceptual model.

## Methods

### *Context, sampling, and recruitment*

The focus of this research was on circular opportunity identification among SMEs located in three EU member states with high (Netherlands), middle (Ireland), and low (Malta) Resource Efficiency Scoreboard rankings. The EU context provided a relevant setting for the study, given the priority of the CE in Europe's SD policy (EC, 2015a) and Circular Economy Action Plan (European Commission, 2020a). The aim of selecting three countries was not to carry out a comparative analysis but to provide a more balanced overview, as opposed to being subject to the biases of micro-level issues in a single European State.

The selection of research participants was carried out using purposive sampling (Shaughnessy & Zechmeister, 1997). This is a non-probability sampling method where participants are chosen according to a set of pre-defined criteria (Bryman, 2012), thereby leading to the creation of a theoretically relevant sample (Davidsson, 2004). For inclusion in this research, participants were required to fulfil the definition of a circular entrepreneur as stated above, that is, that they were founders and/or owner-managers of SMEs operating in one of the three selected EU states, who identified a circular opportunity (also defined above, in the Introduction) in accordance with at least one of the three CE principles defined by the Ellen MacArthur Foundation, namely: (1) preserve and enhance natural capital, (2) optimise resource yields, and/or (3) foster system effectiveness. This study considered that circular entrepreneurship, like other forms of entrepreneurship, may unfold in both start-ups – or 'born circular firms' and in established companies – or 'growing circular firms' (Re, Magnani, & Zucchella, 2021; Zucchella & Urban, 2019); therefore, the age of the company was not a criterion for selection. The age and gender of the participants were not criteria for inclusion or exclusion either.

Prospective participants were identified through online networks such as LinkedIn and personal contacts that were established with individuals and businesses operating in the CE. An additional source for identifying candidates was 'The Circularity Awards Program' (<https://thecirculars.org/awards-program>), which is an international award program for notable contributions to business venturing within CE principles. The circular aspects of the participants' identified opportunities were primarily identified through analysing their websites and online communications. In cases where the circular nature of the business was not mentioned explicitly but was evident due to its alignment with the principles, the entrepreneurs were contacted directly and asked whether they considered their businesses to have a circular aspect. If they answered positively, then they were deemed to have satisfied this criterion.

A total of 23 entrepreneurs were contacted, and 19 of these were found to meet the research criteria. From this shortlist, nine participants were recruited – three from each of the selected countries. The final sample was determined by the entrepreneurs' willingness and availability to partake in the study, whilst striving for a balanced country representation. Although the small sample does not permit generalisation of findings, it was considered appropriate to address the research questions as rich, in-depth data that could be gathered from each participant to shed light on the nature of their circular opportunities and their circular opportunity identification process. Qualitative approaches with small samples are not unusual in CE research (e.g., Cullen & De Angelis, 2021; Pizzi, Leopizzi, & Caputo, 2022; Re, Magnani, & Zucchella, 2021; Rok & Kulik, 2020), particularly when in-depth insights are sought or when access to key informants is challenging.

### *Research participants*

All nine participants were male, and seven were of the nationality where their SMEs were in operation. The other two were French and Hungarian and had established their businesses in Malta and Ireland,

**Table 1.** Overview of research participants

Company name and website	Country	Sector	Core circular activity
Fetch It; <a href="http://www.getfetchit.com">www.getfetchit.com</a>	Malta	Logistics	Green on-demand delivery service that makes use of bicycles instead of motor vehicles
Freshy; <a href="http://www.freshy.io">www.freshy.io</a>	Malta	Food and beverage	Mobile application designed to redistribute surplus food, by enabling restaurants to sell pre-cooked excess food at a discounted price instead of discarding it
GreenR Cabs; <a href="http://www.greenr.cab">www.greenr.cab</a>	Malta	Transport	Zero-emission taxi service that makes use of 100% electric cars
Mamukko; <a href="http://www.mamukko.ie">www.mamukko.ie</a>	Ireland	Accessories	High-end accessories made of upcycled end-of-life materials such as sails, fishing nets, and life rafts
Iameco; <a href="http://www.iameco.com">www.iameco.com</a>	Ireland	Computers	Computers designed with material value maximisation as a primary objective, through the use of natural and recycled materials in manufacturing, and the possibility for disassembly, repair, upgrading, and re-use
Wisetek; <a href="http://www.wisetek.net">www.wisetek.net</a>	Ireland	Information technology	Recovery of used computer components and e-waste recycling
Closing the Loop; <a href="http://www.closingtheloop.eu">www.closingtheloop.eu</a>	Netherlands	Telecom	Gives good-quality second-hand mobile phones a second life in Africa and simultaneously creates a reverse-distribution system in less developed nations to collect mobile phones for recycling
MUD Jeans; <a href="http://www.mudjeans.eu">www.mudjeans.eu</a>	Netherlands	Clothing	Pioneered the leasing of jeans where all elements can be recovered to later be upcycled or recycled
Dutch Awearness; <a href="http://www.dutchawearness.com">www.dutchawearness.com</a>	Netherlands	Clothing	Design of 100% recyclable uniforms and corporate wear for businesses and organisations

respectively. Six participants had completed a tertiary level of education, one was in the process of completing his tertiary studies, and two withdrew from their studies to pursue entrepreneurial activity or to work in the industry from a young age. Five participants were running their first business at the time of the study, whereas the other four had prior entrepreneurial experience with other ventures. Further details about the participants' ventures, including their companies' names (disclosed with their consent), sector, and core circular activities, are presented in [Table 1](#).

### Data collection

This study adopted an exploratory qualitative research approach, employing semi-structured interviews as the data collection method. Prior to data collection, an interview guide was formulated on the basis of the study's conceptual model ([Fig. 1](#)). This included pre-defined questions and prompts to ensure coverage of the key issues identified in the literature ([Creswell, 2009](#)). This interview guide enabled a similar approach across all interviews and facilitated the comparison of data collected from the different participants, while allowing a degree of digression to follow any emergent leads ([Frankfort-Nachmias & Nachmias, 1996](#)). Moreover, although the order of the questions was not firmly fixed, it helped to have the topics prepared in a logical sequence.

The first question was a non-threatening ice-breaker about the interviewees' backgrounds to help put them at ease and establish rapport between them and the interviewer ([Brennen, 2013](#)). They were then asked exploratory questions about the CE, circular entrepreneurship, and their experiences in founding circular businesses. Next, they were asked about their circular opportunity identification process, beginning with a non-leading question, about the circumstances that led them to recognise their circular opportunities, followed by questions based on this study's conceptual model.

The data collection was carried out by the first author during the month of March 2017. The interviews with participants based in Malta were held in person at the entrepreneurs' premises, as this is the researchers' country of residence. The interviews with participants based in the Netherlands and Ireland were conducted over video call, due to financial limitations and time constraints. The average length of the interviews was 35 minutes. All interviews were conducted in English, audio-recorded with the consent of the participants, and transcribed and analysed manually using a thematic analysis strategy. Traditionally, this method allows themes to emerge inductively throughout the data analysis process; however, pre-defined themes may also be established to address particular theoretical aspects of the research (Creswell, 2009). In this study, the analysis was initially guided by a set of themes that were pre-defined by the conceptual framework, followed by an inductive approach for the emergence of additional themes. These are presented and discussed in the next section.

## Findings and discussion

The following sections present the main findings of this study and discuss them in the light of the literature reviewed above. The findings and discussion relating to RQ1, which asks, 'How do circular entrepreneurs identify opportunities in the CE?', are presented first and organised under sub-headings that represent the antecedents of circular opportunity identification in the conceptual model. The findings and discussion that address RQ2, which asks, 'How are CE principles reflected in the opportunities identified by circular entrepreneurs?', are presented next in relation to the ReSOLVE levers.

**RQ1:** How do circular entrepreneurs identify opportunities in the CE?

### *Prior knowledge*

The first key theme relates to prior knowledge of the CE and its principles, in accordance with this study's conceptual model. The participants possessed varying levels of knowledge of circularity prior to identifying their opportunities. Four participants described this type of knowledge as playing an important role in their opportunity identification, two of whom made direct reference to their knowledge of the fundamental 'cradle-to-cradle' (McDonough & Braungart, 2002) building block of the CE. For example, the founder of GreenR Cabs stated that he used to work for 'a big player in the CE' that 'did a lot of recycling and focussed heavily on SD'. He believed that 'this knowledge was embedded somewhere in (his) culture and had an important influence on (his) decision to start the company'. Similarly, the founder of Dutch Awareness recalled working for a key player in the cradle-to-cradle economy for 2 years prior to starting up, which inspired him to create 'a circular supply chain with clothes made of 100% recyclable polyester' that sells 'the performance of the garments instead of the clothes themselves'. The entrepreneur who founded Closing the Loop stated that 'the CE is clearly the next step after cradle-to-cradle, which is something I was very much aware of since around 2009, prior to starting up Closing the Loop' and claimed that this 'played a big part in identifying this business opportunity'.

Despite not explicitly mentioning stocks of knowledge of CE principles, two participants felt in hindsight that they may already have had a grasp on certain 'circular elements' when they identified opportunities. For example, the founder of Wisetek recalled that the CE was not so relevant when he initially established the company; however, they 'always practiced much of what the CE preaches today, particularly organising reverse logistics in the value chain and operating a "zero landfill policy"'. Overall these results support the notion that prior knowledge about the CE and its principles increases entrepreneurs' ability to recognise circular opportunities. One could argue that without specific knowledge about the CE or the schools of thought upon which it is built, the ability of entrepreneurs to identify circular opportunities may be hindered.

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The next theme relates to prior knowledge of natural and communal environments, also in accordance with the conceptual model. Eight participants referred to the role of this form of prior

knowledge as influencing their circular opportunity identification. Three of these became aware of issues in their local community or environment and subsequently started up a business based in that area to combat negative externalities. For example, the founder of GreenR Cabs recognised the worsening situation of traffic congestion and pollution in Malta and introduced a zero-emissions taxi service, while the founder of Iameco saw children dismantling and recycling computers in 1987 using a naked flame and set up a business to ‘reuse the product over and over again, so it stops the waste’. Three others acquired knowledge of linear issues in foreign environments, which were adversely affected by market inefficiencies during their travels abroad. In each of these cases, the founders identified circular solutions in their home country, which had positive environmental and social impacts in the adversely affected foreign areas. For example, the founder of Closing the Loop identified an opportunity to create a transparent and ethical value chain to address electronic waste challenges in Africa, while the founder of Dutch Awareness recalls that he was working on a project in Ethiopia and saw a landfill that was full of textiles from Europe. ‘The situation was really bad’, he said, ‘Along the years, I became increasingly aware that the textile industry was highly inefficient and wasteful’. It is reasonable to suggest that, as the trend of economic globalisation intensifies, the possibility to recognise entrepreneurial solutions of this nature will increase, as the global economy becomes more interconnected.

These results indicate that knowledge of the natural and communal environments influences the identification not only of sustainable opportunities (Hanohov & Baldacchino, 2018; Muñoz & Dimov, 2017; Patzelt & Shepherd, 2011) but also of circular ones as proposed in this study. This resonates with Cullen and De Angelis (2021) and Rok and Kulik (2020) and supports the notion that this form of knowledge enables entrepreneurs to identify circular opportunities by addressing market inefficiencies and negative externalities (Dean & McMullen, 2007) in a linear economy. Moreover, these findings are consistent with those of Hanohov and Baldacchino (2018) who also found spending time abroad as a key source of this type of knowledge.

### *Motivation*

Several participants were motivated primarily to achieve economic gains through circular principles, with the environmental and social benefits being welcome secondary motivators. For instance, the founder of GreenR Cabs said he was primarily motivated to seek a profitable solution to market imperfections (car emissions and air pollution), which had detrimental social and environmental repercussions: ‘The business is here to firstly make money. The fact that it is circular and sustainable is certainly a motivation ... it’s a bonus but it was not my primary motivation’. Furthermore, he also noted that by taking a circular approach, the economic case was more appealing in the long term. Similarly, the founder of Dutch Awareness spoke of the recognition of long-term savings achieved through circular practices: ‘I think for me and many of the companies we’re working with, the main driver of the CE was knowing how much money we can save on materials’.

The importance of personal economic gain as a motivator for the circular entrepreneurs in this study is markedly different from the personal gains considered by Patzelt and Shepherd’s (2011) model. However, it is consistent with recent findings that circular entrepreneurs are motivated by self-realisation, profit, and income security (Henry, Hoogenstrijd, & Kirchherr, 2021, 2023) and may be explained by the magnitude of the ‘business’ case for the CE as highlighted by the Ellen MacArthur Foundation (2015), which estimated that €1.8 trillion could be generated in profits by the CE in Europe by 2030. It is plausible that the motivation of personal economic gains holds more weight in circular entrepreneurship than in sustainable entrepreneurship, given the potential economic upside associated with circular business opportunities and influences the entrepreneurial mind when recognising circular opportunities.

Nevertheless, several participants expressed a desire to achieve the ‘triple bottom line’ (Elkington, 1997), which appeared to be influential in their circular opportunity identification process. For instance, the MUD Jeans founder was motivated to find a commercially viable solution to the

environmental and social injustices in the textile industry, while the founder of Mamukko spoke of the importance of considering the '3Ps' equally as opposed to being motivated solely by financial rewards in circular opportunity recognition.

Moreover, many participants explicitly mentioned an altruistic motivation to make a positive societal or environmental impact through their circular opportunity identification. For instance, the founder of Closing the Loop expressed his 'social' ambition to 'make the telecom industry nicer, more future proof and fairer', while the founder of Wisetek highlighted his motivation to pursue the 'planet' dimension: 'Of course, it's about taking care of the environment. It takes a long time for e-waste (electronic waste) to break down and it has the highest level of toxins, so you really don't want it to end up in the landfill. So, that's a big part of how Wisetek came to be'. These personal motivations to remedy unsustainable developments which are inherent to the linear economy are consistent with Rok and Kulik's (2020) observations about the purpose-led attitudes driving circular entrepreneurs and with Henry, Hoogenstrijd, and Kirchherr (2021, 2023) findings that circular entrepreneurs are motivated not only by personal gains but also by biospheric altruism and social altruism (the latter to a lesser extent). The present study also indicates that Patzelt and Shepherd's (2011) claim, and Hanohov and Baldacchino's (2018) findings, that perception of threat to the environment increases the likelihood of recognising a sustainable opportunity also apply to circular opportunity identification.

Another motivation identified in this study was the entrepreneurs' ambitions to be pioneers in the transition from the 'old' linear economy to the 'new' CE, which echoes the findings of Rok and Kulik (2020). Notably, five participants expressed a strong desire to challenge the status quo of the linear economy in their respective industries prior to identifying their circular opportunities. For example, the founder of MUD Jeans was motivated to 'be a pioneer in the CE and in the fashion industry', which is 'one of the biggest polluters in the world, and it also treats people very badly'. He wanted to show that things can be done differently and still be a fast-growing company. Similarly, the founders of Closing the Loop and Dutch Awearness expressed their ambitions to instigate a transition from linear to circular processes in their industries, creating a 'new economy' in the process. This ulterior form of personal gain that appears to motivate circular entrepreneurs echoes the findings of Rok and Kulik (2020) who also reported that the founders in their study were motivated by being regarded as pioneers and innovators.

A final form of motivation identified in this study concerns a sense of urgency that was expressed by several participants. These findings were all related to the worsening state of the environment and the perceived need to act before 'it's too late'. For instance, the founder of Iameco said that 'We're at five to midnight, it's that severe. The only way forward is by reusing, and using our resources more efficiently, that's our only hope and we have to act upon it'. The founder of Wisetek said the world has reached 'a point of no return' in terms of resource usage and that entrepreneurs would need to find alternative ways to do business other than traditional or linear entrepreneurship. The founder of Dutch Awearness expressed similar concerns about the degrading state of the planet as a result of the linear economy: 'We can't keep going at this rate. I honestly think there's no place for companies with a linear approach in 10 years' time'. These findings appear to lend support to Patzelt and Shepherd's (2011) proposition about perception of threat. In the above examples, the worsening state of the environment is motivating individuals to direct their attention towards sustainable and circular solutions. More notably, a combination of the magnitude of the situation and their values seem to be inspiring entrepreneurs into action. This draws parallels with the notion of 'moral intensity' (Muñoz & Dimov, 2017), which is the degree to which one feels a necessity to act due to moral standards and values. Whilst Muñoz and Dimov found no direct effect of moral intensity on sustainable opportunity intention, they observed the concept as a moderating factor of prior knowledge. Due to the design of this study, our findings cannot be used for measuring moderating effects. However, the findings do suggest that moral intensity may have an influence on inspiring circular entrepreneurial action: As the magnitude of the perception of threat reaches a certain threshold, a sense of urgency to act in accordance with one's values might be at play. Furthermore, the narrative of the CE is built upon an urgent

need to find a long-term solution to decouple economic growth from the consumption of the earth's increasingly finite resources (Ellen MacArthur Foundation, 2013).

### *Entrepreneurial experience and knowledge*

The fourth theme that emerged from the interviews concerns entrepreneurial experience and knowledge of markets and customer problems (which would not have been acquired had they not been involved in entrepreneurial activities), in accordance with the study's conceptual model. Four participants explicitly identified knowledge of markets and ways to serve them as an influencing factor in their circular opportunity identification. In two cases, this market knowledge was acquired through previous jobs, and in the other two, it derived from starting up prior companies, which is consistent with Hanohov and Baldacchino's (2018) findings on sustainable opportunity identification. For instance, the founder of MUD Jeans described his work experience with a Chinese textile manufacturer and a licencing textile company in France, which informed him about the inefficiencies of the industry and about the competences required to start up a circular business in the textile industry. The founder of Closing the Loop had direct entrepreneurial experience and knowledge in the same industry in which he founded his business. Consequently, he felt that 'the idea of Closing the Loop could obviously come more naturally' to him.

Three participants also referred to prior knowledge of customer problems as an influencing factor in their circular opportunity recognition. In each case, this knowledge was acquired through past employment or entrepreneurial experiences, which is also in line with Hanohov and Baldacchino's (2018) findings. For example, the founder of Iameco had specific knowledge about the large and wasteful nature of customers' computers, which he used to work on as an engineer. This led him to focus his attention on generating a solution to the customers' problem. The founder of Wisetek directly turned a challenge of his previous employer into his own entrepreneurial opportunity. Having previously worked with a major computer manufacturer, he was responsible for handling all the returns of data storage components, which were essentially viewed as a 'nuisance' by the company. He explains that he saw this problem as an opportunity and recognised the possibility to become a service provider by taking on their electronic waste and re-introducing it in other areas of the market for re-use or re-manufacturing.

These findings indicate that prior knowledge of markets and customer problems may facilitate opportunity identification, not only as indicated by past studies in traditional entrepreneurship (e.g., Baron, 2006; Baldacchino, Ucbasaran, & Cabantous, 2023; Grégoire, Barr, & Shepherd, 2010; Gruber, MacMillan, & Thompson, 2008, 2012, 2013; Shane, 2000; Shepherd & DeTienne, 2005) and sustainable entrepreneurship (Choongo, Van Burg, Paas, & Masurel, 2016; Hanohov & Baldacchino, 2018; Muñoz & Dimov, 2017; Patzelt & Shepherd, 2011) but also in circular entrepreneurship, thereby supporting and extending extant work on entrepreneurial opportunity identification. Entrepreneurial knowledge enhances the impact that the three explanatory elements have on the process of opportunity recognition for sustainable entrepreneurship (Patzelt & Shepherd, 2011). In the adapted model proposed in this study, entrepreneurial knowledge moderates the effects of the above-mentioned factors on circular opportunity identification. Although the moderating effects of entrepreneurial knowledge cannot be quantified due to the qualitative design of this study, some examples from the data suggest that this moderating effect may hold true. For instance, GreenR Cabs' example of synthesising entrepreneurial knowledge and personal motivation (perception of threat) almost identically mirrors an example used by Patzelt and Shepherd (2011) of an individual opening a 'green car store' (p. 640). This is also consistent with Hanohov and Baldacchino (2018), who found support for this claim but also could not measure the moderating effect due to their qualitative research approach. On the other hand, this disputes Choongo, Van Burg, Paas, & Masurel (2016) who found no support for the influence of entrepreneurial knowledge on the process, whereas this relationship fell outside the scope of Muñoz and Dimov's (2017) study. This study's findings propose that the definition of entrepreneurial knowledge is broadened to also include direct entrepreneurial experience.

**RQ2:** How are CE principles reflected in the opportunities identified by circular entrepreneurs?

An analysis of the opportunities identified by the circular entrepreneurs in this study revealed that they are characterised by the inherent CE principles of (1) preserving and enhancing natural capital, (2) optimising existing resources, and (3) fostering effective systems (Ellen MacArthur Foundation, 2015). The ReSOLVE framework (Ellen MacArthur Foundation, 2015) was identified as a conceptual model for businesses and entrepreneurs to recognise and enact such principles into circular entrepreneurial opportunities. As outlined above, the ReSOLVE framework takes the three core principles of circularity and applies them to the following six ‘levers’ or action areas: Regenerate, Share, Optimise, Loop, Virtualise, and Exchange (Ellen MacArthur Foundation, 2015).

**Regenerate**

Under this lever, entrepreneurs undertake actions to shift to renewable sources of energy and materials to regenerate the health of earth’s ecosystems. The founder of Fetch It identified an opportunity to start up a ‘technological, green on-demand delivery service’. He explained that his primary goal was to be using ‘100% clean energy by the year 2018’, whereby the shift from finite fossil fuels to clean energy constitutes a ‘Regenerate’ action. Similarly, the opportunity identified by GreenR Cabs was to establish a ‘zero-emission taxi service’ through a fleet of 100% electric cars. The founder explained that advancements in clean energy technology and declining costs have made electric cars more accessible, opting to shift to renewables. The entrepreneur behind Iameco set out to design computers which are energy efficient and eco-friendly. The computers’ housing is made of renewable or recycled wood instead of traditional non-renewable materials. Similarly, the opportunity identified by the founder of Dutch Awearness was to create clothes from renewable sources opting for the use of fully recyclable polyester.

**Share**

Through this lever, entrepreneurs can maximise the utilisation of products through shifting to business models focussed on access as opposed to ownership, reusing products and prolonging their life through repair. Examples include Iameco’s computers designed with durable components, which can easily be disassembled and replaced for upgrading, enabling them to prolong their computers’ life by up to 10 years. The Wisetek founder identified an opportunity to operate in a circular manner through the processing of used electronic equipment from data centres and major IT manufacturers. This equipment gets remanufactured or remarketed and reintroduced into the economy, thereby avoiding waste. In the case of the remarketed components, the ‘Share’ action is utilised as the second-hand market reintroduces materials into the economy. Similarly, Closing the Loop give scrapped mobile phones a second life in new market segments.

**Optimise**

This lever reflects an opportunity for businesses to improve the efficiency of a product or service through the removal of waste in supply chains. For instance, the entrepreneur behind Freshy identified an opportunity to develop a mobile application which serves as ‘a platform to relocate excess food to consumers’. This app allows catering establishments to promote last-minute discounted offers on the pre-cooked excess food which they failed to sell throughout the day. The app then promotes the offers to nearby customers. Freshy’s opportunity reflects the ‘Optimise’ lever through the reduction of food waste and improvement of restaurants’ overall efficiency. Similarly, Fetch It’s founder described his business as a connector that closes the gap between supply chains, acting as ‘a driving force to allow people to become more circular’ by ‘allowing clients to move objects very easily at the touch of a button and at a very good price’. In this sense, Fetch It’s opportunity also reflects the ‘Optimise’ action by enabling clients to maximise their resource use.

### *Loop*

This lever presents opportunities to keep materials in the economy functioning at their highest utility possible. Examples here include the founder of Mamukko who identified an opportunity to establish ‘an upcycling fashion firm’ that utilises ‘post-consumer materials’ such as used sails, life rafts, or fishing nets to produce luxury bags and accessories. This reflects the ‘Loop’ action as resources are circulated back into the economy rather than going to landfill. Similarly, Iameco, Closing the Loop, and Wisetek recover and remanufacture electric components, thus ‘looping’ the resources back into the economy. The founders of MUD Jeans and Dutch Awearness also identified innovative business opportunities to create closed loops in a traditionally wasteful fashion industry. MUD Jeans introduced a new concept named ‘Lease a Jeans’, whereby customers pay a monthly fee for access to jeans whilst the company retains ownership of the materials. At the end of use, customers return the jeans to the company, which either upcycles and sells them as vintage jeans or shreds and recycles them into new denim yarn. Dutch Awearness sell the ‘performance’ of clothes to corporate clients. In this way, the company retains ownership of the materials and customers pay for the utilisation of the garments. Once the products reach end of life, they are returned and remanufactured back into new garments.

### *Virtualise*

This action delivers utilities virtually rather than materially. The sole example of this lever in the present study is that of Freshy, whereby the start-up facilitates the exchange of excess food via an online mobile application.

### *Exchange*

The final lever includes replacing old and inefficient materials with advanced renewable ones and/or new technologies. The two garment-producing start-ups, MUD Jeans and Dutch Awearness, employ this lever through the introduction of their innovative models based on access to replace the linear one-way-consumption that is the status quo in the fashion industry. Freshy also introduced an innovative technology-based circular service to replace the standard practice of discarding excess food within the hospitality industry.

The above findings are summarised and mapped onto the ReSOLVE actions in [Table 2](#). They indicate that the ReSOLVE framework offers a means of understanding the circular principles in entrepreneurial opportunities. Furthermore, the framework provides entrepreneurs with a simple and practical tool for the implementation of circular opportunities, which may be applied to both new and established businesses (Ellen MacArthur Foundation, 2013). The findings suggest that, in their own ways, each action can facilitate the reversal of inefficiencies in the linear economy and decouple economic growth and entrepreneurial activity from the consumption of finite resources. The findings therefore suggest that if an individual is interested in sourcing a circular entrepreneurial opportunity, applying the action areas from the ReSOLVE framework is a good place to start. These levers can be applied to the challenges of the linear economy, such as market risk and natural systems.



## **Conclusion**

### *Academic contributions and practical implications*

This study contributes to the literature on the CE in general and on the emergent concept of circular entrepreneurship by being the first to focus on the critical yet underexplored phenomenon of circular opportunity identification. Considering that the literature on circular entrepreneurship is still nascent and dispersed (Suchek, Ferreira, & Fernandes, 2022), this study lays theoretical foundations in this domain by building on and extending transferrable theory from the neighbouring field of sustainable







**Table 2.** The ReSOLVE framework in action

		Implementation (research participants):								
ReSOLVE Levers and Possible Actions (Ellen MacArthur Foundation, 2015)		Fetch It	Freshy	GreenR Cabs	Mamukko	Iameco	Wisetek	Closing the Loop	MUD Jeans	Dutch Awareness
 <ul style="list-style-type: none"> <li>✓ Shift to renewable energy and materials</li> <li>✓ Reclaim, retain, and restore health of ecosystems</li> <li>✓ Return recovered biological resources to the biosphere</li> </ul>		Shifted from finite fossil fuels to clean energy	n/a	Shifted from finite fossil fuels to clean energy	n/a	Uses renewable or recycled wood for computer housing	n/a	n/a	n/a	Manufactures clothing from recyclable polyester
	 <ul style="list-style-type: none"> <li>✓ Peer-to-peer sharing (cars, rooms, appliances, etc.)</li> <li>✓ Re-use (second-hand) products</li> <li>✓ Prolong life through maintenance, repair, durability, upgradability, etc.</li> </ul>	n/a	n/a	n/a	n/a	Designs computers with accessible, durable components which can be replaced for upgrading, prolonging lifespan by up to 10 years	Remarks used computer equipment from data centres and IT manufacturers, re-introducing materials into the economy	Gives used mobile phones a second life	n/a	n/a

(Continued)

**Table 2.** (Continued.)

		Implementation (research participants):								
		Fetch It	Freshy	GreenR Cabs	Mamukko	lameco	Wisetek	Closing the Loop	MUD Jeans	Dutch Awareness
ReSOLVE Levers and Possible Actions (Ellen MacArthur Foundation, 2015)	 Increase performance/efficiency of product	Enables clients to control stock flows between the outlets, avoiding waste in the process	Reduces restaurants' food waste and improves efficiency by enabling them to promote last-minute offers on pre-cooked excess food	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	 Remove waste in production and supply chain									
	 Leverage big data, automation, remote sensing and steering									
	Remanufacture products or components	n/a	n/a	n/a	Produces accessories from used materials, such as sails, fishing nets and life rafts	Recovers and remanufactures end-of-life computers and parts	Remanufactures used electronic equipment	Recycles mobile phone components	Leases garments, then upcycles and sells them as vintage jeans or shreds	Collects and remanufactures end-of-life clothing into new garments
	Digest anaerobically									
	Extract biochemicals from organic waste									

(Continued)

**Table 2.** (Continued.)

		Implementation (research participants):							
ReSOLVE Levers and Possible Actions (Ellen MacArthur Foundation, 2015)	Fetch It	Freshy	GreenR Cabs	Mamukko	lameco	Wisetek	Closing the Loop	MUD Jeans	Dutch Awearness
<ul style="list-style-type: none"> <li>• Deliver utility virtually (books, music, shopping, autonomous vehicles, virtual offices, etc.)</li> </ul>	n/a	Enables restaurants to sell excess food through an online mobile application	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	<ul style="list-style-type: none"> <li>• Replace old with advanced non-renewable materials</li> <li>• Apply new technologies (3D printing, electric engines, etc.)</li> <li>• Choose new products/ services (multi-modal transport, etc.)</li> </ul>	n/a	Replaced the practice of discarding excess food with an innovative tech-based solution	n/a	n/a	n/a	n/a	n/a	Introduced innovative alternative models to replace the linear one-way consumption prevalent in the fashion industry

opportunity identification. Specifically, it proposes a conceptual model that integrates theoretical underpinnings of sustainable opportunity identification (Patzelt & Shepherd, 2011) – which in itself derives from the mainstream literature on traditional entrepreneurship (e.g., Baron, 2006; Shane, 2000; Shepherd & DeTienne, 2005) – together with CE principles (Ellen MacArthur Foundation, 2015), and explores it empirically to assess its suitability for circular opportunity identification. Given that circular entrepreneurship fulfils the triple bottom line (Elkington, 1997) and is a contributor towards sustainability (Dey, Malesios, De, Budhwar, Chowdhury, & Cheffi, 2020; Geissdoerfer, Savaget, Bocken, & Hultink, 2017), this study also advances the literature on sustainable entrepreneurship and sheds light into the black box of sustainability and SMEs.

In addition to the theoretical contributions outlined above, this study has valuable ‘real-world’ outcomes and practical implications (Chapman, Cully, Kosiol, Macht, Chapman, Fitzgerald, & Gertsen, 2020; Macht, Chapman, & Fitzgerald, 2020) as it sheds light on the salient factors that facilitate circular opportunity identification. This in turn facilitates the transition to a CE, which is desirable at the economic, social, and environmental levels (Ellen MacArthur Foundation, 2015). Moreover, this CE transition is required to fulfil the EC’s Circular Economy Action Plan (2020a) and European Green Deal (European Commission, 2020a), as well as a prerequisite for the attainment of the SDGs (Ellen MacArthur Foundation, 2017).

On the basis of this study’s findings, various recommendations for practice may be made. Entrepreneurship educators should aim to develop knowledge about the CE and its benefits, including economic gains made from closing the loop on resources and about circular principles and underlying concepts such as cradle-to-cradle design (McDonough & Braungart, 2002). Similarly, entrepreneurs who would like to enhance their ability to recognise circular opportunities are recommended to acquire the relevant knowledge and skills. Furthermore, they are advised to pay attention to market inefficiencies in the linear economy, which are instigating environmental and social injustices, as these may serve as opportunities for circular business. Additionally, entrepreneurs could utilise the ReSOLVE framework as a tool for generating circular solutions to linear economy challenges. Moreover, they should note that cultivating intrinsic motivation that is aligned with ‘green’ values could make them more sensitive to environmental issues, which could in turn lead to the identification of circular opportunities. Finally, as this study as well as past research indicates that some entrepreneurs are motivated by recognition, policymakers should consider introducing awards and publicising successful circular ventures.

### *Limitations and future research*

One main limitation of this study is that the small, all-male sample does not permit generalisation of results. Moreover, although the participants hailed from three EU member states, a country-based comparative analysis could not be carried out due to the small sample. Future researchers could adopt a quantitative approach based on larger representative samples to detect differences due to gender, context, or other factors and to enable generalisability of findings regarding circular opportunity identification and circular entrepreneurship.

A further limitation may have arisen due to social desirability bias, whereby respondents may have held back from providing responses which they felt would reflect negatively on themselves or their businesses (Holstein & Gubrium, 2011). This limitation might be overcome by future research if it is carried out anonymously. Even if participants replied candidly, their recollection of how they identified circular opportunities may have been distorted by memory bias. This might have led them to ‘edit or entirely rewrite previous experiences – unknowingly and unconsciously – in light of what (they) now know or believe’ (Schacter, 2002). Future research could address this limitation through a scenario-based design or a longitudinal approach to enable the direct observation of circular opportunity identification.

The entrepreneurship literature indicates that opportunity identification is fraught with uncertainty (Baldacchino, Ucbasaran, & Cabantous, 2023), yet this did not emerge in the present study.

This is a limitation that could be addressed in future research on circular entrepreneurship. Another limitation is that this study focused solely on opportunity identification, which is a necessary but insufficient step for entrepreneurship to take place. Once identified, opportunities must be evaluated and exploited to generate value (Choi & Shepherd, 2004), but these latter stages were not explored in this study. Future studies could focus on these stages in the context of the CE.

Finally, whilst the ReSOLVE framework provides a good starting point to explore opportunity identification in the context of circular entrepreneurship, future studies can focus on developing alternative theoretical frameworks to further contribute to this area of research.

**Conflicts of interests.** The authors declare no competing interests.

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